4435-4445 Military Road Site

NIAGARA COUNTY

TOWN OF NIAGARA, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: C932174

Prepared for:

Town of Niagara

7105 Lockport Road

Niagara Falls, New York 14305

Prepared by:

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Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

OCTOBER 2022

CERTIFICATION STATEMENT

I John T. Camp certify that I am currently a NYS registered professional engineer and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

P.E.

10/24/2022 DATE

TABLE OF CONTENTS
4435-4445 Military Road Site
NIAGARA COUNTY
TOWN OF NIAGARA, NEW YORK

SITE MANAGEMENT PLAN

Table of Contents

Section | Description | Page

LIST OF ACRONYMS

ES EXECUTIVE SUMMARY 1

1.0 INTRODUCTION 3

1.1 General 3
1.2 Revisions 4
1.3 Notifications 4

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS 7

2.1 Site Location and Description 7
2.2 Physical Setting 7
2.2.1 Land Use 7
2.2.2 Geology 7
2.2.3 Hydrogeology 8
2.3 Investigation and Remedial History 9
2.4 Remedial Action Objectives 19
2.5 Remaining Contamination 20
2.5.1 Soil 20
2.5.2 Groundwater 23
2.5.3 Soil Vapor 24

TABLE OF CONTENTS (Continued)

Section	Description	Page
3.0	**INSTITUTIONAL AND ENGINEERING CONTROL PLAN**	25
3.1	General	25
3.2	Institutional Controls	25
3.3	Engineering Controls	26
3.3.1	Cover (or Cap)	26
3.3.3.1	Cover (or Cap)	27
4.0	**MONITORING AND SAMPLING PLAN**	28
4.1	General	28
4.2	Site-wide Inspection	28
4.3	Post-Remediation Media Monitoring and Sampling	30
4.3.1	Groundwater Sampling	31
4.3.2	Soil Vapor Intrusion Sampling	33
4.3.3	Monitoring and Sampling Protocol	33
5.0	**OPERATION AND MAINTENANCE PLAN**	34
5.1	General	34
6.0	**PERIODIC ASSESSMENTS/EVALUATIONS**	35
6.1	Climate Change Vulnerability Assessment	35
6.2	Green Remediation Evaluation	35
6.2.1	Timing of Green Remediation Evaluations	37
6.2.2.	Remedial Systems	37
6.2.3	Building Operations	37
6.2.4	Frequency of System Checks, Sampling and Other Periodic Activities	37
6.2.5	Metrics and Reporting	38
6.3	Remedial System Optimization	38

TABLE OF CONTENTS (Continued)

Section	Description	Page
7.0	**REPORTING REQUIREMENTS**	40
7.1	Site Management Reports	40
7.2	Periodic Review Report	42
7.2.1	Certification of Institutional and Engineering Controls	43
7.3	Corrective Measures Work Plan	45
7.4	Remedial Site Optimization Report	45
8.0	**REFERENCES**	46

List of Tables

	Page
1: Notifications	6
2-1: Summary of Groundwater Monitoring Well Measurements	8
2-2: VOCs Remaining in Surface and Sub-surface Soil	21
2-3: SVOCs Remaining in Surface and Sub-surface Soil	22
2-4: Metals Remaining in Surface and Sub-surface Soil	22
2-5: Pesticides Remaining in Surface and Sub-Surface Soil	22
2-6: Groundwater Summary of Exceedances	23
4-1: Post Remediation Sampling Requirements and Schedule	30
4-2: Monitoring Well Construction Details	31
7: Schedule of Interim Monitoring / Inspection Reports	40
Sampling Data Summaries – Remaining Contamination	Attached

List of Figures

	Page
Figure 1 Site Location	Attached
Figure 2 Site Detail	Attached
Figure 3 Remaining Contamination	Attached
Figure 4a 2017 Groundwater Contour	Attached
Figure 4b 2020 Groundwater Contour	Attached
Figure 5 Soil Vapor Sampling Locations	Attached
Figure 6 Institutional Controls	Attached
Figure 7 Engineering Controls	Attached
Figure 8 Samples Collected During Remedy	Attached

Surveys

TABLE OF CONTENTS (Continued)

List of Appendices

Page
A: Environmental Easement/Notice/Deed Restriction ..... Attached
B: List of Site Contacts ..... Attached
C: Monitoring Well Boring and Construction Logs ..... Attached
D: Excavation Work Plan ..... Attached
E: Health and Safety Plan ..... Attached
F: Community Air Monitoring Plan ..... Attached
G: Quality Assurance Project Plan ..... Attached
H: Site Management Forms ..... Attached
I: Remedial System Optimization Table of Contents ..... Attached

List of Acronyms

AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CO2	Carbon Dioxide
CP	Commissioner Policy
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Greenhouse Gas
GWE&T	Groundwater Extraction and Treatment
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
P.E. or PE	Professional Engineer
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control

QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program

ES EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification: **C932174** 4435-4445 Military Road Site, Niagara County, Town of Niagara, New York

Institutional Controls:	1. The property may be used for commercial use;
	2. All ECs must be inspected at a frequency and in a manner defined in the SMP.
	3. The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Niagara County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
	4. Groundwater and other environmental or public health monitoring must be performed as defined in this SMP.
	5. Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP.
	6. All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP.
	7. Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP.
	8. Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP.
	9. Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
	10. The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries, and any potential impacts that are identified must be monitored or mitigated.
	11. Vegetable gardens and farming on the site are prohibited.

Site Identification: **C932174** 4435-4445 Military Road Site, Niagara County, Town of Niagara, New York

Engineering Controls:	1. Cover system
Inspections:	Frequency
1. Cover inspection	Annually
Monitoring:	
1. Sample groundwater Monitoring Wells MW-03, MW-05, TMW-08, and TMW-09. Record groundwater elevations from accessible wells.	Annually
2. Soil Vapor Intrusion Evaluation for New Buildings	As needed
Maintenance:	
1. None	
Reporting:	
1. Groundwater Sampling Data	Annually
2. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the 4435-4445 Military Road Site located in Town of Niagara, New York (hereinafter referred to as the "Site"). See **Figure 1**. The Site is currently in the New York State (NYS) Brownfield Cleanup Program (BCP), Site No. C932174, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

The Town of Niagara entered into a Brownfield Cleanup Agreement (BCA), on June 28, 2019 with the NYSDEC to remediate the site. A figure showing the site location and boundaries of this site is provided in **Figure 1**. The boundaries of the site are more fully described in the metes and bounds site description that is part of the Environmental Easement provided in Appendix A.

After completion of the remedial work, some contamination was left at this site, which is hereafter referred to as "remaining contamination". Institutional and Engineering Controls (ICs and ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Niagara County Clerk, requires compliance with this SMP and all ECs and ICs placed on the site.

This SMP was prepared to manage remaining contamination at the site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC);

- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6 NYCRR Part 375 and the BCA; (Site # C932174) for the site, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in Appendix B of this SMP.

This SMP was prepared by C&S Engineers, on behalf of The Town of Niagara, in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 3, 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the site.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. In accordance with the Environmental Easement for the site, the NYSDEC project manager will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

1. 60-day advance notice of any proposed changes in site use that are required under the terms of the BCA, 6 NYCRR Part 375 and/or Environmental Conservation Law.

2. 7-day advance notice of any field activity associated with the remedial program.

3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan. If the ground-intrusive activity

qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.

4. Notice within 48 hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.

5. Notice within 48 hours of any non-routine maintenance activities.

6. Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

7. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

1. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Brownfield Cleanup Agreement (BCA), and all approved work plans and reports, including this SMP.

2. Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1 on the following page includes contact information for the above notifications. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in **Appendix B**.

Table 1: Notifications*

Name	Contact Information	Required Notification**
Andrew Zwack, NYSDEC Project Manager	(716) 851-7220 andrew.zwack@dec.ny.gov	All Notifications
Benjamin McPherson, NYSDEC Project Manager's Supervisor	(716) 851-7220 benjamin.mcpherson@dec.ny.gov	All Notifications
Kelly Lewandowski, NYSDEC Site Control	(518) 402-9547 kelly.lewandowski@dec.ny.gov	Notifications 1 and 7
Melissa Doroski, NYSDOH Project Manager	(518) 402-7860 melissa.doroski@health.ny.gov	Notifications 4, 6, and 7

* Note: Notifications are subject to change and will be updated as necessary.
** Note: Numbers in this column reference the numbered bullets in the notification list in this section.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located in the Town of Niagara, Niagara County, New York and is identified as Section 131.10 Block 2 and Lot 29 on the Niagara County Tax Map. The site is an approximately 1.19-acre area and is bounded by Sweet Home Road to the north, Grauer Road to the south, Hermitage Street, at a distance, to the east, and Military Road to the west. Refer to **Figure 2 – Site Detail Map** for pertinent site details. The boundaries of the site are more fully described in **Appendix A – Environmental Easement**. The owner of the site parcel at the time of issuance of this SMP is the Town of Niagara, 7105 Lockport Road, Niagara Falls, New York 14305.

2.2 Physical Setting

2.2.1 Land Use

The site contains two concrete building slabs in the center of the property, which have been left in place after the former commercial structures were demolished in 2020. The western two thirds of the site is covered by an asphalt parking lot and the remaining building slabs, while the remaining eastern third of the property is grass covered. The northeastern portion of the site contains a small wooded area. The Site is zoned commercial and is currently vacant.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include a mix of commercial and residential properties. The properties immediately south of the Site include commercial properties; the properties immediately north of the Site include residential and vacant rural properties; the properties immediately east of the Site include residential properties; and the properties to the west of the Site include commercial and residential properties.

2.2.2 Geology

Historic fill material (HFM) is present across the Site from beneath the asphalt or topsoil surface to approximately one feet to three feet below ground surface (bgs). The HFM consists of a mixture of soil types (sand, silt and or clay), ash, coal, gravel, black sands, occasional slag, and construction demolition debris. HFM depths were noted to be deepest just outside the building footprint to three feet bgs and in the southwest corner of the property ending at 2 feet bgs. Beneath the HFM, native

soils of brown clay were found as shallow as eight inches to one foot bgs; changing to brown clayey silts in the water bearing zones.

During the IRM removals of the automotive lifts within the concrete floor slab, native soils were found at approximately 8 inches to one-foot bgs. Native soils in this area were found directly below the concrete slab construction, with no indications of HFM present.

Site specific boring logs are provided in **Appendix C**.

2.2.3 Hydrogeology

According to the 2017 Phase II ESA, the uppermost groundwater-bearing zone beneath the Site is located in silty soils between ten and 13 feet below grade. Groundwater on the site during RI investigations was found at depths of approximately five to eight feet bgs. Previous investigations call out depths ranging from ten to 13 feet bgs, which is most likely due to the dryer weather associated with the Phase II sampling months. **Table 2-1** below presents the groundwater monitoring well measurements from the 2017 Phase II ESA and 2020 RI. Drinking water in the surrounding area is provided via treated municipal services, the Niagara County Water District.

Table 2-1: Summary of Groundwater Monitoring Well Measurements

2017 Phase II			
Well ID	*Groundwater Depth (ft.)*	*Elevation (ft.)*	*Groundwater Elevation (ft.)*
MW-2[a]	10.08	599	588.92
MW-3[a]	11.63	600.86	589.23
MW-4[b]	12.12	600.81	588.69
MW-5[b]	11.04	600.29	589.25
MW-6[b]	11.43	599.51	588.08
MW-7[b]	11.18	600.04	588.86

2020 Remedial Investigation			
Well ID	*Groundwater Depth (ft.)*	*Elevation (ft.)*	*Groundwater Elevation (ft.)*
MW-2[a]	NA	599	-
MW-3[a]	Full to TOC*	600.86	-
MW-4[b]	NA	600.81	-
MW-5 [b]	5.60	600.29	594.69
MW-6 [b]	7.20	599.51	592.31
MW-7 [b]	6.00	600.04	594.04
2021 Pre Design Investigation			
Well ID	*Groundwater Depth (ft.)*	*Elevation (ft.)*	*Groundwater Elevation (ft.)*
MW-3[a]	Full to TOC*	600.86	-

Notes:
a – 2014 Phase II installed well; b – 2017 Phase II installed well; : NA – well not sampled/measured;
* - well seal apparently damaged found perched groundwater below asphalt seeping into well casing at bottom of flush mount collar seal; TOC – top of casing.

Groundwater contour maps based upon the two measuring events in 2017 and 2020 are presented on **Figures 4A and 4B**. Based on the water levels found in the previous Phase II ESA report and the RI, groundwater appears to flow in a southwesterly direction across the site. Groundwater monitoring well construction logs are provided in **Appendix C**.

2.3 Investigation and Remedial History

According to historical records, the Site was initially developed for commercial uses starting around 1960, prior to which the land was vacant. In the 1960s, the Site was used as a laundry, dry cleaner and barbershop. As the 1960s ended, portions of the building at the Site contained auto repair and a gas station. The use of the Site as an auto tire store and auto repair shop, dry cleaner, and barbershop continued throughout the 1980's with the addition of a pizza shop. The use of a portion of the site as a cleaner ended by 1994. The most recent use of the Subject Property included commercial use as Culbert's Wholesale Tire. Culbert's utilized the northern portion of the building at the Site for storage and the southern portion of the building for specialized auto equipment and repair. The property was foreclosed

upon by Niagara County in 2018, and the Town of Niagara assumed ownership on October 11, 2018.

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

IYER Environmental Group, PLCC Phase I ESA Report (2009)

The Phase I ESA for the Site identified the following concerns:

- A 55-gallon drum and a number of small containers of waste oil/oily substance were in the rear of the property;
- Several dozen five-gallon containers of tire sealant were located in the building;
- Parts of the building were in disrepair and full of trash;
- Used tires, trash piles, and containers were located in the woods;
- Past use as a gasoline service station and potential previous gas pump island;
- Past use as a dry cleaner from the 1960s through the 1990s; and
- Part of the property was used as wholesale tire repair and vehicle repair.

Panamerican Phase II ESA Report (2014)

The 2014 Phase II ESA (Panamerican Environmental) included an inventory of containers requiring removal/disposal, a geophysical survey, advancement of 12 soil borings, installation of three groundwater monitoring wells, radiological screening, and the collection and analysis of eight soil samples and one round of groundwater analysis. The soil and groundwater samples were analyzed for US Environmental Protection Agency (EPA) Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), pesticides, Target Analyte List (TAL) metals and polychlorinated biphenyls (PCB).

As part 2014 Phase II investigation, a Pre-Demolition Asbestos-Containing Materials and Lead-Based Paint Inspection was completed on the onsite buildings.

C&S Phase I ESA Report (2017)

An additional Phase I ESA was conducted for the Site in 2017. This Phase I ESA for the Site identified the following RECs:

- Past uses of the Site including a gas station/ automotive service and dry cleaner.
- The Site was listed in the US Brownfields Database for the past automotive and dry cleaner uses. Contaminants at the Site include petroleum contamination, hazardous materials and radioactive material.
- Presence of a tank without inspection records and various drums located at the Site.

C&S Phase II ESA Report (2017)

An additional Phase II ESA done in 2017 (C&S Companies) was completed to provide further information on the RECs identified as a result of the 2017 Phase I ESA conducted by C&S Companies. The previous ESAs did not completely characterize and/or delineate the Site. The intent of the 2017 Phase II ESA was to complete the characterization of the environmental concerns relative to the Site. The Phase II ESA included a floor drain assessment, chemical inventory, the advancement of 39 soil borings, installation of four groundwater monitoring wells, and the collection and analysis of nine surface soil samples, 19 soil samples and one round of groundwater analysis from five wells. The soil samples were analyzed for TCL VOCs and TCL SVOCs. The groundwater samples were analyzed for TCL VOCs, TCL SVOCs, and TAL metals.

The 2017 Phase II ESA summarized the findings of the 2014 (Panamerican) and 2017 (C&S) investigations. To do so, the 2017 Phase II ESA called out three areas of concern. These areas of concern, or areas containing known contamination will be herein referred to Areas 1 to 3:

Area 1: Metal contamination in the area of 2014 Phase II ESA soil boring BH-4

Area 2: Metal contamination in the area of 2014 Phase II ESA soil boring BH-9 location of former pump island

Area 3: Area identified in the 2014 and 2017 Phase II ESA to contain elevated radiation levels in the fill material.

Analytical results from both of the 2014 (Panamerican) and 2017 (C&S) investigations are summarized in below.

For purposes of this discussion and to clarify previous sampling efforts, surface soils are considered to be 0 to 2 inches below grade, near surface soils to be 0 to 1 foot below grade, and subsurface soils to be below 1 foot below grade.

Radiological Impacts

Radiological impacts have been noted in surface soil down to a depth of approximately one foot below grade within Area 3. Material found within the urban fill in this area is believed to be the source of the impact. Based on gamma scintillation surveys, surface soils down to native clay are shown to exceed more than twice background in borings taken in the previous 2014 and 2017 Phase II ESA. One boring, BH-10 noted readings up to 41,000 counts per minute (cpm) in the 2014 Phase II ESA. In general, radiological impacts are found to increase in the region of Area 3 moving westward, and are noted as highest closer to Military Road.

Surface Soil

Surface sampling investigations show the primary contaminants of concern to be metals. Surface soils were primarily impacted within Area 1; surrounding soil boring BH-4, and a few detections in one sample from each Area 2 (BH-9) and Area 3 (BH-11). Detections of metals included arsenic, cadmium, chromium, copper, lead, and zinc. Multiple surface samples within Area 1 exceeded Unrestricted Use SCOs for metals. The 2014 Phase II boring, BH-4 contained the highest metal exceedances with contraventions of the Residential, Restricted Residential, Commercial, and Industrial SCOs. The 2017 Phase II surface samples surrounding BH-4 attempted to delineate the extent of metal contamination through concentric outward sampling (BH-4A-SS through BH-4I-SS). BH-4A-SS noted exceedances of metals for arsenic, cadmium, copper, lead and, zinc; with arsenic and copper exceeding Commercial Use SCOs.

Near Surface Soil

Near surface soil samples taken at depths of zero to one foot bgs show impacts of metals. Near surface soil impacts were noted in Area 2. The 2014 Phase II sample, BH-9 taken from one to three feet bgs showed chromium levels exceeding Commercial Use SCOs. Additional delineation samples taken during the 2017

Phase II showed detects of chromium exceeding commercial SCOs at one foot bgs extending outward from the BH-9 boring location.

Subsurface Soil

Previous investigation of the subsurface completed in the 2014 and 2017 Phase II ESAs show metal and SVOC contamination. Metal contamination exceeding SCOs has been found in the fill material from one to two feet bgs. Native soils below the fill material do not show exceedances of metals. Subsurface metal exceedances are primarily located in the front, southwestern corner of the property near BH-9 at depths of one foot to 2 feet below grade, or to native clay soils. Metal exceedances in the subsurface are for chromium, exceeding Commercial Use SCOs in the area of BH-9 and dropping to Unrestricted Use SCOs or non-detect in all directions further away from BH-9. BH-11 and BH-4 also have Unrestricted Use exceedances of metals at depths of one to three feet. The highest exceedances of chromium were around the area of BH-9 ranged from 3050 ppm to 4820 ppm, exceeding the Commercial Use SCO of 1500 ppm.

Radiological impacts were also noted in subsurface soil at Area 3 within urban fill material starting at a depth of 0.5 feet, to native clays at approximately two feet bgs.

Investigation of the supposed former pump island in the southwestern corner of the site (2016) showed elevated PID readings in various borings. Borings B-23, B-25, and B-25-10S contained the highest values. B-23 read 2,004 ppm at 14 feet bgs, B-25 read 638 ppm at 13 to 14 feet bgs, and B-25-10S read 1095 ppm at 13 to 14 feet bgs. PID values decreased in value further away from these locations. Petroleum-like odors were also noted at the time of sampling, but no visual staining or free product was observed. Because of the relatively higher PID readings at the time of sampling and the USEPA's involvement with this project via a Brownfield Assessment Grant, Niagara County elected to act conservatively and report the spill at the time of the investigation instead of waiting for the results. Samples for VOCs were taken in each of the boring zones exhibiting the high PID readings. Results of these samples were not indicative of a spill, nor exceed applicable SCOs. Exceedances of VOCs were found in one sample at BH-25 at a depth of six to seven feet below grade. VOCs at BH-25 only slightly exceed Unrestricted Use SCOs for ethylbenzene, m/p-xylene, and o-xylene. VOCs were not detected in the remaining borings around the former pump island.

The fill material across the site appears to be a mixture of soil types (sand, silt and or clay), ash, brick, gravel, and construction demolition debris. The native soil is a brown clay and clayey silt. General geological characteristics and fill depths of the three areas are listed below:

Area 1 (BH-4 Area)

Fill material was observed from two inches to 10 inches below ground surface. BH-4 noted fill material to a depth of three feet along the building edge. Directly beneath the fill material was native clay.

Area 2 (BH-9 Area)

Soil borings were advanced in the parking lot on the eastern half of the Site. Asphalt thickness ranged from two-and-a-half inches to seven inches. Fill material was observed beneath the asphalt to 25 inches. Directly beneath the fill material was native clay.

Area 3 Radiological Fill Area

Soil borings were advanced in the parking lot on the eastern half of the Site. Asphalt thickness ranged from two-and-a-half inches to seven inches. Fill material was observed beneath the asphalt to one to two feet bgs. C&S confirmed that the top two feet of fill material located on-site contain slightly elevated levels of radiation, varying between two and seven times the background level. The highest borehole readings came from locations closer to Military Road. Directly beneath the fill material was native clay.

Groundwater

Groundwater wells on the Site were screened between approximately 5 to 15 feet bgs. One round of groundwater sampling was conducted during the 2014 Phase II ESA for monitoring wells MW-1, MW-2, and MW-3. Four additional monitoring wells MW-4, MW-5, MW-6, and MW-7 were installed during the 2017 Phase II ESA in which sampling was completed for the additional wells as well as a second round of sampling conducted at MW-2.

The following summarizes the results of the previous groundwater sampling:

- One groundwater sample in well MW-5 detected a single VOC above the NYSDEC TOGS 1.1.1 GA groundwater standards. 1,2-dichloroethane was detected at 3.5 ppm, slightly above the groundwater standard of 0.6 ppm. No VOC odors were recorded during either Phase II ESA investigation.
- No SVOCs were detected at concentrations above the NYSDEC TOGS 1.1.1 GA groundwater standards.
- The sample collected from MW-03 shows concentrations of the pesticides Aldrin and delta-BHC slightly above the NYSDEC TOGS 1.1.1 GA groundwater standards. However, these reported pesticide concentrations are low and listed as approximate: found below the laboratory quantitation limit, but greater than the Method Detection Limit (MDL). Groundwater in this area of Niagara County is not used as a source of drinking water and exposure to groundwater is unlikely given its depth. Additionally, these compounds were not detected in on-site soil samples.

Seven of the eight total groundwater samples on the property contained concentrations that exceeded NYSDEC TOGS 1.1.1 GA groundwater standards for metals. The exceedances of metals (aluminum, iron, lead, magnesium, manganese, and sodium) in groundwater has been attributed to the high turbidity levels at the time of sampling.

C&S Remedial Investigation, Interim Remedial Measures, and Alternatives Analysis Report (2021)

The Remedial Investigation (RI) activities were dependent upon the completion specific Interim Remedial Measures (IRMs). Because of this, RI activities were scheduled to occur after the completion of the IRMs. The IRMs were implemented to address the potential contaminant sources and various wastes located within the onsite structure:

- Removal and off-site disposal/recycling of all on-site tires
- Disposal of fluids in containers within the auto repair station
- Removal of aboveground petroleum storage tanks
- Removal of in-ground automotive lifts and proper disposal of associated fluids

In addition to the above IRMs, the planned abatement and demolition activities of the onsite structure took place at the same time and prior to the list of activities above to provide easier access to the IRM areas within the structure. However, the abatement and demolition activities themselves were not considered an IRM. The IRM and demolition and abatement activities occurred in March 2020 through May 2020.

Removal and off-site disposal/recycling of all on-site tires, removal of the aboveground storage tank, and disposal of fluids in containers within the auto repair station were completed in conjunction with the abatement and demolition activities.

The RI supplemented existing, limited site characterization information through the advancement of soil borings, excavation of test pits, and collection and analysis of soil and groundwater samples. RI activities started in May 2020 through February 2022.

Upon completion of the RI and receival of sampling results, it was deemed prudent to further delineate the extent of contamination from samples collected as a part of the RI, which had contraventions to Commercial Use SCOs. This was completed under a supplemental Pre-Design Investigation (PDI) as a part of the RI. The PDI activities started in December 2020 through October 2021. The purpose of the PDI was to further delineate soil contamination above Commercial Use SCOs for the purposes of remedial excavation estimates.

Surface Soils

The majority of the western two-thirds of the Site is covered with impervious material (asphalt parking surface or building). Uncovered soils are vegetated and located along the rear, eastern third of the Site. Surface soils along the eastern side of the Site varied from north to south. Native materials of sands and silts with fine to medium gravel were found on the northern portion of the lot while HFM was found below vegetative layers down to approximately one foot bgs at the south end and along the rear of the building.

Surface soils appear to be impacted on the eastern side of the site at the rear of the building. Specific sampling locations show exceedances of various metals above Commercial Use SCOs. Further delineation sampling determined that these impacts to surface soils are extremely localized and do not extend outward from the boring locations themselves. Additional surface sampling locations not

exceeding Commercial Use SCOs show a few metal exceedance above Unrestricted and Residential Use SCOs. It is understood that the contaminant sources are related to the historical urban and commercial uses of the property and the unregulated deposition of HFM that occurred over time prior to the BCP Volunteer owning the Site.

BCP Remediation (2022)

The RI identified HFM and radiological impacted soils at depths ranging from approximately one to two feet bgs. A soil cover system, was implemented to prevent exposure to contaminated fill material and groundwater. As part of the remedy, the following were completed to remediate the Site:

Soil/HFM

The HFM in the following areas were slated for and subsequently removed during remediation:

- B01 Hotspot to address inorganics, particularly total chromium and hexavalent chromium. A square-shaped area approximately 4 feet by 4 feet was excavated to one-foot below grade. 1.7 cubic yards of material was excavated.

- Area 2 / B03 / BH9 Hotspot contamination in this area appears to be linked to chromium HFM described as a white chalky material within the RI. The HFM material appears to be a source of chromium contamination for groundwater based upon down gradient groundwater sampling results. To address inorganics, particularly total chromium and mercury. An irregularly shaped area approximately 120 feet by 40 feet was excavated to two-feet below grade. 290.1 cubic yards of material was excavated.

- B04 Hotspot to address semi-volatile organics. A square-shaped area approximately 4 feet by 4 feet was excavated to one-foot below grade. 1.0 cubic yards of material was excavated.

- B06 Hotspot to address barium. A square-shaped area approximately 4 feet by 4 feet was excavated to one-foot below grade. 1.0 cubic yards of material was excavated.

- B08 Hotspot to address mercury. A square-shaped area approximately 4 feet by 4 feet was excavated to one-foot below grade. 1.3 cubic yards of material was excavated.

- B14 Hotspot to address mercury. A square-shaped area approximately 4 feet by 4 feet was excavated to one-foot below grade. 1.0 cubic yards of material was excavated.

- Area 1 / BH4 Hotspot to address various inorganics. A rectangular-shaped area approximately 14 feet by 20 feet was excavated to one-foot below grade. 10.6 cubic yards of material was excavated.

- B09 / B10 / B11 Auto Lift Area. Rectangular and square-shaped areas approximately 7 feet by 14 feet and 8 feet by 8 feet were excavated to one-foot below grade. 8.8 cubic yards of material was excavated.

- Area 3 / BH11 Hotspot to address radiological impacts (*Please note that this excavation and delineation was done outside of the BCP, but is included here for informational purposes only*). An irregular-shaped area approximately 50 feet by 35 feet was excavated to one to two feet below grade. 67.6 cubic yards of material was excavated.

A total of 455.80 tons of non-hazardous contaminated soil and fill material was excavated for off-site disposal at Modern Landfill in Model City, New York.

Radiological Contamination

Radiological impacts have been noted in surface soil down to a depth of approximately one to two feet foot below grade within the former parking lot. Material found within the urban fill in this area is believed to be the source of the impact. Based on gamma scintillation surveys, surface soils down to native clay are shown to exceed more than twice background. In general, radiological impacts are found to increase in the northern region of the parking lot moving westward, and are noted as highest closer to Military Road.

A total of 123.08 tons of radiological impacted soils was excavated for off-site disposal at Wayne Disposal Landfill in Belleville, Michigan.

Soil Vapor

The RI identified elevated concentrations of 2,2,4-trimethylpentane in two soil vapor samples. VP-01 and VP-02 contained 2,2,4-trimethylpentane at 2,700 ug/M3 and 110 ug/M3, respectively. RI results prompted further investigation of potential offsite receptors (daycare across Military Road). The expanded soil vapor investigation including the adjacent daycare facility was completed on February 12, 2022. The additional round of sampling indicated no evidence of offsite migration of 2,2,4-trimethylpentane nor other gasoline related VOCs. 2,2,4-trimethylpentane was not detected in any air samples

collected within the BCP boundaries, nor at the adjacent daycare facility.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed in the Decision Document dated February 2022 are as follows:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

2.5 Remaining Contamination

The remedy for the Site consisted of the excavation of contaminated soil in the select areas listed below, as well as the subsequent placement of clean backfill.

2.5.1 Soil

The contaminants of concern in the remaining soils meet Protection of Groundwater and Commercial Use SCOs, as applicable. Soils with nuisance characteristics (petroleum or chemical odors, staining) do not remain. No areas that would be considered a source remain. HFM remains beneath the cover system, which is composed of at least one foot of clean soil, asphalt, or concrete building slabs. The HFM is expected to contain contaminants at concentrations below Commercial Use SCOs. Areas with remaining contamination will be monitored and maintained with a cover system as described in Section 3.3.

HFM remains across the Site and may be unearthed during future site development activities. The soils removed to satisfy the remedy were select areas where SVOCs or metals exceeded Commercial Use SCOs, and where hexavalent chromium exceeded Protection of Groundwater SCOs. It should be noted that remaining soils are only required to meet the Protection of Groundwater SCOs for hexavalent chromium. The remedy did not include complete HFM removal. The HFM consists of a mixture of soil types (sand, silt and or clay), ash, coal, gravel, black sands, occasional slag, and construction demolition debris. The typical depth of the HFM is one to three feet below ground surface (bgs), except for in the remedial excavation areas where is was partially or completely removed. The remaining contaminants and concentrations are typical of highly developed areas and are heterogeneous within the fill. The native soil underlying the HFM does not contain contaminants at concentrations that exceed Restricted Residential SCOs.

Radiological impacts have been noted in surface soil down to a depth of approximately one to two feet below grade within the former parking lot. Material found within the urban fill in this area is believed to be the source of the impact. Based on gamma scintillation surveys, surface soils down to native clay are shown to exceed more than twice background. In general, radiological impacts are found to increase in the northern region of the parking lot moving westward, and are noted as highest closer to

Military Road. It should be noted that radiologically impacted soils were removed from the Site as a part of the Remediation Activities, however, the removal of this material was not deemed a requirement by the NYSDEC. This material was elected to be removed by the Site owner, the Town of Niagara.

Residual contamination consisting of industrial fill material that includes Technologically Enhanced Naturally Occurring Radioactive Material (TENORM) in the form of slag, remains below the engineering controls constructed at the site. More specifically, a former utility trench running east beneath the northernmost building slab was shown to exhibit elevated radiological gamma readings. Figure 3 includes the location and estimated extents of the former utility trench. The trench appeared to continue eastward under the northern building slab for an unknown distance at a depth of two to three feet below grade. Any future intrusive work in this area that will penetrate the northern building slab soil cap or encounter or disturb the remaining contamination, including any modifications or repairs to the existing cover system will be performed in compliance with the Excavation Work Plan (EWP) that is attached as Appendix B to this SMP.

Table 2-2
VOCs Remaining in Surface and Sub-surface Soil

Analyte	No. of Samples Exceeding Unrestricted SCO	No. of Samples Exceeding Commercial SCO	Maximum Concentration (ppm)
VOCs	0	0	NA

Total number of sampling depths / locations – 22

Table 2-3
SVOCs Remaining in Surface and Sub-surface Soil

Analyte	No. of Samples Exceeding Unrestricted SCO	No. of Samples Exceeding Commercial SCO	Maximum Concentration (ppm)
SVOCs	0	0	NA

Total number of sampling depths / locations – 29

Table 2-4
Metals Remaining in Surface and Sub-surface Soil

Analyte	No. of Samples Exceeding Unrestricted SCO	No. of Samples Exceeding Commercial SCO	Maximum Concentration (ppm)
Cadmium	2	0	3.32
Chromium (Total)	9	0	1290
Copper	3	0	92.4
Lead	8	0	190
Mercury	10	0	1.4
Zinc	8	0	1010

Total number of sampling depths / locations – 41

Table 2-5
Pesticides Remaining in Surface and Sub-surface Soil

Analyte	No. of Samples Exceeding Unrestricted SCO	No. of Samples Exceeding Commercial SCO	Maximum Concentration (ppm)
4,4' DDT	4	0	0.01
4,4'-DDE	1	0	0.01

Total number of sampling depths / locations – 32

Figure 3 depicts the locations and concentrations of contaminants that are present at concentrations greater than Unrestricted Use SCOs, subsequent to implementing the remedy.

Figure 7 shows the extent of the cover system. **Surveys** for the remedial excavations areas are attached.

Figure 8 shows the location of the sidewall samples collected as a part of the B03 hotspot excavation.

The data provided in **Tables 2-2** to **2-5** demonstrate the types and levels of remaining contaminants that may be encountered during possible future invasive work below the cover system. The Tables attached to the rear of this report, show

the locations, depths, and concentrations of contamination remaining at concentrtions in excess of the Unrestricted Use SCOs.

Figure 3 depicts the locations where samples were collected which exceed Unrestricted Use SCOs but are below Commercial Use SCOs at the Site.

2.5.2 Groundwater

There are isolated groundwater impacts on the Site. **Table 2-6** summarizes VOC and metals results that exceed SCGs.

Table 2-6
Groundwater Summary of Exceedances

Well No. (Sample Date)	Analyte	Concentration (ppb)
MW-5 (02/05/2020)	1,2-dichloroethane	1.3
	Chromium	200
MW-3 (04/16/2021)	Chromium	2,000
	Chromium (dissolved)	2,000
	Chromium, hexavalent	1,000
TMW-08 (5/04/2021)	Chromium, hexavalent	120
TMW-09 (5/04/2021)	Chromium, hexavalent	400

BL = Below TOGS Standard
NA = Not Applicable
NS = Not Sampled

Groundwater conditions at the time of the RI are expected to be similar presently. No post remedial action groundwater sampling has been conducted, but is proposed as part of the monitoring of the remedy (see **Section 4.4**).

2.5.3 Soil Vapor

Two soil vapor samples were collected on the western and southwestern boundary (downgradient) of the Site. The results of the downgradient soil vapor sampling detected gasoline-related VOCs (benzene, toluene, ethylbenzene, and xylene – BTEX) in on-site soil vapor. The NYSDOH does not have air guidelines values (AGVs)

for these compounds. However, based on the concentrations detected, the compounds were conservatively assumed to have the potential to migrate off-site.

Table 6 and **Figure 5** summarize the results of the soil vapor sampling.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC project manager.

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in **Appendix D**) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC project manager.

3.2 Institutional Controls

A series of ICs is required by the Decision Document to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and, (3) limit the use and development of the site to Commercial uses only. Adherence to these ICs on the site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on **Figure 6**. These ICs are:

- The property may be used for: commercial use;
- All ECs must be operated and maintained as specified in this SMP;

- All ECs must be inspected at a frequency and in a manner defined in the SMP;
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Niagara County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;
- Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on **Figure 6**, and any potential impacts that are identified must be monitored or mitigated;
- Vegetable gardens and farming on the site are prohibited; and
- An evaluation shall be performed to determine the need for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible.

3.3 Engineering Controls

3.3.1 Cover (or Cap)

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised of a minimum of 12 inches of clean soil, or asphalt pavement and concrete building slabs of various thicknesses. **Figure 7** presents the location of the cover system and applicable demarcation

layers. The Excavation Work Plan (EWP) provided in **Appendix D** outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP – **Appendix E**) and associated Community Air Monitoring Plan (CAMP – **Appendix F**) prepared for the site. Any disturbance of the site's cover system must be overseen by a qualified environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

3.3.1.1 - Cover (or Cap)

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC project manager. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc. for all samples collected as part of site management for the site are included in the Quality Assurance Project Plan provided in **Appendix G**.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater, indoor air, soil vapor, soils);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards and Part 375 SCOs for soil; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment;

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site – wide Inspection

Site-wide inspections will be performed at a minimum of once per year. These periodic inspections must be conducted when the ground surface is visible (i.e. no snow cover). Site-wide inspections will be performed by a qualified environmental

professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or duration of the inspections will require approval from the NYSDEC project manager. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in **Appendix H – Site Management Forms**. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;
- Whether stormwater management systems, such as basins and outfalls, are working as designed;
- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date.

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC project manager must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a

qualified environmental professional, as defined in 6 NYCCR Part 375. Written confirmation must be provided to the NYSDEC project manager within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

4.3 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the groundwater monitoring wells on a routine basis. Sampling locations, required analytical parameters and schedule are provided in **Table 4-1 – Remedial System Sampling Requirements and Schedule** below. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

Table 4-1 – Post Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameters		Schedule
	VOCs (EPA Method 8260)	Chromium VI (EPA Method SW 7196)	
Monitoring Wells 05	X		Annually
Monitoring Wells 03 and Temporary Wells 08 and 09		X	Annually

Groundwater depths will be collected from all accessible wells.

Groundwater sampling will be conducted using low-flow purging and sampling techniques. Before purging the well, water levels will be measured using an electric water level sounder capable of measuring to the 0.01-foot accuracy. Calibration, purging and sampling procedures will be performed as specified by the USEPA for low-flow sampling. Decontamination will be conducted after each well is sampled to reduce the likelihood of cross contamination. Calibration times, purging volumes, water levels and field measurements will be recorded in a field log. Purge waters will be containerized for proper disposal.

Detailed sample collection and analytical procedures and protocols are provided in **Appendix G – Quality Assurance Project Plan**.

4.3.1 Groundwater Sampling

Groundwater monitoring will be performed annually to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

The monitoring wells MW-03, TMW-08, and TMW-09 were selected for annual monitoring of hexavalent chromium to assess the effectiveness of the chosen remedy, removal of select HFM, on groundwater. Annual monitoring of monitoring well MW-05 is being conducted to monitor the levels of chlorinated volatile organic compounds present in groundwater. The network of on-site wells has been designed based on the following criteria:

- Hydrologic position relative to contaminants found in adjacent soils; and
- Hydrologic position relative to known historic dry cleaner operations and past VOC contaminant detection

The monitoring well network does not includes sentinel wells that monitor downgradient plume migration. Sentinel wells are uncontaminated wells located directly downgradient of the plume and upgradient of sensitive receptors.

Table 4-2 summarizes the wells identification number, as well as the purpose, location, depths, diameter and screened intervals of the wells. As part of the groundwater monitoring, a combination of onsite upgradient wells and downgradient wells are sampled to evaluate the effectiveness of the remedial system. The remedial party will measure depth to the water table for each monitoring well in the network before sampling.

Table 4-2 – Monitoring Well Construction Details

Monitoring Well ID	Well Location *	Coordinates (longitude/ latitude)	Well Diameter (inches)	Elevation (above mean sea level)			
				Casing	Surface	Screen Top	Screen Bottom
MW-1	Upgradient	NA	2	601.02[1]	NA	595.12[1]	585.12[1]
MW-2	Downgradient / South Boundary	NA	2	599	NA	593.5	583.5

Monitoring Well ID	Well Location *	Coordinates (longitude/ latitude)	Well Diameter (inches)	Elevation (above mean sea level)			
				Casing	Surface	Screen Top	Screen Bottom
MW-3	Downgradient / West Boundary	NA	2	600.86	NA	594.86	584.86
MW-4	Site Interior	NA	2	600.81	NA	594.01	584.01
MW-5	Site Interior	NA	2	600.29	NA	594.29	584.29
MW-6	Downgradient / South Boundary	NA	2	599.51	NA	594.01	584.01
MW-7	Upgradient / East Boundary	NA	2	600.04	NA	594.64	584.64

* All wells are onsite.

[1]Elevation data collected from Niagara County LIDAR information

Monitoring well construction logs are included in **Appendix C**.

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC project manager will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC project manager. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures." Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC project manager.

The sampling frequency may only be modified with the approval of the NYSDEC project manager. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC project manager.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

4.3.2 Soil Vapor Intrusion Sampling

Soil vapor intrusion sampling will be performed prior to occupancy of any future habitable structures constructed on the Site to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. At this time there are no conceptual or written plans to construct buildings. Sampling protocol, including locations to be sampled and types of analysis will be coordinated with the Department in the future.

Deliverables for the soil vapor intrusion sampling program are specified in Section 7.0 – Reporting Requirements.

4.3.3 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in **Appendix H - Site Management Forms**. Other observations (e.g., groundwater monitoring well integrity) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific QAPP provided as **Appendix G**.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The site remedy does not rely on any mechanical systems, such as groundwater treatment systems, sub-slab depressurization systems or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

The Site is considered to have low vulnerability related to climatic conditions. There are no State or Federal wetlands or floodplains located on-site. The Site is serviced by municipal storm and sanitary sewer system. The stormwater system is designed to manage flows from significant storm events. In addition, the Site is relatively flat. As such, acute soil cover erosion and the resultant potential exposure to remaining contamination is highly unlikely.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of any green remediation evaluations to be completed for the site during site management, and as reported in the Periodic Review Report (PRR).

The following green activities are expected to be employed during Site development, were applied during Site remediation, or will be utilized during Site management / operation:

Waste:

- Clean concrete and asphalt removed during site work will be sent to a recycling facility.
- General refuse and recyclable material generated from future Site occupants will be separated into respective dumpsters.
- Non-hazardous contaminated soil removed from the Site was taken to Modern Landfill, 1445 Pletcher Road, Model City, New York and used for daily cover in lieu of virgin uncontaminated soil.

Energy:

- The redevelopment of the Site will require the installation of new modern electrical service, transformer, and wiring.
- It is expected that exterior lighting will LED and on timers.
- It is expected that interior lighting will be LED.
- Utilities such as dish washers, dryers, and washing machines are expected to be Energy Star.

Water Usage:

- Fixtures such as toilets and shower heads are expected to be low flow / low use.
- Parking lot stormwater structures may be open bottom and flow through perforated piping to allow stormwater to infiltrate into the subsurface.

Land / Ecosystems:

- The excavation backfill was obtained from a local source.

Emissions

- Future buildings are expected to be heated and cooled with modern high efficiency heater units.

.6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the NYSDEC project manager feels appropriate, e.g. during significant maintenance events or in conjunction with storm recovery activities.

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities. Reporting of these modifications will be presented in the PRR.

6.2.3 Building Operations

Future structures including buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption.

Components to be evaluated will include, but are not limited to:

- Heating/cooling systems and temperature set-points;
- Building skin, insulation and building use and occupancy;
- Ventilation;
- Lighting and plug loads; and
- Grounds and property management.

6.2.4 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site, use of consumables in relation to visiting the Site in order to conduct system checks and/or collect samples, and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources. The frequency of sampling and site visits has been minimized as much as feasible to ensure the effectiveness of the remedy.

6.2.5 Metrics and Reporting

As discussed in Section 7.0 and as shown in **Appendix H – Site Management Forms**, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits. A set of metrics has been developed.

6.3 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC project manager or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;
- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

A RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focus on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and

remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

7.0. REPORTING REQUIREMENTS

7.1 Site Management Reports

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in **Appendix H**. These forms are subject to NYSDEC revision. All site management inspection, maintenance, and monitoring events will be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of **Table 7** and summarized in the Periodic Review Report.

Table 7: Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency*
Site-Wide Inspection Report	Annually
Groundwater Sampling Reports	Annually
Periodic Review Report	Annually, or as otherwise determined by the NYSDEC

* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC project manager.

All interim monitoring/inspections reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air);

- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™

database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the NYSDEC project manager beginning sixteen (16) months after the Certificate of Completion is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in **Appendix A -Environmental Easement**. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections, fire inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.
- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These tables and figures will include a presentation of past data as part of an evaluation of contaminant concentration trends, including but not limited to:
  - Trend monitoring graphs that present groundwater contaminant levels from before the start of the remedy implementation to the most current sampling data;
  - Trend monitoring graphs depicting system influent analytical data on a per event and cumulative basis;

  - O&M data summary tables;
  - A current plume map for sites with remaining groundwater contamination; and
  - A groundwater elevation contour map for each gauging event.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific Remedial Action Work Plan (RAWP), ROD or Decision Document;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan;
  - An evaluation of trends in contaminant levels in the affected media to determine if the remedy continues to be effective in achieving remedial goals as specified by the RAWP, ROD or Decision Document; and
  - The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional as defined in 6 NYCRR Part 375 or Professional Engineer licensed to practice and registered in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, TBD, of C&S Engineers, am certifying as Owner/Remedial Party for the site."

"I certify that the New York State Education Department has granted a Certificate of Authorization to provide Professional Engineering services to the firm that prepared this Periodic Review Report."

- *No new information has come to my attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid; and*

- *The assumptions made in the qualitative exposure assessment remain valid.*

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager. The Periodic Review Report may also need to be submitted in hard-copy format if requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control or failure to conduct site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC project manager.

7.4 Remedial Site Optimization Report

If an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the NYSDEC project manager for approval. A general outline for the RSO report is provided in **Appendix I**. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager.

8.0 REFERENCES

6 NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

Final Report, Phase I Environmental Site Assessment, 4435-4445 Military Road, Paul Grenga Property, by Iyer Environmental Group, December 2009.

NYSDEC DER-10 – Technical Guidance for Site Investigation and Remediation.

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

Phase I Environmental Site Assessment, 4435-4445 Military Road, Town of Niagara, Niagara County, New York, by C&S Engineers, July 2017.

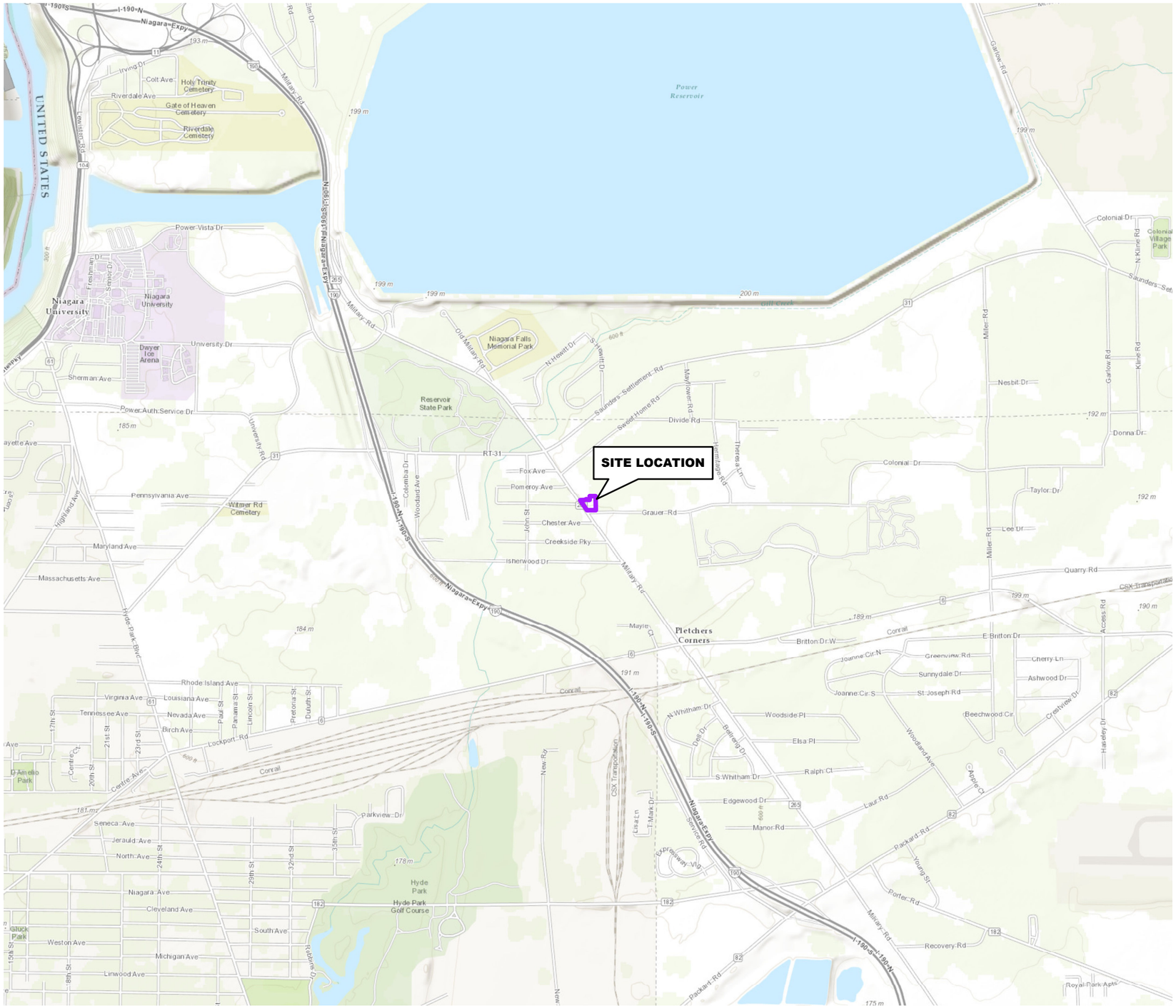
Phase II Environmental Site Assessment for 4435-4445 Military Road, Town of Niagara, Niagara County, New York, by C&S Engineers, December 2016.

Phase II Environmental Site Assessment, 4435-4445 Military Road Site, Town of Niagara, Niagara County, New York, by Panamerican Environmental, Inc., September 2014.

Remedial Action Work Plan for BCP Site. No. C932174, 4435-4445 Military Road Site, 4435-4445 Military Road, Town of Niagara, New York, by C&S Engineers, January 2022.

Remedial Investigation / Interim Remedial Measures and Alternatives Analysis Report for BCP Site No. C932174, 4435 Military Road Site, 4435-4445 Military Road, Town of Niagara, New York, prepared by C&S Engineers, December 2021.

Figures



LEGEND

PROPERTY BOUNDARY

0 1,000 2,000 4,000 Feet

N

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4435-4445 MILITARY ROAD
BROWNFIELD CLEANUP PROGRAM
TOWN OF NIAGARA, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	Q47.001.001
DATE:	FEBRUARY 22, 2016
DRAWN BY:	C. MARTIN
DESIGNED BY:	C. MARTIN
CHECKED BY:	M. COLMERAUER

SITE LOCATION

FIGURE 1

Path: F:\Project\Q47 - Niagara County Dept of Economic Development\Planning-Study\GIS\SITE LOCATION.mxd

Legend

- 2013 SOIL BORING LOCATIONS
- 2016 SOIL BORING LOCATIONS
- 2017 SOIL BORING LOCATIONS (FORMER PUMP ISLAND INVESTIGATION)
- 2013 GROUNDWATER MONITORING WELLS
- 2016 GROUNDWATER MONITORING WELLS
- PROPERTY BOUNDARY
- RECONGIZED ENVIRONMENTAL CONDITION (REC) AREA

0 20 40 80 Feet

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REVISIONS		

PROJECT NO:	249.006.001
DATE:	11/26/2018
DRAWN BY:	A. DEMARCHI
DESIGNED BY:	A. DEMARCHI
CHECKED BY:	D. RIKER

SITE DETAIL

FIGURE 2

Document Path: F:\Project\249A - Town of Niagara\249.006.001 - 4435-4445 Military Road BCP\Planning-Study\GIS\Projects\SMP-FER\site detail.mxd

Legend

- BCP BOUNDARY
- EXTENT OF EXCAVATIONS TO REMEDIATE CONTAMINATION ABOVE COMMERCIAL USE SCOS AND BELOW PROTECTION OF GROUNDWATER FOR HEXAVALENT CHROMIUM
- CONTAINS ANALYTES ABOVE UNRESTRICTED USE BUT BELOW COMMERCIAL USE SCOS
- ESTIMATED EXTENTS OF FORMER UTILITY TRENCH EXHIBITING RADIOLOGICAL IMPACTS.

0 20 40 80 Feet

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PROJECT NO:	249.006.001
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DRAWN BY:	A. DEMARCHI
DESIGNED BY:	A. DEMARCHI
CHECKED BY:	D. RIKER

REMAINING CONTAMINATION

FIGURE 3

Document Path: F:\Project\249A - Town of Niagara\249.006.001 - 4435-4445 Military Road BCP\Planning-Study\GIS\Projects\SMP-FER\remaining contamination REV1.mxd

Legend

- 2013 GROUNDWATER MONITORING WELLS
- 2016 GROUNDWATER MONITORING WELLS

2017 Phase II

Well ID	*Groundwater Depth (ft.)*	*Elevation (ft.)*	*Groundwater Elevation (ft.)*
MW-2	10.08	599	588.92
MW-3	11.63	600.86	589.23
MW-4	12.12	600.81	588.69
MW-5	11.04	600.29	589.25
MW-6	11.43	599.51	588.08
MW-7	11.18	600.04	588.86

0 20 40 80 Feet

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DESIGNED BY:	A. BRENNEN
CHECKED BY:	D. RIKER

2017 GROUNDWATER CONTOUR

FIGURE 4A

Document Path: F:\Project\249A - Town of Niagara\249.006.001 - 4435-4445 Military Road BCP\Planning-Study\GIS\Projects\SMP-FER\2017 gw contour.mxd

Legend

- 2013 GROUNDWATER MONITORING WELLS
- 2016 GROUNDWATER MONITORING WELLS

2020 Remedial Investigation

Well ID	*Groundwater Depth (ft.)*	*Elevation (ft.)*	*Groundwater Elevation (ft.)*
MW-2	NA	599	-
MW-3	Full to TOC	600.86	-
MW-4	NA	600.81	-
MW-5	5.6	600.29	594.69
MW-6	7.2	599.51	592.31
MW-7	6	600.04	594.04

0 20 40 80 Feet

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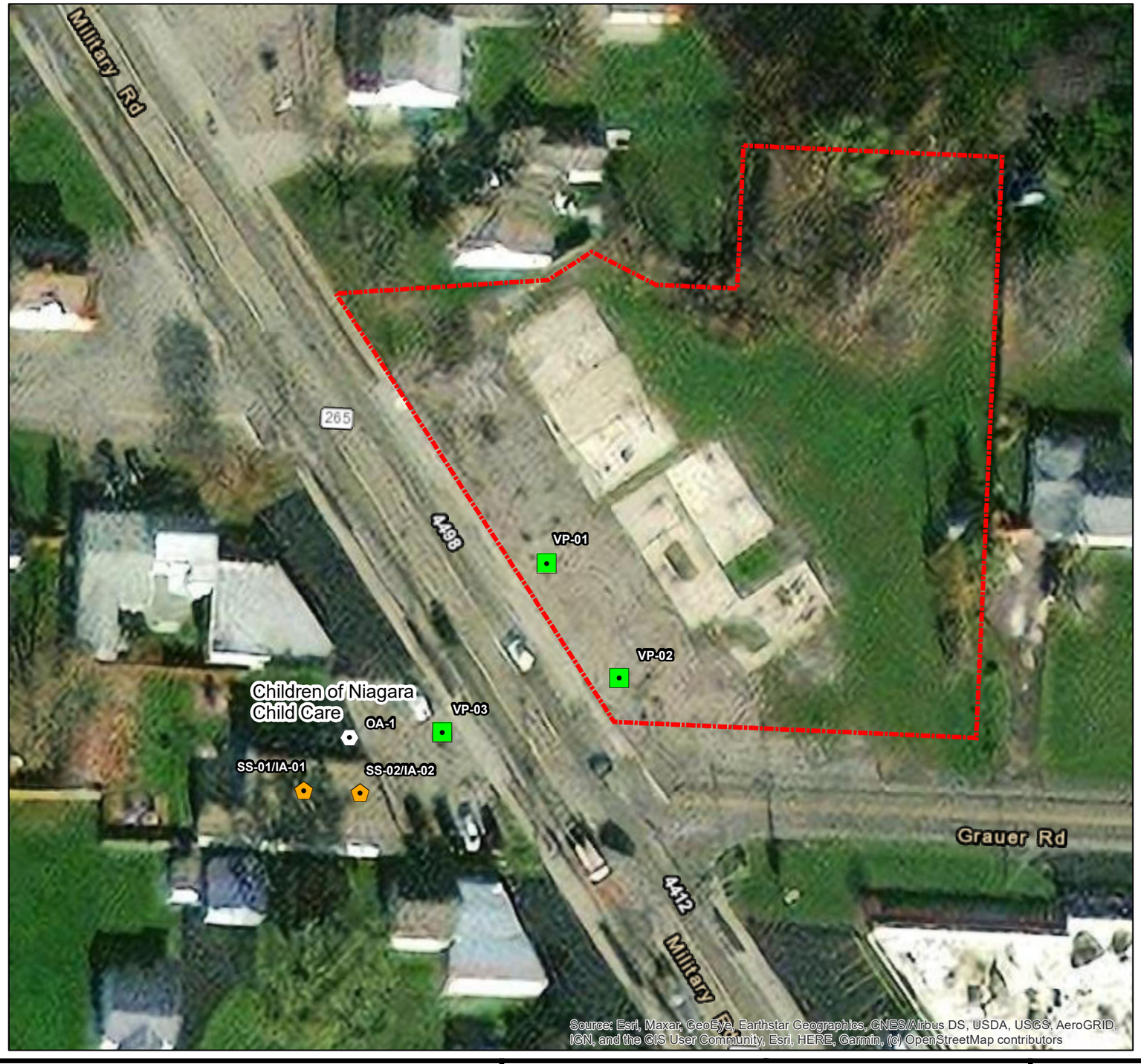
2020 GROUNDWATER CONTOUR

FIGURE 4B

Document Path: F:\Project\249A - Town of Niagara\249.006.001 - 4435-4445 Military Road BCP\Planning-Study\GIS\Projects\SMP-FER\2020 gw contour.mxd



Legend

- BCP BOUNDARY
- SOIL VAPOR LOCATION
- SUB-SLAB AND INDOOR AIR LOCATION
- OUTDOOR AIR LOCATION

0 25 50 100 Feet

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MARK	DATE	DESCRIPTION

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PROJECT NO:	249.006.001
DATE:	1/17/2022
DRAWN BY:	C. MARTIN
DESIGNED BY:	C. MARTIN
CHECKED BY:	D. RIKER

SOIL VAPOR SAMPLING LOCATIONS

FIGURE 5

Document Path: F:\Project\249A - Town of Niagara\249.006.001 - 4435-4445 Military Road BCP\Planning-Study\GIS\Projects\SMP-FER\svi locations.mxd

Legend

BCP BOUNDARY

Track 4 Level Cleanup
Institutional Controls (IC) consists of the following:

- The property may be used for: Commercial Use;
- All ECs must be operated and maintained as specified in the SMP;
- All ECs must be inspected at a frequency and in a manner defined in the SMP.
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Erie County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- Groundwater and other environmental or public health monitoring must be performed as Brownfield Cleanup Program Site Management Plan defined in the SMP;
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in the SMP;
- All future activities that will disturb remaining contaminated material must be conducted in accordance with the SMP;
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in the SMP;
- Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries, and any potential impacts that are identified must be monitored or mitigated; and
- Vegetable gardens and farming on the site are prohibited

0 20 40 80 Feet

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TOWN OF NIAGARA, NEW YORK

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DATE:	05/09/2019
DRAWN BY:	C. MARTIN
DESIGNED BY:	A. BRENNEN
CHECKED BY:	D. RIKER

INSTITUTIONAL CONTROLS

FIGURE 6

Document Path: F:\Project\249A - Town of Niagara\249.006.001 - 4435-4445 Military Road BCP\Planning Study\GIS\Projects\SMP-FERI controls.mxd

Legend

- BCP BOUNDARY
- EXISTING HARDSCAPE COVER TO REMAIN
- EXISTING ONE FOOT SOIL COVER TO REMAIN IN PLACE
- NEW ONE FOOT OR GREATER STONE COVER

Track 4 Level Cleanup
Engineering Controls (EC) consists of the following:

- Engineering Controls (EC) consist of a cover system;
- The cover system is comprised of the following:
  - Maintenance of hard surfaces (concrete building slabs, asphalt pavement, sidewalks, etc.);
  - 12 inches of clean cover in excavation areas
  - 12 inches existing soil cover to remain in-place

0 20 40 80 Feet

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DATE:	1/17/2022
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DESIGNED BY:	C. MARTIN
CHECKED BY:	D. RIKER

ENGINEERING CONTROLS

FIGURE 7

Document Path: F:\Project\249A - Town of Niagara\249.006.001 - 4435-4445 Military Road BCP\Planning-Study\GIS\Projects\SMP-FER\e controls.mxd

Legend

- BCP BOUNDARY
- EXTENT OF EXCAVATIONS TO REMEDIATE CONTAMINATION ABOVE COMMERCIAL USE SCOS AND BELOW PROTECTION OF GROUNDWATER FOR HEXAVALENT CHROMIUM
- DOCUMENTATION SOIL SAMPLES

0 20 40 80 Feet

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DESIGNED BY:	A. DEMARCHI
CHECKED BY:	D. RIKER

SAMPLES COLLECTED DURING REMEDY

FIGURE 8

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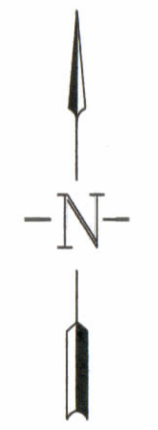
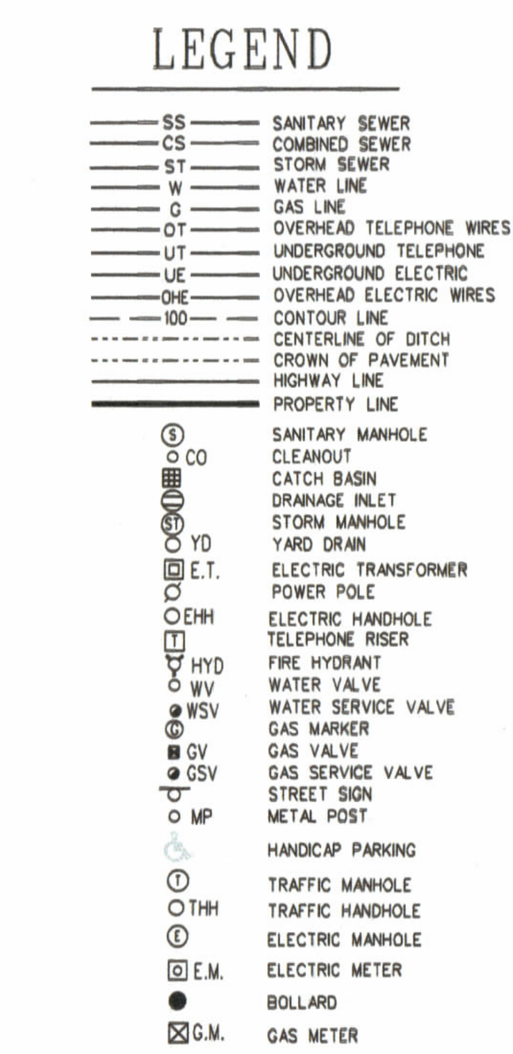
Surveys



CERTIFICATIONS ON THIS BOUNDARY MAP SIGNIFY THAT THE MAP WAS PREPARED IN ACCORDNACE WITH THE CURRENT EXISTING CODE OF PRACTICE FOR LAND SURVEYS ADOPTED BY THE NEW YORK ASSOCIATION OF PROFESSIONAL LAND SURVEYORS, INC. THE CERTIFICATION IS LIMITED TO PERSONS FOR WHOM THE BOUNDARY SURVEY MAP IS PREPARED, THE TITLE COMPANY, THE GOVERMENTAL AGENCY, AND TO THE LENDING INSTITUTION LISTED ON THIS BOUNDARY SURVEY MAP.

CERTIFICATIONS HEREIN ARE NOT TRANSFERABLE

1. NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION



LEGAL DESCRIPTION

ALL THAT TRACT OR PARCEL OF LAND, SITUATE IN THE TOWN OF NIAGARA, COUNTY OF NIAGARA AND STATE OF NEW YORK, BEING PART OF LOT 16, TOWNSHIP 13, RANGE 9, OF HOLLAND LAND COMPANY'S SURVEY BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT WHERE THE NORTH LINE OF GRAUER ROAD INTERSECTS WITH THE NORTHEASTERLY LINE OF MILITARY ROAD; THENCE, NORTHWESTERLY ALONG THE NORTHEASTERLY LINE OF MILITARY ROAD, 226.90 FEET; THENCE EASTERLY ALONG A LINE WITH THE INTERIOR ANGLE OF 60 DEGREES 26'21", 94.32 FEET TO A POINT; THENCE NORTHEASTERLY ALONG A LINE WHICH IS AT RIGHT ANGLES TO MILITARY ROAD, 23.00 FEET, THENCE SOUTHEASTERLY AND DEFLECTING TO THE RIGHT WITH AN ANGLE OF 60 DEGREES 02'22", 32.17 FEET TO A POINT; THENCE EASTERLY AT AN EXTERNAL ANGLE OF 155°27'58" A DISTANCE OF 36.00 FEET; THENCE NORTHERLY AT RIGHT ANGLES TO THE LAST MENTIONED COURSE, 63.3 FEET; THENCE EASTERLY AT RIGHT ANGLES 114.85 FEET; THENCE SOUTHERLY AT RIGHT ANGLES 258.00 FEET TO THE NORTH LINE OF GRAUER ROAD; THENCE WESTERLY ALONG THE NORTH LINE OF GRAUER ROAD, 160.79 FEET TO THE POINT OF BEGINNING. CONTAINING 1.19 ACRES +/-

NOTES:

1) NORTH AS SHOWN ON THIS MAP IS TRUE NORTH AT 78°35' MERIDIAN WEST LONGITUDE, BASED ON THE NEW YORK STATE PLANE COORDINATE SYSTEM NAD 83, WEST ZONE 3103, AS ESTABLISHED FROM THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION REAL TIME NETWORK. (NYSDOT RTN)

2) ELEVATIONS AS SHOWN ON THIS MAP OF SURVEY ARE BASED ON NAVD88 DATUM, AS ESTABLISHED FROM THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION REAL TIME NETWORK. (NYSDOT RTN)

3) THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM VISIBLE STRUCTURES, SURFACE MARKINGS. TERRA POINTE LAND SURVEYING PLLC DOES NOT GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN ARE ALL OF THE UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. ALTHOUGH THE SURVEYOR DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES UPON INSTALLATION. EACH CONTRACTOR MUST CALL DIG SAFELY NEW YORK AT 1-800-962-7962 THREE DAYS PRIOR TO ANY EXCAVATION.

4) CONTOUR INTERVAL IS 1.0 FOOT.

UTILITIES

UNDERGROUND REQUEST NO. 12131-000-676

1. CHARTER COMMUNICATIONS BUFFALO	IN CONFLICT
2. NATIONAL FUEL GAS / NIAGARA FALLS	IN CONFLICT
3. NATIONAL GRID / WEST / ELECTIC	IN CONFLICT
4. NIAGARA COUNTY	NO RESPONSE
5. VERIZON BUFFALO	IN CONFLICT

ENVIROMENTAL EASEMENT

THIS PROPERTY IS SUBJECT TO AN ENVIROMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIROMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIROMENTAL CONSERVATION LAW. THE ENGINEERING AND INSTITUTIONAL CONTROL FOR THIS EASEMENT ARE SET FORTH IN MORE DETAIL IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED BY ANY PARTY WITH AN INTEREST IN THE PROPERTY. THE SMP CAN BE OBTAINED FROM NYS DEPARTMENT OF ENVIROMENTAL CONSERVATION, DIVISION OF ENVIROMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT DERWEB@DEC.NY.GOV.

A COPY OF THIS DOCUMENT WITHOUT A PROPER APPLICATION OF THE SURVEYOR'S EMBOSSED SEAL SHOULD BE ASSUMED TO BE AN UNAUTHORIZED COPY

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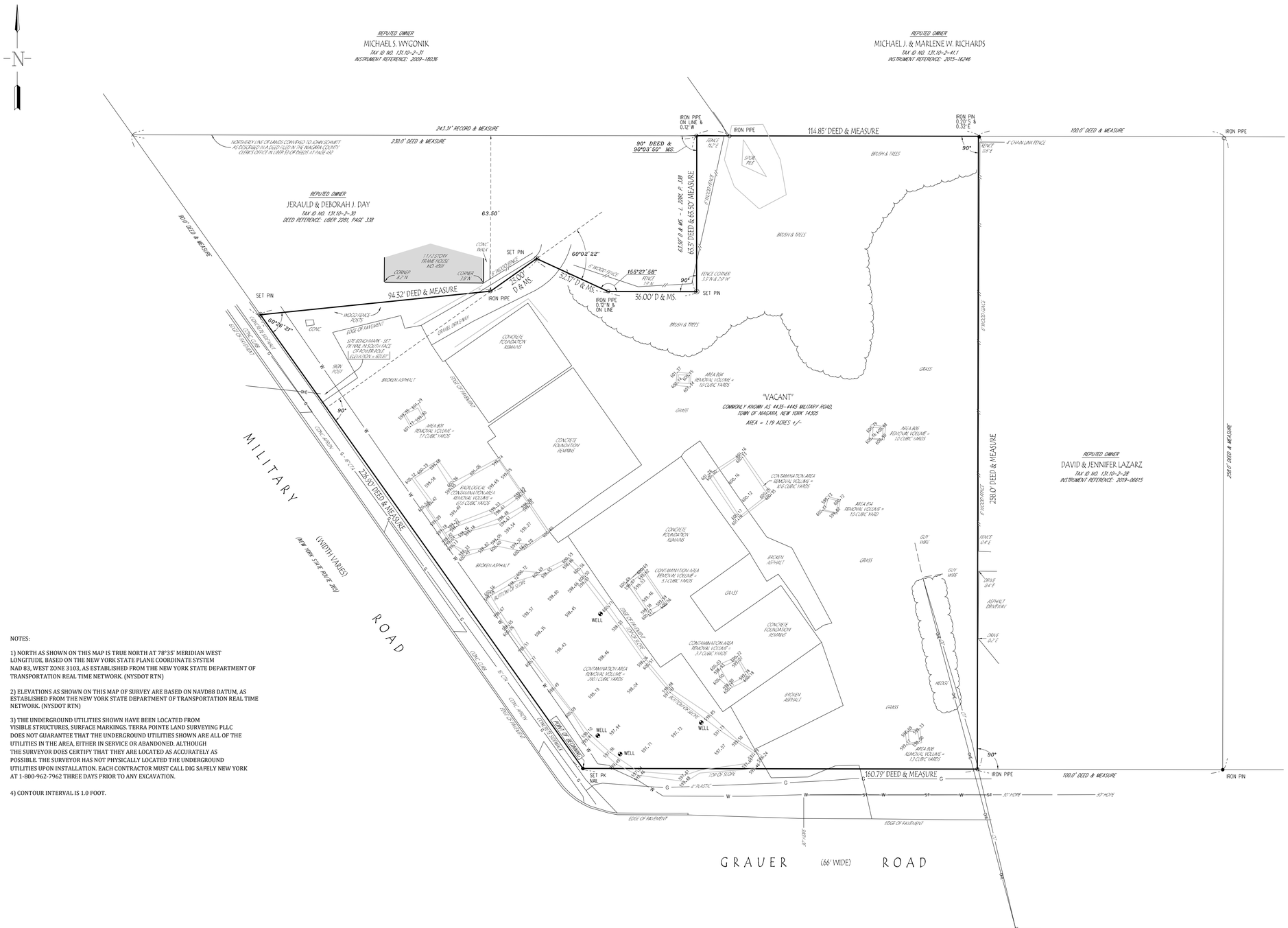
Phone: 716-205-3310
Email: mark.hare@terrapointepllc.com

UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY MAP IS A VIOLATION OF SECTION 7209, PROVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF AN ABSTRACT OF TITLE AND IS SUBJECT TO ANY STATE OF FACTS THAT MAY BE REVEALED BY AN EXAMINATION OF SUCH.

TOWN: NIAGARA	BEING PART OF LOT 16, TOWNSHIP 13, RANGE 9 OF THE HOLLAND LAND COMPANY'S SURVEY	TAX ID NO: 131.10-2-29	JOB TITLE: BOUNDARY & TOPOGRAPHIC SURVEY
COUNTY: NIAGARA		REVISIONS: 3/17/2022 - EDIT REQS.	DRAWING OF: LANDS OWNED BY: TOWN OF NIAGARA NEW YORK
STATE: NEW YORK			
DATE: DECEMBER 23, 2021			
SCALE: 1" = 20'	INSTRUMENT REFERENCE: 2018-17785		
JOB NO: 1364-21			



LEGEND

- SS — SANITARY SEWER
- CS — COMBINED SEWER
- ST — STORM SEWER
- W — WATER LINE
- G — GAS LINE
- OT — OVERHEAD TELEPHONE WIRES
- UT — UNDERGROUND TELEPHONE
- UE — UNDERGROUND ELECTRIC
- OHE — OVERHEAD ELECTRIC WIRES
- 100 — CONTOUR LINE
- CENTERLINE OF DITCH
- CROWN OF PAVEMENT
- HIGHWAY LINE
- PROPERTY LINE
- SANITARY MANHOLE
- CO CLEANOUT
- CATCH BASIN
- DRAINAGE INLET
- STORM MANHOLE
- YD YARD DRAIN
- E.T. ELECTRIC TRANSFORMER
- POWER POLE
- EHH ELECTRIC HANDHOLE
- TELEPHONE RISER
- HYD FIRE HYDRANT
- WV WATER VALVE
- WSV WATER SERVICE VALVE
- GAS MARKER
- GV GAS VALVE
- GSV GAS SERVICE VALVE
- STREET SIGN
- MP METAL POST
- HANDICAP PARKING
- TRAFFIC MANHOLE
- THH TRAFFIC HANDHOLE
- ELECTRIC MANHOLE
- E.M. ELECTRIC METER
- BOLLARD
- G.M. GAS METER

NOTES:

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2) ELEVATIONS AS SHOWN ON THIS MAP OF SURVEY ARE BASED ON NAVD88 DATUM, AS ESTABLISHED FROM THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION REAL TIME NETWORK. (NYSDOT RTN)

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4) CONTOUR INTERVAL IS 1.0 FOOT.

LEGAL DESCRIPTION

ALL THAT TRACT OR PARCEL OF LAND, SITUATE IN THE TOWN OF NIAGARA, COUNTY OF NIAGARA AND STATE OF NEW YORK, BEING PART OF LOT 16, TOWNSHIP 13, RANGE 9, OF HOLLAND LAND COMPANY'S SURVEY BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT WHERE THE NORTH LINE OF GRAUER ROAD INTERSECTS WITH THE NORTHEASTERLY LINE OF MILITARY ROAD; THENCE, NORTHWESTERLY ALONG THE NORTHEASTERLY LINE OF MILITARY ROAD, 226.90 FEET; THENCE EASTERLY ALONG A LINE WITH THE INTERIOR ANGLE OF 60 DEGREES 26'27", 94.32 FEET TO A POINT; THENCE NORTHEASTERLY ALONG A LINE WHICH IS AT RIGHT ANGLES TO MILITARY ROAD, 23.00 FEET; THENCE SOUTHEASTERLY AND DEFLECTING TO THE RIGHT WITH AN ANGLE OF 60 DEGREES 02'22", 32.17 FEET TO A POINT; THENCE EASTERLY AT AN EXTERNAL ANGLE OF 155°27'58", A DISTANCE OF 36.00 FEET; THENCE NORTHERLY AT RIGHT ANGLES TO THE LAST MENTIONED COURSE, 63.5 FEET; THENCE EASTERLY AT RIGHT ANGLES 114.85 FEET; THENCE SOUTHERLY AT RIGHT ANGLES 258.00 FEET TO THE NORTH LINE OF GRAUER ROAD; THENCE WESTERLY ALONG THE NORTH LINE OF GRAUER ROAD, 160.79 FEET TO THE POINT OF BEGINNING. CONTAINING 1.19 ACRES +/-

UTILITIES

UNDERGROUND REQUEST NO. 12131-000-676

1. CHARTER COMMUNICATIONS BUFFALO	IN CONFLICT
2. NATIONAL FUEL GAS / NIAGARA FALLS	IN CONFLICT
3. NATIONAL GRID / WEST / ELECTRIC	IN CONFLICT
4. NIAGARA COUNTY	NO RESPONSE
5. VERIZON BUFFALO	IN CONFLICT

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20' 0 20' 40'
GRAPHIC SCALE IN FEET

6.10 M 0 6.10 M 12.20 M
GRAPHIC SCALE IN METERS

TOWN: NIAGARA	BEING PART OF LOT 16, TOWNSHIP 13, RANGE 9 OF THE HOLLAND LAND COMPANY'S SURVEY	TAX ID NO: 131.10-2-29
COUNTY: NIAGARA		EXCAVATION AREAS ADDED: 3/23/22
STATE: NEW YORK		REVISIONS: 3/17/2022 - EDIT REQS.
DATE: DECEMBER 23, 2021		
SCALE: 1" = 20'	INSTRUMENT REFERENCE: 2018-17785	
JOB NO: 1364-21		

JOB TITLE: EXCAVATION AREA SURVEY
DRAWING OF:
LANDS OWNED BY:
TOWN OF NIAGARA NEW YORK

LEGEND

- SS — SANITARY SEWER
- CS — COMBINED SEWER
- ST — STORM SEWER
- W — WATER LINE
- G — GAS LINE
- OT — OVERHEAD TELEPHONE WIRES
- UT — UNDERGROUND TELEPHONE
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UTILITIES

UNDERGROUND REQUEST NO. 12131-000-676

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NOTES:

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20' 0 20' 40'
GRAPHIC SCALE IN FEET

6.10 M 0 6.10 M 12.20 M
GRAPHIC SCALE IN METERS

TOWN: NIAGARA	BEING PART OF LOT 16, TOWNSHIP 13, RANGE 9 OF THE HOLLAND LAND COMPANY'S SURVEY	TAX ID NO: 131.10-2-29
COUNTY: NIAGARA		STONE BACKFILL AREAS ADDED: 3/10/22
STATE: NEW YORK		REVISIONS: 3/17/2022 - EDIT REQS.
DATE: DECEMBER 23, 2021		
SCALE: 1" = 20'	INSTRUMENT REFERENCE: 2018-17785	
JOB NO: 1364-21		

JOB TITLE: EXCAVATION BACKFILL SURVEY

DRAWING OF: LANDS OWNED BY:

TOWN OF NIAGARA
NEW YORK

Tables

Table 1

SURFACE SOIL RESULTS
4435-4445 MILITARY ROAD

Data in shading indicates that remaining contamination is below Unrestricted Use SCOs or no contaminants have been detected at concentrations greater than Unrestricted Use SCOs.

Location ID - Sample Depth Date Sampled Sample Matrix Units	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	B04 03/23/2020 SOIL mg/kg		B05 03/23/2020 SOIL mg/kg		B06 03/23/2020 SOIL mg/kg		B07 03/23/2020 SOIL mg/kg		B08 03/23/2020 SOIL mg/kg	
SVOCs															
1,4-Dioxane	0.10	9.80	13.00	130.00	250.00	ND		ND		ND		ND		ND	
o-Cresol	0.33	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND	
m-Cresol	0.33	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND	
p-Cresol	0.33	34.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND	
Acenaphthene	20.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND	
Acenaphthylene	100.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND	
Anthracene	100.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND	
Benzo[a]anthracene	1.00	1.00	1.00	5.60	11.00	ND		ND		0.3	J	ND		0.5	J
Benzo[a]pyrene	1.00	1.00	1.00	1.00	1.10	ND		ND		0.3	J	ND		0.6	J
Benzo[b]fluoranthene	1.00	1.00	1.00	5.60	11.00	ND		ND		0.6		0.4	J	0.7	J
Benzo[g,h,i]perylene	100.00	100.00	100.00	500.00	1000.00	ND		ND		0.4	J	ND		0.5	J
Benzo[k]fluoranthene	0.80	1.00	3.90	56.00	110.00	ND		ND		ND		ND		0.3	J
Chrysene	1.00	1.00	3.90	56.00	110.00	ND		ND		0.4	J	ND		0.6	J
Dibenz(a,h)anthracene	0.33	0.33	0.33	0.56	1.10	ND		ND		ND		ND		ND	
Dibenzofuran	7.00	14.00	59.00	350.00	1000.00	ND		ND		ND		ND		ND	
Fluoranthene	100.00	100.00	100.00	500.00	1000.00	ND		ND		0.6	J	0.3	J	1.2	
Fluorene	30.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND	
Hexachlorobenzene	0.33	0.33	1.20	6.00	12.00	ND		ND		ND		ND		ND	
Indeno[1,2,3-cd]pyrene	0.50	0.50	0.50	5.60	11.00	ND		ND		0.3	J	ND		0.4	J
Naphthalene	12.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND	
Pentachlorophenol	0.800	2.40	6.700	6.700	55.000	ND		ND		ND		ND		ND	
Phenanthrene	100.00	100.00	100.00	500.00	1000.00	ND		ND		0.2	J	ND		0.5	J
Phenol	0.33	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND	
Pyrene	100.00	100.00	100.00	500.00	1000.00	ND		ND		0.5	J	0.3	J	0.9	J
Pesticidies															
4,4'-DDD	0.0033	2.60	13.00	92	180	ND		ND		ND		ND		ND	
4,4'-DDE	0.0033	1.80	8.90	62	120	ND		ND		ND		ND		ND	
4,4'-DDT	0.0033	1.70	7.90	47	94	**0.02**	**J**	0.003	**J**	**0.01**	**J**	**0.01**	**J**	**0.01**	**J**
Aldrin	0.0050	0.02	0.10	0.68	1.40	ND		ND		ND		ND		ND	
alpha-BHC	0.0200	0.10	0.48	3.40	6.80	ND		ND		ND		ND		ND	
beta-BHC	0.0360	0.07	0.36	3.0	14.0	ND		ND		ND		0.002	U	ND	
Chlordane (.alpha.)	0.0940	0.91	4.20	24.0	47.0	ND		ND		ND		ND		ND	
delta-BHC	0.0400	100.00	100.00	500.0	1000.0	0.05	U	0.002	JB	0.01	JB	0.002	U	0.04	U
Dieldrin	0.0050	0.04	0.20	1.40	2.80	ND		ND		ND		ND		ND	
Endosulfan I	2.40	4.80	24.0	200	920	ND		ND		ND		ND		ND	
Endosulfan II	2.40	4.80	24.0	200	920	ND		ND		ND		ND		ND	
Endosulfan sulfate	2.40	4.80	24.0	200	920	0.02	J	0.002	J	0.005	J	ND		ND	
Endrin	0.014	2.20	11	89	410	ND		ND		ND		ND		ND	
Endrin aldehyde						ND		0.006	J	0.02	J	ND		ND	
Endrin ketone						ND		0.003	J	0.01	J	ND		ND	
gamma-BHC (Lindane)	0.100	0.28	1.30	9.20	23.0	ND		ND		ND		ND		ND	
Heptachlor	0.042	0.42	2.10	15.0	29.0	ND		ND		ND		ND		ND	

Table 1

SURFACE SOIL RESULTS
4435-4445 MILITARY ROAD

Location ID - Sample Depth Date Sampled Sample Matrix Units	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	B04 03/23/2020 SOIL mg/kg	B05 03/23/2020 SOIL mg/kg	B06 03/23/2020 SOIL mg/kg	B07 03/23/2020 SOIL mg/kg	B08 03/23/2020 SOIL mg/kg
PCBs										
PCB-1016						ND	ND	ND	ND	ND
PCB-1221						ND	ND	ND	ND	ND
PCB-1232						ND	ND	ND	ND	ND
PCB-1242						ND	ND	ND	ND	ND
PCB-1248						ND	ND	ND	ND	ND
PCB-1254						ND	ND	ND	ND	ND
PCB-1260						ND	ND	ND	ND	ND
Metals										
Mercury	0.18	0.81	0.81	2.8	5.7	0.27	0.084	0.34	0.086	8.6
Arsenic	13	16	16	16	16	4.3	0.87 J	6.5	1.7 J	3.6
Barium	350	350	400	400	10000	97.5	28.6	19500 B	18.5	69.3
Beryllium	7.2	14	72	590	2700	0.29 J	0.089 J	0.67	0.032 J	0.49
Cadmium	2.5	2.5	4.3	9.3	60	1.5	0.075 J	0.24	0.22	0.75
Chromium	30	36	180	1500	6800	27.9	7.1	32.4	2.8	32.6
Copper	50	270	270	270	10000	27.1	5.1	31.3	5.1	20.5
Lead	63	400	400	1000	3900	881	76.3	342 B	10.2	57.8
Manganese	1600	2000	2000	10000	10000	487	182 ^	622 B	256	474
Nickel	30	140	310	310	10000	19.0	3.7 J	25.5	2.5 J	15.4
Selenium	3.9	36	180	1500	6800	ND	0.54 JB	0.48 JB	ND	ND
Silver	2	36	180	1500	6800	ND	ND	ND	ND	ND
Zinc	109	2200	10000	10000	10000	322	39.9 B	163 B	33.9	147
WetChem										
Cyanide	27		27	27	10000	ND	ND	ND	ND	ND

Analytical Data compared to Part 375 Standards and DER-10

ND indicates analyte was not detected.

Blank space indicates analyte was not analyzed for in that sample.

B - Compound was found in the blank and sample.

F1 - MS and/or MSD recovery exceeds control limits.

F2 - MS/MSD RPD exceeds control limits

J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

vs - Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.

U - The analyte was analyzed for but was not detected at or above the sample quantitation limit.

Table 2a

SUB-SURFACESOIL RESULTS
HFM SAMPLES
4435-4445 MILITARY ROAD

Location ID - Sample Depth Date Sampled Sample Matrix Units	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	B01-00-0.5 03/23/2020 SOIL mg/kg	B02-00-0.5 03/23/2020 SOIL mg/kg	B03-00-0.5 03/23/2020 SOIL mg/kg	B04-00-0.5 03/23/2020 SOIL mg/kg	B05-00-0.5 03/23/2020 SOIL mg/kg	B06-00-0.5 03/23/2020 SOIL mg/kg	B07-00-0.4 03/23/2020 SOIL mg/kg	B08-00-0.4 03/23/2020 SOIL mg/kg
VOCs													
1,1,1-Trichloroethane	0.68	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
1,1-Dichloroethane	0.27	19	26.0	240	480	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
1,1-Dichloroethene	0.33	100	100.0	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
1,2,4-Trimethylbenzene	3.60	47	52.0	190	380	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
1,2-Dichlorobenzene	1.10	100	100.0	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
1,2-Dichloroethane	0.02	2.30	3.1	30	60	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
1,3,5-Trimethylbenzene	8.40	47	52	190	380	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
1,3-Dichlorobenzene	2.40	17	49	280	560	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
1,4-Dichlorobenzene	1.80	9.80	13	130	250	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
1,4-Dioxane	0.10	9.80	13	130	250	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
2-Butanone (MEK)	0.12	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Acetone	0.05	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Benzene	0.06	2.90	4.8	44	89	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Carbon tetrachloride	0.76	1.40	2.4	22	44	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Chlorobenzene	1.10	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Chloroform	0.37	10	49	350	700	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
cis-1,2-Dichloroethene	0.25	59	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Ethylbenzene	1.00	30	41	390	780	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Methyl tert-butyl ether	0.93	62	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Methylene Chloride	0.05	51	100	500	1000	ND vs	ND vs	ND vs	ND vs	0.004 **JBvs**	ND vs	ND vs	ND vs
n-Butylbenzene	12.00	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
N-Propylbenzene	3.90	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
sec-Butylbenzene	11.00	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
tert-Butylbenzene	5.90	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Tetrachloroethene	1.30	5.50	19	150	300	ND vs	ND vs	ND vs	0.03 **vs**	ND vs	ND vs	ND vs	ND vs
Toluene	0.70	100	100	500	1000	ND vs	0.0005 **Jvs**	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
trans-1,2-Dichloroethene	0.19	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Trichloroethene	0.47	10	21	200	400	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Vinyl chloride	0.02	0.21	0.9	13	27	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs
Xylenes, Total	0.26	100	100	500	1000	ND vs	ND vs	ND vs	ND vs	ND vs	ND vs	0.001 **Jvs**	
SVOCs													
1,4-Dioxane	0.10	9.80	13.00	130.00	250.00	ND	ND	ND	ND	ND	ND	ND	ND
o-Cresol	0.33	100.00	100.00	500.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
m-Cresol	0.33	100.00	100.00	500.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
p-Cresol	0.33	34.00	100.00	500.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20.00	100.00	100.00	500.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100.00	100.00	100.00	500.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100.00	100.00	100.00	500.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
Benzo[a]anthracene	1.00	1.00	1.00	5.60	11.00	ND	ND	ND	1.5 **J**	ND	ND	0.3 **J**	ND
Benzo[a]pyrene	1.00	1.00	1.00	1.00	1.10	ND	ND	ND	1.6 **J**	ND	ND	0.4 **J**	ND
Benzo[b]fluoranthene	1.00	1.00	1.00	5.60	11.00	ND	ND	ND	2.2 **J**	ND	0.2	0.5 **J**	ND
Benzo[g,h,i]perylene	100.00	100.00	100.00	500.00	1000.00	ND	ND	ND	1.3	ND	0.1	0.3 **J**	ND
Benzo[k]fluoranthene	0.80	1.00	3.90	56.00	110.00	ND	ND	ND	1.0 **J**	ND	ND	0.2 **J**	ND
Chrysene	1.00	1.00	3.90	56.00	110.00	ND	ND	ND	1.5 **J**	ND	ND	0.3 **J**	ND
Dibenz(a,h)anthracene	0.33	0.33	0.33	0.56	1.10	ND	ND	ND	0.4 **J**	ND	ND	ND	ND
Dibenzofuran	7.00	14.00	59.00	350.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100.00	100.00	100.00	500.00	1000.00	ND	ND	ND	2.4	0.1 **J**	0.2 **J**	0.7 **J**	ND
Fluorene	30.00	100.00	100.00	500.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.33	0.33	1.20	6.00	12.00	ND	ND	ND	ND	ND	ND	ND	ND
Indeno[1,2,3-cd]pyrene	0.50	0.50	0.50	5.60	11.00	ND	ND	ND	1.2 **J**	ND	ND	0.3 **J**	ND
Naphthalene	12.00	100.00	100.00	500.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	0.800	2.40	6.700	6.700	55.000	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100.00	100.00	100.00	500.00	1000.00	ND	ND	ND	0.6 **J**	ND	ND	0.3 **J**	ND
Phenol	0.33	100.00	100.00	500.00	1000.00	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100.00	100.00	100.00	500.00	1000.00	ND	ND	ND	2.0	0.2 **J**	0.2 **J**	0.5 **J**	ND

Table 2a

SUB-SURFACESOIL RESULTS
HFM SAMPLES
4435-4445 MILITARY ROAD

Pesticidies																
4,4'-DDD	0.0033	2.60	13.00	92	180	ND		ND		ND		ND		**0.01**	**J**	ND		ND	
4,4'-DDE	0.0033	1.80	8.90	62	120	ND		ND		ND		ND		ND		ND		ND	
4,4'-DDT	0.0033	1.70	7.90	47	94	0.011		ND		**0.01**	**J**	**0.01**	**J**	**0.004**	**J**	ND		**0.03**	**J**
Aldrin	0.0050	0.02	0.10	0.68	1.40	ND		ND		ND		ND		ND		ND		ND	
alpha-BHC	0.0200	0.10	0.48	3.40	6.80	ND		ND		ND		ND		ND		ND		ND	
beta-BHC	0.0360	0.07	0.36	3.0	14.0	ND		ND		ND	F1	ND		ND		ND		ND	
Chlordane (.alpha.)	0.0940	0.91	4.20	24.0	47.0	ND		ND		ND		ND		ND		ND		ND	
delta-BHC	0.0400	100.00	100.00	500.0	1000.0	ND		ND		0.054	**U**	0.036	**U**	0.01	**JB**	0.011	**U**	0.019	**U**	ND
Dieldrin	0.0050	0.04	0.20	1.40	2.80	ND		ND		ND		ND		ND		ND		ND	
Endosulfan I	2.40	4.80	24.0	200	920	ND		ND		ND	UJ	ND		ND		ND		ND	
Endosulfan II	2.40	4.80	24.0	200	920	ND		ND		ND		ND		ND		ND		ND	
Endosulfan sulfate	2.40	4.80	24.0	200	920	ND		ND		ND		ND		ND		ND		ND	
Endrin	0.014	2.20	11	89	410	ND		ND		ND		ND		ND		ND		ND	
Endrin aldehyde						ND		ND		ND		ND		0.01	**J**	ND		ND	
gamma-BHC (Lindane)	0.100	0.28	1.30	9.20	23.0	ND		ND		ND		ND		ND		ND		ND	
Heptachlor	0.042	0.42	2.10	15.0	29.0	ND		ND		ND		ND		ND		ND		ND	
Methoxychlor						ND		ND		ND		ND		0.01	**J**	ND		ND	
PCBs																			
PCB-1016						ND		ND		ND		ND		ND		ND		ND	
PCB-1221						ND		ND		ND		ND		ND		ND		ND	
PCB-1232						ND		ND		ND		ND		ND		ND		ND	
PCB-1242						ND		ND		ND		ND		ND		ND		ND	
PCB-1248						ND		ND		ND		ND		ND		ND		ND	
PCB-1254						ND		ND		ND		ND		ND		ND		ND	
PCB-1260						ND		ND		ND		ND		ND		ND		ND	
Metals																			
Mercury	0.18	0.81	0.81	2.8	5.7	0.098		**0.031**	**R**	8.6		0.45		**1.4**		0.28		**0.37**		5.4
Arsenic	13	16	16	16	16	ND		**1.6**	**J**	ND		7.8		**5.8**		6.8		**3.2**		4.6
Barium	350	350	400	400	10000	56.5		**5.9**	**R**	67.2	**J**	45.1		**68.8**	**B**	119		**210**		68.7
Beryllium	7.2	14	72	590	2700	0.60		**0.060**	**J**	0.18	**J**	0.26		**0.46**		0.79		**0.20**	**J**	0.48
Cadmium	2.5	2.5	4.3	9.3	60	0.69		**1.0**	**J**	1.3	**J**	0.89		**1.3**		0.83		**2.6**		2.3
Chromium	30	36	180	1500	6800	2750		**18.1**	**R**	4240	F2	23.0		**24.8**		35.5		**32.5**		36.5
Copper	50	270	270	270	10000	14.5		**5.3**	**R**	13.4	**J**	53.4		**16.9**		24.5		**34.1**		25.2
Lead	63	400	400	1000	3900	30.4		**40.3**	**J**	23.7	**J**	397		**190**	**B**	99.9		**125**		94.6
Manganese	1600	2000	2000	10000	10000	400		**448**	**J**	379	**J**	476		**608**	**B**	667		**681**		583
Nickel	30	140	310	310	10000	12.7		**4.6**	**R**	26.3		10.5		**16.6**		30.3		**14.6**		17.9
Selenium	3.9	36	180	1500	6800	0.47	**J**	ND		ND		ND		ND		ND		ND		ND
Silver	2	36	180	1500	6800	ND		ND		ND		ND		ND		ND		ND		ND
Zinc	109	2200	10000	10000	10000	59.8		**231**	**J**	322		188		**308**	**B**	159		**326**		372
WetChem																			
Cyanide	27		27	27	10000	ND		ND		ND		ND		ND		ND		ND		ND

Analytical Data compared to Part 375 Standards and DER-10
ND indicates analyte was not detected.
Blank space indicates analyte was not analyzed for in that sample.
B - Compound was found in the blank and sample.
F1 - MS and/or MSD recovery exceeds control limits.
F2 - MS/MSD RPD exceeds control limits
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
vs - Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.
U - The analyte was analyzed for but was not detected at or above the sample quantitation limit.
R - The sample result has been rejected in the DUSR

Table 2b

SUB-SURFACE SOIL RESULTS
PFA/PFOAs
4435-4445 MILITARY ROAD

Location ID - Sample Depth	B01-00-0.5		B02-00-0.5		DUP-1		B03-00-0.5		B06-00-0.5		B08-00-0.4		B02-00-0.5-RS		B06-00-0.5-RS	
Date Sampled	03/23/2020		03/23/2020		03/23/2020		03/23/2020		03/23/2020		03/23/2020		05/19/2020		05/19/2020	
Sample Matrix	SOIL		SOIL		SOIL		SOIL		SOIL (NATIVE)		SOIL		SPLP		SPLP	
Units	ppt		ppt		ppt		ppt		ppt		ppt		ppt		ppt	
LCMS																
Perfluorobutanoic acid (PFBA)	180.0	JB	200.0	U	190.0	U	300.0	U	310.0	U	230.0	U	0.87	JB	1.3	JB
Perfluoropentanoic acid (PFPeA)	ND		ND		ND		ND		ND		130.0	J	0.76	J	0.50	J
Perfluorohexanoic acid (PFHxA)	ND		ND		ND		ND		54.0	J	68.0	J	ND		ND	
Perfluoroheptanoic acid (PFHpA)	ND		41.0	J	44.0	J	ND		62.0	J	77.0	J	ND		0.49	J
Perfluorooctanoic acid (PFOA)	ND		ND		ND		ND		180.0	J	150.0	J	ND		2.0	
Perfluorononanoic acid (PFNA)	ND		63.0	J	ND		ND		87.0	J	65.0	J	ND		ND	
Perfluorodecanoic acid (PFDA)	ND		300.0		160.0	J	ND		120.0	J	250.0		ND		ND	
Perfluoroundecanoic acid (PFUnA)	ND		220.0		200.0		ND		100.0	J	68.0	J	ND		ND	
Perfluorododecanoic acid (PFDoA)	ND		170.0	J	280.0		ND		85.0	J	86.0	J	ND		ND	
Perfluorotridecanoic acid (PFTriA)	ND		ND		ND		ND		ND		ND		ND		ND	
Perfluorotetradecanoic acid (PFTeA)	ND		ND		ND		ND		ND		ND		ND		ND	
Perfluorobutanesulfonic acid (PFBS)	ND		ND		ND		ND		31.0	J	ND		ND		ND	
Perfluorohexanesulfonic acid (PFHxS)	ND		65.0	J	73.0	J	ND		52.0	J	48.0	J	0.30	JB	0.57	JB
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ND		ND		ND		ND		ND		ND		ND	
Perfluorooctanesulfonic acid (PFOS)	ND		1100.0		860.0		ND		1900.0		880.0		0.85	J	2.9	I
Perfluorodecanesulfonic acid (PFDS)	ND		46.0	J	66.0	J	ND		ND		ND		ND		ND	
Perfluorooctanesulfonamide (FOSA)	ND		ND		ND		ND		ND		ND		0.68	JB	0.42	JB
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		ND		ND		ND		ND		ND		ND		ND	
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		ND		ND		ND		ND		ND		ND		ND	
6:2 FTS	ND		ND		ND		ND		ND		ND		ND		ND	
8:2 FTS	ND		ND		ND		ND		ND		ND		ND		ND	

Analytical Data compared to Part 375 Standards and DER-10

All soil samples were taken within the HFM onsite unless otherwise noted. (B06)

ND indicates analyte was not detected.

Blank space indicates analyte was not analyzed for in that sample.

B - Compound was found in the blank and sample.

F1 - MS and/or MSD recovery exceeds control limits.

F2 - MS/MSD RPD exceeds control limits

J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

vs - Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.

U - The analyte was analyzed for but was not detected at or above the sample quantitation limit.

Table 2c

SUB-SURFACESOIL RESULTS
NATIVE SOIL
4435-4445 MILITARY ROAD

Location ID - Sample Depth Date Sampled Sample Matrix Units	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	B01-01-1 03/23/2020 SOIL mg/kg		B02-01-1 03/23/2020 SOIL mg/kg		B03-01-2 03/23/2020 SOIL mg/kg		B04-01-1 03/23/2020 SOIL mg/kg		B05-01-1.5 03/23/2020 SOIL mg/kg		B06-01-1 03/23/2020 SOIL mg/kg		B07-01-1 03/23/2020 SOIL mg/kg		B08-01-1 03/23/2020 SOIL mg/kg		B09-03-8 03/23/2020 SOIL ug/kg		B10-03-8 03/23/2020 SOIL mg/kg		B11-03-8 03/23/2020 SOIL mg/kg	
VOCs																											
1,1,1-Trichloroethane	0.68	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
1,1-Dichloroethane	0.27	19	26.0	240	480	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
1,1-Dichloroethene	0.33	100	100.0	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
1,2,4-Trimethylbenzene	3.60	47	52.0	190	380	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	**0.01**	**vs**
1,2-Dichlorobenzene	1.10	100	100.0	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	F1 vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
1,2-Dichloroethane	0.02	2.30	3.1	30	60	ND	vs	ND	vs	ND	vs	ND	vs	ND	F1 vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
1,3,5-Trimethylbenzene	8.40	47	52	190	380	ND	vs	ND	vs	0.001	**Jvs**	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	**0.001**	**Jvs**
1,3-Dichlorobenzene	2.40	17	49	280	560	ND	vs	ND	vs	ND	vs	ND	vs	ND	F1 vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
1,4-Dichlorobenzene	1.80	9.80	13	130	250	ND	vs	ND	vs	ND	vs	ND	vs	ND	F1 vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
1,4-Dioxane	0.10	9.80	13	130	250	ND	vs	ND	vs	ND	vs	ND	vs	ND	F1 vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
2-Butanone (MEK)	0.12	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	F1 vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	**0.0**	**Jvs**
Acetone	0.05	100	100	500	1000	0.01	**Jvs**	0.01	**Jvs**	0.020	**Jvs**	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	**0.02**	**Jvs**	**0.02**	**Jvs**
Benzene	0.06	2.90	4.8	44	89	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	**0.0003**	**Jvs**
Carbon tetrachloride	0.76	1.40	2.4	22	44	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
Chlorobenzene	1.10	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
Chloroform	0.37	10	49	350	700	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
cis-1,2-Dichloroethene	0.25	59	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
Ethylbenzene	1.00	30	41	390	780	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	**0.001**	**Jvs**
Methyl tert-butyl ether	0.93	62	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
Methylene Chloride	0.05	51	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	0.004	**JBvs**	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
n-Butylbenzene	12.00	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	F1 vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
N-Propylbenzene	3.90	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	**0.001**	**Jvs**
sec-Butylbenzene	11.00	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	F1 vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
tert-Butylbenzene	5.90	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
Tetrachloroethene	1.30	5.50	19	150	300	ND	vs	ND	vs	ND	vs	0.03	**vs**	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
Toluene	0.70	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	**0.001**	**Jvs**
trans-1,2-Dichloroethene	0.19	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
Trichloroethene	0.47	10	21	200	400	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
Vinyl chloride	0.02	0.21	0.9	13	27	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs
Xylenes, Total	0.26	100	100	500	1000	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	ND	vs	**0.003**	**Jvs**
SVOCs																											
1,4-Dioxane	0.10	9.80	13.00	130.00	250.00	ND		ND		ND		ND		ND		ND		ND		ND							
o-Cresol	0.33	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
m-Cresol	0.33	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
p-Cresol	0.33	34.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Acenaphthene	20.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Acenaphthylene	100.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Anthracene	100.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Benzo[a]anthracene	1.00	1.00	1.00	5.60	11.00	ND		ND		ND		ND		0.05	**J**	ND		ND		0.03	**J**	ND		ND		**0.3**	**J**
Benzo[a]pyrene	1.00	1.00	1.00	1.00	1.10	ND		ND		ND		ND		0.05	**J**	ND		ND		ND		ND		ND		**0.3**	**J**
Benzo[b]fluoranthene	1.00	1.00	1.00	5.60	11.00	ND		ND		ND		ND		0.08	**JK**	ND		ND		0.04	**J**	ND		ND		**0.3**	**J**
Benzo[g,h,i]perylene	100.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		0.04	**J**	ND		ND		ND		ND		ND		**0.2**	**J**
Benzo[k]fluoranthene	0.80	1.00	3.90	56.00	110.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		**0.1**	**J**
Chrysene	1.00	1.00	3.90	56.00	110.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		**0.4**	**J**
Dibenz(a,h)anthracene	0.33	0.33	0.33	0.56	1.10	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Dibenzofuran	7.00	14.00	59.00	350.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Fluoranthene	100.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		0.07	**J**	ND		ND		0.1	**J**	ND		ND		**0.6**	**J**
Fluorene	30.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Hexachlorobenzene	0.33	0.33	1.20	6.00	12.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Indeno[1,2,3-cd]pyrene	0.50	0.50	0.50	5.60	11.00	ND		ND		ND		ND		0.03	**J**	ND		ND		ND		ND		ND		**0.2**	**J**
Naphthalene	12.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Pentachlorophenol	0.800	2.40	6.700	6.700	55.000	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Phenanthrene	100.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		0.05	**J**	ND		ND		0.04	**J**	ND		ND		**0.3**	**J**
Phenol	0.33	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND			
Pyrene	100.00	100.00	100.00	500.00	1000.00	ND		ND		ND		ND		0.07	**J**	ND		ND		0.04	**J**	ND		ND		**0.5**	**J**

Table 2c

SUB-SURFACESOIL RESULTS
NATIVE SOIL
4435-4445 MILITARY ROAD

Location ID - Sample Depth Date Sampled Sample Matrix Units	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	B01-01-1 03/23/2020 SOIL mg/kg	B02-01-1 03/23/2020 SOIL mg/kg	B03-01-2 03/23/2020 SOIL mg/kg	B04-01-1 03/23/2020 SOIL mg/kg	B05-01-1.5 03/23/2020 SOIL mg/kg	B06-01-1 03/23/2020 SOIL mg/kg	B07-01-1 03/23/2020 SOIL mg/kg	B08-01-1 03/23/2020 SOIL mg/kg	B09-03-8 03/23/2020 SOIL ug/kg	B10-03-8 03/23/2020 SOIL mg/kg	B11-03-8 03/23/2020 SOIL mg/kg
Pesticides																
4,4'-DDD	0.0033	2.60	13.00	92	180	ND	ND	ND	ND	ND	ND	ND	0.003 J			
4,4'-DDE	0.0033	1.80	8.90	62	120	ND	ND	ND	ND	ND	ND	ND				
4,4'-DDT	0.0033	1.70	7.90	47	94	ND	ND	ND	ND	0.003 J	ND	ND	0.003 J			
Aldrin	0.0050	0.02	0.10	0.68	1.40	ND	ND	ND	ND	ND	ND	ND	ND			
alpha-BHC	0.0200	0.10	0.48	3.40	6.80	ND	ND	ND	ND	ND	ND	ND	ND			
beta-BHC	0.0360	0.07	0.36	3.0	14.0	ND	ND	ND	ND	ND	ND	0.002 U	ND			
Chlordane (.alpha.)	0.0940	0.91	4.20	24.0	47.0	ND	ND	ND	ND	ND	ND	ND	ND			
delta-BHC	0.0400	100.00	100.00	500.0	1000.0	ND	0.002 U	0.002 U	0.002 U	0.003 JB	0.001 JB	0.002 U	0.010 U			
Dieldrin	0.0050	0.04	0.20	1.40	2.80	ND	ND	ND	ND	ND	ND	ND	ND			
Endosulfan I	2.40	4.80	24.0	200	920	ND	ND	ND	ND	ND	ND	ND	ND			
Endosulfan II	2.40	4.80	24.0	200	920	ND	ND	ND	ND	ND	ND	ND	ND			
Endosulfan sulfate	2.40	4.80	24.0	200	920	ND	ND	ND	0.001 J	ND	ND	ND	ND			
Endrin	0.014	2.20	11	89	410	ND	ND	ND	ND	ND	ND	ND	ND			
Endrin aldehyde						ND	ND	ND	ND	0.003 J	ND	ND	ND			
gamma-BHC (Lindane)	0.100	0.28	1.30	9.20	23.0	ND	0.002 U	0.002 U	0.002 U	0.002 JB	0.001 JB	0.0019 U	0.010 U			
Heptachlor	0.042	0.42	2.10	15.0	29.0	ND	ND	ND	ND	ND	ND	ND	ND			
Heptachlor epoxide						0.001 J	ND	ND	ND	ND	ND	ND	ND			
PCBs																
PCB-1016						ND	ND	ND	ND	ND	ND	ND	ND			
PCB-1221						ND	ND	ND	ND	ND	ND	ND	ND			
PCB-1232						ND	ND	ND	ND	ND	ND	ND	ND			
PCB-1242						ND	ND	ND	ND	ND	ND	ND	ND			
PCB-1248						ND	ND	ND	ND	ND	ND	ND	ND			
PCB-1254						ND	ND	ND	ND	ND	ND	ND	ND			
PCB-1260						ND	ND	ND	ND	ND	ND	ND	ND			
Metals																
Mercury	0.18	0.81	0.81	2.8	5.7	0.025	0.096	0.034	0.067	0.057	0.031	0.045	0.076			
Arsenic	13	16	16	16	16	4.7	6.2	7.0	5.3	5.8	5.6	4.5	6.5			
Barium	350	350	400	400	10000	131	133	133	135	118 B	143 F1	111	104			
Beryllium	7.2	14	72	590	2700	0.99	1.1	1.1	1.3	1.1	1.3	0.98	1.0			
Cadmium	2.5	2.5	4.3	9.3	60	0.20 J	0.17 J	0.23 J	0.22 J	0.30	0.18 J	0.16 J	0.39			
Chromium	30	36	180	1500	6800	40.8	28.1	33.9	34.9	35.1	40.2	25.9	30.8			
Copper	50	270	270	270	10000	18.8	21.1	25.3	20.9	17.3	22.9	5.4	13.4			
Lead	63	400	400	1000	3900	11.2	12.5	13.3	14.2	27.6 B	16.7	13.6	29.2			
Manganese	1600	2000	2000	10000	10000	510	290	466	636	827 B	373	365	940			
Nickel	30	140	310	310	10000	32.8	39.5	45.8	36.5	25.7	34.4	18.3	22.9			
Selenium	3.9	36	180	1500	6800	ND	ND	ND	ND	ND	ND	ND	1.3 J			
Silver	2	36	180	1500	6800	ND	ND	ND	ND	ND	ND	ND	ND			
Zinc	109	2200	10000	10000	10000	59.0	60.3	67.8	70.1	113 B	81.6 B	81.4	99.8			
WetChem																
Cyanide	27	27	27	27	10000	ND	ND	ND	ND	ND	ND	ND	ND			

Analytical Data compared to Part 375 Standards and DER-10
ND indicates analyte was not detected.
Blank space indicates analyte was not analyzed for in that sample.
B - Compound was found in the blank and sample.
F1 - MS and/or MSD recovery exceeds control limits.
F2 - MS/MSD RPD exceeds control limits
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
vs - Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.

Table 2d

DELINEATION SOIL RESULTS
4435-4445 MILITARY ROAD

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	Protection of Groundwater	B01-2N	B01-2E	B01-2S	B01-2W	B01-4S	B01-4W	BO1-00-0-1	BOI-2N	BOI-2E	BOI-4W	BOI-4S
Sample Depth							0.5'	0.5'	0.5'	0.5'	0.5'	0.5'		0.5'	0.5'	0.5'	0.5'
Date Sampled							01/21/2021	01/21/2021	01/21/2021	01/21/2021	01/21/2021	01/21/2021	06/29/2021	06/29/2021	06/29/2021	06/29/2021	06/29/2021
Sample Matrix							SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
Units							mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Metals																	
Chromium	30	36	180	1500	6800	NA	1180	1290	1590	3780	265	816					
WetChem																	
Chromium (hexavalent)	1	22	110	400	800	19							36.4	ND	ND	ND	ND

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	Protection of Groundwater	B03-2N	B03-2E	B03-2S	B03-2S	B03-2W	B03-4N	B03-4E	B03-4S	B03-4S	B03-4W	B03-4W	B03-6N	B03-6E	B03-6S	B03-6W	B03-8N	B03-8E	B03-8S
Sample Depth							0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'	0.5'
Date Sampled							01/21/2021	01/21/2021	01/21/2021	03/11/2021	01/21/2021	01/21/2021	01/21/2021	01/21/2021	03/11/2021	01/21/2021	03/11/2021	01/21/2021	01/21/2021	01/21/2021	01/21/2021	01/21/2021	01/21/2021	01/21/2021
Sample Matrix							SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO	SO
Units							mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Metals																								
Mercury	0.18	0.81	0.81	2.8	5.7	NA	0.31	0.061	0.19		0.12	0.12	0.031	0.16		ND								
Chromium	30	36	180	1500	6800	NA	1860	1090	5060		2830	3110	3020	3550		6050		2620	3300	2800	116	3190	2580	3050
WetChem																								
Chromium (hexavalent)	1	22	110	400	800	19				34.5					6.9		137							

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	Protection of Groundwater	B04-2N	B04-2E	B04-2S	B04-2W
Sample Depth							0.5'	0.5'	0.5'	0.5'
Date Sampled							01/21/2021	01/21/2021	01/21/2021	01/21/2021
Sample Matrix							SO	SO	SO	SO
Units							ug/kg	ug/kg	ug/kg	ug/kg
SVOCs										
Benzo[a]pyrene	1	1	1	1	1	NA	0.12 J	0.095 J	0.10 J	0.093 J

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	Protection of Groundwater	B06-2N	B06-2E	B06-2S	B06-2W
Sample Depth							Surface	Surface	Surface	Surface
Date Sampled							01/21/2021	01/21/2021	01/21/2021	01/21/2021
Sample Matrix							SO	SO	SO	SO
Units							mg/kg	mg/kg	mg/kg	mg/kg
Metals										
Barium	350	350	400	400	10000	NA	105 ^6+	105 ^6+	77.2 ^6-	64.4 ^6+

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	Protection of Groundwater	B08-2N	B08-2E	B08-2S	B08-2W
Sample Depth							0.4'	0.4'	0.4'	0.4'
Date Sampled							01/21/2021	01/21/2021	01/21/2021	01/21/2021
Sample Matrix							SO	SO	SO	SO
Units							mg/kg	mg/kg	mg/kg	mg/kg
Metals										
Mercury	0.18	0.81	0.81	2.8	5.7	NA	1.0	1.3	0.60	0.45

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	Protection of Groundwater	B14-2N	B14-2S	B14-2E	B14-2W
Sample Depth							0-1'	0-1'	0-1'	0-1'
Date Sampled							03/11/2021	03/11/2021	03/11/2021	03/11/2021
Sample Matrix							SO	SO	SO	SO
Units							mg/kg	mg/kg	mg/kg	mg/kg
Metals										
Mercury	0.18	0.81	0.81	2.8	5.7	NA	0.24	0.11	0.50	0.19

Analytical Data compared to Part 375 Standards and DER-10
ND indicates analyte was not detected.
NA indicates SCO not applicable for specific analyte
Blank space indicates analyte was not analyzed for in that sample.
^6+ - Interference Check Standard (ICSA and/or ICSAB) is outside acceptance limits, high biased.
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Table 2e

ADDITIONAL RI SOIL RESULTS
4435-4445 MILITARY ROAD

Location ID	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	B14-00-0-1		B13-00-0-1		B12-00-0-1	
Sample Depth						0-1'		0-1'		0-1'	
Date Sampled						01/21/2021		01/21/2021		01/21/2021	
Sample Matrix						SO		SO		SO	
Units						mg/kg		mg/kg		mg/kg	
VOCs											
1,1,1-Trichloroethane	1	100	100	500	1000	ND	vs				
1,1-Dichloroethane	0	19	26	240	480	ND	vs				
1,1-Dichloroethene	0	100	100	500	1000	ND	vs				
1,2-Dichlorobenzene	1	100	100	500	1000	ND	vs				
1,2-Dichloroethane	0	2	3	30	60	ND	vs				
1,3-Dichlorobenzene	2	17	49	280	560	ND	vs				
1,4-Dichlorobenzene	2	10	13	130	250	ND	vs				
2-Butanone (MEK)	0	100	100	500	1000	ND	vs				
Acetone	0	100	100	500	1000	ND	vs				
Benzene	0	3	5	44	89	ND	vs				
Carbon tetrachloride	1	1	2	22	44	ND	vs				
Chlorobenzene	1	100	100	500	1000	ND	vs				
Chloroform	0	10	49	350	700	ND	vs				
cis-1,2-Dichloroethene	0	59	100	500	1000	ND	vs				
Ethylbenzene	1	30	41	390	780	ND	vs				
Methyl tert-butyl ether	1	62	100	500	1000	ND	vs				
Methylene Chloride	0	51	100	500	1000	**0.0031**	**Jvs**				
Tetrachloroethene	1	6	19	150	300	ND	vs				
Toluene	1	100	100	500	1000	ND	vs				
trans-1,2-Dichloroethene	0	100	100	500	1000	ND	vs				
Trichloroethene	0	10	21	200	400	ND	vs				
Vinyl chloride	0	0	1	13	27	ND	vs				
Xylenes, Total	0	100	100	500	1000	ND	vs				
SVOCs											
1,4-Dioxane	0	10	13	130	250	ND		ND		ND	
2-Methylphenol	0	100	100	500	1000	ND		ND		ND	
4-Methylphenol	0	34	100	500	1000	ND		ND		ND	
Acenaphthene	20	100	100	500	1000	ND		ND		ND	
Acenaphthylene	100	100	100	500	1000	ND		ND		ND	
Anthracene	100	100	100	500	1000	ND		ND		ND	
Benzo[a]anthracene	1	1	1	6	11	**0.150**	**J**	**0.095**	**J**	**0.240**	**J**
Benzo[a]pyrene	1	1	1	1	1	**0.180**	**J**	**0.100**	**J**	**0.280**	**J**
Benzo[b]fluoranthene	1	1	1	6	11	**0.260**		**0.130**	**J**	**0.360**	**JF2**
Benzo[g,h,i]perylene	100	100	100	500	1000	**0.140**	**J**	**0.086**	**J**	**0.240**	**J**
Benzo[k]fluoranthene	1	1	4	56	110	**0.076**	**J**	**0.059**	**J**	**0.190**	**J**
Chrysene	1	1	4	56	110	**0.210**		**0.110**	**J**	**0.320**	**J**
Dibenz(a,h)anthracene	0	0	0	1	1	ND		ND		ND	
Dibenzofuran	7	14	59	350	1000	ND		ND		ND	
Fluoranthene	100	100	100	500	1000	**0.260**		**0.180**	**J**	**0.490**	**JF1**
Fluorene	30	100	100	500	1000	ND		ND		ND	
Hexachlorobenzene	0	0	1	6	12	ND		ND		ND	
Indeno[1,2,3-cd]pyrene	1	1	1	6	11	**0.120**	**J**	**0.076**	**J**	**0.220**	**J**
Naphthalene	12	100	100	500	1000	ND		ND		ND	
Pentachlorophenol	1	2	7	7	55	ND		ND		ND	
Phenanthrene	100	100	100	500	1000	**0.140**	**J**	**0.090**	**J**	**0.230**	**J**
Phenol	0	100	100	500	1000	ND		ND		ND	
Pyrene	100	100	100	500	1000	**0.200**	**J**	**0.150**	**J**	**0.340**	**J**
Pesticidies											
4,4'-DDD	0.0	3	13	92	180	ND					
4,4'-DDE	0.0	2	9	62	120	**0.00140**	**J**				
4,4'-DDT	0.0	2	8	47	94	ND					
Aldrin	0	0	0	1	1	ND					
alpha-BHC	0	0	0	3	7	ND					
cis-Chlordane	0	1	4	24	47	ND					
beta-BHC	0	0	0	3	14	ND					
delta-BHC	0	100	100	500	1000	ND					
Dieldrin	0	0	0	1	3	ND					
Endosulfan I	2	5	24	200	920	ND					
Endosulfan II	2	5	24	200	920	**0.00072**	**J**				
Endosulfan sulfate	2	5	24	200	920	ND					
Endrin	0	2	11	89	410	ND					
gamma-BHC (Lindane)	0	0	1	9	23	ND					
trans-Chlordane						ND					
Heptachlor	0	0	2	15	29	ND					

Table 2e

ADDITIONAL RI SOIL RESULTS
4435-4445 MILITARY ROAD

Location ID						B14-00-0-1		B13-00-0-1		B12-00-0-1	
Sample Depth	Unrestricted Use	Residential Use	Restricted Residential Use	Commercial Use	Industrial Use	0-1'		0-1'		0-1'	
Date Sampled						01/21/2021		01/21/2021		01/21/2021	
Sample Matrix						SO		SO		SO	
Units						mg/kg		mg/kg		mg/kg	
PCBs											
PCB-1016						ND					
PCB-1221						ND					
PCB-1232						ND					
PCB-1242						ND					
PCB-1248						ND					
PCB-1254						ND					
PCB-1260						ND					
Total PCBs	0.1	1	1	1	25	ND					
Metals											
Aluminum						13300		21000		9780	F1
Mercury	0.18	0.81	0.81	2.8	5.7	8.4		1.1		0.69	F1
Antimony						ND		ND		ND	F1
Arsenic	13	16	16	16	16	7.8		5.3		5.9	
Barium	350	350	400	400	10000	197	^6-	87.9	^6-	87.0	^6+F1
Beryllium	7.2	14	72	590	2700	0.66		0.81		0.43	
Cadmium	2.5	2.5	4.3	9.3	60	0.89		0.28		1.1	
Calcium						105000	B	37800	B	90400	BF2
Chromium						300		27.8		29.8	F1
Cobalt						7.5		12.9		6.7	
Copper	50	270	270	270	10000	74.8		17.1		36.5	
Iron						17600		22500		18200	
Lead	63	400	400	1000	3900	185		63.2		165	F1F2
Magnesium						57000		25500		56100	F2
Manganese	1600	2000	2000		10000	719	B	316	B	571	BF2
Nickel	30	140	310	310	10000	20.7		21.3		22.1	
Potassium						3480		3600		2460	F1
Selenium	3.9	36	180	1500	6800	1.7	J	2.1	J	1.3	J
Silver	2	36	180	1500	6800	0.28	J	0.28	J	ND	
Sodium						252	B	146	JB	144	JB
Thallium						ND		ND		ND	
Vanadium						28.8		40.0		21.4	F1
Zinc	109	2200		10000	10000	189		112		206	
WetChem											
Cyanide	27	27	27	27	10000	ND					

Analytical Data compared to Part 375 Standards and DER-10

ND indicates analyte was not detected.

Blank space indicates analyte was not analyzed for in that sample.

^6+ - Interference Check Standard (ICSA and/or ICSAB) is outside acceptance limits, high biased.

B - Compound was found in the blank and sample.

F1 - MS and/or MSD recovery exceeds control limits.

F2 - MS/MSD RPD exceeds control limits

J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

vs - Reported analyte concentrations are below 200 ug/kg and may be biased low due to the sample not being collected according to 5035A-L low-level specifications.

Table 3

2014 PHASE II ESA
SOIL RESULTS
4435-4445 MILITARY ROAD

TABLE 1 - 4435 MILITARY ROAD - PHASE 2 ESA SOIL SAMPLE ANALTICAL RESULTS SUMMARY * PAGE 1 of 2												
Sampling Program	**PEI - Phase 2 ESA SOIL BORING SAMPLING PROGRAM**											
Sample Number	**BH 3**	**BH 3 - SS**	**BH 4**	**BH 4 - SS**	**BH 9**	**BH 9 - SS**	**BH 11**	**BH 11 - SS**	**NYSDEC**	**NYSDEC**	**NYSDEC**	**NYSDEC**
Sample Date	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**PART 375**	**PART 375**	**PART 375**	**PART 375**
Sample depth (bgs)	**1' - 3'**	**Surface**	**1' - 3'**	**Surface**	**1' - 3'**	**Surface**	**1' - 3'**	**Surface**	**Residential**	**Restrict Res**	**Comercial**	**Industrial**
Compounds	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**(a)**	**(b)**	**(c)**	**(d)**
Metals												
Mercury	0.13	0.27	0.54	0.04	0.39	0.13	0.19	0.01	0.81	1	2.8	5.7
Arsenic	3.12	4.6	5.3	**138(a)-(d)**	1.5 J	2.4	4.7	6.3	16	16	16	16
Barium	38.0	120	121	138	22.4	23.9	101	110	350	400	400	10,000
Beryllium	ND	0.67	0.94	ND	ND	ND	0.85	0.87	14	72	590	2,700
Cadmium	0.63 J	2.13	0.97	**10.3 (a)-(c)**	ND	**3.07 (a)**	0.81	0.89	2.5	4.3	9.3	60
Chromium	12.6	43.9	31.5	**44.1 (a)**	**4820 (a)-(c)**	959	33.1	**34.5**	36	180	1500	6800
Copper	12.8	42,8	27.2	**2260 (a)-(c)**	17.9	5.9	18.1	19.2	270	270	270	10000
Lead (Axial)	18.4	88.5	37.8	**863 (a) (b)**	ND	127	22.9	24.1	400	400	1000	3900
Magnesium	ND	ND	ND	ND	313	ND	ND	ND	N/A	N/A	N/A	N/A
Manganese	324	451	646	5.08	ND	408	1500	1300	2000	2000	10000	10,000
Nickel	**8.8**	25.8	30.1	89.4	26.9	31.7	22.3	23.3	140	310	310	10000
Selenium	ND	2.2	3.5	ND	ND	ND	3.1	3.8	36	180	1500	6800
Silver	ND	0.58 J	0.68 J	2.7	ND	ND	1.34	1.2 J	36	180	1500	6800
Zinc	84	308	**92.7**	**10600(a)-(d)**	31	759	83.6	91.6	2200	10000	10000	10000
PCBS												
PCB-1248	ND	ND	0.04 J	0.02 J	ND	ND	ND	ND	1	1	1	25
Pesticides												
4,4-DDT	0.003 J	0.004 J	ND	0.002 J	ND	ND	ND	ND	1.7	N	47.0	94
4,4 DDD	0.003 J	0.002 J	0.002 J	0.002 J	ND	ND	ND	ND	2.6	13	92.0	180
Endrin Aldehyde	0.003 J	0,028	0.002 J	0.01 J	ND	M\ND	ND	ND	N/A	N/A	N/A	N/A
alpha-BHC	ND	ND	ND	ND	ND	ND	ND	ND	0.097	0.48	3.4	6.8
beta BHC	ND	ND	0.003 J	0.002 J	ND	ND	ND	ND	0.072	0.36	3	14
delta BHC	ND	ND	0.004 J	0.003 J	ND	ND	ND	ND	100	100	500.00	1000
Endosulfan Sulfate	ND	ND	ND	ND	ND	0.003 J	ND	ND	4.8	24	200.00	920
cis-Chlordane	ND	0.004	ND	ND	ND	ND	0.002 J	0.009	N/A	N/A	N/A	N/A
Dieldrin	ND	ND	ND	0.002	ND	ND	ND	ND	0.039	0.2	1.40	2.8
Methoxychlor	ND	0.005	ND	0.002 J	ND	ND	ND	ND	N/A	N/A	N/A	N/A

Table 3

2014 PHASE II ESA
SOIL RESULTS
4435-4445 MILITARY ROAD

TABLE 1 - 4435 MILITARY ROAD - PHASE 2 ESA SOIL SAMPLE ANALTICAL RESULTS SUMMARY * PAGE 2 of 2												
Sampling Program	**PEI - Phase 2 ESA SOIL BORING SAMPLING PROGRAM**											
Sample Number	**BH 3**	**BH 3 - SS**	**BH 4**	**BH 4 - SS**	**BH 9**	**BH 9 - SS**	**BH 11**	**BH 11 - SS**	**NYSDEC**	**NYSDEC**	**NYSDEC**	**NYSDEC**
Sample Date	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**11/5/2013**	**PART 375**	**PART 375**	**PART 375**	**PART 375**
Sample depth (bgs)	**1' - 3'**	**Surface**	**1' - 3'**	**Surface**	**1' - 3'**	**Surface**	**1' - 3'**	**Surface**	**Residential**	**Restrict Res**	**Comercial**	**Industrial**
Compounds	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**(a)**	**(b)**	**(c)**	**(d)**
VOCs												
o-Xylene	ND	N/A	0.002 J	N/A	ND	N/A	ND	N/A	100	100	500	1000
Toluene	ND	N/A	0.006 J	N/A	ND	N/A	ND	N/A	100	100	500	1000
Ethylbenzene	ND	N/A	0.001 J	N/A	ND	N/A	ND	N/A	30	41	390	780
Acetone	ND	N/A	0.027 J	N/A	0.025 J	N/A	0.02 J	N/A	100	100	500	1000
1,2,4 Trimethylbenzene	ND	N/A	0.003 J	N/A	ND	N/A	ND	N/A	47	52	190	380
1,3,5 Trimethylbenzene	ND	N/A	0.001 J	N/A	ND	N/A	ND	N/A	47	52	190	380
2-Butanone	ND	N/A	ND	N/A	ND	N/A	ND	N/A	N/A	N/A	N/A	N/A
Benzene	ND	N/A	0.004 J	N/A	ND	N/A	ND	N/A	2.9	4.8	44	89
Carbon Disulfide	ND	N/A	0.003 J	N/A	ND	N/A	ND	N/A	N/A	N/A	N/A	N/A
Cyclohexane	ND	N/A	0.006 J	N/A	ND	N/A	ND	N/A	N/A	N/A	N/A	N/A
Methylcyclohexane	ND	N/A	0.008 J	N/A	ND	N/A	ND	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	0.02	N/A	ND	N/A	ND	N/A	ND	N/A	5.5	19	150	300
m,p-Xylene	ND	N/A	ND	N/A	ND	N/A	ND	N/A	100	100	500	1000
TICs (Total)	ND	N/A	0.4 J	N/A	0.03	N/A	ND	N/A	N/A	N/A	N/A	NA
SVOCs												
Benzo(a)anthracene	ND	0.42	ND	ND	ND	ND	ND	0.25 J	1	1	5.6	11
Benzo(a)pyrene	ND	0.4	ND	ND	ND	ND	ND	0.25 J	1	1	1	1.1
Benzo(b)fluoranthene	ND	0.39	ND	ND	ND	ND	ND	0.26 J	1	1	5.6	11
Benzo(g,h,I)perylene	ND	0.25 J	ND	ND	ND	ND	ND	ND	100	100	500	1000
Benzo(k)fluoranthene	ND	0.37	ND	ND	ND	ND	ND	0.24 J	1	3.9	56	110
Chrysene	ND	0.46	ND	ND	ND	ND	0.22 J	0.31 J	1	3.9	56	110
Bis (2-ethylhexyl) phthalate	ND	0.35	ND	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A
Butylbenzylphthalate	ND	0.43	ND	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A
Fluoranthene	ND	0.93	ND	ND	ND	ND	0.42	ND	100	100	500	1000
Indeno(1,2,3-cd)pyrene	ND	0.32	ND	ND	ND	ND	ND	ND	0.5	0.5	5.6	11
Phenanthrene	ND	0.53	ND	ND	ND	ND	0.24 J	0.31 J	100	100	500	1000
Pyrene	ND	0.81	ND	ND	ND	ND	0.32 J	0.48	100	100	500	1000
TICs (Total)	1	3.6	11.9	7.2	1.4	1.6	7.4	2.3	N/A	N/A	NA	NA

*** Data Has Been Validated**

ND - Non-Detect NA - Not Available
Shaded Value - Exceeds Part 375 SCOs
TICs - Tentitively Identified Compounds
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.
C - Calibration acceptability criteria exceeded for this analyte
J - Estimated value-below calibration range N - Analysis indicates tentitive analyte identification

Table 4a

2017 Phase II ESA
Surface Soil Sampling Results
4445 Military Road

Sample ID	NY SCO - Unrestricted Use	NY SCO - Residential	NY SCO - Restricted Residential	NY SCO - Commercial	NY SCO - Industrial	BH-4A-SS	BH-4B-SS	BH-4C-SS	BH-4D-SS	BH-4E-SS	BH-4F-SS	BH-4G-SS	BH-4H-SS	BH-4I-SS
Lab Sample Number						H4680-01	H4680-02	H4680-03	H4680-04	H4680-05	H4680-06	H4680-07	H4680-08	H4680-09
Sampling Date						8/29/2016	8/29/2016	8/29/2016	8/29/2016	8/29/2016	8/29/2016	8/29/2016	8/29/2016	8/29/2016
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Volatile Organic Compounds														
Acetone	0.05	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide		100				NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	0.12	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene		59	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	0.06	2.9	4.8	44	89	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02	2.3	3.1	30	60	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.47	10	21	200	400	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	0.7	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.3	5.5	19	150	300	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Mixed)	0.26	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2.4	17	49	280	560	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	9.8	13	130	250	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds														
Acenaphthene	20	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	100	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	100	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	1	1	5.6	11	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	1	1	1	1	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1	1	1	5.6	11	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	100	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.8	1	3.9	56	110	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	1	1	3.9	56	110	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	7	14	59	350	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	100	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	30	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	0.33	0.41	1.2	6	12	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	12	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	100	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	0.33	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	100	100	100	500	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals														
Arsenic	13	16	16	16	16	90.7 D	3.73	6.22	6.54	7.15	5.96	5.02	4.95	9.83
Cadmium	2.5	2.5	4.3	9.3	60	3.94 D	2.42	0.517	0.178 J	0.456	1.69	2.57	1.7	3.32
Chromium	30	36	180	1500	6800	27.5 D	7.76	27.3	25	32.3	25.1	276	23.7	5.86
Copper	50	270	270	270	10000	1360 D	22.6	39.3	35	38.6	52	83.4	38	92.4
Lead	63	400	400	1000	3900	665 D	70.4	66.7	39.7	86.4	119	126	131	182
Zinc	109	2200	10000	10000	10000	6290 D	742	132	86.1	174	472	410	477	1010

Notes:

All concentrtaions in mg/kg

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL. The concentration given is an approximate value.

D - The reported value is from a secondary analysis with a dilution factor. The original analysis exceeded the calibration range.

NA - Not Analyzed For

Only compounds with Part 375 SCO Standards

Table 4b

2017 Phase II ESA
Subsurface Soil Sampling Results
4445 Military Road

Sample ID	NY SCO - Unrestricted Use	NY SCO - Residential	NY SCO - Restricted Residential	NY SCO - Commercial	NY SCO - Industrial	BH-20-12-15 FT	BH-26-1 FT	BH-15-0-1 FT	BH-16-0-1 FT	DUP-A	BH-9A-1 FT	BH-9B-1 FT	BH-9C-1 FT	BH-9D-1 FT	BH-9E-1 FT	BH-9F-1 FT	BH-9G-1 FT	BH-9H-1 FT	BH-9I-1 FT	DUP-B
Lab Sample Number						H4680-27	H4680-30	H4680-10	H4680-11	H4680-14	H4680-17	H4680-18	H4680-19	H4680-20	H4680-21	H4680-22	H4680-23	H4680-24	H4680-25	H4680-26
Sampling Date						8/30/2016	8/30/2016	8/29/2016	8/29/2016	8/29/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016	8/30/2016
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Volatile Organic Compounds																				
Acetone	0.05	100	100	500	1000	0.013 J	0.0229 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide		100				0.0018 J	0.0046 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	0.12	100	100	500	1000	0.0264 U	0.0229 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene		59	100	500	1000	0.0042 J	0.0046 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	0.06	2.9	4.8	44	89	0.0053 U	0.0046 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02	2.3	3.1	30	60	0.0098	0.0046 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.47	10	21	200	400	0.0053 U	0.0046 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	0.7	100	100	500	1000	0.0017 J	0.0023 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.3	5.5	19	150	300	0.0053 U	0.0046 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Mixed)	0.26	100	100	500	1000			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2.4	17	49	280	560	0.0053 U	0.0046 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	9.8	13	130	250	0.0053 U	0.0046 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds																				
Acenaphthene	20	100	100	500	1000	0.38 U	0.37 U	2 U	0.38 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	100	100	100	500	1000	0.38 U	0.37 U	2 U	0.38 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	100	100	100	500	1000	0.38 U	0.11 J	2 U	0.0936 J	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	1	1	5.6	11	0.38 U	0.46	2 U	0.3 J	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	1	1	1	1	1.1	0.38 U	0.38	2 U	0.26 J	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1	1	1	5.6	11	0.38 U	0.47	2 U	0.3 J	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	100	100	100	500	1000	0.38 U	0.24 J	2 U	0.18 J	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.8	1	3.9	56	110	0.38 U	0.26 J	2 U	0.19 J	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	1	1	3.9	56	110	0.38 U	0.39	2 U	0.29 J	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	0.38 U	0.37 U	2 U	0.38 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	7	14	59	350	1000	0.38 U	0.37 U	2 U	0.38 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	100	100	100	500	1000	0.38 U	0.83	2 U	0.55	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	30	100	100	500	1000	0.38 U	0.37 U	2 U	0.38 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	0.33	0.41	1.2	6	12	0.38 U	0.37 U	2 U	0.38 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	0.38 U	0.25 J	2 U	0.19 J	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	12	100	100	500	1000	0.38 U	0.37 U	2 U	0.38 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	100	100	100	500	1000	0.38 U	0.41	2 U	0.3 J	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	0.33	100	100	500	1000	0.38 U	0.0952 J	2 U	0.38 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	100	100	100	500	1000	0.38 U	0.71	2 U	0.48	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals																				
Arsenic	13	16	16	16	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	2.5	2.5	4.3	9.3	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	30	36	180	1500	6800	NA	NA	NA	NA	NA	411	1940	1700	4780	3880	1330	976	3050	3400	23.2
Copper	50	270	270	270	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	63	400	400	1000	3900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	109	2200	10000	10000	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

All concentrtaions in mg/kg

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL.
The concentration given is an approximate value.

NA - Not Analyzed For

U - The compound was not detected at the indicated concentration.

Only compounds with Part 375 SCO Standards

Table 4c

2017 Phase II ESA
Pump Island Subsurface Soil Sampling Results
4445 Military Road

Sample ID Lab Sample Number Sampling Date Units	NY SCO - Unrestricted Use mg/kg	NY SCO - Residential mg/kg	NY SCO - Restricted Residential mg/kg	NY SCO - Commercial mg/kg	NY SCO - Industrial mg/kg	B-25-6-7 FT L1720848-01 6/19/2017 mg/kg	B-25-10S-13-14 FT L1720848-06 6/19/2017 mg/kg	B-25-5E-13-14 FT L1720848-08 6/19/2017 mg/kg	B-25-5W-13-14 FT L1720848-10 6/19/2017 mg/kg
Volatile Organics by GC/MS									
Toluene	0.7	100	100	500	1000	0.4	0.097 U	0.086 U	0.099 U
Ethylbenzene	1	30	41	390	780	6.8	0.048 J	0.021 J	0.066 U
p/m-Xylene	0.26	100	100	500	1000	25	0.11 J	0.11 U	0.13 U
o-Xylene	0.26	100	100	500	1000	8.4	0.028 J	0.11 U	0.13 U
Isopropylbenzene		100				0.86	0.27	0.42	0.059 J
Cyclohexane						1 J	1.5	2.5	0.08 J
Methyl cyclohexane						0.26 J	0.36	0.64	0.26 U

Notes:

All concentrtaions in mg/kg

J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than MDL. The concentration given is an approximate value.

U - The compound was not detected at the indicated concentration.

Table 5a

GROUNDWATER RESULTS
4435-4445 MILITARY ROAD

Location ID		MW-03		MW-05		MW-06		MW-07		DUP-200205	
Date Sampled		02/05/2020		02/05/2020		02/05/2020		02/05/2020		02/05/2020	
Sample Matrix		Water		Water		Water		Water		Water	
Units	NYS TOGS Groundwater Standand & Guidance Value	ug/l		ug/l		ug/l		ug/l		ug/l	
VOCs											
1,1,1-Trichloroethane	5	ND		ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	5	ND		ND		ND		ND		ND	
1,1,2-Trichloro-1,2,2-trifluoroethane	5	ND		ND		ND		ND		ND	
1,1,2-Trichloroethane	1	ND		ND		ND		ND		ND	
1,1-Dichloroethane	5	ND		ND		ND		ND		ND	
1,1-Dichloroethene	5	ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	5	ND	*	ND	UJ	ND	UJ	ND	UJ	ND	*
1,2-Dichlorobenzene	3	ND		ND		ND		ND		ND	
1,2-Dichloroethane	0.6	ND		**1.3**		ND		ND		ND	
1,2-Dichloropropane	5	ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	3	ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	3	ND		ND		ND		ND		ND	
2-Butanone (MEK)	50	ND		ND		ND		ND		ND	
2-Hexanone	50	ND		ND	F1	ND		ND		ND	
Acetone	50	ND		ND		ND		ND		ND	
Benzene	1	ND		ND		ND		ND		ND	
Bromodichloromethane	50	ND		ND		ND		ND		ND	
Bromoform	50	ND		ND		ND		ND		ND	
Bromomethane	5	ND		ND		ND		ND		ND	
Carbon disulfide	60	ND		ND		ND		ND		**0.27**	**J**
Carbon tetrachloride	5	ND		ND		ND		ND		ND	
Chlorobenzene	5	ND		ND		ND		ND		ND	
Chloroethane	5	ND		ND		ND		ND		ND	
Chloroform	7	ND		ND		ND		ND		ND	
Chloromethane	5	ND		ND		ND		ND		ND	
cis-1,2-Dichloroethene	5	ND		ND		ND		ND		ND	
Dibromochloromethane	50	ND		ND		ND		ND		ND	
Dichlorodifluoromethane	5	ND		ND		ND		ND		ND	
Ethylbenzene	5	ND		ND		ND		ND		ND	
1,2-Dibromoethane	0.0006a	ND		ND		ND		ND		ND	
Isopropylbenzene	5	ND		ND		ND		ND		ND	
Methyl tert-butyl ether	10	ND		ND		**2.9**		ND		ND	
Methylene Chloride	5	ND		ND		ND		ND		ND	
Styrene	5	ND		ND		ND		ND		ND	
Tetrachloroethene	5	ND		ND		ND		ND		ND	
Toluene	5	ND		ND		ND		ND		ND	
trans-1,2-Dichloroethene	5	ND		ND		ND		ND		ND	
Trichloroethene	5	ND		ND		ND		ND		ND	
Trichlorofluoromethane	5	ND		ND		ND		ND		ND	
Vinyl chloride	2	ND		ND		ND		ND		ND	
Xylenes, Total	5	ND		ND		ND		ND		ND	

Table 5a

GROUNDWATER RESULTS
4435-4445 MILITARY ROAD

	Location ID	MW-03	MW-05		MW-06	MW-07	DUP-200205	
	Date Sampled	02/05/2020	02/05/2020		02/05/2020	02/05/2020	02/05/2020	
	Sample Matrix	Water	Water		Water	Water	Water	
	Units	ug/l	ug/l		ug/l	ug/l	ug/l	
	NYS TOGS Groundwater Standand & Guidance Value							
SVOCs								
1,4-Dioxane			ND		1.1	ND	ND	
2,4-Dichlorophenol	5	ND	ND		ND	ND	ND	
2,4-Dinitrotoluene	5	ND	ND	F2	ND	ND	ND	
2,6-Dinitrotoluene	5	ND	ND	F2	ND	ND	ND	
2-Chloronaphthalene	10	ND	ND		ND	ND	ND	
2-Nitroaniline	5	ND	ND	F2	ND	ND	ND	
3,3'-Dichlorobenzidine	5	ND	ND		ND	ND	ND	
3-Nitroaniline	5	ND	ND	F2	ND	ND	ND	
4-Chloroaniline	5	ND	ND		ND	ND	ND	
4-Nitroaniline	5	ND	ND		ND	ND	ND	
Acenaphthene	20	ND	ND		ND	ND	ND	
Anthracene	50	ND	ND	F2	ND	ND	ND	
Atrazine	7.5	ND	ND	F2	ND	ND	ND	
Benzo[a]anthracene	0.002a	ND	ND	F2	ND	ND	ND	
Benzo[b]fluoranthene	0.002a	ND	ND	F2	ND	ND	ND	
Benzo[k]fluoranthene	0.002a	ND	ND		ND	ND	ND	
Biphenyl	5	ND	ND		ND	ND	ND	
bis (2-chloroisopropyl) ether	5	ND	ND		ND	ND	ND	
Bis(2-chloroethoxy)methane	5	ND	ND	F2	ND	ND	ND	
Bis(2-chloroethyl)ether	1	ND	ND	F2	ND	ND	ND	
Bis(2-ethylhexyl) phthalate	5	ND	ND	F2	ND	ND	ND	
Butyl benzyl phthalate	50	ND	ND	F2	ND	ND	ND	
Chrysene	0.002a	ND	ND	F2	ND	ND	ND	
Diethyl phthalate	50	ND	ND	F2	ND	ND	ND	
Dimethyl phthalate	50	ND	ND	F2	ND	ND	ND	
Di-n-butyl phthalate	50	ND	ND	F2	ND	ND	0.35	J
Di-n-octyl phthalate	50	ND	ND	F2	ND	ND	ND	
Fluoranthene	50	ND	ND	F2	ND	ND	ND	
Fluorene	50	ND	ND	F2	ND	ND	ND	
Hexachlorobenzene	0.04a	ND	ND	F2	ND	ND	ND	
Hexachlorobutadiene	0.5a	ND	ND		ND	ND	ND	
Hexachlorocyclopentadiene	5	ND	ND		ND	ND	ND	
Hexachloroethane	5	ND	ND		ND	ND	ND	
Indeno[1,2,3-cd]pyrene	0.002a	ND	ND	F2	ND	ND	ND	
Isophorone	50	ND	ND	F2	ND	ND	ND	
Naphthalene	10	ND	ND		ND	ND	ND	
Nitrobenzene	0.4	ND	ND		ND	ND	ND	
N-Nitrosodiphenylamine	50	ND	ND	F2	ND	ND	ND	
Phenanthrene	50	ND	ND	F2	ND	ND	ND	
Pyrene	50	ND	ND	F2	ND	ND	ND	

Table 5a

GROUNDWATER RESULTS
4435-4445 MILITARY ROAD

	Location ID	MW-03		MW-05		MW-06		MW-07		DUP-200205	
	Date Sampled	02/05/2020		02/05/2020		02/05/2020		02/05/2020		02/05/2020	
	Sample Matrix	Water		Water		Water		Water		Water	
	Units	ug/l		ug/l		ug/l		ug/l		ug/l	
	NYS TOGS Groundwater Standand & Guidance Value										
Pesticidies											
4,4'-DDD	0.3	0.050	U	0.250	U	0.050	U	0.050	U	ND	
4,4'-DDE	0.2	ND		ND		ND		ND		ND	
4,4'-DDT	0.2	ND	*	0.15	J*	ND	*	0.031	J*	0.031	J*
alpha-BHC	0.01	ND		0.250	U	ND		0.050	U	0.050	U
beta-BHC	0.04	ND		ND		ND		ND		ND	
delta-BHC	0.04	ND		0.250	U	0.050	U	0.050	U	0.050	U
Dieldrin	0.004	ND		ND		ND		ND		ND	
Endrin	ND	ND		ND		ND		ND		ND	
Endrin aldehyde	5	0.020	J	0.12	J	ND		ND		0.024	J
gamma-BHC (Lindane)	0.05	ND		0.250	U	ND		ND		0.050	U
Heptachlor	0.04	ND		ND		ND		ND		ND	
Heptachlor epoxide	0.03	0.013	J	ND		ND		0.0089	J	ND	
Methoxychlor	35	ND		ND		ND		ND		0.053	
Toxaphene	0.06	ND		ND		ND		ND		ND	
PCBs											
PCB-1016		ND		ND		ND		ND		ND	
PCB-1221		ND		ND		ND		ND		ND	
PCB-1232		ND		ND		ND		ND		ND	
PCB-1242		ND		ND		ND		ND		ND	
PCB-1248		ND		ND		ND		ND		ND	
PCB-1254		ND		ND		ND		ND		ND	
PCB-1260		ND		ND		ND		ND		ND	
Metals											
Mercury	0.7	ND		0.470		ND		ND		ND	
Mercury, Dissolved	0.7					ND					
Arsenic	25	6	J	ND		ND		ND		ND	
Arsenic, Dissolved	25					ND					
Barium	1000	48		59		110		53		38	
Barium, Dissolved	1000					34					
Beryllium	3	0	J	ND		1	J	0	J	ND	
Beryllium, Dissolved	3					ND					
Cadmium	5	ND		ND		1	J	1	J	ND	
Cadmium, Dissolved	5					ND					
Chromium	50	190		ND		11		6		200	
Chromium, Dissolved	50					ND					
Copper	200	4	J	ND		9	J	6	J	3	J
Copper, Dissolved	200					ND					
Iron	300	1200	B	200		10800	B	4000	B	700	B
Iron, Dissolved	300					ND					
Lead	25	8	J	ND		18		10		4	J
Lead, Dissolved	25					ND					
Magnesium	35000	24800		50000		40800		38100		19900	

Table 5a

GROUNDWATER RESULTS
4435-4445 MILITARY ROAD

	Location ID	MW-03		MW-05		MW-06		MW-07		DUP-200205	
	Date Sampled	02/05/2020		02/05/2020		02/05/2020		02/05/2020		02/05/2020	
	Sample Matrix	Water		Water		Water		Water		Water	
	Units	ug/l		ug/l		ug/l		ug/l		ug/l	
	NYS TOGS Groundwater Standand & Guidance Value										
Magnesium, Dissolved	35000					24100					
Manganese	300	41	B	480	F1	350	B	54	B	23	B
Manganese, Dissolved	300					21					
Nickel	100	2	J	1	J	11		4	J	1	J
Nickel, Dissolved	100					2	J				
Selenium	10	ND		ND		ND		ND		ND	
Selenium, Dissolved	10					ND					
Silver	50	ND		ND		ND		ND		ND	
Silver, Dissolved	50					ND					
Sodium	20000	43400		43300		120000		85300		44300	
Sodium, Dissolved	20000					114000					
Thallium	0.5	ND		ND		ND		ND		ND	
Thallium, Dissolved	0.5					ND					
Zinc	2000	16	B	2	J	57	B	37	B	9	JB
Zinc, Dissolved	2000					100	U				
Cyanide, Total	200	ND		ND		ND		ND	F1	ND	

ND indicates analyte was not detected.

Blank space indicates analyte was not analyzed for in that sample.

* - LCS or LCSD is outside acceptance limits.

B - Compound was found in the blank and sample.

F1 - MS and/or MSD Recovery is outside acceptance limits.

F2 - MS/MSD RPD exceeds control limits

I - Value is EMPC (estimated maximum possible concentration).

J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

U - The analyte was analyzed for but was not detected at or above the sample quantitation limit.

TABLE 5b

GROUNDWATER SAMPLE RESULTS - PFAS
4435-4445 MILITARY ROAD SITE

	Location ID	MW-05		MW-06		MW-07		DUP-200205		MW-06 RS	
	Sample Matrix	Water		Water		Water		Water		Water	
	Date Sampled	02/05/2020		02/05/2020		02/05/2020		02/05/2020		05/19/2020	
	Units	ng/l		ng/l		ng/l		ng/l		ng/l	
LCMS											
Perfluorobutanoic acid (PFBA)		17	B	28	B	4.9	B	5.7	B	4.3	
Perfluoropentanoic acid (PFPeA)		18		47		2.0		2.0		1.6	J
Perfluorohexanoic acid (PFHxA)		14		40		1.8	J	2.6		1.9	
Perfluoroheptanoic acid (PFHpA)		12		29		1.1	J	1.5	J	1.4	J
Perfluorooctanoic acid (PFOA)		16		49		3.9		2.0		3.2	
Perfluorononanoic acid (PFNA)		2.3		11		0.26	J	0.62	J	1.1	JB
Perfluorodecanoic acid (PFDA)		ND		5.1		ND		ND		ND	
Perfluoroundecanoic acid (PFUnA)		ND		ND		ND		ND		ND	
Perfluorododecanoic acid (PFDoA)		ND		ND		ND		ND		ND	
Perfluorotridecanoic acid (PFTriA)		ND		ND		ND		ND		ND	
Perfluorotetradecanoic acid (PFTeA)		ND		ND		ND		ND		ND	
Perfluorobutanesulfonic acid (PFBS)		1.3	J	1.6	J	1.4	J	0.92	J	0.82	J
Perfluorohexanesulfonic acid (PFHxS)		1.8	J	3.9		1.8	J	0.87	J	0.97	J
Perfluoroheptanesulfonic Acid (PFHpS)		ND		ND		ND		ND		ND	
Perfluorooctanesulfonic acid (PFOS)		4.0		15		3.3	I	3.5		4.1	
Perfluorodecanesulfonic acid (PFDS)		ND		ND		ND		ND		ND	
Perfluorooctanesulfonamide (PFOSA)		ND		ND		ND		ND		ND	
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)		ND		ND		ND		ND		ND	
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)		ND		ND		ND		ND		ND	
1H,1H,2H,2H-perfluorooctanesulfonic acid (6:2)		ND		ND		ND		ND		ND	
1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2)		ND		ND		ND		ND		ND	
	TOTAL PFAS	86		230		20		20		19.4	

ND indicates analyte was not detected.
Blank space indicates analyte was not analyzed for in that sample.
* - LCS or LCSD is outside acceptance limits.
B - Compound was found in the blank and sample.
F1 - MS and/or MSD Recovery is outside acceptance limits.
F2 - MS/MSD RPD exceeds control limits
I - Value is EMPC (estimated maximum possible concentration).
J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
MW-06 RS was resampled on 5/19/2020.

Table 5c

PRE DELINEATION SAMPLING
GROUNDWATER RESULTS
4435-4445 MILITARY ROAD

	Location ID	MW-03		TMW-08		TMW-09		TMW-08		TMW-09	
	Date Sampled	04/16/2021		04/16/2021		04/16/2021		05/04/2021		05/04/2021	
	Sample Matrix	Water		Water		Water		Water		Water	
	Units	mg/l		mg/l		mg/l		mg/l		mg/l	
	NYS TOGS Groundwater Standand & Guidance Value										
Metals											
Chromium	0.05	**2.00**	^+			**0.25**	^+				
Chromium, Dissolved	0.05	**2.00**				**0.01**					
WetChem											
Chromium, hexavalent	0.05	**1.00**		**0.23**				**0.12**		**0.40**	

ND indicates analyte was not detected.

Blank space indicates analyte was not analyzed for in that sample.

^+ - Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.

Table 6

SOIL VAPOR SAMPLING RESULTS
4435-4445 MILITARY ROAD

Location ID	NYSDOH Guidance Value	VP-01		VP-02
Date Sampled		8/5/2021		8/5/2021
Sample Matrix		Soil Vapor		Soil Vapor
Analysis		TO-15		TO-21
Units		ug/M^3		ug/M^3
Volatile Organics				
1,1,1-Trichloroethane		ND		ND
1,1,2,2-Tetrachloroethane		ND		ND
1,1,2-Trichloroethane		ND		ND
1,1-Dichloroethane		ND		ND
1,1-Dichloroethene		ND		ND
1,2,4-Trichlorobenzene		ND		ND
1,2,4-Trimethylbenzene		2.1		9.5
1,2-Dibromoethane		ND		ND
1,2-Dichlorobenzene		ND		ND
1,2-Dichloroethane		ND		ND
1,2-Dichloropropane		ND		ND
1,3,5-Trimethylbenzene		1.5		4.1
1,3-butadiene		ND		ND
1,3-Dichlorobenzene		ND		8.9
1,4-Dichlorobenzene		ND		ND
1,4-Dioxane		ND		ND
2,2,4-trimethylpentane		2700		110
4-ethyltoluene		0.49	J	3.0
Acetone		5300		5900
Allyl chloride		ND		ND
Benzene		3.4		61
Benzyl chloride		ND		ND
Bromodichloromethane		ND		ND
Bromoform		ND		ND
Bromomethane		ND		ND
Carbon disulfide		1.4		34
Carbon tetrachloride		ND		ND
Chlorobenzene		ND		ND
Chloroethane		ND		0.92
Chloroform		ND		11
Chloromethane		ND		ND
cis-1,2-Dichloroethene		ND		ND
cis-1,3-Dichloropropene		ND		ND
Cyclohexane		6.0		130
Dibromochloromethane		ND		ND
Ethyl acetate		ND		ND
Ethylbenzene		2.0		8.2
Freon 11		1.3		1.9
Freon 113		ND		ND
Freon 114		ND		ND
Freon 12		2.3		2.3
Heptane		ND		52
Hexachloro-1,3-butadiene		ND		ND
Hexane		35		410
Isopropyl alcohol		47		42
m&p-Xylene		7.5		34
Methyl Butyl Ketone		ND		ND
Methyl Ethyl Ketone		87		100
Methyl Isobutyl Ketone		ND		ND
Methyl tert-butyl ether		ND		ND
Methylene chloride	60	0.83		1.5
o-Xylene		2.2		10
Propylene		ND		ND
Styrene		ND		0.89
Tetrachloroethylene	30	ND		ND
Tetrahydrofuran		ND		ND
Toluene		7.0		33
trans-1,2-Dichloroethene		ND		ND
trans-1,3-Dichloropropene		ND		ND
Trichloroethene	2	ND		ND
Vinyl acetate		ND		ND
Vinyl Bromide		ND		ND
Vinyl chloride		ND		ND

- Analytical results compared to NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006.
- Results and guidance in ug/m3
- Highlighted cell indicates the respective guidance value exceeded.
- "- -" indicates analysis not performed.
- Blank space indicates that a NYSDOH Guidance Value does not exist
- ND indicates analyte was not detected above laboratory detection limits.
- "J" indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Appendix A
Environmental Easement / Notice / Deed Restriction

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Office of the General Counsel
625 Broadway, 14th Floor, Albany, New York 12233-1500
P: (518) 402-9185 | F: (518) 402-9018
www.dec.ny.gov

RECEIVED
Town of Niagara
SEP 9 2022
Town Clerk

RECEIVED
SEP 08 2022
TOWN OF NIAGARA
SUPERVISOR'S OFFICE

September 6, 2022

Lee Wallace
Town Supervisor
Town of Niagara
7105 Lockport Road
Niagara Falls, NY 14305

RE: Environmental Easement Package
Site Name: 4435-4445 Military Road
Site No.: C932174

Dear Mr. Wallace,

Enclosed please find a fully executed Environmental Easement, and TP-584 tax forms required for recording.

Once the Environmental Easement is recorded, the local municipality will need to be notified via Certified Mail, Return Receipt Requested.

Please return to this office, copies of the recorded easement marked by the County Clerk's Office with the date and location of recording, and a certified copy of the municipal notices. The information from the recorded easement and notices are necessary to process the Certificate of Completion.

If you have any further questions or concerns relating to this matter, please contact our office at (518) 408-0409.

Sincerely,

Cheryl Salem
Legal Assistant I
Remediation Bureau

ec: J. Andaloro, Esq., NYSDEC

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 25th day of August, 2022, between Owner, Town of Niagara, having an office at 7105 Lockport Road, Niagara Falls, County of Niagara, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee"), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 4435-4445 Military Road in the City of Niagara, County of Niagara and State of New York, known and designated on the tax map of the County Clerk of Niagara as tax map parcel number: Section 131.10 Block 2 Lot 29, being the same as that property conveyed to Grantor by deed dated October 11, 2018 and recorded in the Niagara County Clerk's Office in Instrument No. 2018-17785. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 1.19 +/- acres, and is hereinafter more fully described in the Land Title Survey dated December 23, 2021 and revised on March 17, 2022 prepared by Mark S. Hare, which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C9321174-04-19, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Niagara County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential or Restricted Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i) and (ii), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a

defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C932174
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

11. Consistency with the SMP. To the extent there is any conflict or inconsistency between the terms of this Environmental Easement and the SMP, regarding matters specifically addressed by the SMP, the terms of the SMP will control.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Town of Niagara:

By: _____

Print Name: Lee S. Wallace

Title: Town Supervisor Date: 8-15-2022

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF Niagara)

On the 15th day of August, in the year 2022, before me, the undersigned, personally appeared Lee Wallace, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

JACQUELINE SIEGMANN
NOTARY PUBLIC, STATE OF NEW YORK
QUALIFIED IN NIAGARA COUNTY
NO. 01SI6171343
MY COMMISSION EXPIRES JULY 23, 2023

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting by and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: Andrew Guglielmi
Andrew O. Guglielmi, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

Andrew Guglielmi

On the 25th day of August, in the year 2022 before me, the undersigned, personally appeared ~~Michael J. Ryan~~, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Jennifer Andaloro
Notary Public - State of New York

JENNIFER ANDALORO
Notary Public, State of New York
No. 02AN6098246
Qualified in Albany County
Commission Expires January 14, 2024

SCHEDULE "A" PROPERTY DESCRIPTION

ALL THAT TRACT OR PARCEL OF LAND, situate in the town of Niagara, County of Niagara and state of New York, being part of Lot 16, township 13, Range 9 of the Holland Land Company's Survey bounded and described as follows:

BEGINNING AT A POINT where the north line of Grauer Road intersects the northeasterly line of Military Road; Thence, northwesterly along the northeasterly line of Military Road, 226.90 feet: Thence easterly along a line with an interior angle of 60 degrees 26' 21", 94.32 feet to a point; Thence northeasterly along a line which is at right angles to Military Road, 23.00 feet; Thence southeasterly and deflecting to the right with an angle of 60 degrees 2' 22", 32.17 feet to a point; Thence easterly at an external angle of 155° 27' 58" a distance of 36.00 feet; Thence northerly at right angles to the last mentioned course. 63.3 feet; Thence easterly at right angles 114.85 feet; Thence southerly at right angles 258.00 feet to the north line of Grauer Road; Thence westerly along the north line of Grauer Road, 160.79 feet to the point of beginning.

Department of Taxation and Finance

TP-584 (9/19)

Recording office time stamp

Combined Real Estate Transfer Tax Return, Credit Line Mortgage Certificate, and Certification of Exemption from the Payment of Estimated Personal Income Tax

See Form TP-584-I, Instructions for Form TP-584, *before completing this form. Print or type.*

Schedule A – Information relating to conveyance

Grantor/Transferor

☐ Individual ☐ Corporation ☐ Partnership ☐ Estate/Trust ☐ Single member LLC ☐ Multi-member LLC ☒ Other

Name *(if individual, last, first, middle initial)* (☐ *mark an X if more than one grantor*): Town of Niagara

Social Security number (SSN):

Mailing address: 7105 Lockport Road

SSN:

City: Niagara Falls | State: NY | ZIP code: 14305

Employer Identification Number (EIN): 16-6002322

Single member's name if grantor is a single member LLC *(see instructions)*:

Single member EIN or SSN:

Grantee/Transferee

☐ Individual ☐ Corporation ☐ Partnership ☐ Estate/Trust ☐ Single member LLC ☐ Multi-member LLC ☒ Other

Name *(if individual, last, first, middle initial)* (☐ *mark an X if more than one grantee*): New York State Department of Environmental Conservation

SSN:

Mailing address: 625 Broadway, 14th Floor

SSN:

City: Albany | State: NY | ZIP code: 12233

EIN: 14-6013200

Single member's name if grantee is a single member LLC *(see instructions)*:

Single member EIN or SSN:

Location and description of property conveyed

Tax map designation – Section, block & lot *(include dots and dashes)*	SWIS code (six digits)	Street address	City, town, or village	County
131.10-2-29	13500	4435-4445 Military Road	Niagara	Niagara

Type of property conveyed *(mark an X in applicable box)*

1 ☐ One- to three-family house
2 ☐ Residential cooperative
3 ☐ Residential condominium
4 ☒ Vacant land
5 ☐ Commercial/industrial
6 ☐ Apartment building
7 ☐ Office building
8 ☐ Four-family dwelling
9 ☐ Other _____

Date of conveyance: ____ (month) ____ (day) 2022 (year)

Percentage of real property conveyed which is residential real property 0 % *(see instructions)*

Condition of conveyance *(mark an X in all that apply)*

a. ☐ Conveyance of fee interest
b. ☐ Acquisition of a controlling interest (state percentage acquired _____ %)
c. ☐ Transfer of a controlling interest (state percentage transferred _____ %)
d. ☐ Conveyance to cooperative housing corporation
e. ☐ Conveyance pursuant to or in lieu of foreclosure or enforcement of security interest *(attach Form TP-584.1, Schedule E)*
f. ☐ Conveyance which consists of a mere change of identity or form of ownership or organization *(attach Form TP-584.1, Schedule F)*
g. ☐ Conveyance for which credit for tax previously paid will be claimed *(attach Form TP-584.1, Schedule G)*
h. ☐ Conveyance of cooperative apartment(s)
i. ☐ Syndication
j. ☐ Conveyance of air rights or development rights
k. ☐ Contract assignment
l. ☐ Option assignment or surrender
m. ☐ Leasehold assignment or surrender
n. ☐ Leasehold grant
o. ☒ Conveyance of an easement
p. ☒ Conveyance for which exemption from transfer tax claimed *(complete Schedule B, Part 3)*
q. ☐ Conveyance of property partly within and partly outside the state
r. ☐ Conveyance pursuant to divorce or separation
s. ☐ Other *(describe)* _____

For recording officer's use	Amount received	Date received	Transaction number
	Schedule B, Part 1 $ _____		
	Schedule B, Part 2 $		

Schedule B – Real estate transfer tax return (Tax Law Article 31)

Part 1 – Computation of tax due

1	Enter amount of consideration for the conveyance *(if you are claiming a total exemption from tax, mark an **X** in the Exemption claimed box, enter consideration and proceed to Part 3)* ☐ **Exemption claimed**	1.	
2	Continuing lien deduction *(see instructions if property is taken subject to mortgage or lien)*	2.	
3	Taxable consideration *(subtract line 2 from line 1)*	3.	
4	Tax: $2 for each $500, or fractional part thereof, of consideration on line 3	4.	
5	Amount of credit claimed for tax previously paid *(see instructions and attach Form TP-584.1, Schedule G)*	5.	
6	Total tax due* *(subtract line 5 from line 4)*	6.	

Part 2 – Computation of additional tax due on the conveyance of residential real property for $1 million or more

1	Enter amount of consideration for conveyance *(from Part 1, line 1)*	1.	
2	Taxable consideration *(multiply line 1 by the percentage of the premises which is residential real property, as shown in Schedule A)*	2.	
3	Total additional transfer tax due* *(multiply line 2 by 1% (.01))*	3.	

Part 3 – Explanation of exemption claimed on Part 1, line 1 *(mark an **X** in all boxes that apply)*

The conveyance of real property is exempt from the real estate transfer tax for the following reason:

a. Conveyance is to the United Nations, the United States of America, New York State, or any of their instrumentalities, agencies, or political subdivisions (or any public corporation, including a public corporation created pursuant to agreement or compact with another state or Canada) ..... a ☒

b. Conveyance is to secure a debt or other obligation ..... b ☐

c. Conveyance is without additional consideration to confirm, correct, modify, or supplement a prior conveyance ..... c ☐

d. Conveyance of real property is without consideration and not in connection with a sale, including conveyances conveying realty as bona fide gifts ..... d ☒

e. Conveyance is given in connection with a tax sale ..... e ☐

f. Conveyance is a mere change of identity or form of ownership or organization where there is no change in beneficial ownership. (This exemption cannot be claimed for a conveyance to a cooperative housing corporation of real property comprising the cooperative dwelling or dwellings.) Attach Form TP-584.1, Schedule F ..... f ☐

g. Conveyance consists of deed of partition ..... g ☐

h. Conveyance is given pursuant to the federal Bankruptcy Act ..... h ☐

i. Conveyance consists of the execution of a contract to sell real property, without the use or occupancy of such property, or the granting of an option to purchase real property, without the use or occupancy of such property ..... i ☐

j. Conveyance of an option or contract to purchase real property with the use or occupancy of such property where the consideration is less than $200,000 and such property was used solely by the grantor as the grantor's personal residence and consists of a one-, two-, or three-family house, an individual residential condominium unit, or the sale of stock in a cooperative housing corporation in connection with the grant or transfer of a proprietary leasehold covering an individual residential cooperative apartment ..... j ☐

k. Conveyance is not a conveyance within the meaning of Tax Law, Article 31, § 1401(e) *(attach documents supporting such claim)* ..... k ☐

* The total tax (from Part 1, line 6 and Part 2, line 3 above) is due within 15 days from the date of conveyance. Make check(s) payable to the county clerk where the recording is to take place. For conveyances of real property within New York City, use Form TP-584-NYC. If a recording is not required, send this return and your check(s) made payable to the ***NYS Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-0045. If not using U.S. Mail, see Publication 55, *Designated Private Delivery Services*.

Schedule C – Credit Line Mortgage Certificate (Tax Law Article 11)

Complete the following only if the interest being transferred is a fee simple interest.
This is to certify that: *(mark an **X** in the appropriate box)*

1. ☐ The real property being sold or transferred is not subject to an outstanding credit line mortgage.

2. ☐ The real property being sold or transferred is subject to an outstanding credit line mortgage. However, an exemption from the tax is claimed for the following reason:

   a ☐ The transfer of real property is a transfer of a fee simple interest to a person or persons who held a fee simple interest in the real property (whether as a joint tenant, a tenant in common or otherwise) immediately before the transfer.

   b ☐ The transfer of real property is (A) to a person or persons related by blood, marriage or adoption to the original obligor or to one or more of the original obligors or (B) to a person or entity where 50% or more of the beneficial interest in such real property after the transfer is held by the transferor or such related person or persons (as in the case of a transfer to a trustee for the benefit of a minor or the transfer to a trust for the benefit of the transferor).

   c ☐ The transfer of real property is a transfer to a trustee in bankruptcy, a receiver, assignee, or other officer of a court.

   d ☐ The maximum principal amount secured by the credit line mortgage is $3 million or more, and the real property being sold or transferred is **not** principally improved nor will it be improved by a one- to six-family owner-occupied residence or dwelling.

   Note: for purposes of determining whether the maximum principal amount secured is $3 million or more as described above, the amounts secured by two or more credit line mortgages may be aggregated under certain circumstances. See TSB-M-96(6)-R for more information regarding these aggregation requirements.

   e ☐ Other *(attach detailed explanation)*.

3. ☐ The real property being transferred is presently subject to an outstanding credit line mortgage. However, no tax is due for the following reason:

   a ☐ A certificate of discharge of the credit line mortgage is being offered at the time of recording the deed.

   b ☐ A check has been drawn payable for transmission to the credit line mortgagee or mortgagee's agent for the balance due, and a satisfaction of such mortgage will be recorded as soon as it is available.

4. ☐ The real property being transferred is subject to an outstanding credit line mortgage recorded in _____ (insert liber and page or reel or other identification of the mortgage). The maximum principal amount of debt or obligation secured by the mortgage is _____. No exemption from tax is claimed and the tax of _____ is being paid herewith. *(Make check payable to county clerk where deed will be recorded.)*

Signature (both the grantors and grantees must sign)

The undersigned certify that the above information contained in Schedules A, B, and C, including any return, certification, schedule, or attachment, is to the best of their knowledge, true and complete, and authorize the person(s) submitting such form on their behalf to receive a copy for purposes of recording the deed or other instrument effecting the conveyance.

Grantor signature	Title	Grantee signature	Title
[signature]	Town Supervisor	[signature]	NYS DEC Attorney
Grantor signature	Title	Grantee signature	Title

Reminder: Did you complete all of the required information in Schedules A, B, and C? Are you required to complete Schedule D? If you marked *e*, *f*, or *g* in Schedule A, did you complete Form TP-584.1? Have you attached your check(s) made payable to the county clerk where recording will take place? If no recording is required, send this return and your check(s), made payable to the ***NYS Department of Taxation and Finance***, directly to the NYS Tax Department, RETT Return Processing, PO Box 5045, Albany NY 12205-0045. If not using U.S. Mail, see Publication 55, *Designated Private Delivery Services*.

Schedule D – Certification of exemption from the payment of estimated personal income tax (Tax Law, Article 22, § 663)

Complete the following only if a fee simple interest or a cooperative unit is being transferred by an individual or estate or trust.

If the property is being conveyed by a referee pursuant to a foreclosure proceeding, proceed to Part 2, mark an *X* in the second box under *Exemption for nonresident transferors/sellers*, and sign at bottom.

Part 1 – New York State residents

If you are a New York State resident transferor/seller listed in Form TP-584, Schedule A (or an attachment to Form TP-584), you must sign the certification below. If one or more transferor/seller of the real property or cooperative unit is a resident of New York State, **each** resident transferor/seller must sign in the space provided. If more space is needed, photocopy this Schedule D and submit as many schedules as necessary to accommodate all resident transferors/sellers.

Certification of resident transferors/sellers

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor/seller as signed below was a resident of New York State, and therefore is not required to pay estimated personal income tax under Tax Law § 663(a) upon the sale or transfer of this real property or cooperative unit.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

Note: A resident of New York State may still be required to pay estimated tax under Tax Law § 685(c), but not as a condition of recording a deed.

Part 2 – Nonresidents of New York State

If you are a nonresident of New York State listed as a transferor/seller in Form TP-584, Schedule A (or an attachment to Form TP-584) but are not required to pay estimated personal income tax because one of the exemptions below applies under Tax Law § 663(c), mark an ***X*** in the box of the appropriate exemption below. If any one of the exemptions below applies to the transferor/seller, that transferor/seller is not required to pay estimated personal income tax to New York State under Tax Law § 663. **Each** nonresident transferor/seller who qualifies under one of the exemptions below must sign in the space provided. If more space is needed, photocopy this Schedule D and submit as many schedules as necessary to accommodate all nonresident transferors/sellers.

If none of these exemption statements apply, you must complete Form IT-2663, *Nonresident Real Property Estimated Income Tax Payment Form*, or Form IT-2664, *Nonresident Cooperative Unit Estimated Income Tax Payment Form.* For more information, see *Payment of estimated personal income tax,* on Form TP-584-I, page 1.

Exemption for nonresident transferors/sellers

This is to certify that at the time of the sale or transfer of the real property or cooperative unit, the transferor/seller (grantor) of this real property or cooperative unit was a nonresident of New York State, but is not required to pay estimated personal income tax under Tax Law § 663 due to one of the following exemptions:

☐ The real property or cooperative unit being sold or transferred qualifies in total as the transferor's/seller's principal residence (within the meaning of Internal Revenue Code, section 121) from _____ (Date) to _____ (Date) *(see instructions)*.

☐ The transferor/seller is a mortgagor conveying the mortgaged property to a mortgagee in foreclosure, or in lieu of foreclosure with no additional consideration.

☐ The transferor or transferee is an agency or authority of the United States of America, an agency or authority of New York State, the Federal National Mortgage Association, the Federal Home Loan Mortgage Corporation, the Government National Mortgage Association, or a private mortgage insurance company.

Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date
Signature	Print full name	Date

Appendix B
List of Site Contacts

And A

Name	Organization	Affiliation	Phone Number	Email Address
Lee Wallace	Town of Niagara	Town Supervisor - Site Owner	(716) 297-2150	lwallace@townofniagara.com
Lee Wallace	Town of Niagara	Town Supervisor - Remedial Party	(716) 297-2150	lwallace@townofniagara.com
Michael Nisengard	Lippes Mathias, LLP	Remedial Party Attorney	(716) 853-5100 ext. 1284	mnisengard@lippes.com
Alex Brennen	C&S Engineers	Project Manager	(315) 455-2000	abrennen@cscos.com
John T. Camp, P.E.	C&S Engineers	P.E. / QEP	(315) 455-2000	jcamp@cscos.com
Andrew Zwack, NYSDEC	NYSDEC Region 9	Project Manager	(716) 851-7220	andrew.zwack@dec.ny.gov
Benjamin McPherson, NYSDEC	NYSDEC Region 9	Project Manager Supervisor	(716) 851-7220	benjamin.mcpherson@dec.ny.gov
Kelly A. Lewandowski, P.E.	NYSDEC	Site Control	(518) 402-9547	Kelly.lewandowski@dec.ny.gov
Melissa Doroski, NYSDOH	NYSDOH	Project Manager	(518) 402-7860	melissa.doroski@health.ny.gov

Appendix C
Soil Boring and Test Pit Logs, Monitoring Well Construction Logs

	BH-1	BH-2	BH-3	BH-4	BH-5	BH-6
Total Depth	16 feet	12 feet	12 feet	8 feet	8 feet	11 feet
General Geology	0-2 ft – silt, silty clay 2-10 feet – red-brown clay - tight 10-12 feet – red-brown clay - soft 12-13 feet – brown clay 13-14 feet– brown sandy gravel 14-16 feet – Moist sandy, silty clay	0-1 ft – fill, silty soil with brick, stone, gravel 1-4 feet – light brown silty clay 4-12 feet – red-brown clay - tight	0-1 ft – fill, silty sandy soil with pea gravel 1-2 feet – silty sand 2-4 feet – brown silty clay 4-8 feet red-brown clay – tight 8-12 feet – brown clay – soft Took samples 1) surface soil 2)subsurface at 1-3 feet (collected field duplicate sample)	0-1 ft – fill, black silty sandy soil with gravel 1-3 feet – black silty clay fill 3-4 feet – brown clay 4-8 feet - brown silty clay – wet Took samples 1) surface soil 2)subsurface at 1-3 feet	0-0.5 ft – fill, silty soil with stone 0.5-2 feet – brown clayey silt 2-8 feet – red-brown clay - tight	0-1 ft – fill, silt soil with stone 1-2 feet – brown silty clay 2-9 feet – red-brown clay – tight some stone at 8-9 feet 9-11 feet – brown clay
PID Readings (ppm)	No readings above background	No readings above background	No readings above background	No readings above background	No readings above background	No readings above background
Odor	No odor noticed	No odor noticed	No odor noticed	No odor noticed	No odor noticed	No odor noticed

	BH-7	BH-8	BH-9	BH-10	BH-11	BH-12
Total Depth	8 feet	8 feet	4 feet	8 feet	8 feet	8 feet
General Geology	0-1 ft – asphalt, fill, silt soil with stone 1-3 feet – fill with white ash/chalk-like material 3-4 feet – silty clay 4-8 feet – silty clay - wet	0-0.5 ft – asphalt, fill, silt soil with stone 0.5-2 feet – fill with white ash/chalk-like material possibly lime 2-4 feet – silty clay 4-8 feet – red-brown clay - tight	0-0.5 ft – asphalt, fill, silt soil with stone 0.5-2 feet – fill with white ash/chalk-like material possibly lime 2-3 feet – silt soil 3-4 feet – silty clay Took samples 1) surface soil 2)subsurface at 1-3 feet (collected MS/MSD sample)	0-1 ft – silt fill with stone/slag – note elevated radiological reading 1-4 feet – clay 4-8 feet – red-brown clay – tight	0-0.5 ft – asphalt, fill, silt soil with stone and blue slag – note elevated radiological reading 0.5-4 feet – silty clay 4-8 feet – red-brown clay – tight Took samples 1) surface soil 2)subsurface at 1-3 feet	0-0.5 ft – asphalt, fill, silt soil with stone and blue-gray ash-like slag – note elevated radiological reading 0.5-2 feet – clayey silt 2-8 feet – red-brown clay – tight at 4-8 feet
PID Readings (ppm)	No readings above background	No readings above background	No readings above background	No readings above background	No readings above background	No readings above background
Odor	No odor noticed	No odor noticed	No odor noticed	No odor noticed	No odor noticed	No odor noticed

NATURE'S WAY
ENVIRONMENTAL CONSULTANTS & CONTRACTORS, INC

3553 Crittenden Road
Alden, NY 14004
(716) 937- 6527
www.natureswayenvironmental.com

WELL COMPLETION REPORT

DATE: 11/18/13

HOLE NUMBER: MW 1

PROJECT: Monitoring Well Installation at 4445 Military Rd. Niagara Falls, NY

CLIENT: Panamerican Environmental

SN	0/6	6/12	12/18	18/24	LITH	WELL DETAIL	REMARKS	COMMENTS
						8" Road Box (0.7)		Well Development with 1 1/2" Bailers:
						Soil Backfill (2.5)		Bailed 12 Gallons Reddish Brown Silty till end
						Cement / Bentonite Grout		
						2" PVC Riser Pipe (5.2)		
						(6.0)		
						2" 10 Slot PVC Screen		▼ Water Level at 8.1' BGS at Completion
						#2 Size Sand		
						(16.0)		Total Depth 15.9' BGS

0 5 10 15 20

LOGGED BY: Dale M. Gramza / Senior Geologist

NATURE'S WAY
ENVIRONMENTAL CONSULTANTS & CONTRACTORS, INC

3553 Crittenden Road
Alden, NY 14004
(716) 937- 6527
www.natureswayenvironmental.com

WELL COMPLETION REPORT

DATE: 11/18/13

HOLE NUMBER: MW 2

PROJECT: Monitoring Well Installation at
4445 Military Rd. Niagara Falls, NY

CLIENT: Panamerican Environmental

SN	0/6	6/12	12/18	18/24	LITH	WELL DETAIL	REMARKS	COMMENTS
						8" Road Box (0.7)		Well Development with 1 1/2" Bailers:
						Soil Backfill (1.5)		Bailed 11 Gallons Reddish Brown Cloudy till end
						Cement / Bentonite Grout		
						2" PVC Riser Pipe (4.6)		
						(5.5)		
						2" 10 Slot PVC Screen		▼ Water Level at 7.2' BGS at Completion
						# 2 Size Sand		
						(15.5)		Total Depth 15.5' BGS

0
5
10
15
20

LOGGED BY: Dale M. Gramza / Senior Geologist

NATURE'S WAY
ENVIRONMENTAL CONSULTANTS & CONTRACTORS, INC

3553 Crittenden Road
Alden, NY 14004
(716) 937- 6527
www.natureswayenvironmental.com

WELL COMPLETION REPORT

DATE: 11/18/13

HOLE NUMBER: MW 3

PROJECT: Monitoring Well Installation at
4445 Military Rd. Niagara Falls, NY

CLIENT: Panamerican Environmental

SN	0/6	6/12	12/18	18/24	LITH	WELL DETAIL	REMARKS	COMMENTS
						8" Road Box (0.7)		Well Development with 1 1/2" Bailers:
						Soil Backfill (2.7)		Bailed 7 Gallons (dry) Reddish Brown Silty till end
						Cement / Bentonite Grout		
						2" PVC Riser Pipe (5.4)		
						(6.0)		
						2" 10 Slot PVC Screen		
						#2 Size Sand		▼ Water Level at 9.95' BGS at Completion
						(16.0)		Total Depth 16.0' BGS

0 5 10 15 20

LOGGED BY: Dale M. Gramza / Senior Geologist

C&S Engineers, Inc.
141 Elm Street
Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454

BORING LOG

Boring No.	**BH-4A**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-5" ***Gravel FILL - brown, grey, moist, small rounded Gravel, some Silt***	10:11 AM
1				5"-12" ***dark grey, Silty CLAY w/ embedded fill - slug - dry***	45" recovered
				12"-45" ***brown Silty CLAY - dense***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6				Sample:	
				BH-4A-1ft Fill	
7				BH-4A-1.5ft Native	
				BH-4A-2ft Native	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

C&S Engineers, Inc.
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Fax: 716-847-1454

BORING LOG

Boring No.	**BH-4B**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-8" ***FILL***	10:26 AM
1				8"-22" ***Silty CLAY - dark grey***	48" recovered
				22"-48" ***brown Silty CLAY - dense***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6				Surface Sample	
				1'	
7				2'	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-4C**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-8" ***FILL***	
1				8"-24" ***Silty CLAY - dark grey***	48" recovered
				24"-48" ***brown Silty CLAY - dense***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6				Surface Sample	
				1'	
7				2'	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-4D**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-2" ***FILL***	
1				2"-10" ***Silty CLAY - dark grey***	35" recovered
				10"-35" ***brown Silty CLAY - dense***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6				Surface Sample	
				1'	
7				2'	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
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22					
23					

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BORING LOG

Boring No.	**BH-4E**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-5" ***FILL***	11:00 AM
1				5"-18" ***Silty CLAY - dark grey***	43" recovered
				18"-43" ***brown Silty CLAY***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6				No Sample	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-4F**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-8" ***FILL***	
1				8"-16" ***Silty CLAY - dark grey***	48" recovered
				16"-48" ***brown CLAY***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6				No Sample	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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Fax: 716-847-1454

BORING LOG

Boring No.	**BH-4G**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	**Undist:**
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-10" ***FILL***	
1				10"-16" ***Silty CLAY - dark grey***	48" recovered
				16"-48" ***brown CLAY***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6				No Sample	
7					
8					
9					
10					
11					
12					
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14					
15					
16					
17					
18					
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20					
21					
22					
23					

C&S Engineers, Inc.
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Fax: 716-847-1454

BORING LOG

Boring No.	**BH-4H**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time	Drill Rig:	Geoprobe		
While Drilling:			**Casing:**	2.125"	**Rock Core:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**	
After Casing Removal:			**Hammer:**			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS
				c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10% S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	(e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4" ***FILL***	
1				4"-18" ***Silty CLAY - dark grey***	48" recovered
				18"-48" ***brown CLAY***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6				No Sample	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

C&S Engineers, Inc.
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Buffalo, New York 14203
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BORING LOG

Boring No.	**BH-4I**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time	Drill Rig:	Geoprobe		
While Drilling:			**Casing:**	2.125"	**Rock Core:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**	
After Casing Removal:			**Hammer:**			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-5" ***FILL***	11:30 AM
1				5"-16" ***Silty CLAY - dark grey***	48" recovered
				16"-48" ***brown CLAY***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6				No Sample	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-9A**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time	Drill Rig:	Geoprobe		
While Drilling:			**Casing:**	2.125"	**Rock Core:**	**Undist:**
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**	
After Casing Removal:			**Hammer:**			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS
				c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10% S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	(e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-6" ***Asphalt and Gravel***	8:29 AM
1				6"-12" ***FILL-stone, gravel, rock pieces, Brown, dry***	39.5" recovered
				12"-23" ***Gravely FILL-Crushed cement, pieces 1" and smaller, light grey/***	0 ppm
2				***white colored***	Sunny, Fair, 63°F
				23"-39.5" ***Silty CLAY-Brown, moist***	
3					
4					
5				***END OF BORING AT 4 FT***	
6				Sample:	
				BH-9A-1ft Fill	
7				BH-9A-2ft Fill	
				BH-9A-3ft Native	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-9B**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time	Drill Rig:	Geoprobe		
While Drilling:			**Casing:**	2.125"	**Rock Core:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**	
After Casing Removal:			**Hammer:**			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4" ***Asphalt and Gravel***	8:38 AM
1				4"-12" ***FILL-stone, gravel, rock pieces, Brown, dry***	35.5" recovered
				12"-21.5" ***Gravely FILL-Crushed cement, pieces 1" and smaller, light grey/***	0 ppm
2				***white colored***	
				21.5"-35.5" ***Silty CLAY-Brown, moist***	
3					
4					
5				***END OF BORING AT 4 FT***	
6				Sample:	
				BH-9B-1ft Fill	
7				BH-9B-2ft Fill	
				BH-9B-3ft Fill/Native	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-9C**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time	Drill Rig:	Geoprobe			Undist:	
While Drilling:			**Casing:**	2.125"	**Rock Core:**			
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine	**MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4"	***Asphalt and Gravel***		8:43 AM
1				4"-11.5"	***FILL-stone, gravel, rock pieces, Brown, dry***		32" recovered
				11.5"-23"	***Gravely FILL-Crushed cement, pieces 1" and smaller, light grey/***		0 ppm
2					***white colored***		
				23"-32"	***Silty CLAY-Brown, moist***		
3							
4							
5					***END OF BORING AT 4 FT***		
6					Sample:		
					BH-9C-1ft Fill		
7					BH-9C-2ft Fill		
					BH-9C-3ft Native		
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							

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BORING LOG

Boring No.	**BH-9D**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe				
While Drilling:			**Casing:**	2.125"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4" ***Asphalt and Gravel***	8:47 AM
1				4"-8" ***FILL-stone, gravel, rock pieces, Brown, dry***	45" recovered
				8"-25" ***Gravely FILL-Crushed cement, pieces 1" and smaller, light grey/***	0 ppm
2				***white colored, last few inches fine gravel***	
				25"-45" ***Silty CLAY-Brown, moist***	
3					
4					
5				***END OF BORING AT 4 FT***	
6				Sample:	
				BH-9D-1ft Fill	
7				BH-9D-2ft Fill	
				BH-9D-3ft Native	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-9E**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	**Undist:**
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS
				c - coarse, m - medium, f - fine; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%	(e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-5" ***Asphalt and Gravel***	8:53 AM
1				5"-9.5" ***FILL-stone, gravel, rock pieces, Brown, dry***	39" recovered
				9.5"-20" ***Gravely FILL-Crushed cement, pieces 1" and smaller, light grey/***	0 ppm
2				***white colored***	
				20"-25" ***FILL-crushed concrete, moist***	
3				25"-39" ***Silty CLAY-Brown, moist***	
4					
5				***END OF BORING AT 4 FT***	
6				Sample:	
				BH-9E-1ft Fill	
7				BH-9E-2ft Fill	
				BH-9E-3ft Native	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-9F**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	**Undist:**
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4.5" ***Asphalt and Gravel***	8:58 AM
1				4.5"-11.5" ***FILL-stone, gravel, rock pieces, Brown, dry***	43.5" recovered
				11.5"-28.5" ***Gravely FILL-Crushed cement, pieces 1" and smaller, light grey/***	0 ppm
2				***white colored***	
				28.5"-43.5" ***Silty CLAY-Brown, moist***	
3					
4					
5				***END OF BORING AT 4 FT***	
6				Sample:	
				BH-9F-1ft Fill	
7				BH-9F-2ft Fill	
				BH-9F-3ft Native	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-9G**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4" ***Asphalt and Gravel***	9:07 AM
1				4"-10" ***FILL-stone, gravel, rock pieces, Brown, dry***	38" recovered
				10"-22" ***Gravely FILL-Crushed cement, pieces 1" and smaller, light grey/***	0 ppm
2				***white colored***	
				22"-38" ***Silty CLAY-Brown, moist***	
3					
4					
5				***END OF BORING AT 4 FT***	
6				Sample:	
				BH-9G-1ft Fill	
7				BH-9G-2ft Fill	
				BH-9G-3ft Native	
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-9H**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time	Drill Rig:	Geoprobe		
While Drilling:			**Casing:**	2.125"	**Rock Core:**	**Undist:**
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**	
After Casing Removal:			**Hammer:**			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-3" ***Asphalt and Gravel***	9:14 AM
1				3"-7.5" ***FILL-stone, gravel, rock pieces, Brown, dry***	44.5" recovered
				7.5"-22" ***Gravely FILL-Crushed cement, pieces 1" and smaller, light grey/***	0 ppm
2				***white colored***	
				22"-44.5" ***Silty CLAY-Brown, moist***	
3					
4					
5				***END OF BORING AT 4 FT***	
6				Sample:	
				BH-9H-1ft Fill	
7				BH-9H-2ft Fill	
				BH-9H-3ft Native	
8				DUP B Native	
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-9I**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe				
While Drilling:			**Casing:**	2.125"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine	**MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-2.5"	***Asphalt and Gravel***		9:18 AM
1				2.5"-5"	***FILL-stone, gravel, rock pieces, Brown, dry***		44.5" recovered
				5"-19.5"	***Gravely FILL-Crushed cement, pieces 1" and smaller, light grey/***		0 ppm
2					***white colored***		
				19.5"-48"	***Silty CLAY-Brown, moist, soft to dense***		
3							
4							
5					***END OF BORING AT 4 FT***		
6					Sample:		
					BH-9I-1ft Fill		
7					BH-9I-2ft Native		
					BH-9I-3ft Native		
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							

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BORING LOG

Boring No.	**BH-13**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road					
Location:	4435-4445 Military Road, Town of Niagara, NY					
Client:	Niagara County Department of Economic Development					
Drilling Firm:	Nature's Way					
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe		
While Drilling:			**Casing:**	2.125"	**Rock Core:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**	
After Casing Removal:			**Hammer:**			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-7" ***Asphalt and Gravel Subbase, moist to wet perched water***	8:30 AM
1				7"-42" ***Brown, dense, stiff CLAY***	42" recovered
					0 ppm
2					
3					
4					
				0"-48" ***Brown, dense, stiff CLAY***	48" rec
5					0 ppm
6					
7					
8					
				0"-9" ***Slug***	42" rec
9				9"-30" ***Brown, dense, stiff CLAY***	0 ppm
				30"-42" ***CLAY - moist, soft***	
10					
11					
12					
				0"-12" ***Slug***	48" rec
13				12"-24" ***loose brown Silty CLAY, soft, wet***	0 ppm
				24"-28" ***loose brown Silty CLAY, soft, wet w/ embedded Gravel, 1" and smaller***	
14				***angular, dark grey***	
				28"-48" ***Clay SILT, brown, water saturated, some embedded Gravel***	
15					
16					
17				***END OF BORING AT 16 FT***	
18				No Sample	
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-14**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin
Undist:	

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	
Sampler:	Acetate liner	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"		MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-14"	***FILL - Gravel, light grey, angular, dark brown Silt and med Sand***	9:20 AM
1				14"-48"	***CLAY - dense, stiff***	48" recovered
						0 ppm
2						
3						
4						
				0"-2"	***Slug***	48" rec
5				2"-48"	***CLAY - dense, stiff, trace embedded coarse Sand and Gravel***	0 ppm
6						
7						
8						
				0"-9"	***Slug***	48" rec
9				9"-30"	***CLAY - dense, stiff***	0 ppm
				30"-48"	***CLAY - brown, moist, soft***	
10						
11						
12						
				0"-22"	***Slug***	42" rec
13				22"-42"	***Clay SILT - brown, water saturated, embedded Gravel***	0 ppm
14						
15						
16						
17					***END OF BORING AT 16 FT***	
18					No Sample	
19						
20						
21						
22						
23						

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BORING LOG

Boring No.	**BH-15**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe				
While Drilling:			**Casing:**	2.125"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine	**MATERIAL DESCRIPTION** (S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-12"	***FILL***		12:00 PM
1				12"-48"	***CLAY - brown***		48" recovered
							0 ppm
2							
3							
4							
				0"-48"	***CLAY - brown, dense, stiff***		48" rec
5							0 ppm
6							
7							
8							
				0"-6"	***Slug***		48" rec
9				6"-48"	***CLAY - dense, stiff***		0 ppm
10					***SVOC (DUP-A)***		
11							
12							
				0"-12"	***Slug***		48" rec
13				12"-48"	***Clay SILT - brown, water saturated, w/ embedded Gravel, loose, soft***		0 ppm
14							
15							
16							
17					***END OF BORING AT 16 FT***		
18					Sample:		
					BH-15-1 ft Fill		
19							
20							
21							
22							
23							

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BORING LOG

Boring No.	**BH-16**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe				
While Drilling:			**Casing:**	2.125"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine	**MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-18"	***FILL***		
1				18"-44"	***CLAY***		48" recovered
							0 ppm
2							
3							
4							
				0"-48"	***CLAY w/ embedded Gravel***		48" rec
5							0 ppm
6							
7							
8							
				0"-12"	***Slug***		48" rec
9				12"-36"	***CLAY - dense, stiff***		0 ppm
				36"-48"	***CLAY - soft***		
10							
11							
12							
				0"-8"	***Slug***		27" rec
13				8"-27"	***Clay SILT - brown, water saturated, w/ embedded Gravel***		0 ppm
14							
15							
16							
17					***END OF BORING AT 16 FT***		
18					No Sample		
19							
20							
21							
22							
23							

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BORING LOG

Boring No.	**BH-17**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe				
While Drilling:			**Casing:**	2.125"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-6" ***FILL***	1:30 PM
1				6"-17" ***Sandy CLAY - dark grey, dry***	48" recovered
				17"-48" ***brown CLAY***	0 ppm
2					
3					
4					
				0"-48" ***brown CLAY***	48" rec
5					0 ppm
6					
7					
8					
				0"-40" ***brown CLAY***	48" rec
9				40"-48" ***CLAY - soft***	0 ppm
10					
11					
12					
				0"-10" ***Slug***	48" rec
13				10"-48" ***Clay SILT - brown, water saturated, w/ embedded Gravel***	0 ppm
14					
15					
16					
17				***END OF BORING AT 16 FT***	
18				No Sample	
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-18**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe				
While Drilling:			**Casing:**	2.125"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-14" ***Asphalt and Gravel Subbase***	2:30 PM
1				14"-31" ***brown CLAY***	31" recovered
					0 ppm
2					
3					
4					
				0"-12" ***perched water, CLAY***	48" rec
5				12"-48" ***CLAY***	0 ppm
6					
7					
8					
				0"-16" ***Slug***	48" rec
9				16"-48" ***CLAY - soft, saturated***	0 ppm
10					
11					
12					
				0"-16" ***Sandy CLAY - Silt, saturated, loose, embedded Gravel***	16" rec
13					0 ppm
14					
15					
16					
17				***END OF BORING AT 16 FT***	
18				No Sample	
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-19**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/29/16
Finish Date:	
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe				
While Drilling:			**Casing:**	2.125"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-9" ***FILL***	3:00 PM
1				9"-48" ***brown CLAY***	48" recovered
					0 ppm
2					
3					
4					
				0"-48" ***CLAY***	48" rec
5					0 ppm
6					
7					
8					
				0"-8" ***Slug***	48" rec
9				8"-48" ***CLAY***	0 ppm
10					
11					
12					
				0"-19" ***Slug***	38" rec
13				19"-38" ***Clay SILT - loose, saturated, embedded Gravel***	0 ppm
14					
15					
16					
17				***END OF BORING AT 16 FT***	
18				No Sample	
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-20**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	5-6" bgs (past concrete)
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe				
While Drilling:			**Casing:**	2.125"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**	Indoor soil sampling of a garage		
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-6" ***Asphalt/Gravel, brown FILL, Sandy, stone pieces 1" and smaller***	10:02 AM
1				6"-47.5" ***Silty CLAY-brown, black, moist, soft to dense***	47.5" recovered
					0 ppm
2					
3					
4					
				0"-4" ***Slug***	10:09 AM
5				4"-48" ***Silty CLAY-brown, dense, pieces of rock 1" and smaller, specks***	48" recovered
				of orange and red color in clay	0 ppm
6					
7					
8					
				0"-5" ***Slug***	10:18 AM
9				5"-49.5" ***Silty CLAY-dark brown, black, dense to soft, moist***	49.5" recovered
					0 ppm
10					
11					
12					
				0"-8" ***Slug***	10:18 AM
13				8"-27" ***Silty CLAY-brown,moist to wet, thin layer of rock pieces***	49.5" recovered
				27"-34" ***Silty CLAY-brown, wet to saturated, soft***	0 ppm
14					
15					
16					
17				***END OF BORING AT 16 FT***	
18				Sample:	
				MS-MSD for VOCs and SVOCs	
19				BH-20	
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-21**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	**Undist:**
Sampler:	Acetate liner	**Other:**	boring by road on asphalt parking lot
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-5" ***Asphalt and Gravel***	11:09 AM
1				5"-10" ***FILL-stone, Brown, Black***	48" recovered
				10"-48" ***Silty CLAY-Brown, black, dense***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-22**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	**Undist:**
Sampler:	Acetate liner	**Other:**	boring on asphalt lot by building and MW-4
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4" ***Asphalt and Gravel***	11:13 AM
1				4"-12" ***FILL-stone, Brown, Black***	46" recovered
				12"-46" ***Silty CLAY-Brown, black, dense***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-23**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	**Undist:**
Sampler:	Acetate liner	**Other:**	boring by building edge (near northwest corner)
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-5" ***Asphalt and Gravel***	11:17 AM
1				5"-12" ***FILL-Brown, Black, Stones***	35.5" recovered
				12"-35.5" ***Silty CLAY-Brown, dense***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-24**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	**Undist:**
Sampler:	Acetate liner	**Other:**	boring by Military Road near northwest corner of the property
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4" ***Asphalt and Gravel***	11:22 AM
1				4"-11" ***FILL-Brown, Black, Stones***	43" recovered
				11"-43" ***Silty CLAY-Brown, dense***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-25**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road
Location:	4435-4445 Military Road, Town of Niagara, NY
Client:	Niagara County Department of Economic Development
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe		
Casing:	2.125"	**Rock Core:**	**Undist:**
Sampler:	Acetate liner	**Other:**	boring by Military Road, on asphalt parking, in front of the building half separation
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-4" ***Asphalt and Gravel***	11:25 AM
1				4"-10" ***FILL-Brown, Stones and Gravel, 1" and smaller pieces***	34.5" recovered
				10"-34.5" ***Silty CLAY-Brown, black, moist, soft to dense***	0 ppm
2					
3					
4					
5				***END OF BORING AT 4 FT***	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**BH-26**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	5-6" bgs (past concrete)
Start Date:	8/30/16
Finish Date:	8/30/16
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road						
Location:	4435-4445 Military Road, Town of Niagara, NY						
Client:	Niagara County Department of Economic Development						
Drilling Firm:	Nature's Way						
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe			
While Drilling:			**Casing:**	2.125"	**Rock Core:**		**Undist:**
Before Casing Removal:			**Sampler:**	Acetate liner	**Other:**	inside building (former Culbert's) - 4435	
After Casing Removal:			**Hammer:**		Military Road		

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0"-3" ***Cement***	12:19 PM
1				3"-21" ***FILL-Black, brown, cement and rock pieces***	38" recovered
				21"-38" ***Soft to dense Clay, Silty CLAY, brown***	0.1 ppm
2					
3					
4					
				0"-4" ***Slug***	12:23 PM
5				4"-49" ***Silty CLAY-brown, dense***	49" recovered
					0 ppm
6					
7					
8					
				0"-34" ***Silty CLAY-brown, dense, a little bit of Slug***	12:34 PM
9				34"-46.5" ***Silty CLAY-brown, black, soft, moist***	46.5" recovered
					0 ppm
10					
11					
12					
				0"-3" ***Silty CLAY-dense, brown***	12:46 PM
13				3"-12" ***Silty CLAY-brown, soft, moist***	45.5" recovered
				12"-46" ***Silty CLAY-Sandy, moist to wet, saturated, brown***	0.1 ppm
14					
15					
16					
17				***END OF BORING AT 16 FT***	
18				Sample:	
				BH-26-1ft Fill	
19					
20					
21					
22					
23					

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd.
Syracuse, New York 13212
Phone: 315-455-2000
Fax: 315-455-9667

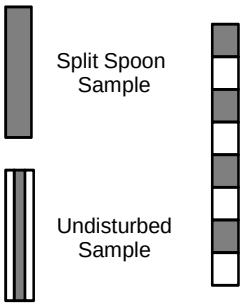
BORING LOG
GENERAL INFORMATION & KEY

Casing, Sampling and Other Equipment

H.S.A: Hollow Stem Auger (record I.D.)
S.S.A: Solid Stem Auger (record O.D.)
Steel: Hollow Steel Flush Joint Casing (recorded I.D.)
Open: Open Hole / No Casing (record I.D.)
S.S.: Split Spoon (record I.D.)
Hammer: Auto - Automatic, Manual - Manual (rope & cat-head)
Undist: Tube - Shelby, Oste - Osteberg (record I.D. & length)

Rock Cores			
	Standard	I.D.	Wire Line I.D.
	EW / EX	1-13/32"	-- --
	AW / AX	1-25/32"	AQ 1-1/8"
	BW / BX	2-7/32"	BQ 1-1/2"
	NW / NX	2-27/32"	NQ 1-31/32"
	HW / HX	2-25/32"	HQ 2-5/8"

Symbol Legend & Abbreviations



Abbreviations
W.O.R. - Weight of Rods
W.O.H. - Weight of Rods & Hammer
N - Standard Penetration Test N-value
N.W.E. - No Water Encountered
do - ditto (same as above)
Rec - Recovery
RQD - Rock Quality Designation
PP - Pocket Penetrometer
Tor - Torvane

Color
br - brown
rd - red
gr - gray
grn - green
blk - black
wht - white

Description of Soil Density

Relative Soil Density determined while advancing the soil boring by using ASTM Method D-1586, *Standard Penetration Test N-Value* . The N-Value is calculated by adding the hammer blow counts of the 2nd and 3rd sampling intervals together for driving a 2" O.D. sampler with a 140 lb. hammer falling 30" --OR-- by obtaining Pocket Penetrometer or Torvane Readings.

Course Grained Soils Greater than half the material larger than No. 200 Sieve (sand and gravel)		**Fine Grained Soils**					
		N-Value	**Undrained Shear Strength (q_u)**				**Relative Density**
			psi	psf	tsf or kg/cm^2	kN/m^2	
N-Value	**Relative Density**	< 2	< 2.5	< 375	< 0.2	< 20	Very Soft
< 4	Very Loose	2 to 4	2.5 - 5	375 - 750	0.20 - 0.40	20 - 40	Soft
4 to 10	Loose	5 to 8	5 -10	750 - 1,500	0.40 - 0.75	40 - 75	Firm -or- Medium Stiff
11 to 30	Medium Dense	9 to 15	10 - 20	1,500 - 3,000	0.75 - 1.50	75 - 150	Stiff
31 to 50	Dense	16 to 30	20 - 40	3,000 - 6,000	1.50 - 3.00	150 - 300	Very Stiff
> 50	Very Dense	> 30	> 40	> 6,000	> 3	> 3,000	Hard

Description of Soil Type

Material	**Grain Size**	**Material**	**Grain Size**	**Material**	**Grain Size**	**Material**	**Grain Size**
Boulder	> 8"	**Gravel**		**Sand**		**Silt & Clay**	< #200
Cobble	8" - 3"	Course	3" - 1-1/2"	Course	#4 - #10	Note: # indicates U.S. Standard Sieve with size shown.	
		Medium	1-1/2" - 3/4"	Medium	#10 - #40		
		Fine	3/4" - #4	Fine	#40 - #200		

Bed Rock Classification Terms & Field Test / Field Observation

Term	**Field Test / Field Observation**	**Rock Mass Classification based on RQD**	
Hardness		**RQD**	**Rock Mass Quality**
Soft	Can be Scratched by Fingernail	< 25%	very poor
Medium Hard	Easily Scratched by Pen Knife or Nail	25% - 50%	poor
Hard	Difficultly Scratched by Pen Knife or Nail	50% - 75%	fair
Very Hard	Cannot be Scratched by Pen Knife or Nail	75% - 90%	good
Weathering		90% - 100%	excellent
Very Weathered	Based on observations (e.g., amount of disintegration, iron staining, core recovery, clay seams, amount of material within joints, etc.)		
Weathered			
Sound			
Bedding (Natural Breaks in Rock Layers)			
Laminated	< 1 inch		
Thinly Bedded	1 inch to 4 inches		
Bedded	4 inches to 12 inches		
Thickly Bedded	12 inches to 36 inches		
Massive	> 36 inches		

$$RQD = \frac{\Sigma \text{ of pieces} \geq 4"}{\text{total length of run}}$$

ASTM Method D-6032, *Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Cores*

C&S Engineers, Inc.	BORING LOG	Boring No.	MW-4
141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com		Sheet 1 of:	1
		Project No.:	Q47.001.001

Project Name:	Phase II ESA for 4445 Military Road							**Surface Elev.:**	600 amsl
Location:	4435-4445 Military Road, Town of Niagara, NY							**Datum:**	ground surface
Client:	Niagara County Department of Economic Development							**Start Date:**	8/1/16
Drilling Firm:	Nature's Way							**Finish Date:**	
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	acker				**Inspector:**	Cody Martin
While Drilling:			**Casing:**		**Rock Core:**			**Undist:**	
Before Casing Removal:			**Sampler:**	2' spit spoon	**Other:**				
After Casing Removal:			**Hammer:**						

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse m - medium f - fine	**MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
			8	5"	***FILL Gravel w/ brown Silt and med S. moist***		5" rec
1			7				0.5 ppm
			3				
2							
			3	1"	***FILL***		16" rec
3			5	15"	***Brown CLAY - soft, high pL, moist***		0 ppm
			8				
4			11				
			5		***Brown CLAY - soft, high pL, moist***		24" rec
5			9				0 ppm
			13				
6			18				
			3		***Brown CLAY - soft, high pL, moist***		24" rec
7			10				0 ppm
			13				
8			18				
			7		***Brown CLAY - soft, high pL, moist***		24" rec
9			13				0 ppm
			15				
10			21				
			4		***Brown CLAY - soft, high pL, moist***		24" rec
11			8				0 ppm
			8				
12			10				
			2	10"	***Brown CLAY - soft, high pL, moist***		24" rec
13			8	14"	***Water, saturated Clay SILT, trace imbedded pea gravel***		0 ppm
			6				
14			5				
			2		***saturated Clay SILT, trace imbedded pea gravel***		8" rec
15			4				0 ppm
			4				
16			8				
17					***END OF BORING AT 16 FT***		
18					***16.8***		
					S 5'		
19					***Ren 2'***		
20							
21							
22							
23							

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Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454
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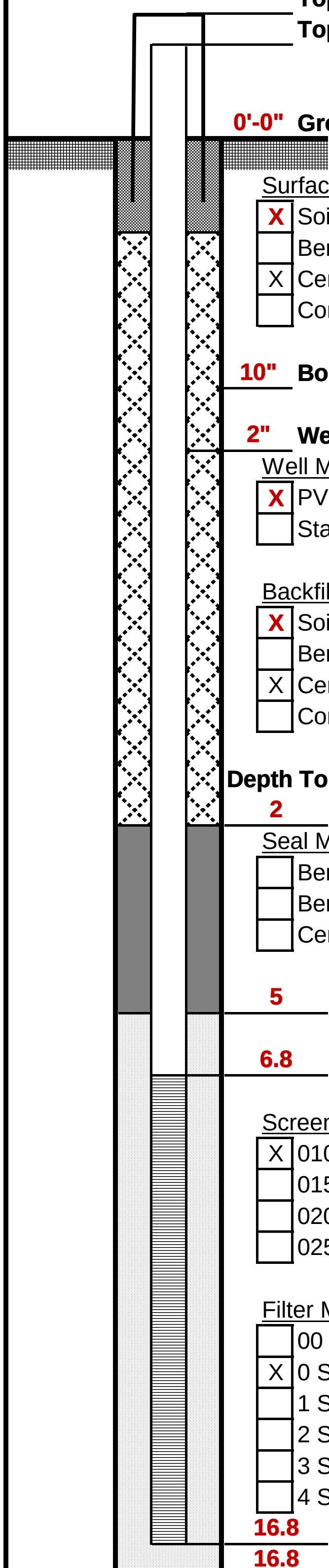
GROUNDWATER OBSERVATION WELL CONSTRUCTION LOG

		Well No.	**MW - 4**
		Project No.:	
		Surface Elev.:	
Project Name:	Phase II ESA for 4445 Military Road	***Datum:***	
Location:	4435-4445 Military Road, Town of Niagara, NY	***Start Date:***	8/1/16
Client:	Niagara County Department of Economic Development	***Finish Date:***	8/1/16
Drilling Firm:	Nature's Way	***Inspector:***	CM
Drill Rig:		***Casing:***	

Notes: (provide description of observation well location, method of construction, development method and any other information)

Adjacent to auto bay doors



Top Protective Casing

Top of Riser

0'-0" Ground Surface

Surface Backfill Material
- [X] Soil Cuttings
- [ ] Bentonite Slurry
- [X] Cement/Bentonite Grout
- [ ] Concrete

10" Bore Hole Diameter

2" Well Diameter

Well Material
- [X] PVC
- [ ] Stainless Steel

Backfill Material
- [X] Soil Cuttings
- [ ] Bentonite Slurry
- [X] Cement/Bentonite Grout
- [ ] Concrete

Depth To:

2 Top of Seal

Seal Material
- [ ] Bentonite Chips/Pellets
- [ ] Bentonite Slurry
- [ ] Cement/Bentonite Grout

5 Top of Filter Pack

6.8 Top of Screen

Screen Slot Size
- [X] 010 in
- [ ] 015 in
- [ ] 020 in
- [ ] 025 in

Filter Material
- [ ] 00 Sand Pack
- [X] 0 Sand Pack
- [ ] 1 Sand Pack
- [ ] 2 Sand Pack
- [ ] 3 Sand Pack
- [ ] 4 Sand Pack

16.8 Bottom of Screen

16.8 Bottom of Bore Hole

Groundwater Measurement Data

Date	Time	Depth to Water	Water Elevation	Tide Status

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BORING LOG

Boring No.	**MW-5**
Sheet 1 of:	1
Project No.:	Q47.001.001
Project Name:	Phase II ESA for 4445 Military Road
Surface Elev.:	600 amsl
Location:	4435-4445 Military Road, Town of Niagara, NY
Datum:	ground surface
Client:	Niagara County Department of Economic Development
Start Date:	8/1/16
Drilling Firm:	
Finish Date:	
Groundwater / **Depth** / **Date & Time**	**Drill Rig:** acker
Inspector:	Cody Martin
While Drilling:	**Casing:** **Rock Core:** **Undist:**
Before Casing Removal:	**Sampler:** 2' spit spoon **Other:**
After Casing Removal:	**Hammer:**

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
			-	***FILL - brown, grey medium Sand, brown Silt, and Gravel***	12:00 PM
1			4		8" rec
			10		0.3 ppm
2			16		
			2	***CLAY - Some silt, brown, moist, stiff, dense, trace embedded pea***	15" rec
3			6	***Gravel***	0 ppm
			12		
4			15		
			5	***CLAY - Some silt, brown, moist, stiff, dense, trace embedded pea***	20" rec
5			12	***Gravel***	0 ppm
			16		
6			21		
			5	***CLAY - Some silt, brown, moist, stiff, dense, trace embedded pea***	24" rec
7			11	***Gravel***	0 ppm
			11		
8			15		
			4	***CLAY - Some silt, brown, moist, stiff, dense, trace embedded pea***	24" rec
9			11	***Gravel***	0 ppm
			10		
10			16		
			4	18" ***CLAY - Some silt, brown, moist, stiff, dense, trace embedded pea***	24" rec
11			4	***Gravel***	0 ppm
			4	6" ***Clay SILT - Some Clay, water saturated, soft, loose***	
12			6		
			2	***Clay SILT - Some Clay, water saturated, soft, loose***	10" rec
13			6		0 ppm
			6		
14			7		
			1	***Same Clay SILT, water saturated, embedded Gravel***	12" rec
15			2		0 ppm
			3		
16			9		
17				***END OF BORING AT 16 FT***	
18					
19					
20					
21					
22					
23					

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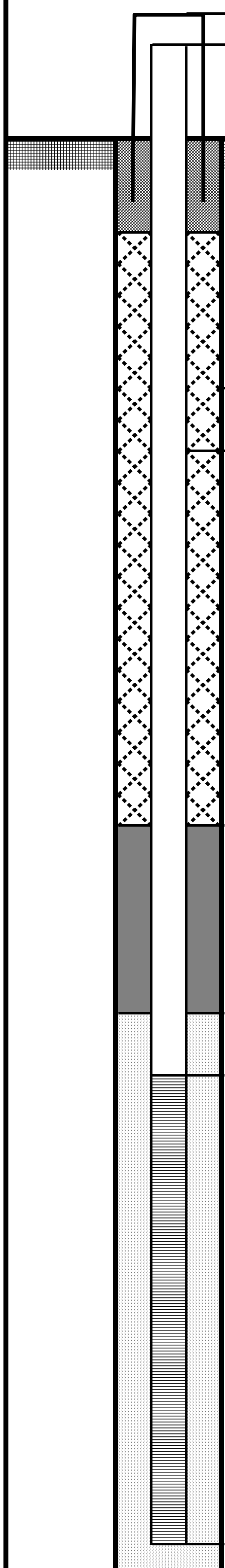
GROUNDWATER OBSERVATION WELL CONSTRUCTION LOG

Well No.	**MW - 5**
Project No.:	
Surface Elev.:	
Project Name:	Phase II ESA for 4445 Military Road
Datum:	
Location:	4435-4445 Military Road, Town of Niagara, NY
Start Date:	8/1/16
Client:	Niagara County Department of Economic Development
Finish Date:	8/1/16
Drilling Firm:	Nature's Way
Inspector:	CM
Drill Rig:	
Casing:	
Notes:	(provide description of observation well location, method of construction, development method and any other information)



Top Protective Casing

Top of Riser

0'-0" **Ground Surface**

Surface Backfill Material
- [X] Soil Cuttings
- [ ] Bentonite Slurry
- [X] Cement/Bentonite Grout
- [ ] Concrete

10" **Bore Hole Diameter**

2" **Well Diameter**

Well Material
- [X] PVC
- [ ] Stainless Steel

Backfill Material
- [X] Soil Cuttings
- [ ] Bentonite Slurry
- [X] Cement/Bentonite Grout
- [ ] Concrete

Depth To:

2 **Top of Seal**

Seal Material
- [ ] Bentonite Chips/Pellets
- [ ] Bentonite Slurry
- [ ] Cement/Bentonite Grout

5 **Top of Filter Pack**

6 **Top of Screen**

Screen Slot Size
- [X] 010 in
- [ ] 015 in
- [ ] 020 in
- [ ] 025 in

Filter Material
- [ ] 00 Sand Pack
- [X] 0 Sand Pack
- [ ] 1 Sand Pack
- [ ] 2 Sand Pack
- [ ] 3 Sand Pack
- [ ] 4 Sand Pack

16 **Bottom of Screen**

16 **Bottom of Bore Hole**

Groundwater Measurement Data

Date	Time	Depth to Water	Water Elevation	Tide Status

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BORING LOG

Boring No.	**MW-6**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/1/16
Finish Date:	
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:								
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	acker				
While Drilling:			**Casing:**		**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	2' spit spoon	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine	MATERIAL DESCRIPTION (S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
					FILL Gravel w/ brown Silt and med S. moist	2:00 PM
1			4			6" rec
			5			0.5 ppm
2			10			
			5	1"	***FILL Gravel w/ brown Silt and med S. moist***	14" rec
3			3	13"	***dry, dense CLAY***	0 ppm
			5			
4			8			
			7		***dry, dense CLAY***	24" rec
5			8			0 ppm
			11			
6			15			
			6		***dry, dense CLAY, trace embedded Gravel***	24" rec
7			7			0 ppm
			11			
8			22			
			3		***dry, dense CLAY***	24" rec
9			7			0 ppm
			7			
10			11			
			7	10"	***dry, dense CLAY***	24" rec
11			6	14"	***Clay SILT - soft, loose, wet***	0 ppm
			5			
12			5			
			2		***Same Clay SILT, water saturated***	18" rec
13			3			0 ppm
			5			
14			13			
					Same Clay SILT - water saturated, loose embedded Gravel	14" rec
15			6			0 ppm
			16			
16						
17					***END OF BORING AT 16 FT***	
18						
19						
20						
21						
22						
23						

C&S COMPANIES

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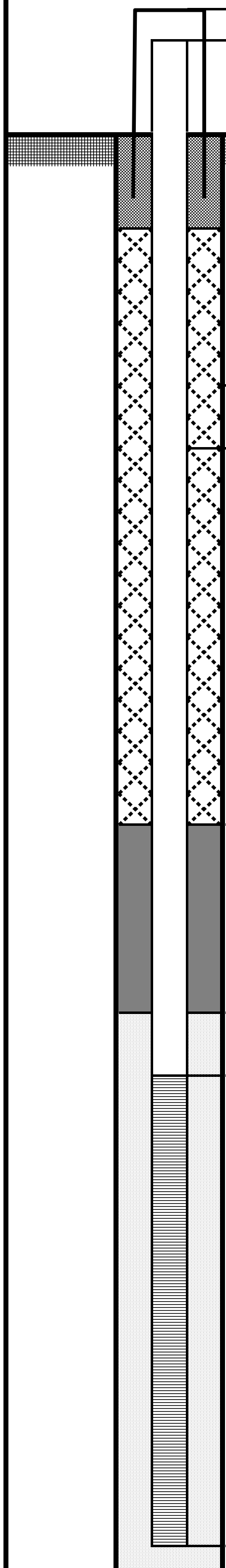
GROUNDWATER OBSERVATION WELL CONSTRUCTION LOG

		Well No.	**MW - 6**
		Project No.:	
		Surface Elev.:	
Project Name:	Phase II ESA for 4445 Military Road	***Datum:***	
Location:	4435-4445 Military Road, Town of Niagara, NY	***Start Date:***	8/1/16
Client:	Niagara County Department of Economic Development	***Finish Date:***	
Drilling Firm:	Nature's Way	***Inspector:***	
Drill Rig:		***Casing:***	

Notes: (provide description of observation well location, method of construction, development method and any other information)



Top Protective Casing

Top of Riser

0'-0" **Ground Surface**

Surface Backfill Material
- [X] Soil Cuttings
- [X] Bentonite Slurry
- [ ] Cement/Bentonite Grout
- [ ] Concrete

10 **Bore Hole Diameter**

2 **Well Diameter**

Well Material
- [X] PVC
- [ ] Stainless Steel

Backfill Material
- [X] Soil Cuttings
- [ ] Bentonite Slurry
- [X] Cement/Bentonite Grout
- [ ] Concrete

Depth To:

2 **Top of Seal**

Seal Material
- [X] Bentonite Chips/Pellets
- [ ] Bentonite Slurry
- [ ] Cement/Bentonite Grout

4 **Top of Filter Pack**

5.5 **Top of Screen**

Screen Slot Size
- [ ] 010 in
- [ ] 015 in
- [ ] 020 in
- [ ] 025 in

Filter Material
- [ ] 00 Sand Pack
- [X] 0 Sand Pack
- [ ] 1 Sand Pack
- [ ] 2 Sand Pack
- [ ] 3 Sand Pack
- [ ] 4 Sand Pack

15.5 **Bottom of Screen**

15.5 **Bottom of Bore Hole**

Groundwater Measurement Data

Date	Time	Depth to Water	Water Elevation	Tide Status

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BORING LOG

Boring No.	**MW-7**
Sheet 1 of:	1
Project No.:	Q47.001.001
Surface Elev.:	600 amsl
Datum:	ground surface
Start Date:	8/2/16
Finish Date:	
Inspector:	Cody Martin

Project Name:	Phase II ESA for 4445 Military Road							
Location:	4435-4445 Military Road, Town of Niagara, NY							
Client:	Niagara County Department of Economic Development							
Drilling Firm:								
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	acker				
While Drilling:			**Casing:**		**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	2' spit spoon	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine	MATERIAL DESCRIPTION (S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
			9	1"	***FILL***	8:30 AM
1			8	5"	***dry, dense CLAY***	6" rec
			7			0 ppm
2			8			
			10		***dry, dense CLAY***	17" rec
3			13			0 ppm
			18			
4			24			
			11		***dry, dense CLAY***	24" rec
5			12			0 ppm
			13			
6			20			
			7		***dry, dense CLAY***	24" rec
7			10			0 ppm
			12			
8			17			
			6		***Same dense CLAY - moist, at 16" soft***	24" rec
9			7			0 ppm
			12			
10			20			
			10	14"	***Clay SILT - some Clay, wet, saturated, lens of Silt embedded***	14" rec
11			50/5		***gravel/coarse Sand - Rock at 14"***	0 ppm
12						
			8		***Same Clay SILT, water saturated***	7" rec
13			2			0 ppm
			8			
14			13			
			2		***Same Clay SILT, water saturated, loose Silt w/ grey coarse Sand***	4" rec
15			5		***Gravel, 0.25" angular rock pieces***	0 ppm
			8			
16			15			
17					***END OF BORING AT 16 FT***	
18						
19						
20						
21						
22						
23						

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Phone: 716-847-1630
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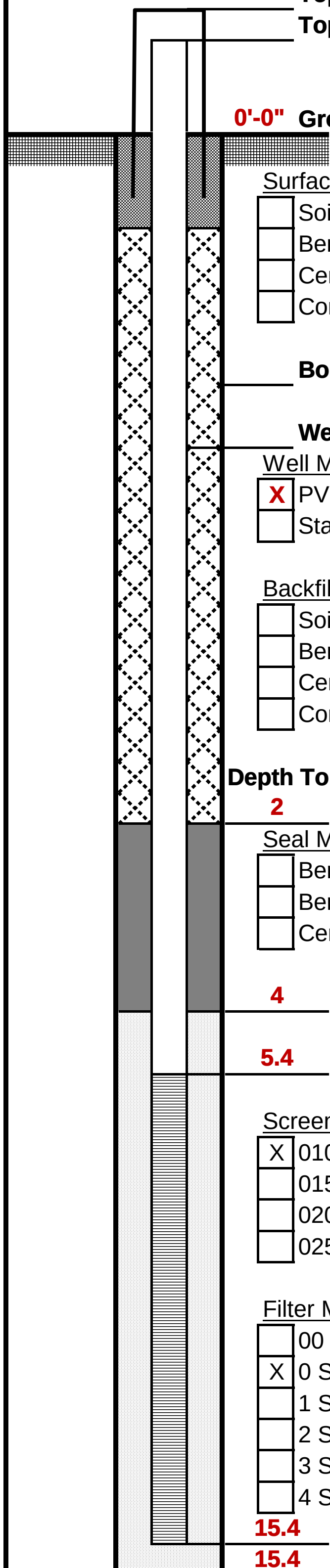
GROUNDWATER OBSERVATION WELL CONSTRUCTION LOG

Well No.	**MW - 7**		
Project No.:			
Surface Elev.:			
Project Name:	Phase II ESA for 4445 Military Road	**Datum:**	
Location:	4435-4445 Military Road, Town of Niagara, NY	**Start Date:**	8/2/16
Client:	Niagara County Department of Economic Development	**Finish Date:**	8/2/16
Drilling Firm:	Nature's Way	**Inspector:**	
Drill Rig:		**Casing:**	

Notes: (provide description of observation well location, method of construction, development method and any other information)



Top Protective Casing

Top of Riser

0'-0" **Ground Surface**

Surface Backfill Material
- [ ] Soil Cuttings
- [ ] Bentonite Slurry
- [ ] Cement/Bentonite Grout
- [ ] Concrete

Bore Hole Diameter

Well Diameter

Well Material
- [X] PVC
- [ ] Stainless Steel

Backfill Material
- [ ] Soil Cuttings
- [ ] Bentonite Slurry
- [ ] Cement/Bentonite Grout
- [ ] Concrete

Depth To:

2 **Top of Seal**

Seal Material
- [ ] Bentonite Chips/Pellets
- [ ] Bentonite Slurry
- [ ] Cement/Bentonite Grout

4 **Top of Filter Pack**

5.4 **Top of Screen**

Screen Slot Size
- [X] 010 in
- [ ] 015 in
- [ ] 020 in
- [ ] 025 in

Filter Material
- [ ] 00 Sand Pack
- [X] 0 Sand Pack
- [ ] 1 Sand Pack
- [ ] 2 Sand Pack
- [ ] 3 Sand Pack
- [ ] 4 Sand Pack

15.4 **Bottom of Screen**

15.4 **Bottom of Bore Hole**

Groundwater Measurement Data

Date	Time	Depth to Water	Water Elevation	Tide Status

C&S Engineers, Inc.
141 Elm Street
Buffalo, New York 14203
Phone: 716-847-1630
Fax: 716-847-1454
www.cscos.com

BORING LOG

Boring No.	**B01**
Sheet 1 of:	
Project No.:	
Surface Elev.:	
Datum:	
Start Date:	3/23/20
Finish Date:	3/23/20
Inspector:	A. Brennen

Project Name:	4435-4445 Military Rd BCP							
Location:	Town of Niagara, NY							
Client:	Town of Niagara							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe - Truck mounted				
While Drilling:			**Casing:**	2"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	4' core	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-0.5' ***Gravel, Asphalt Subbase***	
1	X			0.5 - 1' ***FILL - light grey Sands, F - C Gravel, possible slag***	
	X				
2				1 - 4' ***Light brown silty Clays, trace gravel***	
				Native	
3					
4				4 - 8' ***Same as above, Dense***	
5					
				Moist at 6'	
6					
				Wet at 7, soft clay'	
7					
8				8 - 10' ***Same as above, wet, clay***	
9					
10				***Refusal at 10'***	
					PID readings were 0.0 ppm
11					unless otherwise noted
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**B02**
Sheet 1 of:	
Project No.:	
Surface Elev.:	
Datum:	
Start Date:	3/23/20
Finish Date:	3/23/20
Inspector:	A. Brennen

Project Name:	4435-4445 Military Rd BCP
Location:	Town of Niagara, NY
Client:	Town of Niagara
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe - Truck mounted		
Casing:	2"	**Rock Core:**	**Undist:**
Sampler:	4' core	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-0.5' ***Gravel, Asphalt Subbase***	
1	X			0.5 - 1.4' ***FILL - dark Sands, F - C Gravel, concrete***	
	X				
2				1.4 - 4' ***Light brown silty Clays, trace F gravel***	
				Native	
3					
4				4 - 8' ***Same as above, Dense***	
5					
6					
7					
8				8 - 10' ***Same as above, slightly moist***	
9					
10				***Refusal @ 10'***	
					PID readings were 0.0 ppm
11					unless otherwise noted
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**B03**
Sheet 1 of:	
Project No.:	
Surface Elev.:	
Datum:	
Start Date:	3/23/20
Finish Date:	3/23/20
Inspector:	A. Brennen

Project Name:	4435-4445 Military Rd BCP
Location:	Town of Niagara, NY
Client:	Town of Niagara
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe - Truck mounted		
Casing:	2"	**Rock Core:**	**Undist:**
Sampler:	4' core	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	c - coarse, m - medium, f - fine	**MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%	**COMMENTS** (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
				0-0.5'	***Gravel, Asphalt Subbase***		
1				0.5 - 2'	***FILL - White & light blue Sands, F Gravel***		
							MS/MSD taken in fill
2	X			2 - 4'	***Light brown silty Clays, trace F gravel***		
	X				***Native***		
3							
4				4 - 8'	***Same as above, Dense***		
5							
6							
7							
8					***Refusal @ 8'***		
9							
10							
							PID readings were 0.0 ppm
11							unless otherwise noted
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							

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BORING LOG

Boring No.	**B04**
Sheet 1 of:	
Project No.:	
Surface Elev.:	
Datum:	
Start Date:	3/23/20
Finish Date:	3/23/20
Inspector:	A. Brennen

Project Name:	4435-4445 Military Rd BCP
Location:	Town of Niagara, NY
Client:	Town of Niagara
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe - Truck mounted		
Casing:	2"	**Rock Core:**	**Undist:**
Sampler:	4' core	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
	X			0-0.3' ***Topsoil***	
1	X			0.3 - 0.8' ***Brown Sands, loose F-M Gravel FILL?***	
	X				
2				0.8' - 4' ***Light brown silty Clays, trace F gravel***	
				Native	
3					
4				4 - 8' ***Same as above, Dense***	
5					
6					
7					
8				***Refusal @ 8'***	
9					
10					
					PID readings were 0.0 ppm
11					unless otherwise noted
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**B05**
Sheet 1 of:	
Project No.:	
Surface Elev.:	
Datum:	
Start Date:	3/23/20
Finish Date:	3/23/20
Inspector:	A. Brennen

Project Name:	4435-4445 Military Rd BCP
Location:	Town of Niagara, NY
Client:	Town of Niagara
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe - Truck mounted		
Casing:	2"	**Rock Core:**	**Undist:**
Sampler:	4' core	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

c - coarse
m - medium
f - fine

a - and - 35-50%
s - some - 20-35%
l - little - 10-20%
t - trace - 0-10%

S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
	X			0-0.4' ***Black gravel, sands - dumped asphalt & FILL***	
1	X			0.4 - 1' ***Silty sands, F-C gravel***	
	X			***Native?***	
2				1' - 4' ***Light brown silty Clays***	
				Native	
3					
4				4 - 8' ***Same as above, Dense***	
5					
6					
7					
8				***Refusal @ 8'***	
9					
10					
					PID readings were 0.0 ppm
11					unless otherwise noted
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**B06**
Sheet 1 of:	
Project No.:	
Surface Elev.:	
Datum:	
Start Date:	3/23/20
Finish Date:	3/23/20
Inspector:	A. Brennen

Project Name:	4435-4445 Military Rd BCP
Location:	Town of Niagara, NY
Client:	Town of Niagara
Drilling Firm:	Nature's Way

Groundwater	Depth	Date & Time
While Drilling:		
Before Casing Removal:		
After Casing Removal:		

Drill Rig:	Geoprobe - Truck mounted		
Casing:	2"	**Rock Core:**	**Undist:**
Sampler:	4' core	**Other:**	
Hammer:			

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
	X			0-0.3' ***Topsoil***	
1	X			0.3 - 0.7' ***clayey Silt, moist grey/brown, trace F gravel***	
	X			***Native***	
2				0.7' - 4' ***Light brown silty Clays, trace F-C gravel***	
				Native	
3					
4				4 - 8' ***Same as above, Dense***	
5					
6					
7					
8				***Refusal @ 8'***	
9					
10					
					PID readings were 0.0 ppm
11					unless otherwise noted
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**B07**
Sheet 1 of:	
Project No.:	
Surface Elev.:	
Datum:	
Start Date:	3/23/20
Finish Date:	3/23/20
Inspector:	A. Brennen

Project Name:	4435-4445 Military Rd BCP							
Location:	Town of Niagara, NY							
Client:	Town of Niagara							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe - Truck mounted				
While Drilling:			**Casing:**	2"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	4' core	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
	X			0-0.3' ***Topsoil***	
1	X			0.3 - 0.8' ***Light brown sandy Silt and F-C gravel***	
	X			***Native***	
2				0.8' - 4' ***Light brown silty Clays, trace F-C gravel***	
				Native	
3					
4				4 - 8' ***Same as above, Dense***	
5					
6					
7					
8				***Refusal @ 8'***	
9					
10					
					PID readings were 0.0 ppm
11					unless otherwise noted
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

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BORING LOG

Boring No.	**B08**
Sheet 1 of:	
Project No.:	
Surface Elev.:	
Datum:	
Start Date:	3/23/20
Finish Date:	3/23/20
Inspector:	A. Brennen

Project Name:	4435-4445 Military Rd BCP							
Location:	Town of Niagara, NY							
Client:	Town of Niagara							
Drilling Firm:	Nature's Way							
Groundwater	**Depth**	**Date & Time**	**Drill Rig:**	Geoprobe - Truck mounted				
While Drilling:			**Casing:**	2"	**Rock Core:**		**Undist:**	
Before Casing Removal:			**Sampler:**	4' core	**Other:**			
After Casing Removal:			**Hammer:**					

(N -- No. of blows to drive sampler 12" w/140 lb. hammer falling 30" ASTM D-1586, Standard Penetration Test)

Depth (ft)	Sample No.	Symbol	Blows on Sampler per 6"	MATERIAL DESCRIPTION (c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10%; S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey)	COMMENTS (e.g., N-value, recovery, relative moisture, core run, RQD, % recovered)
	X			0-0.4' ***Topsoil***	
1	X			0.4 - 0.8' ***black/brown silty sand, trace F - M gravel FILL?***	
	X				
2				0.8' - 4' ***Light brown silty Clays, trace F-M gravel***	
				Native	
3					
4				4 - 8' ***Same as above, Dense***	
5					
6					
7					
8				***Refusal @ 8'***	
9					
10					
					PID readings were 0.0 ppm
11					unless otherwise noted
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

C&S COMPANIES	**C&S Engineers, Inc.** 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**TEST PIT**	***Test Pit No.*** **(Boring B11) AL-01**
			Sheet 1 of:
			Project No.: 249006001

Project Name:	4435 - 4445 Military Rd			***Start Date:***	3/6/20
Location:	Town of Niagara, NY	***Operator:***	Metro Env.	***Finish Date:***	3/6/20
Client:	Town of Niagara	***Equipment:***	Excavator	***Inspector:***	A. Brennen

Depth (ft)	Sample No.	Symbol	Exc. Depth	MATERIAL DESCRIPTION c - coarse, m - medium, f - fine; a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10% S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	COMMENTS (e.g., caving of sidewalls, excavation difficulties, PID readings)
				0-0.5" : ***Concrete slab***	0.0 ppm
1				5" - 1' ***Subbase, gravel***	0.8 ppm
2				1' ***Brown, silty clays - Native***	0.0 ppm
3				***Soil staining noted along lift casing. Believed to be caused from oil seepage orginating from concrete floor spills.***	
4					
5					
6					
7					
8				8' ***End of lift casing. End of test pit.***	
9				***Soil and concrete backfilled.***	
10					
11					
12					
13					
14					
15					

C&S COMPANIES	C&S Engineers, Inc. 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**TEST PIT**	***Test Pit No.***	**(B10 Boring) AL-02**
			Sheet 1 of:	
			Project No.:	249006001
Project Name:	4435 - 4445 Military Rd		***Start Date:***	3/6/20
Location:	Town of Niagara, NY	***Operator:*** Metro Env.	***Finish Date:***	3/6/20
Client:	Town of Niagara	***Equipment:*** Excavator	***Inspector:***	A. Brennen

Depth (ft)	Sample No.	Symbol	Exc. Depth	c - coarse m - medium f - fine **MATERIAL DESCRIPTION** S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey a - and - 35-50% s - some - 20-35% l - little - 10-20% t - trace - 0-10%	**COMMENTS** (e.g., caving of sidewalls, excavation difficulties, PID readings)
				0-0.5" : ***Concrete slab***	0.0 ppm
1				5"- 1.2' ***Sands, F - C Gravel, C&D Debris, FILL***	0.0 ppm
2				1.2' ***Brown, silty clays - Native***	0.0 ppm
3				***Soil staining noted along lift casing. Believed to be caused from oil seepage orginating from concrete floor spills.***	
4					
5					
6					
7					
8				8' ***End of lift casing. End of test pit.***	
9				***Soil backfilled. Stained concrete to be disposed later.***	
10					
11					
12					
13					
14					
15					

C&S COMPANIES	**C&S Engineers, Inc.** 141 Elm Street Buffalo, New York 14203 Phone: 716-847-1630 Fax: 716-847-1454 www.cscos.com	**TEST PIT**	***Test Pit No.*** **(B09 Boring) AL-03**
			Sheet 1 of:
			Project No.: 249006001
Project Name:	4435 - 4445 Military Rd		***Start Date:*** 3/6/20
Location:	Town of Niagara, NY	***Operator:*** Metro Env.	***Finish Date:*** 3/6/20
Client:	Town of Niagara	***Equipment:*** Excavator	***Inspector:*** A. Brennen

Depth (ft)	Sample No.	Symbol	Exc. Depth	MATERIAL DESCRIPTION c - coarse, m - medium, f - fine a - and - 35-50%, s - some - 20-35%, l - little - 10-20%, t - trace - 0-10% S - Sand, $ - Silt, G - Gravel, C - Clay, cly - clayey	COMMENTS (e.g., caving of sidewalls, excavation difficulties, PID readings)
				0-0.5" : ***Concrete slab***	0.0 ppm
1				5"- 1.2' ***Sands, F - C Gravel, C&D Debris, FILL***	0.0 ppm
2				1.2' ***Brown, silty clays - Native***	0.0 ppm
3				***Soil staining noted along lift casing. Believed to be caused from oil seepage orginating from concrete floor spills.***	
4					
5					
6					
7					
8				8' ***End of lift casing. End of test pit.***	
9				***Soil backfilled. Stained concrete to be disposed later.***	
10					
11					
12					
13					
14					
15					

C&S COMPANIES

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141 Elm Street
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SOIL SAMPLE LOG

Sheet 1 of:	2
Project No.:	249006001
Contactor:	TREC
Date:	1/20/2021

Project Name:	Military Rd BCP - Pre-Design Investigation Sampling
Location:	4435-4445 Military RD, Niagara Falls, NY
Client:	Town of Niagara

Sample No.	Sample ID	Date	Time	Weather Conditions	Sample Collected By	Datum	Depth	Material Decription	PID (ppm)	Analysis	COC #
	B01-2N	1/21/20	0840	35° Partly Cloudy	AB		0-.5	Grey Sands + Gravel to Brn Sands		Chrom. Tot	
	B01-2E										
	B01-2S										
	B01-2W										
	B01-4N										
	B01-4E										
	B01-4S										
	B01-4W										
	B01-6N										
	B01-6E										
	B01-6S										
	B01-6W										
	B03-2N		0930				0-1	Grey/Wht Chalky Sands		Merc. + Chrom	
	B03-2E										
	B03-2S										
	B03-2W										
	B03-4N										
	B03-4E										
	B03-4S										
	B03-4W										
	B03-6W										
	B03-6E										
	B03-6S										
	B03-8N										
No sample DOT ROW →	~~B03-8E~~										
	B03-8S										
	B03-8E									"	
	B03-6W							Dark Grey Stones / Sand		"	
	B08-2N		1000				0-.5	Blk Sands, gravel to Lt Brn Clays		Merc.	
	B08-2E										
	B08-2S										
	B08-2W										
	B08-4N										
	B08-4E										
	B08-4S										
	B08-4W				AB						

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SOIL SAMPLE LOG

Sheet 2 of:	2
Project No.:	249006001
Contactor:	TREC
Date:	1/20/2021

Project Name:	Military Rd BCP - Pre-Design Investigation Sampling
Location:	4435-4445 Military RD, Niagara Falls, NY
Client:	Town of Niagara

Sample No.	Sample ID	Date	Time	Weather Conditions	Sample Collected By	Datum	Depth	Material Decription	PID (ppm)	Analysis	COC #
	B08-6N	1/21/20	1000	Partly Cloudy, Windy	AB		0-5'	Black Sands + Gravel, DK Brn Clay		Merc	
	B08-6E										
	B08-6S										
	B08-6W		↓				↓	↓		↓	
	B06-2N		1030				5-5	Dark Silty Sand and Gravel		Barium	
	B06-2E										
	B06-2S										
	B06-2W										
	B06-4N										
	B06-4E										
	B06-4S										
	B06-4W										
	B06-6N										
	B06-6E										
	B06-6S										
	B06-6W		↓				↓	↓		↓	
	B04-2N		1100				0-1	Dark Silty Sands some Gravel + Lt Brn Clay Below		Benz(a)pyr.	
	B04-2E										
	B04-2S										
	B04-2W										
	B04-4N										
	B04-4E										
	B04-4S										
	B04-4W						↓	↓		↓	
	B12-00-01		1105				0-1	DK Silty Sands + some Grav Lt Brn Clays @ 0.7'		SVOC, Met	
	B13-00-01		1145				0-1'	DK Silty Sands + Gravel Lt Brn Clays @ 0.5'		SVOC, Met	
	B14-00-01		1130				0-1'	Same as above Lt Brn Clays to Gravel @ 0.8'		SVOC, VOC, Met, PCB, Pest	
		↓			↓						

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Fax: 716-847-1454

SOIL SAMPLE LOG

Sheet 1 of:	1
Project No.:	249.006.001
Contactor:	
Date:	3/11/21

Project Name:	Military Road BCP - Pre-Design Investigation Sampling
Location:	4435-4445 Military Road, Niagara Falls, New York
Client:	Town of Niagara

Sample No.	Sample ID	Date	Time	Weather Conditions	Sample Collected By	Datum	Depth	Material Decription	PID (ppm)	Analysis	COC #
	B14-2N	~~2/11/21~~	1600	65° Sunny, W wind	~~AB~~		0-1 ft	Silty Gravel, Organics, to Brn Silty Clay	0.0	Mercury Only	480-155234-34402.1
	B14-2S	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-2E	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-2W	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-4N	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-4S	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-4E	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-4W	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-6N	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-6S	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-6E	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B14-6W	2/11/2021					0-1 ft			Mercury Only	480-155234-34402.1
	B03-2S		1540					White Sands, Chalky	-	Hex Cr	
	B03-4S		~~1540~~	1540					-	Hex Cr.	
	B03-4W	V	~~1540~~	1540	V				-	Hex Cr.	

Appendix D
Excavation Work Plan

4435-4445 Military Road Site
SITE NO. C932174
Excavation Work Plan

1. NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination or breach or alter the site's cover system, the site owner or their representative will notify the NYSDEC contacts listed in the table below. **Table 1** includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix B of the SMP.

Table 1: Notifications*

Name	Contact Information
NYSDEC Project Manager Andrew Zwack	(716) 851-7220 Andrew.Zwack@dec.ny.gov
Benjamin McPherson, NYSDEC Project Manager's Supervisor	(716) 851-7220 benjamin.mcpherson@dec.ny.gov
NYSDEC Site Control Kelly Lewandowski	(518) 402-9547 Kelly.lewandowski@dec.ny.gov
Melissa Doroski, NYSDOH Project Manager	(518) 402-7860 melissa.doroski@health.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

The notification to the Project Manager will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications of truck routes, and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP, 29 CFR 1910.120 and 29 CFR 1926 Subpart P;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix E of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP.

2. SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Sections 6 and 7 of this Plan.

Radiological Considerations
Instrument-based soil screening for gamma radiation levels using a Ludlum model #2221 scaler with a #44-10 probe (or equivalent) will be performed during all excavations into known or potentially radiologically impacted material (slag) or a breach of the cover system.

Radiological screening will be conducted by a qualified environmental professional. Should radiation levels (counts per minute) exceed 1.5x site specific background levels, action-specific work plan shall be developed to address additional screening, sampling, analysis, and handling of elevated radiological material. NYSDEC and NYSDOH will be notified of any screening level exceedances. The contamination must be addressed as described in **Sections 3** through **Section 6** of this plan.

Material will be segregated based on previous environmental data and screening results into material that requires off-site disposal On-site reuse of radiologically impacted material is prohibited.

3. SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

4. MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete. Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

5. MATERIALS TRANSPORT OFF-SITE

Transport of regulated materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

As shown on the attached **Map**, the truck transport route is north on Military Road to NYS Route 31 west to either the north or southbound ramps to Route 190. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Offsite queuing will be prohibited.

6. MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed off-site in a permitted facility in accordance with all local, State and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated off-site management of materials from this site will not occur without formal NYSDEC project manager approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, (e.g. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C&D debris recovery facility) Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include, but will not be limited to: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility.

7. MATERIAL REUSE ON-SITE

The qualified environmental professional as defined in 6 NYCRR part 375 will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e. contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Proposed materials for reuse on-site must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in NYSDEC DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances [October 2020] guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

Soil/fill material for reuse on-site will be segregated and staged as described in Sections 2 and 3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse on-site will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

On-site reuse of radiologically impacted material is prohibited.

8. FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed off-site at a permitted facility in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

9. COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the decision document. The existing cover system is comprised of a minimum of 12 inches of clean soil, and asphalt pavement and concrete building slabs of varying thickness. The demarcation layer, consisting of geotextile will be replaced to provide a visual reference to the top of the remaining contamination zone, the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this SMP. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

10. BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. A copy of the form is **Attached**.

Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d) and DER-10 Appendix 5 for commercial use. Soils that meet 'general' fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

11. STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

12. EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project manager will be promptly notified of the discovery.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes [TAL metals, TCL volatiles and semi-volatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone within two hours to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

13. COMMUNITY AIR MONITORING PLAN

Air sampling locations are to be determined. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and downwind monitoring stations. Exceedances of action levels listed in the CAMP will be reported to NYSDEC.

13A: Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part-per-million, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

14. ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis is not anticipated to be necessary. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's remediation contractor, and any measures that are implemented will be discussed in the final SMP.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include:

a) Limiting the area of open excavations and size of soil stockpiles;
b) Shrouding open excavations with tarps and other covers; and
c) Using foams to cover exposed odorous soils.

If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include:

d) Direct load-out of soils to trucks for off-site disposal;
e) Use of chemical odorants in spray or misting systems; and,
f) Use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting / filtering systems.

15. DUST CONTROL PLAN

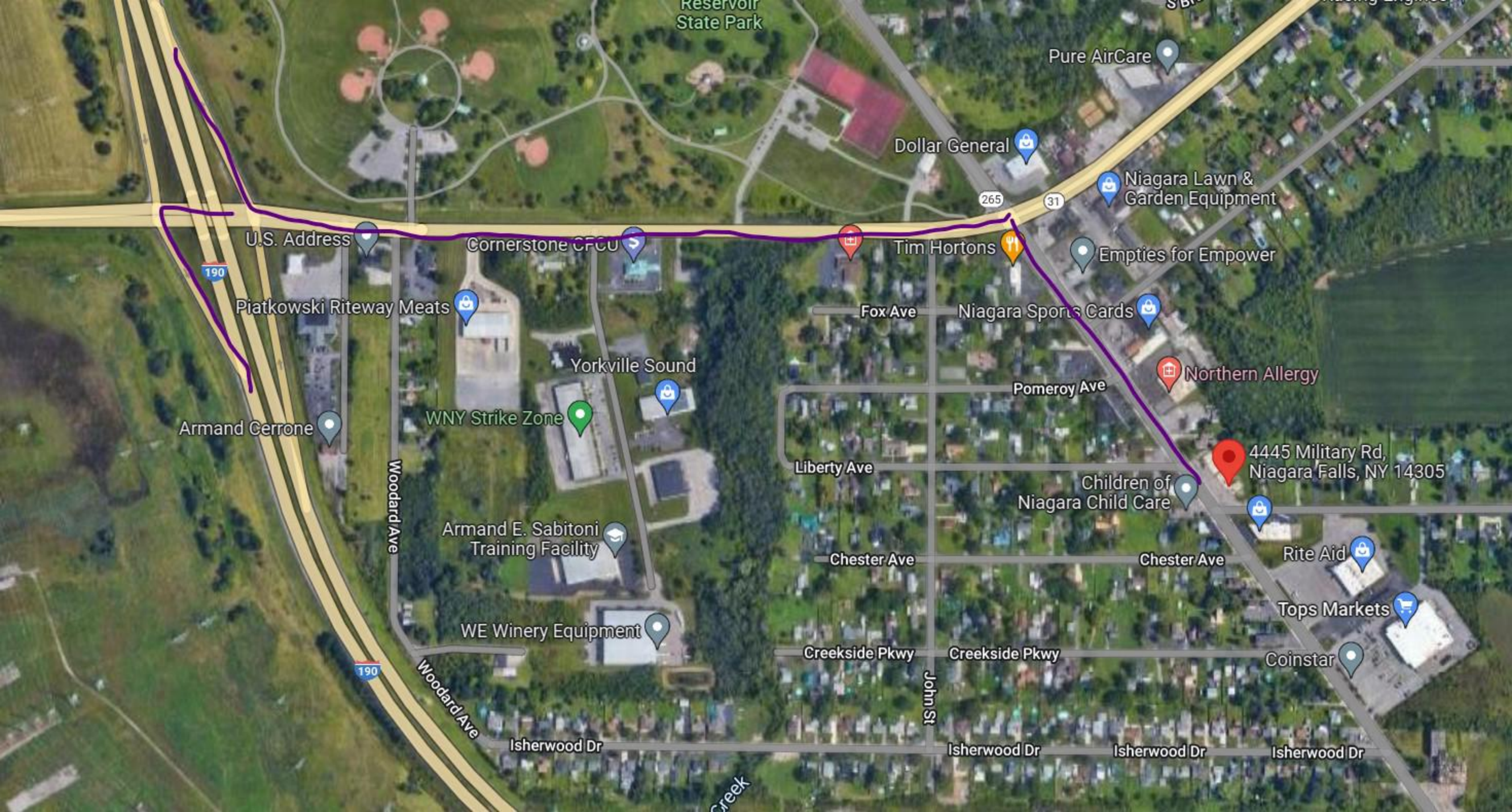
Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided as Appendix F of the SMP. If particulate levels at the site exceed the thresholds listed in the CAMP or if airborne dust is observed on the site or leaving the site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the site.
A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

16. OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.


Reservoir State Park
Pure AirCare
Dollar General
Niagara Lawn & Garden Equipment
265
31
U.S. Address
Cornerstone CFCU
Tim Hortons
Empties for Empower
190
Piatkowski Riteway Meats
Fox Ave
Niagara Sports Cards
Yorkville Sound
Northern Allergy
Pomeroy Ave
WNY Strike Zone
Armand Cerrone
4445 Military Rd, Niagara Falls, NY 14305
Liberty Ave
Children of Niagara Child Care
Woodard Ave
Armand E. Sabitoni Training Facility
Chester Ave
Chester Ave
Rite Aid
Tops Markets
WE Winery Equipment
Creekside Pkwy
Creekside Pkwy
Coinstar
John St
190
Woodard Ave
Isherwood Dr
Isherwood Dr
Isherwood Dr
Isherwood Dr

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Request to Import/Reuse Fill or Soil

This form is based on the information required by DER-10, Section 5.4(e). Use of this form is not a substitute for reading the applicable Technical Guidance document.

SECTION 1 – SITE BACKGROUND

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? Choose an item

Does it contain less than 10%, by weight, material that would pass a size 80 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

_____ _____

Signature Date

_____

Print Name

_____

Firm

Revised August 2014

Appendix E
Health and Safety Plan

Health and Safety Plan
for
4435-4445 Military Road Site

BCP Site No. C932174

4435-4445 Military Road Site

4435-4445 Military Road

Town of Niagara, New York

Prepared by

C&S Engineers, Inc.
141 Elm Street, Suite 100
Buffalo, New York 14203

September, 2021

EMERGENCY PHONE NUMBERS

Emergency Medical Service 911

Police Department 911

Fire Department 911

Mount St. Mary's Hospital ..... (716) 297-4800

National Response Center ..... (800) 424-8802

Poison Control Center ..... (800) 222-1222

Center for Disease Control ..... (800) 311-3435

NYSDEC Region 9 (Buffalo, New York) ..... (716) 851-7201

C&S Engineers ..... (315) 455-2000

Niagara Town Office ..... (716) 297-5243

TABLE OF CONTENTS

Page

Emergency Phone Numbers ..... *i*
Section 1 – General Information 1
1.1 Responsibilities 1
Section 2 - Health And Safety Personnel 2
2.1 Project Manager (PM) 2
2.2 Health and Safety Manager 2
2.3 Health and Safety Officer (HSO) 2
2.4 Emergency Coordinator 3
2.5 Site Workers 3
Section 3 - Pertinent Site Information 4
3.1 Site Location and General History 4
Section 4 – Training 5
4.1 Site-Specific Training 5
4.2 Safety Briefings 5
Section 5 - Personal Protective Equipment 6
5.1 General 6
5.2 Personal Protective Equipment – Site Specific 7
Section 6 - Monitoring Procedures 8
6.1 Monitoring During Site Operations 8
6.1.1 Drilling Operations (Monitoring Well Installation and Subsurface Borings) 8
6.2 Action Levels 8
6.3 Personal Monitoring Procedures 8
Section 7 – Communications 9
Section 8 - Safety Considerations For Site Operations 10
8.1 General 10
8.2 Field Operations 11
Section 9 - Decontamination Procedures 12
Section 10 – Disposal Procedures 13
Section 11 - Emergency Response Procedures 14
11.1 Emergency Coordinator 14
11.2 Evacuation 14
11.3 Potential or Actual Fire or Explosion 14
11.4 Environmental Incident (spread or release of contamination) 14
11.5 Personnel Injury 14
11.6 Personnel Exposure 14
11.7 Adverse Weather Conditions 15
11.8 Incident Investigation and Reporting 15
Section 12 – Community Relations 16
13.1 Community Health and Safety Plan 16
13.1.1 Community Health and Safety Monitoring 16
13.1.2 Community Air Monitoring Plan 16
Section 13 - Authorizations 17

FIGURES

Figure 1 Site Location
Figure 2 Site Detail

Attachment A – Map and Directions to Hospital

Appendix A – Guidance on Incident Investigation and Reporting

SECTION 1 – GENERAL INFORMATION

This Health and Safety Plan (HASP) addresses health and safety considerations for the activities that personnel employed by C&S Engineers, Inc., (C&S) may be engaged in during site investigation at the 4435-4445 Military Road Site located in Town of Niagara, New York (Site). **Figure 1** and **Figure 2** shows the location and layout of the Site. This HASP will be implemented by the Health and Safety Officer (HSO) during site work.

Compliance with this HASP is required of C&S personnel who enter this Site. The content of the HASP may change or undergo revision based upon additional information made available to the health, safety, and training (H&S) committee, monitoring results or changes in the technical scope of work. Any changes proposed must be reviewed by the H&S committee.

1.1 Responsibilities

Project Manager……	Dan Riker Phone: (716) 955-3018 Cell: (716) 572-5312
Health and Safety Manager……	Brent Testut Phone: (315) 703-4376 Cell: (707) 631-8846
Site Health and Safety Officer……....	Alex Brennen Phone: (716) 427-6385 Cell: (716) 946-9133
Emergency Coordinator……..	Alex brennen Phone: (716) 427-6385 Cell: (716) 946-9133

SECTION 2 - HEALTH AND SAFETY PERSONNEL

The following information briefly describes the health and safety designations and general responsibilities for this Site.

2.1 Project Manager (PM)

The PM is responsible for the overall project including the implementation of the HASP. Specifically, this includes allocating adequate manpower, equipment, and time resources to conduct Site activities safely.

2.2 Health and Safety Manager

- Has the overall responsibility for coordinating and reporting health and safety activities and the health and safety of Site Workers.
- Must have completed, at a minimum, the OSHA 30-Hour Construction Safety Training, and either the 24-Hour training course for the Occasional Hazardous Waste Site Worker or the 40-Hour training course for the Hazardous Waste Operations Worker that meets OHSA 29 CFR 1910.
- Must have completed the 8-Hour Site supervisor/manager's course for supervisors and managers having responsibilities for hazardous waste Site operations and management.
- Directs and coordinates health and safety monitoring activities.
- Ensures that field teams utilize proper personal protective equipment (PPE).
- Conducts initial on-site specific training prior to Site Workers commencing work.
- Conducts and documents daily and periodic safety briefings.
- Ensures that field team members comply with this HASP.
- Immediately notifies the Project Manager of all accident/incidents.
- Determines upgrading or downgrading of PPE based on Site conditions and/or real time monitoring results.
- Ensures that monitoring instruments are calibrated daily or as the manufacturer's instructions determine.
- Provides daily summaries of field operations and progress to the Project Manager.
- Submits and maintains all documentation required in this HASP and any other pertinent health and safety documentation.

2.3 Health and Safety Officer (HSO)

- Must be designated by the Health and Safety Manager and at a minimum, have the 40-Hour training course for the Hazardous Waste Operations Worker that meets OHSA 29 CFR 1910, as well as the OSHA 10-Hour Construction Safety Training.
- Must schedule and attend a Pre-Construction Safety Meeting with the Health and Safety Manager to discuss the Subcontractor Safety Requirements and must attend the Weekly Subcontractor Coordination Meeting.
- Responsible for ensuring subcontractors and their lower tier contractors comply with project safety requirements.

- Must make frequent and regular inspections of their work areas and activities and ensure hazards that are under their control are corrected immediately and all other hazards are reported to the Project Manager and Health and Safety Manager.
- Must report all work related injuries, regardless of severity, to the Project Manager and the Health and Safety Manager within 24 hours after they occur.

2.4 Emergency Coordinator

- Will at a minimum, have the 40-Hour training course for the Hazardous Waste Operations Worker that meets OHSA 29 CFR 1910, as well as the OSHA 10-Hour Construction Safety Training.
- The Emergency Coordinator or his on-site designee will, in coordination with the Town of Niagara, implement the emergency response procedures outlined in Section 12 whenever conditions at the Site warrant such action.
- The Emergency Coordinator or his on-site designee will be responsible for assuring the evacuation, emergency treatment, emergency transport of C&S personnel as necessary, and notification of emergency response units (refer to phone listing in the beginning of this HASP) and the appropriate management staff.

2.5 Site Workers

- Report any unsafe or potentially hazardous conditions to the Health and Safety Officer and Manager.
- Maintain knowledge of the information, instructions, and emergency response actions contained in the HASP.
- Comply with rules, regulations, and procedures as set forth in this HASP, including any revisions that are instituted.
- Prevent unauthorized personnel from entering work Site.

SECTION 3 - PERTINENT SITE INFORMATION

3.1 Site Location and General History

The Site is comprised of one parcel: 4435-4445 Military Road (SBL: 131.10-2-29). The BCP Site is located in the northern portion of the Town of Niagara, Niagara County, New York. The Site is approximately 1.15 acres and is owned by the Town of Niagara. Sweet Home Road is located to the north, Grauer Road is located to the south, Military Road is located to the west and Hermitage Street is located at a distance to the east. The site is bounded by residential properties and Military and Grauer Roads.

According to historical records, the Site was initially developed for commercial uses starting around 1960, prior to which the land was vacant. In the 1960s, the Site was used as a laundry, dry cleaner and barbershop. As the 1960s ended, portions of the building at the Site contained auto repair and a gas station. The use of the Site as an auto tire store and auto repair shop, dry cleaner, and barbershop continued throughout the 1980's with the addition of a pizza shop. The use of a portion of the site as a cleaner ended by 1994. The most recent use of the Subject Property included commercial use as Culbert's Wholesale Tire. Culbert's utilized the northern portion of the building at the Site for storage and the southern portion of the building for specialized auto equipment and repair. The property was foreclosed upon by Niagara County in 2018, and the Town of Niagara assumed ownership on October 11, 2018.

SECTION 4 – TRAINING

4.1 Site-Specific Training

Training will be provided that specifically addresses the activities, procedures, monitoring, and equipment for the Site operations prior to going on site. Training will include familiarization with Site and facility layout, known and potential hazards, and emergency services at the Site, and details all provisions contained within this HASP. This training will also allow Site Workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

4.2 Safety Briefings

C&S project personnel will be given briefings by the HSO on a daily or as needed basis to further assist Site workers in conducting their activities safely. Pertinent information will be provided when new operations are to be conducted. Changes in work practices must be implemented due to new information made available, or if Site or environmental conditions change. Briefings will also be given to facilitate conformance with prescribed safety practices. When conformance with these practices is not occurring or if deficiencies are identified during safety audits, the project manager will be notified.

SECTION 5 - PERSONAL PROTECTIVE EQUIPMENT

5.1 General

The level of protection to be worn by field personnel will be defined and controlled by the HSO. Depending upon the type and levels of material present or anticipated at the site, varying degrees of protective equipment will be needed. If the possible hazards are unknown, a reasonable level of protection will be taken until sampling and monitoring results can ascertain potential risks. The levels of protection listed below are based on USEPA Guidelines. A list of the appropriate clothing for each level is also provided.

Level A protection must be worn when a reasonable determination has been made that the highest available level of respiratory, skin, eye, and mucous membrane protection is needed. It should be noted that while Level A provides maximum available protection, it does not protect against all possible hazards. Consideration of the heat stress that can arise from wearing Level A protection should also enter into the decision making process. Level A protection includes:

- Open circuit, pressure-demand self-contained breathing apparatus (SCBA)
- Totally encapsulated chemical resistant suit
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level B protection must be used when the highest level of respiratory protection is needed, but hazardous material exposure to the few unprotected areas of the body (e.g., the back of the neck) is unlikely. Level B protection includes:

- Open circuit, pressure-demand SCBA or pressure airline with escape air bottle
- Chemical protective clothing: Overalls and long sleeved jacket; disposal chemical resistant coveralls; coveralls; one or two piece chemical splash suit with hood
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level C must be used when the required level of respiratory protection is known, or reasonably assumed to be, not greater than the level of protection afforded by air purifying respirators; and hazardous materials exposure to the few unprotected areas of the body (e.g. the back of the neck) is unlikely. Level C protection includes:

- Full or half face air-purifying respirator
- Chemical protective clothing: Overalls and long-sleeve jacket; disposable chemical resistant coveralls; coveralls; one or two piece chemical splash suit
- Gloves, inner (surgical type)
- Gloves, outer, chemical protective
- Boots, chemical protective

Level D is the basic work uniform. It cannot be worn on any site where respiratory or skin hazards exist. Level D protection includes:

- Safety boots/shoes
- Safety glasses
- Hard hat with optional face shield

Note that the use of SCBA and airline equipment is contingent upon the user receiving special training in the proper use and maintenance of such equipment.

5.2 Personal Protective Equipment – Site Specific

Level D with some modification will be required when working in the work zone on this Site. In addition to the basic work uniform specified by Level D protection, Nitrile gloves will be required when contact with soil or ground water is likely. Hearing protection will be worn when power equipment is used to perform subsurface investigation work. An upgrade to a higher level (Level C) of protection may occur if determined necessary by the HSO.

SECTION 6 - MONITORING PROCEDURES

6.1 Monitoring During Site Operations

All Site environmental monitoring should be accompanied by periodic meteorological monitoring of appropriate climatic conditions.

6.1.1 Drilling Operations (Monitoring Well Installation and Subsurface Borings)

Monitoring will be performed by the HSO or drilling observer during the conduct of work. A photoionization detector (PID) equipped with an appropriate map (e.g. 10.6 or 11.7 eV) will be utilized to monitor for the presence of volatile organic vapors within the breathing zone, the borehole, and subsurface samples upon their retrieval. Drill cuttings and excavation spoils will also be monitored by use of the PID. The PID will be field checked for calibration accuracy three times per day (morning, lunch, and end of day. If subsurface conditions warrant, a combustible gas indicator (CGI) with oxygen alarm may also be used to monitor the borehole for the presence of combustible gases. Similar monitoring of fluids produced during well development will also be conducted.

6.2 Action Levels

The action threshold for VOCs established in the CAMP is 5 ppm above background. If this value is exceeded for the 15-minute average work will be halted and work may resume once instantaneous readings fall below 5 ppm work. The action level for dust is 100 (µg/m3) over background during a 15-minute average. If this limit is exceeded, dust suppression techniques will be employed, including using water to wet the area.

6.3 Personal Monitoring Procedures

Personal monitoring shall be performed as a contingency measure in the event that VOC concentrations are consistently above the 5 ppm action level as detected by the PID. If the concentration of VOCs is above this action level, then amendments to the HASP must be made before work can continue at the Site.

SECTION 7 – COMMUNICATIONS

Cell phones will be the primary means of communicating with emergency support services/facilities.

SECTION 8 - SAFETY CONSIDERATIONS FOR SITE OPERATIONS

8.1 General

Standard safe work practices that will be followed include:

- Do not climb over/under drums, or other obstacles.
- Do not enter the work zone alone.
- Practice contamination avoidance, on and off-site.
- Plan activities ahead of time, use caution when conducting concurrently running activities.
- No eating, drinking, chewing or smoking is permitted in work zones.
- Due to the unknown nature of waste placement at the Site, extreme caution should be practiced during excavation activities.
- Apply immediate first aid to any and all cuts, scratches, abrasions, etc.
- Be alert to your own physical condition. Watch your buddy for signs of fatigue, exposure, etc.
- A work/rest regimen will be initiated when ambient temperatures and protective clothing create a potential heat or cold stress situation.
- No work will be conducted without adequate natural light or without appropriate supervision.
- Task safety briefings will be held prior to onset of task work.
- Ignition of flammable liquids within or through improvised heating devices (barrels, etc.) or space heaters is forbidden.
- Entry into areas of spaces where toxic or explosive concentrations of gases or dust may exist without proper equipment is prohibited.
- Any injury or unusual health effect must be reported to the Site health and safety officer.
- Prevent splashing or spilling of potentially contaminated materials.
- Use of contact lenses is prohibited while on site.
- Beards and other facial hair that would impair the effectiveness of respiratory protection are prohibited if respiratory protection is necessary.
- Field crew members should be familiar with the physical characteristics of investigations, including:

    - Wind direction in relation to potential sources
    - Accessibility to co-workers, equipment, and vehicles
    - Communication
    - Hot zones (areas of known or suspected contamination)
    - Site access
    - Nearest water sources

- The number of personnel and equipment in potentially contaminated areas should be minimized consistent with site operations.

8.2 Field Operations

The HSO or designee will be present on-site during all intrusive work (e.g., drilling operations, excavations, trenching) and will provide monitoring to oversee that appropriate levels of protection and safety procedures are utilized by C&S personnel. The use of salamanders or other equipment with an open flame is prohibited and the use of protective clothing, especially hard hats and boots, will be required during drilling or other heavy equipment operations.

SECTION 9 - DECONTAMINATION PROCEDURES

Decontamination involves physically removing contaminants and/or converting them chemically into innocuous substances. Only general guidance can be given on methods and techniques for decontamination. Decontamination procedures are designed to:

- Remove contaminant(s).
- Avoid spreading the contamination from the work zone.
- Avoid exposing unprotected personnel outside of the work zone to contaminants.

Contamination avoidance is the first and best method for preventing spread of contamination from a hazardous site. Each person involved in site operations must practice the basic methods of contamination avoidance listed below. Additional precautions may be required in the HASP.

- Know the limitations of all protective equipment being used.
- Do not enter a contaminated area unless it is necessary to carry out a specific objective.
- When in a contaminated area, avoid touching anything unnecessarily.
- Walk around pools of liquids, discolored areas, or any area that shows evidence of possible contamination.
- Walk upwind of contamination, if possible.
- Do not sit or lean against anything in a contaminated area. If you must kneel (e.g., to take samples), use a plastic ground sheet.
- If at all possible, do not set sampling equipment directly on contaminated areas. Place equipment on a protective cover such as a ground cloth.
- Use the proper tools necessary to safely conduct the work.

Specific methods that may reduce the chance of contamination are:

- Use of remote sampling techniques.
- Opening containers by non-manual means.
- Bagging monitoring instruments.
- Use of drum grapplers.
- Watering down dusty areas.

Equipment which will need to be decontaminated includes tools, monitoring equipment, and personal protective equipment. Items to be decontaminated will be brushed off, rinsed, and dropped into a plastic container supplied for that purpose. They will then be washed with a detergent solution and rinsed with clean water. Monitoring instruments may be wrapped in plastic bags prior to entering the field in order to reduce the potential for contamination. Instrumentation that is contaminated during field operations will be carefully wiped down. Heavy equipment, if utilized for operations where it may be contaminated, will have prescribed decontamination procedures to prevent contaminant materials from potentially leaving the Site. On-site contractors, such as drillers or backhoe operators, will be responsible for decontaminating all construction equipment prior to demobilization.

SECTION 10 – DISPOSAL PROCEDURES

All discarded materials, waste materials, or other objects shall be handled in such a way as to reduce or eliminate the potential for spreading contamination, creating a sanitary hazard, or causing litter to be left on-site. All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary and segregated for proper disposal. All contaminated waste materials shall be disposed of as required by the provisions included in the contract and consistent with regulatory provisions. All non-contaminated materials shall be collected and bagged for appropriate disposal. Investigation Derived Waste (IDW) will be managed and characterized. Characterization of IDW may require TCLP sampling and analysis consistent with the work plan for the Site and DER-10 Technical Guidance for Site Investigation and Remediation.

SECTION 11 - EMERGENCY RESPONSE PROCEDURES

As a result of the hazards at the Site, and the conditions under which operations are conducted, there is the possibility of emergency situations. This section establishes procedures for the implementation of an emergency plan.

11.1 Emergency Coordinator

Emergency Coordinator:..... Alex Brennen .....Work Phone: (716) 946-9133

The Emergency Coordinator or his on-site designee will, in concert with the Town of Niagara, implement the emergency response procedures whenever conditions at the Site warrant such action. The Emergency Coordinator or his on-site designee will be responsible for assuring the evacuation, emergency treatment, emergency transport of C&S personnel as necessary, and notification of emergency response units (**refer to phone listing** in the beginning of this HASP) and the appropriate management staff.

11.2 Evacuation

In the event of an emergency situation, such as fire, explosion, significant release of toxic gases, etc., all personnel will evacuate and assemble in a designated assembly area. The Emergency Coordinator or his on-site designee will have authority to contact outside services as required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given. The Emergency Coordinator or his on-site designee must see that access for emergency equipment is provided and that all ignition sources have been shut down once the emergency situation is established. Once the safety of all personnel is established, the Fire Department and other emergency response groups will be notified by telephone of the emergency.

11.3 Potential or Actual Fire or Explosion

Immediately evacuate the Site and notify local fire and police departments, and other appropriate emergency response groups, if LEL values are above 25% in the work zone or if an actual fire or explosion has taken place.

11.4 Environmental Incident (spread or release of contamination)

Control or stop the spread of contamination if possible. Notify the Emergency Coordinator and the Project Manager. Other appropriate response groups will be notified as appropriate.

11.5 Personnel Injury

Emergency first aid shall be applied on-site as necessary. Then, decontaminate (en route if necessary) and transport the individual to nearest medical facility if needed. The ambulance/rescue squad shall be contacted for transport as necessary in an emergency. A map of directions to the nearest hospital is shown in **Attachment A**.

11.6 Personnel Exposure

- *Skin Contact*: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, and then provide appropriate medical attention. Eyes should be thoroughly rinsed with water for at least 15 minutes.
- *Inhalation*: Move to fresh air and/or, if necessary, decontaminate and transport to emergency medical facility.
- *Ingestion*: Decontaminate and transport to emergency medical facility.
- *Puncture Wound/Laceration*: Decontaminate, if possible, and transport to emergency medical facility.

11.7 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work can continue without sacrificing the health and safety of field workers.

11.8 Incident Investigation and Reporting

In the event of an incident, procedures discussed in the Medical Emergency/Incident Response Protocol, presented in **Appendix A** of this HASP, shall be followed.

SECTION 12 – COMMUNITY RELATIONS

13.1 Community Health and Safety Plan

13.1.1 Community Health and Safety Monitoring

As part of the site work, three general types of efforts are scheduled, including, non-intrusive reconnaissance tasks, sampling or monitoring tasks (monitoring point sampling), and intrusive tasks (test trenching, subsurface borings, monitoring well installation). During completion of general reconnaissance and sampling or monitoring tasks, potential for health and safety risks to off-site landowners or the local community are not anticipated.

During completion of intrusive efforts at or adjacent to the Site; health and safety monitoring efforts will be concentrated on the area or areas in which intrusive efforts are being completed. Since the air pathway is the most available and likely avenue for the release of potential contaminants to the atmosphere at or near the Site, in addition to limiting public or community access to the areas in which intrusive efforts are completed, health and safety measures will primarily consist of monitoring the air pathway for worker exposure.

13.1.2 Community Air Monitoring Plan

Efforts will be taken to complete field work in a manner which will minimize the creation of airborne dust or particulates. Under dry conditions, work areas may be wetted to control dust. During periods of extreme wind, intrusive field work may be halted until such time as the potential for creating airborne dust or particulate matter as a result of investigation activities is limited. Periodic monitoring following the guidelines of the site's Community Air Monitoring Plan (CAMP) will be implemented during all non-intrusive Site investigation activities, including surface soil and sediment sampling, and collection of groundwater samples from groundwater monitoring wells.

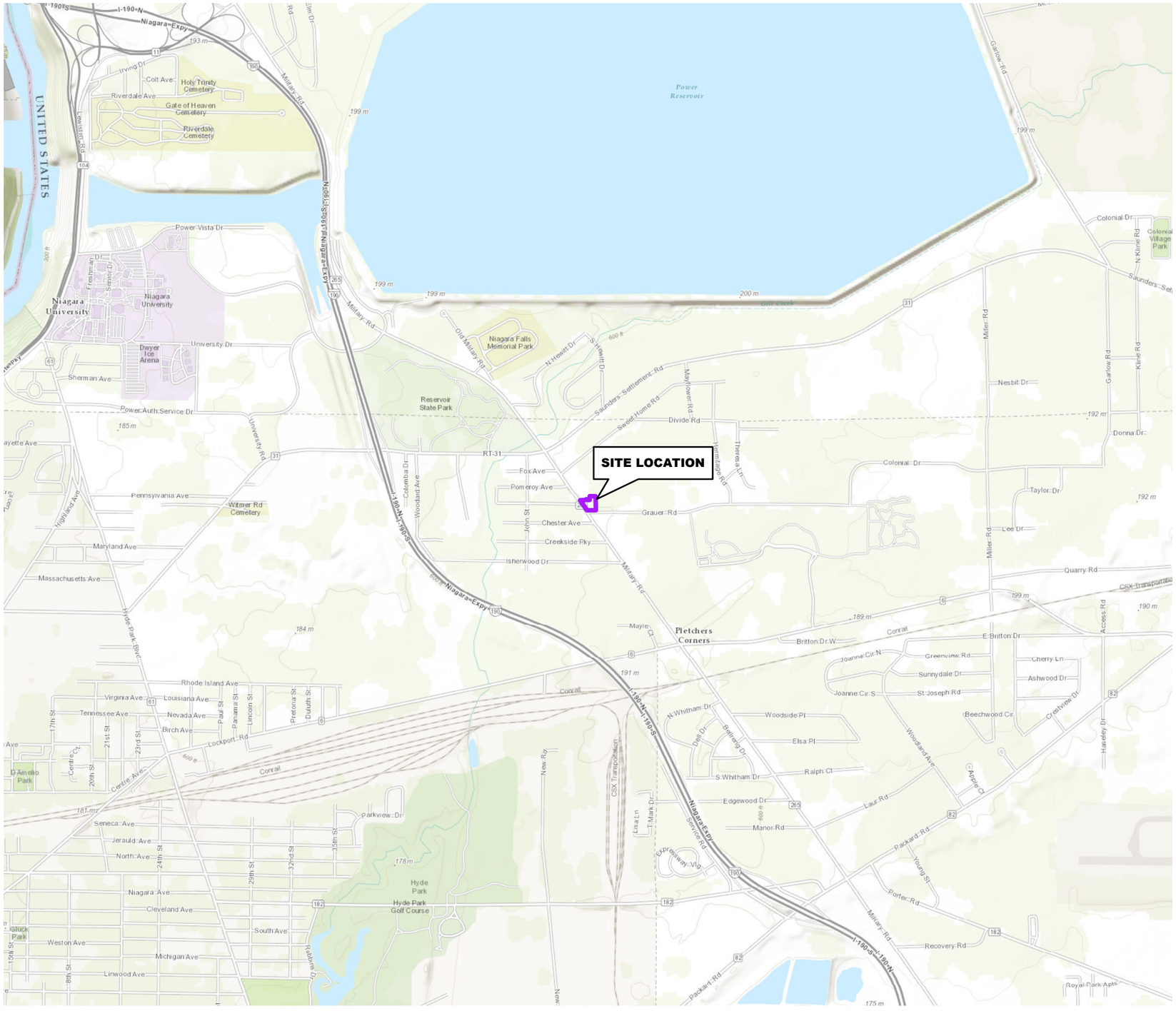
During completion of Site investigation, a CAMP will be implemented for the duration of intrusive activities. These additional air monitoring activities will include establishment of background conditions, continuous monitoring for volatile organic compounds and/or particulates at the downwind work area (exclusion zone) perimeter, recording of monitoring data, and institution and documentation of response levels and appropriate actions consistent with NYSDOH guidance.

SECTION 13 - AUTHORIZATIONS

Personnel authorized to enter the Site while operations are being conducted must be approved by the HSO. Authorization will involve completion of appropriate training courses, medical examination requirements, and review and sign-off of this HASP. No C&S personnel should enter the work zone alone. Each site visitor should check in with the HSO or Project Manager prior to entering the work zones.

FIGURE 1

SITE LOCATION MAP



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4435 - 4445 MILITARY ROAD
REMEDIAL ACTION WORK PLAN
TOWN OF NIAGARA, NEW YORK

MARK	DATE	DESCRIPTION
REVISIONS		

PROJECT NO:	Q47.001.001
DATE:	FEBRUARY 22, 2016
DRAWN BY:	C. MARTIN
DESIGNED BY:	C. MARTIN
CHECKED BY:	M. COLMERAUER

SITE LOCATION

FIGURE 1

Path: F:\Project\Q47 - Niagara County Dept of Economic Development\Planning-Study\GIS\SITE LOCATION.mxd

FIGURE 2

SITE DETAIL PHOTO

Notes

1) ONLY ANALYTES EXCEEDING UNRESTRICTED USE SCOS, AT A MINIMUM, ARE SHOWN. EXECPT WHERE OTHERWISE NOTED BY "NO EXCEEDANCE"

0 20 40 80 Feet

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N

4435-4445 MILITARY ROAD
REMEDIAL ACTION WORK PLAN
TOWN OF NIAGARA, NEW YORK

MARK	DATE	DESCRIPTION

REVISIONS

PROJECT NO:	249.006.001
DATE:	11/16/2020
DRAWN BY:	C. MARTIN
DESIGNED BY:	C. MARTIN
CHECKED BY:	D. RIKER

SITE MAP

FIGURE 2

ATTACHMENT A

MAP TO HOSPITAL

Google Maps Mount St. Mary's Hospital to 4445 Military Road, Niagara Falls, NY

Drive 2.6 miles, 5 min

Map data ©2021 Google 2000 ft

Mount St. Mary's Hospital

5300 Military Rd, Lewiston, NY 14092

1. Head east toward NY-265 N

446 ft

2. Turn right onto NY-265 S

Destination will be on the left

2.5 mi

Appendix A

GUIDANCE ON INCIDENT INVESTIGATION AND REPORTING

MEDICAL EMERGENCY / INCIDENT RESPONSE PROTOCOL

1.0 PURPOSE

From time to time employees of C&S Engineers, Inc. will sustain an injury while working on the job. While every effort is being made to prevent this, in the event of an injury or illness on the job, the following procedures will be implemented. This format may also be utilized in the event of a property damage incident.

2.0 SCOPE

This guideline applies to all C&S Engineers, Inc. job sites and employees.

3.0 GUIDELINES

Upon notification or awareness of an incident/accident with injuries or illness the Emergency Coordinator or his On-Site Designee will:

1. Ensure that the injured employee is receiving immediate first aid and medical care.
2. Notify Emergency Services (911) if injuries are severe.
3. Stabilize the work area; ensure that no one else can be injured.
4. Notify the Project Manager at the earliest possible convenience**.**
5. Notify the Owner/Client at the earliest possible convenience.

To assist the Health and Safety Manager in the root cause analysis, the Emergency Coordinator or his On-Site Designee will also make an attempt to:

1. Obtain the names and phone numbers of witnesses.
2. Preserve the accident scene if possible for analysis.

3.1 Injury Management

1. If the patient is stable with non-life threatening injuries, the foreman will ensure the employee is transported to the emergency medical facility listed in Section 1 of the HASP. Directions to the nearest emergency medical facility are located in **Attachment A** of the HASP.

At no time will an injured employee drive themselves to medical care.

2. If the patient has serious or life threatening injuries, the emergency coordinator or his on- site designee will notify the emergency services for the area for treatment and transport to a hospital or emergency room. Serious injuries can be considered but not limited to head injuries, loss of consciousness, severe laceration or amputation, fractured bones, burns and eye injuries.

3. Following the treatment and care of the injured employee, the emergency coordinator or his on-site designee and the project manager will initiate the completion of the first injury report. The Health & Safety Manager will assist.

3.2 Project Manager

1. Upon notification of a personal injury or illness on the job site, will notify C&S Engineers, Inc, President and Corporate Legal and C&S Companies Health and Safety Manager.
2. Will report to the worksite to initiate the first injury report.
3. Will report to the treatment facility to check on the well being of the injured employee.
4. The project manager will ensure that the treatment facility is aware that this is a workers compensation case.
5. Will assist the Health and Safety Manager in the analysis of the incident.

3.3 Health & Safety Manager

1. Upon notification of the personal injury will determined if it is necessary to report to the treatment facility or the accident site, depending on the nature of the injuries and the circumstances of the accident.
2. Will report to the worksite to begin a root cause analysis investigation of the accident.
3. The investigation may include interview of witnesses, field crew , and project manager, the photographing of the scene, reconstruction of the accident scene, using test instruments and taking measurements. The Health and Safety Manager may draw diagrams from the information learned.
4. The Health and Safety Manager will work with the owner/client as necessary to investigate the accident.
5. The Health & Safety manager will ensure that the site is safe to resume work.
6. The Health & Safety Manager shall initiate the New York State Compensation form requirements (C-2) and forward a copy of the C-2 to the C & S Engineers, Inc. controller for transmittal to the Compensation Carrier within 8 hrs of notification of the incident or by the end of the next business day.
7. The Health and Safety manager, upon completion of the investigation, will provide the
8. Project Manager with a written investigative report (copy to the President)
9. The accident will be reviewed at the next Project Managers meeting with the intent to prevent further or similar events on other projects.
10. The Health & Safety Manager will assess the incident to determine OSHA record ability and make record if necessary on the OSHA 300 form, within five working days.

4.0 INCIDENT RESPONSE

4.1 Purpose

To prevent the occurrence of accidents on C&S Engineers, Inc., work sites and to establish a procedure for investigation and reporting of incidents occurring in, or related to C&S work activities.

4.2 Scope

Applies to all incidents related to C&S Engineers, Inc. work activities.

4.3 Definitions

Accident - An undesired event resulting in personal injury and/or property damage, and/or equipment failure.

Fatality - An injury or illness resulting in death of the individual.

Incident - Any occurrence which results in, or could potentially result in, the need for medical care or property damage. Such incidents shall include lost time accidents or illness, medical treatment cases, unplanned exposure to toxic materials or any other significant occurrence resulting in property damage or in "near misses."

Incidence Rate - the number of injuries, illnesses, or lost workdays related to a common exposure base of 100 full-time workers. The rate is calculated as:

N/EH x 200,000

N = number of injuries and illnesses or lost workday cases; EH = total hours worked by all associates during calendar year. 200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

Injury - An injury such as a cut, fracture, sprain, amputation, etc. which results from a work accident or from a single instantaneous event in the work environment.

Lost Workday Case - A lost workday case occurs when an injured or ill employee experiences days away from work beginning with the next scheduled work day. Lost workday cases do not occur unless the employee is effected beyond the day of injury or onset of illness.

Recordable Illness - An illness that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These illnesses require medical treatment and evaluation of work related injury. For example, dermatitis, bronchitis, irritation of eyes, nose, and throat can result from work and non-work related incidents.

Recordable Injury - An injury that results from the course of employment and must be entered on the OSHA 300 Log and Summary of Occupational Injuries and Illnesses. These injuries require medical treatment; may involve loss of consciousness; may result in restriction of work or motion or transfer to another job; or result in a fatality.

Near Miss - An incident which, if occurring at a different time or in a different personnel or equipment configuration, would have resulted in an incident.

4.4 Responsibilities

Employees - It shall be the responsibility of all C&S Engineers, Inc. employees to report all incidents as soon as possible to the HSC, regardless of the severity.

Human Resources - has overall responsibility for maintaining accident/ incident reporting and investigations according to current regulations and recording injuries/ illness on the OSHA 300 log, and posting the OSHA 300 log.

Emergency Coordinator - It is the responsibility of the Emergency Coordinator to investigate and prepare an appropriate report of all accidents, illnesses, and incidents occurring on or related to C&S Engineers, Inc. work. The Emergency Coordinator shall complete **Attachment A** within 24 hours of the incident occurrence.

Health and Safety Manager (HSM) - It is the responsibility of the HSM to investigate and prepare an appropriate report of all lost time injuries and illnesses and significant incidents occurring on or related to C&S Companies. The HSM shall maintain the OSHA 300 form.

Project Managers (PM) - It shall be the PM's responsibility to promptly correct any deficiencies in personnel, training, actions, or any site or equipment deficiencies that were determined to cause or contribute to the incident investigated.

5.0 GUIDELINES

5.1 Incident Investigation

The Project Manager will immediately investigate the circumstances surrounding the incident and will make recommendations to prevent recurrence. The HSM shall be immediately notified by telephone if a serious accident/ incident occurs. The incident shall be evaluated to determine whether it is OSHA recordable. If the incident is determined to be OSHA 300 recordable, it shall be entered on the OSHA 300 form.

The Project Manager with assistance from the HSM must submit to the office an incident report form pertaining to any incident resulting in injury or property damage.

5.2 Incident Report

The completed incident report must be completed by the Project Manager within 12 hours of the incident and distributed to the HSM, and Human Resources. This form shall be maintained by Human Resources for at least five years for all OSHA recordable cases. This form serves as an equivalent to the OSHA 101 form.

5.3 Incident Follow-up Report

The Incident Follow-Up Report (**Attachment B**) shall be distributed with the Incident Report within one week of the incident. Delay in filing this report shall be explained in a brief memorandum.

5.4 Reporting of Fatalities or Multiple Hospitalization Accidents

Fatalities or accidents resulting in the hospitalization of three or more employees must be reported to OSHA verbally or in writing within 8 hours. The report must contain 1) circumstances surrounding the accident(s), 2) the number of fatalities, and 3) the extent of any injuries.

5.5 OSHA 300A Summary Form

Recordable cases must be entered on the log within six workdays of receipt of the information that a recordable case has occurred. The OSHA log must be kept updated to within 45 calendar days.

OSHA 300 forms must be updated during the 5 year retention period, if there is a change in the extent or outcome of an injury or illness which affects an entry on a log. If a change is necessary, the original entry should be lined out and a corrected entry made on that log. New entries should be made for previously unrecorded cases that are discovered or for cases that initially weren't recorded but were found to be recordable after the end of the year. Log totals should also be modified to reflect these changes.

5.6 Posting

The log must be summarized at the end of the calendar year and the summary must be posted from February 1 through May 31.

5.7 OSHA 300A

Facilities selected by the Bureau of Labor Statistics (BLS) to participate in surveys of occupational injuries and illnesses will receive the OSHA 300A. The data from the annual summary on the OSHA 300 log should be transferred to the OSHA 300A, other requested information provided and the form returned as instructed by the BLS.

5.8 Access to OSHA Records

All OSHA records (accident reporting forms and OSHA 300 logs) should be available for inspection and copying by authorized Federal and State government officials.

Employees, former employees, and their representatives must be given access for inspection and copying to only the log, OSHA No. 300, for the establishment in which the employee currently works or formerly worked.

6.0 REFERENCES

29 CFR Part 1904

7.0 ATTACHMENTS

Attachment A - Incident Investigation Form
Attachment B - Incident Follow-Up Report
Attachment C - Establishing Recordability

ATTACHMENT A

INCIDENT INVESTIGATION FORM

Accident investigation should include:

Location: _____

Time of Day: _____

Accident Type: _____

Victim: _____

Nature of Injury: _____

Released Injury: _____

Hazardous Material: _____

Unsafe Acts: _____

Unsafe Conditions: _____

Policies, Decisions: _____

_____

Personal Factors: _____

_____

Environmental Factors: _____

_____

_____

ATTACHMENT B

INCIDENT FOLLOW-UP REPORT

Date _____

Foreman: _____

Date of Incident: _____

Site: _____

Brief description of incident: _____

_____

_____

_____

_____

Outcome of incident: _____

_____

_____

_____

Physician's recommendations: _____

_____

_____

_____

Date the injured returned to work: _____

Project Manager Signature: _____

Date: _____

ATTACH ANY ADDITIONAL INFORMATION TO THIS FORM

ATTACHMENT C

ESTABLISHING RECORDABILITY

1. Deciding whether to record a case and how to classify the case.

   Determine whether a fatality, injury or illness is recordable.

   A fatality is recordable if:

   - Results from employment

   An injury is recordable if:

   - Results from employment and
   - It requires medical treatment beyond first aid or
   - Results in restricted work activity or job transfer, or
   - Results in lost work day or
   - Results in loss of consciousness

   An illness is recordable if:

   - It results from employment

2. Definition of "Resulting from Employment"

   Resulting from employment is when the injury or illness results from an event or exposure in the work environment. The work environment is primarily composed of: 1) The employer's premises, and 2) other locations where associates are engaged in work-related activities or are present as a condition of their employment.

   The employer's premises include company rest rooms, hallways, cafeterias, sidewalks and parking lots. Injuries occurring in these places are generally considered work related.

   The employer's premises EXCLUDES employer controlled ball fields, tennis courts, golf courses, parks, swimming pools, gyms, and other similar recreational facilities, used by associates on a voluntary basis for their own benefit, primarily during off work hours.

   Ordinary and customary commute, is not generally considered work related.

   Employees injured or taken ill while engaged in consuming food, as part of a normal break or activity is not considered work related. Employees injured or taken ill as the result of smoking, consuming illegal drugs, alcohol or applying make up are generally not considered work related. Employee injured by un authorized horseplay is generally not considered work related, however, an employee injured as a result of a fight or other workplace violence act, may be considered work related.

Associates who travel on company business are considered to be engaged in work related activities all the time they spend in the interest of the company. This includes travel to and from customer contacts, and entertaining or being entertained for purpose of promoting or discussing business. Incidents occurring during normal living activities (eating, sleeping, recreation) or if the associate deviates from a reasonably direct route of travel are not considered OSHA recordable.

3. Distinction between Medical Treatment and First Aid.

First aid:

Any one-time treatment, and any follow up visit for the purpose of observation, of minor scratches, cuts, burns, splinters, etc., which do not ordinarily require medical care. Such one time treatment, and follow up visit for the purpose of observation, is considered first aid even though provided by a physician or registered professional personnel.

Medical Treatment (recordable):

a) Must be treated only by a physician or licensed medical personnel.
b) Impairs bodily function (i.e. normal use of senses, limbs, etc.).
c) Results in damage to physical structure of a non-superficial nature (fractures).
d) Involves complications requiring follow up medical treatment.

Appendix F
Community Air Monitoring Plan

Community Air Monitoring Plan

for

4435-4445 MILITARY ROAD SITE
4435-4445 MILITARY ROAD
TOWN OF NIAGARA, NEW YORK

BCP SITE NO. C932174

September 2021

Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil / waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

<u>VOC Monitoring, Response Levels and Actions</u>

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate

surrogate, such as isobutylene. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust

suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number;
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;

(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50$_o$ C (14 to 122$_o$ F); and
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record-keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM-10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:
(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Special Requirements:

In addition or in combination with the above, the following special requirements apply for work within 20 feet of potentially exposed individuals or structures:

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates will reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices will be considered to prevent exposures related to the work activities and to control dust and odors. Consideration will be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring will occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3, work activities will be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements are as stated above under "Special Requirements for Work within 20 Feet of Potentially Exposed Individuals or Structures" except that in this instance "nearby/occupied structures" would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, shall be understood and the monitoring locations established accordingly. In these situations, exhaust fans or other engineering controls will be used to create negative air pressure within the work area during remedial activities. Additionally, the planned work will be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

Appendix G
Quality Assurance Project Plan

Quality Assurance Project Plan

for

4435-4445 Military Road Site

Town of Niagara, Niagara County, New York

Site No. C932174

Prepared by:

C&S ENGINEERS, INC.

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JULY 2022

Table of Contents

1 Introduction 1
2 Quality Control Objectives 2
2.1 Data Quality Objectives 2
2.2 Sampling Procedures 3
2.3 Laboratory Certification and Coordination 4
2.4 Analytical Methodologies 4
2.5 Analytical Quality Control 4
2.6 Data Usability Summary Report 4
3 Field Sampling Plan 5
3.1 Sampling Procedures 7
3.1.1 Preparation for Sampling 7
3.2 Sample Collection Techniques 9
3.2.1 Surface Soil Sampling 9
3.2.2 Subsurface Soil Sampling – Direct Push Drilling 9
3.2.3 Subsurface Soil Sampling – Hollow Stem Auger 10
3.2.4 Groundwater Monitoring Well Construction / Completion 11
3.2.5 Air Sample Collection 11
3.3 Field Measurement Techniques ..... **Error! Bookmark not defined.**
3.4 General Decontamination 13
4 Sample Management Plan 15
4.1 Sample Management 15
4.2 Sample Handling 15

Attachment A – Supporting Documentation for PFAS Analysis

1 Introduction

C&S' Quality Control (QC) Program is a vital part of its approach to remedial investigations. Through our thorough QC program, our firm is able to provide accurate and dependable data. QC also provides safe working conditions for field staff.

The QC program contains procedures, which provide for collected data to be properly evaluated, and which document that quality control procedures have been followed in the collection of samples. The QC program represents the methodology and measurement procedures used in collecting quality field data. This methodology includes the proper use of equipment, documentation of sample collection, and sample handling practices.

Procedures used in the firm's QC program are consistent with federal, state, and local regulations, as well as, appropriate professional and technical standards.

This QC program has been organized into the following areas:

- QC Objectives
- Field Sampling Techniques
    - Procedures
    - Preparation
    - Measurement
    - Decontamination
- Sample Management

2 Quality Control Objectives

2.1 Data Quality Objectives

Data Quality Objectives (DQOs) are statements which describe the desired quality of data necessary to meet the objectives of the sampling program. The DQOs for the site sampling program were formulated during the scoping effort and developed as part of this Plan. The general steps followed in preparation of the DQOs were as follows:

- *Identification of the media to be sampled* - Identifies the media being investigated (e.g., ground water, surface soil).

- *Identification of the data uses* - Identifies the intended use of the data according to the following:
  - Site Characterization - Data are used to determine the composition, nature, and extent of contamination.
  - Risk Assessment - Data are used to evaluate the actual or potential risks posed by contaminants determined to be present on-site. Particular attention is given to sampling at locations where human exposure is possible.
  - Health and Safety Plan (HASP) - Data are used to establish the level of protection needed for on-site workers during site characterization activities.
  - Monitoring - Data are used during the monitoring of the remedial action to access the effectiveness of such action.
  - PRP Enforcement - Data are used to help establish potentially responsible parties (PRP's).
  - Evaluation of Alternatives - Data are used to evaluate various proposed remedial technologies and assist in proper design of alternatives.

- *Identification of the data types* - Identifies what types of analyses are to be performed.

- *Sample Collected* - Describes the sample types to be collected.
  - Environmental - Refers to a specific media sampled such as water, soil, air, or biological.
  - Source - Refers to sampling an actual contamination source.
  - Grab - A discrete sample representative of a specific location.
  - Composite - A sample that represents a mixture of a number of grab samples that represents the average properties over the extent of areas sampled.
  - Biased -Sampling that focuses on a specific area of expected contamination or uncontaminated area (background).

- *Identification of the data quality needs* - Identifies the analytical options available to support data collection activities and are identified as follows:
  - Level I: *Field Screening* - portable type instruments which provide real-time data.
  - Level II: *Field Analysis* - portable analytical instruments in an on-site lab or transported to the site.

- Level III: *Standard Analytical Protocols* - standard analytical protocols or without the NYSDEC Analytical Services Protocol (ASP) (2000) deliverables/reportables documentation.
- Level IV: *NYSDEC ASP Reportables/Deliverables* - rigorous QA / QC protocols and reportables/deliverables documentation; NYSDEC ASP (2000) Category B deliverables.
- Level V: *Non-Standard* - methods which have been modified to meet specific site study or remediation needs or by use of some other specialized analytical methods that cannot be obtained through standard or typical avenues of analytical support.

► *Identification of Data Quality Factors* - Describes factors which influence the quality or quantity of data to be collected. Primary contaminants and associated levels of concern are identified concerning ARARs or potential risks. The required detection limit are also given or referenced.

► *Identification of QA / QC Samples* - Specifies additional samples to be collected to support Quality Assurance / Quality Control (QA / QC) procedures. Additional samples to be collected could include:

- *Matrix Spike/Matrix Spike Duplicates* - Matrix spike and matrix spike duplicate samples are collected as a duplicate sample to which the analytical laboratory will add known amounts of target analytes. These QA / QC samples are intended to assess the extraction procedure used by the laboratory.
- *Blind Duplicates* – Blind duplicates are a duplicate of another sample submitted for analysis. The location of the sample is recorded in the field book and not disclosed on the chain of custody. These QA / QC samples are intended to assess the repeatability of analysis by the laboratory.
- *Field Blanks* - Field (equipment) blanks are samples which are obtained by running analyte-free water through the sample collection equipment in a way that is identical to the sample collection procedures. Field blanks may be used during QA / QC procedures to evaluate if sampling equipment has contributed contaminants to the samples.
- *Trip Blanks* - Trip blanks are samples which are prepared prior to the sampling event in the same type of sample container and are kept with the collected samples throughout the sampling event unit analysis. Trip blank vials are not opened in the field and are analyzed for volatile organics only.

2.2 Sampling Procedures

All sampling objectives, locations, and procedures have been included as the Remedial Investigation Work Plan (RIWP) and are further described in Section 3. Items including Field Measurement Techniques, General Field Decontamination, and Sample Management have also been included in Sections 3 and 4.

2.3 Laboratory Certification and Coordination

The Environmental Laboratory Approval Program (ELAP) certification is an accreditation issued by the New York State Department of Health (NYSDOH). Such laboratories have demonstrated that they consistently ensure the accuracy and reliability of samples analyzed. All chemical analyses for samples from the site will be completed by an ELAP laboratory capable of performing project specific analyses as indicated in this QA / QC plan. The project QA / QC Officer will also be responsible for all project related laboratory coordination.

Supporting documentation related to per- and polyfluoroalkyl substances (PFAS) analysis, such as standard operating procedures (SOPs), analyte lists, and method detection limits (MDLs) are provided in **Attachment A**.

2.4 Analytical Methodologies

Sampling and analysis will be performed for the Target Compound List (TCL) parameters including volatiles. The specific analyses will be conducted according to the following NYSDEC ASP 2000 methodologies:

Parameter Group	**Analysis Method**
Volatiles	8260C or TO-15 for air
Semivolatiles	8270D
PCBs	8082A
Pesticides	8081B
Herbicides	8151A
Metals / Inorganics	6010D, 7471B, 9010C/9012B, 7196A
PFOA/PFOS	LC-MS/MS using 537.1 methodologies

Samples will be analyzed by NYS ELAP approved laboratories, and the data will be presented in Category B reportables / deliverables format.

2.5 Analytical Quality Control

Analytical quality control for this Project will be consistent with the methodology and quality assurance/quality control requirements in the NYSDEC ASP 2000.

The tables on the following page detail sample volumes, containers, preservation, and holding time for typical analytes.

2.6 Data Usability Summary Report

A Data Usability Summary Report (DUSR) will be prepared consistent with NYSDECs Guidance for the Development of Quality Assurance Plans and Data Usability Summary Reports as given in DER-10. The main objective of the DUSR is to determine whether the

data presented meets the project specific needs for data quality and data use.

Table 2.5a
Water Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	40-ml glass vial with Teflon-backed septum	Two (2); fill completely, no headspace	Cool to 4° C (ice in cooler), Hydrochloric acid to pH <2	14 days
Semi-volatile Organic Compounds (SVOCs)	1,000 or 200-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Pesticides	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Polychlorinated biphenyls (PCBs)	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Metals	250-ml HDPE	One (1); fill completely	Cool to 4° C (ice in cooler) Nitric acid to pH <2	180 days (28 for mercury)
Cyanide	1,000-mL HDPE		Cool to 4° C (ice in cooler) Nitric acid to pH <2	14 days

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

Table 2.5b
Soil Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14 days
VOCs via EPA 5035	40 mL vials with sodium bisulfate, methanol, and/or DI water	Three (3), 5 grams each	Cool to 4° C (ice in cooler)	2 days
SVOCs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	7/40 days
PCBs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	7/40 days
Pesticides	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14/40 days
Metals	4-oz. glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	180 days (28 for mercury)
Cyanide	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14 days

Applicable information for PFAS samples is as follows:

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

Table 2.5c
PFAS Samples

Matrix	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction / Analysis
Water	2 – 250 ml polypropylene	Two (2) fill as completely as possible	Cool to 4°C (ice in cooler) 1.25 grams Trizma	14 days to extraction 28 days after extraction
Soil	1 – 250 ml HDPE or polypropylene	One (1) fill as completely as possible	Cool to 4°C (ice in cooler)	28 days

3 Field Sampling Plan

3.1 Sampling Procedures

The following sections provide procedures for collecting a variety of samples, not all of which will be needed at this site.

3.1.1 Preparation for Sampling

The sample collection technique is of prime importance to assure the integrity of the collected sample. The following techniques include provisions so that:

- A representative sample is obtained;
- Contamination of the sample is minimized;
- The sample is properly preserved; and
- An acceptable Chain-of-Custody record is maintained.

The QA / QC Sampling Component of the Plan includes:

- Incorporation of accepted sampling techniques referenced in the sampling plan;
- Procedures for documenting any field actions contrary to the QA / QC Plan;
- Documentation of all preliminary activities such as equipment check-out, calibrations, and container storage and preparation;
- Documentation of field measurement quality control data (quality control procedures for such measurements shall be equivalent to corresponding QC procedures);
- Documentation of field activities;
- Documentation of post-field activities including sample shipment and receipt, field team debriefing, and equipment check-in;
- Generation of quality control samples including duplicate samples, field blanks, equipment blanks, and trip blanks;
- The use of these samples in the context of data evaluation with details of the methods employed (including statistical methods) and of the criteria upon which the information generated will be judged; and
- The number of QA / QC samples generally required are shown in the following table. When there is a disagreement with QA / QC sample numbers and types, between this document and a Work Plan, the Work Plan shall prevail.

Table 3-1
QA / QC Samples

Sample Type	Analysis	Number	Note
MS / MSD	Full Suite	Every sample batch, or minimum of 5% (1 per 20)	Two additional samples at a given location
Trip Blank	VOC	One per day or 5% (1 per 20), whichever is more frequent	Vials of clean water provided by laboratory. Packed with collected samples.
Field Blank	PFAS	One per day or 5% (1 per 20), or whichever is more frequent	Clean water passed through / over decontaminated sample collection equipment / tubing
Blind Duplicate	Same as field sample	Every sample batch, or minimum of 5% (1 per 20)	An additional sample at a given location

The personnel responsible for collection of groundwater, soil, air, miscellaneous media, and petroleum spill remediation / verification samples will be familiar with standard sampling procedures and follow the appropriate protocol. Field records will be maintained in bound notebooks with numbered pages to document daily instrument calibration, locations sampled, field observations, and weather conditions. Each page will be dated and signed by the sampler. Each notebook will be numbered and a log of notebooks will be maintained by the project manager.

Prior to sampling, all equipment must be procured and accommodations for sample container delivery, and sample shipment must be made. The following is a list of general equipment that would be on hand for sampling events. Special equipment for each sampling event is presented in the section describing that specific sampling event.

General Field Sampling Equipment

- Field Data Sheets
- Chain-of-Custody forms
- Engineers tape and folding ruler with 0.01 foot intervals
- Field Record Sheets
- Latex gloves
- Face-safety shield
- Tyvek coveralls
- Respirators
- Photoionization detector
- Bio-degradable phosphate free detergent
- Coolers and ice (no blue ice)
- Drums
- Sample bottles
- Aluminum foil
- Duct and filament tape
- Tap water
- Distilled water
- Laboratory grade methanol and hexane
- Wash buckets
- Decontamination towels / cloths
- Large disposal containers
- Large plastic sheets

3.2 Sample Collection Techniques

3.2.1 Surface Soil Sampling

Surface soil samples will be collected at the locations and depths indicated in the Work Plan. When sampling is conducted in areas where a vegetative turf has been established, a pre-cleaned trowel or shovel will be used to remove the turf so that it may be replaced at the conclusion of sampling. Samples will then be collected using a pre-cleaned, stainless steel spoon. When the sample is obtained, it will be deposited into a pre-cleaned stainless steel bowl or plastic pail for mixing prior to filling the sample containers. The soil will be mixed thoroughly until the material is homogenized. At that point, the soil will be placed into the laboratory provided containers.

Once removed from the ground the soil will immediately be observed for soil characteristics, including general soil type (sand, silt, clay), moisture, and evidence of impairment ((e.g. petroleum or chemical odors, staining, volatile organic vapors as measured by a photoionization detector (PID)). The PID will be calibrated daily (and more often as required by the manufacturer's data) prior to use in the field, using calibration test gases.

When PFAS sampling / testing is required, no sampling equipment components or sample containers should come into contact with aluminum foil, LDPE, glass, or Teflon tape. Acceptable equipment includes stainless steel spoons and bowl, HDPE containers, and steel shovels or augers that are not coated.

3.2.2 Subsurface Soil Sampling – Direct Push Drilling

3.2.2.1 Boring Advancement

Generally, soil borings will be advanced with a Geoprobe direct push sampling system. The use of direct push technology allows for rapid sampling, observation, and characterization of relatively shallow overburden soils. The Geoprobe utilizes a four to five-foot macrocore sampler, with disposable polyethylene sleeves. Soil cores will be retrieved in four or five-foot sections, and can be easily cut from the polyethylene sleeves for observation and sampling. The macrocore sampler will be decontaminated between boring locations using an alconox and water solution.

Prior to initiating drilling activities, the Macrocores, drive rods, and pertinent equipment, will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.

Test borings will be advanced with 2-inch (or larger) inside diameter (ID) direct push Macrocore through overburden soils. Drilling fluids, other than potable water will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants

is also not allowed unless approved by the NYSDEC representative.

3.2.3 Subsurface Soil Sampling – Hollow Stem Auger

The drilling and installation of monitoring wells will be performed using a rotary drill rig which will have sufficient capacity to perform 4 1/4-inch ID hollow-stem auger drilling in the overburden, retrieve Macrocore or split-spoon samples. Equipment sizes and diameters may vary based on project-specific criteria. Any investigative derived waste generated during the advancement of soil borings and monitoring well installations will be containerized and characterized for proper disposal.

Prior to initiating drilling activities, the augers, rods, Macrocore, split spoons, and other pertinent equipment will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. Steam cleaning activities will be performed in a designated on-site decontamination area. During and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.

Test borings will be advanced with 4 1/4-inch ID hollow stem augers through overburden, driven by truck-, track-, or trailer-mounted drilling equipment. Alternative methods of drilling or equipment may be allowed or requested for project specific criteria, but must be approved by the NYSDEC. Drilling fluids, other than water from a NYSDEC-approved source, will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

Hollow stem auger advanced groundwater-monitoring wells typically utilize minimum 2-inch threaded flush joint PVC pipe with 0.010-in. slotted screen or pre-packed well screens. PVC piping used for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe. All materials used to construct the wells will be NSF / ASTM approved. Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated wood cap or plastic plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well.

3.2.3.1 Subsurface Soil Sample Screening and Collection

When polyethylene sleeves or split spoons are removed from borings, the soil will immediately be observed for soil characteristics, including general soil type (sand, silt, clay), moisture, confining layers, and evidence of impairment (e.g. petroleum or chemical odors, staining, volatile organic vapors as measured by a PID – ex-situ and headspace). Generally, sample selection is based on evidence of impairment, depth, spatial distribution, or for delineation purposes. Normally, sample locations will not be known until the end of each day in the field. Therefore, samples for potential analysis will be placed in new Ziploc bags and placed on ice until they are placed into laboratory provided glassware.

When PFAS sampling / testing is required, no sampling equipment components or sample containers should come into contact with aluminum foil, LDPE, glass, or Teflon tape. Acceptable equipment includes stainless steel spoons and bowl, HDPE containers, and steel tools that are not coated.

3.2.4 Groundwater Monitoring Well Construction / Completion

Artificial Sand Pack
When utilized, granular backfill will be chemically and texturally clean, inert, siliceous, and of appropriate grain size for the screen slot size and the host environment. The sand pack will be installed using a tremie pipe, when possible (i.e., a tremie pipe may not fit into smaller, 2-inch diameter boreholes). When utilized, the well screen and casing will be installed, and the sand pack placed around the screen and casing to a depth extending at least 2 feet above the top of the screen. A pre-packed well screen may be used if pre-approved by the NYSDEC.

Bentonite Seal
A minimum 2-foot thick seal will be placed directly on top of the sand pack, and care will be taken to avoid bridging. In the event that Site geology does not allow for a 2-foot seal (e.g., only 1-foot of space remains between the top of the sand pack and ground surface), the remaining space in the annulus will be filled with bentonite.

Grout Mixture
Upon completion of the bentonite seal, the well may be grouted with a 30% solids pure bentonite grout, a non-shrinking cement grout, a cement / bentonite grout mix, or a bentonite / soil mix as indicated in the Work Plan. The grout will be placed from the top of the bentonite seal to the ground surface.

Surface Protection
At all times during the progress of the work, precautions shall be used to prevent tampering with or the entrance of foreign material into the well. Upon completion of the well, a suitable cap shall be installed to prevent material from entering the well. Where permanent wells are to be installed, the well riser shall be protected by a flush mounted road box set into a concrete pad or locking well cap for stick-up wells. A concrete pad, sloped away from the well, shall be constructed around the flush mount road box or stick-up casing at ground level.

Any well that is to be temporarily removed from service or left incomplete due to delay in construction shall be capped with a watertight cap.

Surveying
Coordinates and elevations will be established for each monitoring well and sampling location. Elevations to the closest 0.01 foot shall be used for the survey. These elevations shall be referenced to a regional, local, or project-specific datum. The location, identification, coordinates, and elevations of the wells will be plotted on maps with a scale large enough to show their location with reference to other structures at each site.

Well Development

After completion of the well, but not sooner than 48 hours after grouting is completed, development will be accomplished using pumping, bailing, and / or surge blocking. No dispersing agents, acids, disinfectants, or other additives will be used during development or introduced into the well at any other time. During development, water will be removed throughout the entire water column by periodically lowering and raising the pump intake (or bailer stopping point).

Water elevations will be taken on all wells prior to development, purging, and sampling. All measurements will be taken within a 24-hour period to obtain consistent elevations and recorded on well data sheets. The procedure for measuring water levels in the monitoring wells is:

- Unlock and remove well cap;
- Test the atmosphere of the well with the calibrated PID. If the gases from the well have caused the air in the breathing zone to read greater than 5 ppm, stop work and refer to the HASP
- Measure water level to nearest 0.01 foot with a water level indicator (electronic).
- Water level indicators will be decontaminated before moving to next well. The tape and cable are decontaminated by washing in a bucket of distilled water-biodegradable phosphate free-detergent solution, followed by a rinse with distilled water.

Development water will either be properly contained and treated as waste until the results of chemical analysis of samples are obtained or discharged on Site as determined by the Site-specific work plans and/or consultation with the NYSDEC representatives on Site.

The development process will continue until removal of a minimum of 110% of the water lost during drilling, three well volumes; whichever is greater (or as specified in the Work Plan), and when water quality monitoring demonstrates stabilization of the effluent. The water quality meter will be calibrated prior to each sampling event (and more often as required by the manufacturer's data), using calibration fluids. Stabilization criteria is shown in the table below. In the event that limited recharge does not allow for the recovery of all drilling water lost in the well or three well volumes, the well will be allowed to stabilize to conditions deemed representative of groundwater conditions. Stabilization periods will vary by project but will be confirmed with the NYSDEC prior to sampling.

Table 3-2
Well Development Stabilization Criteria

Parameter	Stabilization Criteria
pH	Difference of ±0.2
specific electric conductance	Difference of ± 3%
temperature	Difference of ± 0.5 ºC
turbidity	±10% (when turbidity is greater than 10 NTUs)
oxidation -reduction potential (ORP)	± 20 millivolts
dissolved oxygen (DO)	10% or ±0.2 mg/L, whichever is greater

3.2.4.1 Groundwater Sample Collection

Groundwater samples will be collected using a dedicated low flow pump. When analysis is limited to VOCs, samples may be collected with disposable or stainless steel bailers. When PFAS sampling / testing is required, only the following equipment will be permitted:

- Stainless steel inertia pump with HDPE tubing
- Peristaltic pump with HDPE and silicone tubing
- Stainless steel bailer with stainless steel ball
- Bladder pump (identified as PFAS-free) with HDPE tubing

All sampling equipment will be properly decontaminated in the field (see Section 3.4). The following equipment will be available for sampling of monitoring wells in addition to the general sampling equipment list:

- Well Data Sheets
- Pump
- Electronic water level indicator
- Water Quality Meter
- Acid resistant gloves

The following activities will be completed before going into the field every day before the start of sampling:

1. Fill out appropriate section on Well Data Sheet for the wells to be sampled;
2. Obtain the sampling schedule for each well to be sampled;
3. Calibrate the PID with the calibration gas;
4. Determine the amount of sampling to be done for the day and prepare the necessary number of coolers;
5. Each well to be sampled will have designated coolers containing the pre-labeled, certified clean, sample bottles. The groundwater samples will be placed in the cooler labeled for the well from which they were taken. The bottle shall be labeled with large distinguishable letters, so that the groundwater samples will be placed in the proper cooler; and
6. Select the appropriate sample bottles for the day's sampling. The bottles shall be pre-marked with a sample parameter and preservatives. Reusable glass bottles will have been cleaned and prepared at the laboratory. The bottles for the various parameters to be analyzed from each well location will then be placed in a cooler.

The following steps describe the sample collection of groundwater:

1. Unlock and remove the well cap;
2. When VOCs are a contaminant of concern, test the air at the wellhead with the calibrated PID. If the gases from the well have caused the air in the breathing zone to read greater than 5 ppm, stop work and refer to the HASP. Record the reading on the Well Data Sheet;
3. In order to obtain a representative sample of the formation water, the well must be

purged of the static water within the well. Prior to purging, the static water level within the well must be measured and the measurement recorded on the Well Data Sheet. To determine the amount of water necessary to purge, find the liquid column height in the well to determine the total volume (three liquid column borehole volumes) of liquid to be purged;

4. Purge the well; lower pump slowly into the well until it is below the water surface. In accordance with the Work Plan, purge waters will either be disposed within the vicinity of the respective well or containerized.
5. Record the amount of water purged in the field logbook and on the Well Data Sheet.
6. If the well goes dry during pumping, allow for full recovery (measure the water level) and then sample. If recovery takes more than twenty minutes, proceed to next well but return to sample within 24 hours.
7. Fill the appropriate sample bottles according to the sampling schedule for each well. While filling the sample bottles, record the well number, type, volume of container, and the preservatives used on the Ground Water Sampling Analyses form.
8. The preservatives for the various sampling parameters were previously added to the clean sample bottles by the laboratory. Some parameters may require additional special handling.
9. Volatile organics analyses sample vials must be free of air bubbles. When a bubble-free sample has been obtained, it must be immediately chilled.
10. Collect the matrix spike duplicates, duplicates, field blanks, and trip blanks, as applicable. Take samples according to sampling schedule presented in the Work Plan.
11. Record all pertinent information in field logbook and on the Well Data Sheet (include color, odor, sediment content of sample, etc.). Any situations at the site that have the potential to interfere with the analytical results should also be recorded here.
12. Lock well, inspect well site, and note any maintenance required.
13. Dispose of potentially contaminated materials in designated container.

3.2.5 Air Sample Collection

Indoor Air Sampling

Indoor air samples will be collected using a SummaTM canister (1-Liter capacity) equipped with a critical orifice flow regulation device sized to allow an air sample to be collected over a 24-hour sampling period. Care is taken to deploy the canisters away from the direct influence of any forced air emanating from air conditioning units, central air conditioning vents, furnaces or heaters. The indoor air sampling procedure is as follows:

- Building spaces are examined to determine a location for deploying the sample. The canister is deployed in areas not subject to disturbances and which will not interfere with the occupant's normal activities.
- Building occupants are requested to keep out of the sampling area during the sampling event.

- Air sample canisters are labeled with a unique sample designation number. The sample number and location is recorded in the field log book.
- The canister vacuum is measured using an integrated vacuum gauge immediately prior to canister deployment, and recorded in the field log book. The critical orifice flow controller is installed, as supplied by the laboratory, on the canister, the canister is opened fully at the beginning of sample collection period, and the start time is recorded.
- The canister valve is closed fully at the end of the sample period by disconnecting the regulator from the canister (after 24-hours) and the end time recorded. Any evidence of canister disturbance during the sample collection will be recorded.
- The canister vacuum is measured and recorded immediately after canister retrieval at the end of the sample period. Once the vacuum is measured, the canisters are returned to their sampling boxes for safe storage and shipping. Field data is verified as correctly entered into field books prior to shipment; and canisters are shipped to the laboratory under a chain-of-custody.

Sub-Slab Soil Gas Sampling

Sub-slab sampling points are installed to collect soil gas immediately below the slab. Sub-slab gas samples are collected using a 1-Liter Summa™ canister fitted with a flow orifice pre-calibrated to collect a 1-Liter sample over a 24-hour period. Once the 24-hour sampling period has been completed, the canister is boxed and shipped to the laboratory for analysis. A brief summary of the sampling protocol is provided below. The sub-slab vapor points are installed by first advancing a small diameter hole (approximately 3/8-inches in diameter) through the floor slab to determine thickness. The holes are drilled via a hammer drill or concrete core. The hole extends through the slab and terminates at the interface with underlying material (i.e. gravel base or soil). A sample point consisting of a length of tubing is placed into the boring. The cored slab annulus is filled with clay placed around the sub-slab vapor point. The bottom of the sub-slab vapor point extends to the bottom of slab. Prior to sub-slab soil gas sample collection, the monitoring point and above grade tubing is purged at a rate not exceeding 200 ml/min. The total volume purged prior to sample collection equals three volumes of air in the open space of tubing and the sample point. At the end of the sampling event, a pressure gauge reading is recorded. The 1-Liter canister with a calibrated 24-hour orifice is connected to the tubing. The following summarizes the above:

- The sub-slab sampling point construction is temporary, with the sampling points securely mounted through the concrete slab and grouted in place using pottery clay.
- Prior to sub-slab soil gas sample collection, the monitoring point and above grade tubing is purged at a rate not exceeding 200 ml/min.
- Samples are collected over a 24-hour period at a flow rate not greater than 200 mL/min.
- Helium is used as a field tracer during sampling. The Helium is introduced into a dome next to the above grade sampling train and Summa™ canister. The helium is read using a helium meter that is capable to read down to 1-2%.

- Field documentation is maintained in a field notebook and on field data forms.

Ambient Air Sampling

Ambient air samples are collected in the same manner as the indoor air samples

3.3 General Decontamination

The following procedures will be performed for the decontamination of exploration equipment, sampling equipment, and personnel after each drilling/sampling event:

Drill rig, backhoe, and excavator - The drill rig, direct-push rig, backhoe, and/or excavator will be cleaned prior to their entrance and exit of the site. Greases and oils will not be used on any down hole equipment during drilling or exploration activities.

Exploration equipment - To avoid cross contamination, use of a PID meter and cleaning between each sampling site will be employed on backhoe arms, buckets, hollow stem augers, casing drill rods, down-hole tools, and appurtenant equipment.

Split spoon sampler - The split spoon sampler will be scrubbed, cleaned, and put through a series of rinses between each sampling event. A number of split spoon samplers will be used so that one can be utilized for sampling while the others are being cleaned.

Reusable equipment - The following steps will be employed to decontaminate reusable equipment:

- Rinse equipment of soil or foreign material with potable water;
- Immerse and scrub equipment with bio-degradable phosphate-free detergent and potable water;
- Immerse and scrub in a potable water rinse without detergent;
- Immerse and scrub in deionized/distilled water;
- Saturate by spraying or immersion in laboratory-grade hexane;
- Air dry and wrap cleaned equipment in foil to carry to next monitoring site to prevent contamination of equipment during transfer; and
- The decontamination wash and rinse water will not be considered hazardous unless visual inspection or monitoring by the PID and other equipment indicate that contaminants may be present. The rinse waters can be discharged on-site if they are not contaminated. If contaminants are expected to be present, the rinsate waters should be placed in 55 gallon drums and stored on-site.

Disposable equipment - The following steps will be employed to decontaminate disposable equipment:

- Rinse with potable water;
- Remove all standing liquid from the piece of equipment;
- Dispose of the equipment in a dedicated container for contaminated solids; and

- Dispose of rinse water in 55 gallon drums if contaminants are found to be present.

Sample containers - upon filling and capping sample bottles, the outside of the bottle will be wiped off with a clean paper towel. These towels will be disposed of in a dedicated container for contaminated solids.

Personnel decontamination - The following procedures will be used to decontaminate sampling personnel.

- After each sampling event chemical resistant gloves will be disposed of in a dedicated container for contaminated solids;
- At the end of each sampling day, Tyvek™ coveralls will be disposed of in a dedicated container for contaminated solids;
- Boots will be rinsed off with water to remove mud, clay, or any other contaminants; and
- Personnel will be required to follow procedures outlined in the HASP.

Special Considerations When Sampling for PFAS

- Clothing that contains PTFE material, including Gore-Tex or that have been water-proofed with PFAS materials should be avoided. All clothing worn by sampling personnel should first be laundered multiple times. Acceptable rain gear includes PVC, polyurethane, or rubber. If such materials are required because site conditions warrant additional protection for samplers, their use will be documented in the field notes.
- Decontamination water shall be verified in advance to be PFAS-free through laboratory analysis or certification. Previous results of non-detect for PFAS are acceptable.

4 Sample Management Plan

4.1 Sample Management

This Sample Management Plan provides procedures to document and track samples and results obtained during this work effort. A series of pre-printed forms with the appropriate information serves as a vehicle for documentation and tracking.

In order to accomplish this task, the documentation materials will include sample labels, sample characterization and Chain-of-Custody sheets, daily field reports, and a sample log.

Sample Label - A sample label will be completed for each sample obtained and will be affixed to the sample container. The label is configured in a way to address various types of mediums. Information on the label includes, at a minimum, client name, location, sample description, sample number, date, time, grab sample, composite sample, notes, and sampler's name.

Sample Characterization & Chain-of-Custody Sheet - All pertinent field information will be entered onto the sample characterization and chain-of-custody sheets including client name, sample ID, sample description, location of sample, sampling method, number of containers, container type, analysis required, and preservation. The monitoring well form has space allotted for entering information regarding the well including depth to water, well volume, sample pH, temperature, color, etc. The Chain-of-Custody section of the form will document the sample's pathway of sample shipment which will include names of persons delivering/receiving, dates, and times. The reverse side of this form will be used by the laboratory to document analysis performed on the sample. Copies of the completed forms will be retained by the Engineer and the analytical laboratory. The original sample characterization and Chain-of-Custody sheets will be submitted in the Remedial Investigation report along with the laboratory results.

Daily Field Reports - Daily activities will be recorded on the Inspection Report form. The purpose of this form will be to summarize the work performed on the site each day. The completed forms will be submitted to the Project Manager on a daily basis for short term site activity and on a weekly basis for site activities of a longer duration.

Sample Log - The sample log will be utilized to track each individual sample obtained at the site. The upper portion, "Field Identification" will be completed the day the sample is taken. The form will accompany the sample characterization and Chain-of-Custody form to the laboratory. Personnel at the laboratory will complete the middle section of this form and return it to the Engineer, who will use the document to track incoming results. The bottom of the sheet has space allocated to enter "Recommended Actions" based on laboratory results.

4.2 Sample Handling

Each collected sample will be dispensed into the appropriate sample containers for the

type of analysis to be performed. Sampling staff will wear nitrile gloves at all times when handling samples. Appropriate sample preservatives will be added to the sample containers by the contracted analytical laboratory prior to the delivery into the field, except in cases where the sample preservative must be added after sample collection. All samples that require cool storage will be immediately placed in coolers with appropriate packaging materials so as to protect the breakage of sample containers during shipment. The sample coolers will be filled with cubed ice (no "Blue Ice") prior to leaving the sample collection location. In the instance that a local analytical laboratory is contracted, the samples will be hand delivered to the laboratory each sampling day. The chain-of-custody forms will be signed by the laboratory personnel picking up the samples and placed within the coolers. In the instance that an analytical laboratory is contracted which is not based locally and a common carrier is used for sample shipment, the chain-of-custody forms will be signed by the sampler and the carrier personnel and placed inside of the coolers. Careful packaging techniques will be used to prevent sample containers from breakage during shipment. Materials such as cardboard, foam wrap, or Styrofoam may be used as packaging materials. All samples will be delivered to the contracted analytical laboratory on the day they were collected and will be received by the laboratory within 24 hours of sample collection. The samples will be collected with sufficient time allowed at the end of the day for the analytical laboratory to properly process the sample chain-of-custody form.

Determination of Selected Perfluorinated Alkyl Substances by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry Isotope Dilution (LC/MS/MS)

Reference: EPA Method 537, Version 1.1, September 2009, EPA Document #: EPA/600/R-08/09

EPA Method 537.1, Version 1, November 2018, EPA Document #: EPA/600/R-18/352

Department of Defense, Quality Systems Manual for Environmental Laboratories, Version 5.2, .2019

1. Scope and Application

Matrices: Drinking water, Non-potable Water, and Soil Matrices

Definitions: Refer to Alpha Analytical Quality Manual.

1.1 This is a liquid chromatography/tandem mass spectrometry (LC/MS/MS) method for the determination of selected perfluorinated alkyl substances (PFAS) in Non-Drinking Water and soil Matrices. Accuracy and precision data have been generated in reagent water, and finished ground and surface waters for the compounds listed in Table 1.

1.2 The data report packages present the documentation of any method modification related to the samples tested. Depending upon the nature of the modification and the extent of intended use, the laboratory may be required to demonstrate that the modifications will produce equivalent results for the matrix. Approval of all method modifications is by one or more of the following laboratory personnel before performing the modification: Area Supervisor, Department Supervisor, Laboratory Director, or Quality Assurance Officer.

1.3 This method is restricted to use by or under the supervision of analysts experienced in the operation of the LC/MS/MS and in the interpretation of LC/MS/MS data. Each analyst must demonstrate the ability to generate acceptable results with this method by performing an initial demonstration of capability.

2. Summary of Method

2.1 A 250-mL water sample is fortified with extracted internal standards (EIS) and passed through a solid phase extraction (WAX) cartridge containing a mixed mode, Weak Anion Exchange, reversed phase, water-wettable polymer to extract the method analytes and isotopically-labeled compounds. The compounds are eluted from the solid phase in two fractions with methanol followed by a small amount of 2% ammonium hydroxide in methanol solution. The extract is concentrated with nitrogen in a heated water bath, and then adjusted to a 1-mL volume with 80:20% (vol/vol) methanol:water. A 3 µl injection is made into an LC equipped with a C18 column that is interfaced to an MS/MS. The analytes are separated and identified by comparing the acquired mass spectra and retention times to reference spectra and retention times for calibration standards acquired under identical LC/MS/MS conditions. The concentration of each analyte is determined by using the isotope dilution technique. Extracted Internal Standards (EIS) analytes are used to monitor the extraction efficiency of the method analytes.

2.2 Method Modifications from Reference

None.

Table 1

Parameter	Acronym	CAS
PERFLUOROALKYL ETHER CARBOXYLIC ACIDS (PFECAs)		
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid	HFPO-DA	62037-80-3
4,8-dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
PERFLUOROALKYLCARBOXILIC ACIDS (PFCAs)		
Perfluorobutanoic acid	PFBA	375-22-4
Perfluoropentanoic acid	PFPeA	2706-90-3
Perfluorohexanoic acid	PFHxA *	307-24-4
Perfluoroheptanoic acid	PFHpA *	375-85-9
Perfluorooctanoic acid	PFOA *	335-67-1
Perfluorononanoic acid	PFNA *	375-95-1
Perfluorodecanoic acid	PFDA *	335-76-2
Perfluoroundecanoic acid	PFUnA *	2058-94-8
Perfluorododecanoic acid	PFDoA *	307-55-1
Perfluorotridecanoic acid	PFTrDA *	72629-94-8
Perfluorotetradecanoic acid	PFTA *	376-06-7
Perfluorohexadecanoic acid	PFHxDA	67905-19-5
Perfluorooctadecanoic acid	PFODA	16517-11-6
PERFLUOROALKYLSULFONATES (PFASs)		
Perfluorobutanesulfonic acid	PFBS *	375-73-5
Perfluoropentanesulfonic acid	PFPeS	2706-91-4
Perfluorohexanesulfonic acid	PFHxS *	355-46-4
Perfluoroheptanesulfonic acid	PFHpS	375-92-8
Perfluorooctanesulfonic acid	PFOS *	1763-23-1
Perfluorononanesulfonic acid	PFNS	68259-12-1
Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluorododecanesulfonic acid	PFDoS	79780-39-5

*** also reportable via the standard 537 method**

Table 1 Cont.

Parameter	Acronym	CAS
CHLORO-PERFLUOROALKYLSULFONATE		
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	763051-92-9
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	756426-58-1
PERFLUOROOCTANESULFONAMIDES (FOSAs)		
Perfluorooctanesulfonamide	PFOSA	754-91-6
N-methylperfluoro-1-octanesulfonamide	NMeFOSA	31506-32-8
N-ethylperfluoro-1-octanesulfonamide	NEtFOSA	4151-50-2
TELOMER SULFONATES		
1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	4:2FTS	27619-93-8
1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	6:2FTS	27619-97-2
1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	8:2FTS	39108-34-4
1H,1H,2H,2H-perfluorododecane sulfonate (10:2)	10:2FTS	120226-60-0
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS		
N-methyl perfluorooctanesulfonamidoacetic acid	NMeFOSAA *	2355-31-9
N-ethyl perfluorooctanesulfonamidoacetic acid	NEtFOSAA *	2991-50-6
NATIVE PERFLUOROOCTANESULFONAMIDOETHANOLS (FOSEs)		
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol	NMeFOSE	24448-09-7
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol	NEtFOSE	1691-99-2

*** also reportable via the standard 537 method**

3. Reporting Limits

The reporting limit for PFAS's is 2 ng/L for aqueous samples (20 ng/L for HFPO-DA) and 1 ng/g (10 ng/g for HFPO-DA) for soil samples.

4. Interferences

4.1 PFAS standards, extracts and samples should not come in contact with any glass containers or pipettes as these analytes can potentially adsorb to glass surfaces. PFAS analyte and EIS standards commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in polypropylene containers.

4.2 Method interferences may be caused by contaminants in solvents, reagents (including reagent water), sample bottles and caps, and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in the chromatograms. The method analytes in this method can also be found in many common laboratory supplies and equipment, such

as PTFE (polytetrafluoroethylene) products, LC solvent lines, methanol, aluminum foil, SPE sample transfer lines, etc. All items such as these must be routinely demonstrated to be free from interferences (less than 1/3 the RL for each method analyte) under the conditions of the analysis by analyzing laboratory reagent blanks as described in Section 9.2. **Subtracting blank values from sample results is not permitted.**

4.3 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of matrix interferences will vary considerably from source to source, depending upon the nature of the water. Humic and/or fulvic material can be co-extracted during SPE and high levels can cause enhancement and/or suppression in the electrospray ionization source or low recoveries on the SPE sorbent. Total organic carbon (TOC) is a good indicator of humic content of the sample.

4.4 SPE cartridges can be a source of interferences. The analysis of field and laboratory reagent blanks can provide important information regarding the presence or absence of such interferences. Brands and lots of SPE devices should be tested to ensure that contamination does not preclude analyte identification and quantitation.

5. Health and Safety

5.1 The toxicity or carcinogenicity of each reagent and standard used in this method is not fully established; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. A reference file of material safety data sheets is available to all personnel involved in the chemical analysis. Additional references to laboratory safety are available in the Chemical Hygiene Plan.

5.2 All personnel handling environmental samples known to contain or to have been in contact with municipal waste must follow safety practices for handling known disease causative agents.

5.3 PFOA has been described as “likely to be carcinogenic to humans.” Pure standard materials and stock standard solutions of these method analytes should be handled with suitable protection to skin and eyes, and care should be taken not to breathe the vapors or ingest the materials.

6. Sample Collection, Preservation, Shipping and Handling

6.1 Sample Collection for Aqueous Samples

6.1.1 Samples must be collected in two (2) 250-mL high density polyethylene (HDPE) container with an unlined plastic screw cap.

6.1.2 The sample handler must wash their hands before sampling and wear nitrile gloves while filling and sealing the sample bottles. PFAS contamination during sampling can occur from a number of common sources, such as food packaging and certain foods and beverages. Proper hand washing and wearing nitrile gloves will aid in minimizing this type of accidental contamination of the samples.

6.1.3 Open the tap and allow the system to flush until the water temperature has stabilized (approximately 3 to 5 min). Collect samples from the flowing system.

6.1.4 Fill sample bottles. Samples do not need to be collected headspace free.

6.1.5 After collecting the sample and cap the bottle. Keep the sample sealed from time of collection until extraction.

6.1.6 Field Reagent Blank (FRB)

6.1.6.1 A FRB must be handled along with each sample set. The sample set is composed of samples collected from the same sample site and at the same time. At the laboratory, fill the field blank sample bottle with reagent water and preservatives, seal, and ship to the sampling site along with the sample bottles. For each FRB shipped, an empty sample bottle (no preservatives) must also be shipped. At the sampling site, the sampler must open the shipped FRB and pour the reagent water into the empty shipped sample bottle, seal and label this bottle as the FRB. The FRB is shipped back to the laboratory along with the samples and analyzed to ensure that PFAS's were not introduced into the sample during sample collection/handling.

The reagent water used for the FRBs must be initially analyzed for method analytes as a MB and must meet the MB criteria in Section 9.2.1 prior to use. This requirement will ensure samples are not being discarded due to contaminated reagent water rather than contamination during sampling.

6.2 Sample Collection for Soil and Sediment samples.

Grab samples are collected in polypropylene containers. Sample containers and contact surfaces containing PTFE shall be avoided.

6.3 Sample Preservation

Not applicable.

6.4 Sample Shipping

Samples must be chilled during shipment and must not exceed 10 °C during the first 48 hours after collection. Sample temperature must be confirmed to be at or below 10 °C when the samples are received at the laboratory. Samples stored in the lab must be held at or below 6 °C until extraction, but should not be frozen.

NOTE: Samples that are significantly above 10° C, at the time of collection, may need to be iced or refrigerated for a period of time, in order to chill them prior to shipping. This will allow them to be shipped with sufficient ice to meet the above requirements.

6.5 Sample Handling

6.5.1 Holding Times

6.5.1.1 Water samples should be extracted as soon as possible but must be extracted within 14 days. Soil samples should be extracted within 28 days. Extracts are stored at < 10 ° C and analyzed within 28 days after extraction.

7. Equipment and Supplies

7.1 SAMPLE CONTAINERS – 250-mL high density polyethylene (HDPE) bottles fitted with unlined screw caps. Sample bottles must be discarded after use.

7.2 POLYPROPYLENE BOTTLES – 4-mL narrow-mouth polypropylene bottles.

7.3 CENTRIFUGE TUBES – 50-mL conical polypropylene tubes with polypropylene screw caps for storing standard solutions and for collection of the extracts.

7.4 AUTOSAMPLER VIALS – Polypropylene 0.7-mL autosampler vials with polypropylene caps.

7.4.1 NOTE: Polypropylene vials and caps are necessary to prevent contamination of the sample from PTFE coated septa. However, polypropylene caps do not reseal, so evaporation occurs after injection. Thus, multiple injections from the same vial are not possible.

7.5 POLYPROPYLENE GRADUATED CYLINDERS – Suggested sizes include 25, 50, 100 and 1000-mL cylinders.

7.6 Auto Pipets – Suggested sizes include 5, 10, 25, 50, 100, 250, 500, 1000, 5000 and 10,000-µls.

7.7 PLASTIC PIPETS – Polypropylene or polyethylene disposable pipets.

7.8 ANALYTICAL BALANCE – Capable of weighing to the nearest 0.0001 g.

7.9 SOLID PHASE EXTRACTION (SPE) APPARATUS FOR USING CARTRIDGES

7.9.1 SPE CARTRIDGES – 0.5 g SPE cartridges containing a reverse phase copolymer characterized by a weak anion exchanger (WAX) sorbent phase.

7.9.2 VACUUM EXTRACTION MANIFOLD – A manual vacuum manifold with large volume sampler for cartridge extractions, or an automatic/robotic sample preparation system designed for use with SPE cartridges, may be used if all QC requirements discussed in Section 9 are met. Extraction and/or elution steps may not be changed or omitted to accommodate the use of an automated system. Care must be taken with automated SPE systems to ensure the PTFE commonly used in these systems does not contribute to unacceptable analyte concentrations in the MB (Sect. 9.2.1).

7.9.3 SAMPLE DELIVERY SYSTEM – Use of a polypropylene transfer tube system, which transfers the sample directly from the sample container to the SPE cartridge, is recommended, but not mandatory. Standard extraction manifolds come equipped with PTFE transfer tube systems. These can be replaced with 1/8” O.D. x 1/16” I.D. polypropylene or polyethylene tubing cut to an appropriate length to ensure no sample contamination from the sample transfer lines. Other types of non-PTFE tubing may be used provided it meets the MB (Sect. 9.2.1) and LCS (Sect. 9.3) QC requirements. The PTFE transfer tubes may be used, but an MB must be run on each PFTE transfer tube and the QC requirements in Section 13.2.2 must be met. In the case of automated SPE, the removal of PTFE lines may not be feasible; therefore, MBs will need to be rotated among the ports and must meet the QC requirements of Sections 13.2.2 and 9.2.1.

7.10 Extract Clean-up Cartridge – 250 mg 6ml SPE Cartridge containing graphitized polymer carbon

7.11 EXTRACT CONCENTRATION SYSTEM – Extracts are concentrated by evaporation with nitrogen using a water bath set no higher than 65 °C.

7.12 LABORATORY OR ASPIRATOR VACUUM SYSTEM – Sufficient capacity to maintain a vacuum of approximately 10 to 15 inches of mercury for extraction cartridges.

7.13 LIQUID CHROMATOGRAPHY (LC)/TANDEM MASS SPECTROMETER (MS/MS) WITH DATA SYSTEM

7.13.1 LC SYSTEM – Instrument capable of reproducibly injecting up to 10-µL aliquots, and performing binary linear gradients at a constant flow rate near the flow rate used for development of this method (0.4 mL/min). The LC must be capable of pumping the water/methanol mobile phase without the use of a degasser which pulls vacuum on the mobile phase bottle (other types of degassers are acceptable). Degassers which pull vacuum on the mobile phase bottle will volatilize the ammonium acetate mobile phase causing the analyte peaks to shift to earlier retention times over the course of the analysis batch. The usage of a column heater is optional.

NOTE: During the course of method development, it was discovered that while idle for more than one day, PFAS's built up in the PTFE solvent transfer lines. To prevent long delays in purging high levels of PFAS's from the LC solvent lines, they were replaced with PEEK tubing and the PTFE solvent frits were replaced with stainless steel frits. It is not possible to remove all PFAS background contamination, but these measures help to minimize their background levels.

7.13.2 LC/TANDEM MASS SPECTROMETER – The LC/MS/MS must be capable of negative ion electrospray ionization (ESI) near the suggested LC flow rate of 0.4 mL/min. The system must be capable of performing MS/MS to produce unique product ions for the method analytes within specified retention time segments. A minimum of 10 scans across the chromatographic peak is required to ensure adequate precision.

7.13.3 DATA SYSTEM – An interfaced data system is required to acquire, store, reduce, and output mass spectral data. The computer software should have the capability of processing stored LC/MS/MS data by recognizing an LC peak within any given retention time window. The software must allow integration of the ion abundance of any specific ion within specified time or scan number limits. The software must be able to calculate relative response factors, construct linear regressions or quadratic calibration curves, and calculate analyte concentrations.

7.13.4 ANALYTICAL COLUMN – An LC BEH C_{18} column (2.1 x 50 mm) packed with 1.7 µm d_p C_{18} solid phase particles was used. Any column that provides adequate resolution, peak shape, capacity, accuracy, and precision (Sect. 9) may be used.

8. Reagents and Standards

8.1 GASES, REAGENTS, AND SOLVENTS – Reagent grade or better chemicals should be used.

8.1.1 REAGENT WATER – Purified water which does not contain any measurable quantities of any method analytes or interfering compounds greater than 1/3 the RL for each method analyte of interest. Prior to daily use, at least 3 L of reagent water should be flushed from the purification system to rinse out any build-up of analytes in the system's tubing.

8.1.2 METHANOL (CH_3OH, CAS#: 67-56-1) – High purity, demonstrated to be free of analytes and interferences.

8.1.3 AMMONIUM ACETATE ($NH_4C_2H_3O_2$, CAS#: 631-61-8) – High purity, demonstrated to be free of analytes and interferences.

8.1.4 ACETIC ACID (H_3CCOOH, CAS#: 64-19-7) - High purity, demonstrated to be free of analytes and interferences.

8.1.5 1M AMMONIUM ACETATE/REAGENT WATER – High purity, demonstrated to be free of analytes and interferences.

8.1.6 2mM AMMONIUM ACETATE/METHANOL:WATER (5:95) – To prepare, mix 2 ml of 1M AMMONIUM ACETATE,1 ml ACETIC ACID and 50 ml METHANOL into l Liter of REAGENT WATER.

8.1.7 Methanol/Water (80:20) – To prepare a 1 Liter bottle, mix 200 ml of REAGENT WATER with 800 ml of METHANOL.

8.1.8 AMMONIUM HYDROXIDE (NH_3, CAS#: 1336-21-6) – High purity, demonstrated to be free of analytes and interferences.

8.1.9 Sodium Acetate ($NaOOCCH_3$, CAS#: 127-09-3) – High purity, demonstrated to be free of analytes and interferences.

8.1.10 25 mM Sodium Acetate Buffer – To prepare 250mls, dissolve .625 grams of sodium acetate into 100 mls of reagent water. Add 4 mls Acetic Acid and adjust the final volume to 250 mls with reagent water.

8.1.11 NITROGEN – Used for the following purposes: Nitrogen aids in aerosol generation of the ESI liquid spray and is used as collision gas in some MS/MS instruments. The nitrogen used should meet or exceed instrument manufacturer's specifications. In addition, Nitrogen is used to concentrate sample extracts (Ultra High Purity or equivalent).

8.1.12 ARGON – Used as collision gas in MS/MS instruments. Argon should meet or exceed instrument manufacturer's specifications. Nitrogen gas may be used as the collision gas provided sufficient sensitivity (product ion formation) is achieved.

8.2 STANDARD SOLUTIONS – When a compound purity is assayed to be 96% or greater, the weight can be used without correction to calculate the concentration of the stock standard. PFAS analyte and IS standards commercially purchased in glass ampoules are acceptable; however, all subsequent transfers or dilutions performed by the analyst must be prepared and stored in polypropylene containers. Standards for sample fortification generally should be prepared in the smallest volume that can be accurately measured to minimize the addition of excess organic solvent to aqueous samples.

NOTE: Stock standards and diluted stock standards are stored at ≤4 °C.

8.2.1 ISOTOPE DILUTION Extracted Internal Standard (ID EIS) STOCK SOLUTIONS - ID EIS stock standard solutions are stable for at least 6 months when stored at 4 °C. The stock solution is purchased at a concentration of 1000 ng/mL.

8.2.2 ISOTOPE DILUTION Extracted Internal Standard PRIMARY DILUTION STANDARD (ID EIS PDS) – Prepare the ID EIS PDS at a concentration of 500 ng/mL. The ID PDS is prepared in 80:20% (vol/vol) methanol:water. The ID PDS is stable for 6 months when stored at ≤4 °C.

Table 2

Isotope Labeled Standard	Conc. of EIS Stock (ng/mL)	Vol. of EIS Stock (mL)	Final Vol. of EIS PDS (mL)	Final Conc. of EIS PDS (ng/mL)
M4PFBA	1000	1.0	2.0	500
M5PFPeA	1000	1.0	2.0	500
M5PFHxA	1000	1.0	2.0	500
M4PFHpA	1000	1.0	2.0	500
M8PFOA	1000	1.0	2.0	500
M9PFNA	1000	1.0	2.0	500
M6PFDA	1000	1.0	2.0	500
M7PFUdA	1000	1.0	2.0	500
MPFDoA	1000	1.0	2.0	500
M2PFTeDA	1000	1.0	2.0	500
M2PFHxDA	50,000	.02	2.0	500
d3-N-MeFOSA	50,000	.02	2.0	500
d5-N-EtFOSA	50,000	.02	2.0	500
d7-N-MeFOSE	50,000	.02	2.0	500
d9-N-EtFOSE	50,000	.02	2.0	500
M8FOSA	1000	1.0	2.0	500
d3-N-MeFOSAA	1000	1.0	2.0	500
d5-N-EtFOSAA	1000	1.0	2.0	500
M3PFBS	929	1.0	2.0	464.5
M3PFHxS	946	1.0	2.0	473
M8PFOS	957	1.0	2.0	478.5
M2-4:2FTS	935	1.0	2.0	467.5
M2-6:2FTS	949	1.0	2.0	474.5
M2-8:2FTS	958	1.0	2.0	479
M3HFPO-DA	50,000	.4	2.0	10,000

8.2.3 ANALYTE STOCK STANDARD SOLUTION – Analyte stock standards are stable for at least 6 months when stored at 4 °C. When using these stock standards to prepare a PDS, care must be taken to ensure that these standards are at room temperature and adequately vortexed.

8.2.4 Analyte Secondary Spiking Standard Prepare the spiking solution of additional add on components for project specific requirements only. ANALYTE PRIMARY SPIKING STANDARD – Prepare the spiking standard at a concentration of 500 ng/mL in methanol. The spiking standard is stable for at least two months when stored in polypropylene centrifuge tubes at room temperature.

Table 3

Analyte	Conc. of IS Stock (ng/mL)	Vol. of IS Stock (mL)	Final Vol. of IS PDS (mL)	Final Conc. of IS PDS (ng/mL)
PFBA	2000	1	4	500
PFPeA	2000	1	4	500
PFHxA	2000	1	4	500
PFHpA	2000	1	4	500
PFOA	2000	1	4	500
PFNA	2000	1	4	500
PFDA	2000	1	4	500
PFUdA	2000	1	4	500
PFDoA	2000	1	4	500
PFTrDA	2000	1	4	500
PFTeDA	2000	1	4	500
FOSA	2000	1	4	500
N-MeFOSAA	2000	1	4	500
N-EtFOSAA	2000	1	4	500
L-PFBS	1770	1	4	442.5
L-PFPeS	1880	1	4	470
L-PFHxSK	1480	1	4	370
Br-PFHxSK	344	1	4	86
L-PFHpS	1900	1	4	475
L-PFOSK	1460	1	4	365
Br-PFOSK	391	1	4	97.75
L-PFNS	1920	1	4	480
L-PFDS	1930	1	4	482.5
4:2FTS	1870	1	4	467.5
6:2FTS	1900	1	4	475
8:2FTS	1920	1	4	480

8.2.5 Analyte Secondary Spiking Standard Prepare the spiking solution of additional add on components for project specific requirements only.

Table 4

Analyte	Conc. of IS Stock (ng/mL)	Vol. of IS Stock (mL)	Final Vol. of IS PDS (mL)	Final Conc. of IS PDS (ng/mL)
ADONA	2000	1	4	500
PFHxDA	2000	1	4	500
PFODA	2000	1	4	500
HFPO-DA	100,000	.4	4	10,000
9ClPF3ONS	50,000	0.04	4	500
11ClPF3OUdS	50,000	0.04	4	500

8.2.6 LOW, MEDIUM AND HIGH LEVEL LCS – The LCS's will be prepared at the following concentrations and rotated per batch; 2 ng/L, 40 ng/L, 500 ng/l for drinking waters. The analyte PDS contains all the method analytes of interest at various concentrations in methanol. The analyte PDS has been shown to be stable for six months when stored at ≤4 °C.

8.2.7 Isotope Dilution Labeled Recovery Stock Solutions (ID REC) – ID REC Stock solutions are stable for at least 6 months when stored at 4 °C. The stock solution is purchased at a concentration of 1000 ng/mL.

8.2.8 Isotope Dilution Labeled Recovery Primary Dilution Standard (ID REC PDS) - Prepare the ID REC PDS at a concentration of 500 ng/mL. The ID REC PDS is prepared in 80:20% (vol/vol) methanol:water. The ID REC PDS is stable for at least six months when stored in polypropylene centrifuge tubes at ≤4 °C.

Table 5

Analyte	Conc. of REC Stock (ng/mL)	Vol. of REC Stock (mL)	Final Vol. of REC PDS (mL)	Final Conc. of REC PDS (ng/mL)
M2PFOA	2000	1	4	500
M2PFDA	2000	1	4	500
M3PFBA	2000	1	4	500
M4PFOS	2000	1	4	500

8.2.9 CALIBRATION STANDARDS (CAL) –

Current Concentrations (ng/mL): 0.5, 1.0, 5.0, 10.0, 50.0, 125, 150, 250, 500

Prepare the CAL standards over the concentration range of interest from dilutions of the analyte PDS in methanol containing 20% reagent water. 20 µl of the EIS PDS and REC PDS are added to the CAL standards to give a constant concentration of 10 ng/ml. The lowest concentration CAL standard must be at or below the RL (2 ng/L), which may depend on system sensitivity. The CAL standards may also be used as CCVs (Sect. 9.8). To make calibration stock standards:

Table 6

Calibration Standard Concentration	Final Aqueous Cal STD Level Concentration	Final Soil Cal STD Level Concentration	24 compound stock added (ul)	PFHxDA Stock added (ul)	500 ng/ml PFHxDA dilution added (ul)	PFODA Stock added (ul)	500 ng/ml PFODA dilution added (ul)	ADONA, HFPO-DA, 11Cl-PF3OUdS, 9Cl-PF3ONS Stock added (ul)	500 ng/ml ADONA dilution added (ul)	Final Volume in MeOH/H_2O (82:20)
.5 ng/ml	2 ng/L	.25 ng/g	6.25		25		25		25	25 mls
1 ng/ml	4 ng/L	.5 ng/g	5		20		20		20	10 mls
5 ng/ml	20 ng/L	1 ng/g	25		100		100		100	10 mls
10 ng/ml	40 ng/L	5 ng/g	125	5		5		5		25 mls

50 ng/ml	200 ng/L	25 ng/g	250	10		10		10		10 mls
125 ng/ml	500 ng/L	62.5 ng/g	625	25		25		25		10 mls
150 ng/ml	600 ng/L	75 ng/g	750	30		30		30		10 mls
250 ng/ml	1000 ng/L	125 ng/g	625							5 mls
500 ng/ml	2000 ng/L	250 ng/g	1250							5 mls

9. Quality Control

The laboratory must maintain records to document the quality of data that is generated. Ongoing data quality checks are compared with established performance criteria to determine if the results of analyses meet the performance characteristics of the method.

9.1 MINIMUM REPORTING LIMIT (MRL) CONFIRMATION

9.1.1 Fortify, extract, and analyze seven replicate LCSs at 2 ng/l. Calculate the mean measured concentration (*Mean*) and standard deviation for these replicates. Determine the Half Range for the prediction interval of results (HR_{PIR}) using the equation below

$$HR_{PIR} = 3.963s$$

Where:

s = the standard deviation
3.963 = a constant value for seven replicates.

9.1.2 Confirm that the upper and lower limits for the Prediction Interval of Result (*PIR* = *Mean* ± HR_{PIR}) meet the upper and lower recovery limits as shown below

The Upper PIR Limit must be ≤150% recovery.

$$\frac{Mean + HR_{PIR}}{Fortified\ Concentration} \times 100\% \leq 150\%$$

The Lower PIR Limit must be ≥ 50% recovery.

$$\frac{Mean - HR_{PIR}}{Fortified\ Concentration} \times 100\% \geq 50\%$$

9.1.3 The RL is validated if both the Upper and Lower PIR Limits meet the criteria described above. If these criteria are not met, the RL has been set too low and must be determined again at a higher concentration.

9.2 Blank(s)

9.2.1 **METHOD BLANK (MB) -** A Method Blank (MB) is required with each extraction batch to confirm that potential background contaminants are not interfering with the identification or quantitation of method analytes. Prep and analyze a MB for every 20 samples. If the MB produces a peak within the retention time window of any analyte that would prevent the determination of that analyte, determine the source of contamination and eliminate the interference before processing samples. Background contamination must be reduced to an acceptable level before proceeding. Background from method analytes or other contaminants that

interfere with the measurement of method analytes must be below the RL. If the method analytes are detected in the MB at concentrations equal to or greater than this level, then all data for the problem analyte(s) must be considered invalid for all samples in the extraction batch. Because background contamination is a significant problem for several method analytes, it is highly recommended that the analyst maintain a historical record of MB data.

9.2.2 **FIELD REAGENT BLANK (FRB)** - The purpose of the FRB is to ensure that PFAS's measured in the Field Samples were not inadvertently introduced into the sample during sample collection/handling. Analysis of the FRB is required only if a Field Sample contains a method analyte or analytes at or above the RL. The FRB is processed, extracted and analyzed in exactly the same manner as a Field Sample.

9.3 Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicates (LCSD)

9.3.1 An LCS is required with each extraction batch. The fortified concentration of the LCS may be rotated between low, medium, and high concentrations from batch to batch. Default limits of 50-150% of the true value may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. Calculate the percent recovery (%*R*) for each analyte using the equation

$$\%R = \frac{A \times 100}{B}$$

Where:

A = measured concentration in the fortified sample
B =fortification concentration.

9.3.2 Where applicable, LCSD's are to be extracted and analyzed. The concentration and analyte recovery criteria for the LCSD must be the same as the batch LCS The RSD's must fall within ≤30% of the true value for medium and high level replicates, and ≤50% for low level replicates. Calculate the relative percent difference (RPD) for duplicate MSs (MS and MSD) using the equation

$$RPD = \frac{|LCS - LCSD|}{(LCS + LCSD) / 2} \times 100$$

9.3.3 **If the LCS and or LCSD results do not meet these criteria for method analytes, then all data for the problem analyte(s) must be considered invalid for all samples in the extraction batch.**

9.4 Labeled Recovery Standards (REC)

The analyst must monitor the peak areas of the REC(s) in all injections during each analysis day.

9.5 Extracted Internal Standards (EIS)

9.5.1 The EIS standard is fortified into all samples, CCVs, MBs, LCSs, MSs, MSDs, FD, and FRB prior to extraction. It is also added to the CAL standards. The EIS is a means of assessing method performance from extraction to final

chromatographic measurement. Calculate the recovery (%R) for the EIS using the following equation

$$\%R = (A / B) \times 100$$

Where:

A = calculated EIS concentration for the QC or Field Sample
B = fortified concentration of the EIS.

9.5.2 Default limits of 50-150% may be used for analytes until sufficient replicates have been analyzed to generate proper control limits. A low or high percent recovery for a sample, blank, or CCV does not require discarding the analytical data but it may indicate a potential problem with future analytical data. When EIS recovery from a sample, blank, or CCV are outside control limits, check 1) calculations to locate possible errors, 2) standard solutions for degradation, 3) contamination, and 4) instrument performance. For CCVs and QC elements spiked with all target analytes, if the recovery of the corresponding target analytes meet the acceptance criteria for the EIS in question, the data can be used but all potential biases in the recovery of the EIS must be documented in the sample report. If the associated target analytes do not meet the acceptance criteria,the data must be reanalyzed.

9.6 Matrix Spike (MS)

9.6.1 Analysis of an MS is required in each extraction batch and is used to determine that the sample matrix does not adversely affect method accuracy. Assessment of method precision is accomplished by analysis of a Field Duplicate (FD) (Sect. 9.6); however, infrequent occurrence of method analytes would hinder this assessment. If the occurrence of method analytes in the samples is infrequent, or if historical trends are unavailable, a second MS, or MSD, must be prepared, extracted, and analyzed from a duplicate of the Field Sample. Extraction batches that contain MSDs will not require the extraction of a field sample duplicate. If a variety of different sample matrices are analyzed regularly, for example, drinking water from groundwater and surface water sources, method performance should be established for each. Over time, MS data should be documented by the laboratory for all routine sample sources.

9.6.2 Within each extraction batch, a minimum of one Field Sample is fortified as an MS for every 20 Field Samples analyzed. The MS is prepared by spiking a sample with an appropriate amount of the Analyte Stock Standard (Sect. 8.2.3). Use historical data and rotate through the low, mid and high concentrations when selecting a fortifying concentration. Calculate the percent recovery (%*R*) for each analyte using the equation

$$\%R = \frac{(A - B)}{C} \times 100$$

Where:

A = measured concentration in the fortified sample
B = measured concentration in the unfortified sample
C = fortification concentration.

9.6.3 Analyte recoveries may exhibit matrix bias. For samples fortified at or above their native concentration, recoveries should range between 50-150%. If the accuracy of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the LCS, the recovery is judged to be

matrix biased. The result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.7 Laboratory Duplicate

9.7.1 FIELD DUPLICATE OR LABORATORY FORTIFIED SAMPLE MATRIX DUPLICATE (FD or MSD) – Within each extraction batch (not to exceed 20 Field Samples), a minimum of one FD or MSD must be analyzed. Duplicates check the precision associated with sample collection, preservation, storage, and laboratory procedures. If method analytes are not routinely observed in Field Samples, an MSD should be analyzed rather than an FD.

9.7.2 Calculate the relative percent difference (*RPD*) for duplicate measurements (*FD1* and *FD2*) using the equation

$$RPD = \frac{|FD1 - FD2|}{(FD1 + FD2) / 2} \times 100$$

9.7.3 RPDs for FDs should be ≤30%. Greater variability may be observed when FDs have analyte concentrations that are within a factor of 2 of the RL. At these concentrations, FDs should have RPDs that are ≤50%. If the RPD of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the CCV, the recovery is judged to be matrix biased. The result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.7.4 If an MSD is analyzed instead of a FD, calculate the relative percent difference (RPD) for duplicate MSs (MS and MSD) using the equation

$$RPD = \frac{|MS - MSD|}{(MS + MSD) / 2} \times 100$$

9.7.5 RPDs for duplicate MSs should be ≤30% for samples fortified at or above their native concentration. Greater variability may be observed when MSs are fortified at analyte concentrations that are within a factor of 2 of the RL. MSs fortified at these concentrations should have RPDs that are ≤50% for samples fortified at or above their native concentration. If the RPD of any analyte falls outside the designated range, and the laboratory performance for that analyte is shown to be in control in the LCSD where applicable, the result is judged to be matrix biased. If no LCSD is present, the associated MS and MSD are to be re-analyzed to determine if any analytical has occurred. If the resulting RPDs are still outside control limits, the result for that analyte in the unfortified sample is labeled suspect/matrix to inform the data user that the results are suspect due to matrix effects.

9.8 Initial Calibration Verification (ICV)

9.8.1 As part of the IDC (Sect. 13.2), and after each ICAL, analyze a QCS sample from a source different from the source of the CAL standards. If a second vendor is not available, then a different lot of the standard should be used. The QCS should be prepared and analyzed just like a CCV. Acceptance criteria for the QCS are identical to the CCVs; the calculated amount for each analyte must be ±

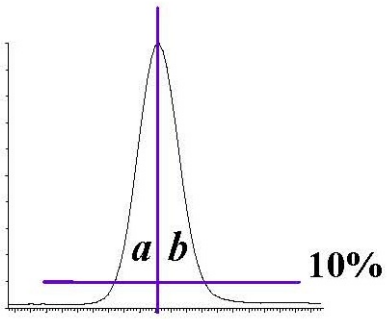
30% of the expected value. If measured analyte concentrations are not of acceptable accuracy, check the entire analytical procedureto locate and correct the problem.

9.9 Continuing Calibration Verification (CCV)

9.9.1 CCV Standards are analyzed at the beginning of each analysis batch, after every 10 Field Samples, and at the end of the analysis batch. See Section 10.7 for concentration requirements and acceptance criteria.

9.10 Method-specific Quality Control Samples

9.10.1 PEAK ASYMMETRY FACTOR – A peak asymmetry factor must be calculated using the equation below during the IDL and every time a calibration curve is generated. The peak asymmetry factor for the first two eluting peaks in a midlevel CAL standard (if only two analytes are being analyzed, both must be evaluated) must fall in the range of 0.8 to 1.5. Modifying the standard or extract composition to more aqueous content to prevent poor shape is not permitted. See guidance in Section 10.6.4.1 if the calculated peak asymmetry factors do not meet the criteria.



$$A_s = b / a$$

Where:

A_s = peak asymmetry factor
b = width of the back half of the peak measured (at 10% peak height) from the trailing edge of the peak to a line dropped perpendicularly from the peak apex
a = the width of the front half of the peak measured (at 10% peak height) from the leading edge of the peak to a line dropped perpendicularly from the apex.

9.11 Method Sequence

- CCV-LOW
- MB
- LCS
- LCSD
- MS
- Duplicate or MSD
- Field Samples (1-10)
- CCV-MID
- Field Samples (11-20)
- CCV-LOW

10. Procedure

10.1 Equipment Set-up

10.1.1 This procedure may be performed manually or in an automated mode using a robotic or automatic sample preparation device. If an automated system is used to prepare samples, follow the manufacturer's operating instructions, but all extraction and elution steps must be the same as in the manual procedure. Extraction and/or elution steps may not be changed or omitted to accommodate the use of an automated system. If an automated system is used, the MBs should be rotated among the ports to ensure that all the valves and tubing meet the MB requirements (Sect. 9.2).

10.1.2 Some of the PFAS's adsorb to surfaces, including polypropylene. Therefore, the aqueous sample bottles must be rinsed with the elution solvent (Sect 10.3.4) whether extractions are performed manually or by automation. The bottle rinse is passed through the cartridge to elute the method analytes and is then collected (Sect. 10.3.4).

10.1.3 **NOTE:** The SPE cartridges and sample bottles described in this section are designed as single use items and should be discarded after use. They may not be refurbished for reuse in subsequent analyses.

10.2 Sample Preparation and Extraction of Aqueous Samples

10.2.1 Samples are preserved, collected and stored as presented in Section 6.

The entire sample that is received must be sent through the SPE cartridge. In addition, the bottle must be solvent rinsed and this rinse must be sent through the SPE cartridge as well. The method blank (MB) and laboratory control sample (LCS) must be extracted in exactly the same manner (i.e., must include the bottle solvent rinse). It should be noted that a water rinse alone is not sufficient. This does not apply to samples with high concentrations of PFAS that are prepared using serial dilution and not SPE.

10.2.2 Determine sample volume. Weigh all samples to the nearest 1g. If visible sediment is present, centrifuge and decant into a new 250mL HDPE bottle and record the weight of the new container.

NOTE: Some of the PFAS's adsorb to surfaces, thus the sample volume may **NOT** be transferred to a graduated cylinder for volume measurement.

10.2.3 The MB, LCS and FRB may be prepared by measuring 250 mL of reagent water with a polypropylene graduated cylinder or filling a 250-mL sample bottle to near the top.

10.2.4 Adjust the QC and sample pH to 3 by adding acetic acid in water dropwise

10.2.5 Add 20 µL of the EIS PDS (Sect. 8.2.2) to each sample and QC, cap and invert to mix.

10.2.6 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS (Sect. 8.2.3). Cap and invert each sample to mix.

10.3 Cartridge SPE Procedure

10.3.1 CARTRIDGE CLEAN-UP AND CONDITIONING – DO NOT allow cartridge packing material to go dry during any of the conditioning steps. Rinse each cartridge with 3 X 5 mL of 2% ammonium hydroxide in methanol, followed by 5mls of methanol. Next, rinse each cartridge with 5 mls of the 25 mM acetate buffer, followed by 15 mL of reagent water, without allowing the water to drop below the top edge of the packing. If the cartridge goes dry during the conditioning phase, the conditioning must be started over. Add 4-5 mL of reagent water to each cartridge, attach the sample transfer tubes (Sect. 7.9.3), turn on the vacuum, and begin adding sample to the cartridge.

10.3.2 SAMPLE EXTRACTON – Adjust the vacuum so that the approximate flow rate is approximately 4 mL/min. Do not allow the cartridge to go dry before all the sample has passed through.

10.3.3 SAMPLE BOTTLE AND CARTRIDGE RINSE – After the entire sample has passed through the cartridge, rinse the sample bottles with 4 ml reagent water followed by 4 ml 25 mM acetate buffer at pH 4 and draw the aliquot through the sample transfer tubes and the cartridges. Draw air or nitrogen through the cartridge for 5-10 min at high vacuum (10-15 in. Hg). **NOTE: If empty plastic reservoirs are used in place of the sample transfer tubes to pass the samples through the cartridges, these reservoirs must be treated like the transfer tubes. After the entire sample has passed through the cartridge, the reservoirs must be rinsed to waste with reagent water.**

10.3.4 SAMPLE BOTTLE AND CARTRIDGE ELUTION, Fraction 1 – Turn off and release the vacuum. Lift the extraction manifold top and insert a rack with collection tubes into the extraction tank to collect the extracts as they are eluted from the cartridges. Rinse the sample bottles with 12 mls of methanol and draw the aliquot through the sample transfer tubes and cartridges. Use a low vacuum such that the solvent exits the cartridge in a dropwise fashion.

SAMPLE BOTTLE AND CARTRIDGE ELUTION, Fraction 2 In a separate collection vial, rinse the sample bottles with 12 mL of 2% ammonium hydroxide in methanol and elute the analytes from the cartridges by pulling the 4 mL of methanol through the sample transfer tubes and the cartridges. Use a low vacuum such that the solvent exits the cartridge in a dropwise fashion. To the final extract, add 50 ul of acetic acid.

NOTE: If empty plastic reservoirs are used in place of the sample transfer tubes to pass the samples through the cartridges, these reservoirs must be treated like the transfer tubes. After the reservoirs have been rinsed in Section 10.3.3, the elution solvent used to rinse the sample bottles must be swirled down the sides of the reservoirs while eluting the cartridge to ensure that any method analytes on the surface of the reservoirs are transferred to the extract.

CLEAN-UP CARTRIDGE ELUTION, Elute the clean-up cartridge with 8 additional mls of methanol and draw the aliquot through the cartridge. Use a low vacuum such that the solvent exits the cartridge in a dropwise fashion.

10.3.5 Fractions 1 and 2 are to be combined during the concentration stage (section10.6)

10.4 Sample Prep and Extraction Protocol for Soils

10.4.1 Homogenize and weigh 2 grams of sample (measured to the nearest hundredth of a gram) intoa 50 ml polypropylene centrifuge tube. For laboratory control blanks and spikes, 2 grams of clean sand is used.

10.4.2 Add 20 µL of the EIS PDS (Sect. 8.2.2) to each sample and QC.

10.4.3 If the sample is an LCS, LCSD, MS, or MSD, add the necessary amount of analyte PDS (Sect. 8.2.3). Cap and invert each sample to mix.

10.4.4 To all samples, add 10 mls of methanol, cap, vortex for 25 seconds at 3000RPM and mix for 30 minutes using a shaker table of tumbler at 120RPM.

10.4.5 Following mixing, sonicate each sample for 30 minutes and let samples sit overnight (at least 2 hours is required for RUSH samples).

10.4.6 Centrifuge each sample at 3500RPM for 10 minutes.

10.4.7 Remove supernatant, and reserve for clean-up.

10.5 Extract Clean-up

10.5.1 CARTRIDGE CLEAN-UP AND CONDITIONING –. Rinse each cartridge with 15 mL of methanol and discard. If the cartridge goes dry during the conditioning phase, the conditioning must be started over. Attach the sample transfer tubes (Sect. 7.9.3), turn on the vacuum, and begin adding sample to the cartridge.

10.5.2 Adjust the vacuum so that the approximate flow rate is 1-2 mL/min. Do not allow the cartridge to go dry before all the sample has passed through.

10.5.3 SAMPLE BOTTLE AND CARTRIDGE RINSE – After the entire sample has passed through the cartridge, rinse the sample collection vial with two 1-mL aliquots of methanol and draw each aliquot through the cartridges. Draw air or nitrogen through the cartridge for 5 min at high vacuum (10-15 in. Hg).

10.5.4 If extracts are not to be immediately evaporated, cover collection tubes and store at ambient temperature till concentration.

10.6 Extract Concentration

10.6.1 Concentrate the extract to dryness under a gentle stream of nitrogen in a heated water bath (60-65 °C) to remove all the water/methanol mix. Add the appropriate amount of 80:20% (vol/vol) methanol:water solution and 20 µl of the ID REC PDS (Sect. 8.2.7) to the collection vial to bring the volume to 1 mL and vortex. Transfer two aliquots with a plastic pipet (Sect. 7.6) into 2 polypropylene autosampler vials.

NOTE: It is recommended that the entire 1-mL aliquot not be transferred to the autosampler vial because the polypropylene autosampler caps do not reseal after injection. Therefore, do not store the extracts in the autosampler vials as evaporation losses can occur occasionally in these autosampler vials. Extracts can be split between 2 X 700 µl vials (Sect. 7.4).

10.7 Sample Volume Determination

10.7.1 If the level of the sample was marked on the sample bottle, use a graduated cylinder to measure the volume of water required to fill the original sample bottle to the mark made prior to extraction. Determine to the nearest 10 mL.

10.7.2 If using weight to determine volume, weigh the empty bottle to the nearest 10 g and determine the sample weight by subtraction of the empty bottle weight from the original sample weight (Sect. 10.2.2). Assume a sample density of 1.0 g/mL. In either case, the sample volume will be used in the final calculations of the analyte concentration (Sect. 11.2).

10.8 Initial Calibration - Demonstration and documentation of acceptable initial calibration is required before any samples are analyzed. After the initial calibration is successful, a CCV is required at the beginning and end of each period in which analyses are performed, and after every tenth Field Sample.

10.8.1 ESI-MS/MS TUNE

10.8.1.1 Calibrate the mass scale of the MS with the calibration compounds and procedures prescribed by the manufacturer.

10.8.1.2 Optimize the [M-H]- for each method analyte by infusing approximately 0.5-1.0 µg/mL of each analyte (prepared in the initial mobile phase conditions) directly into the MS at the chosen LC mobile phase flow rate (approximately 0.4 mL/min). This tune can be done on a mix of the method analytes. The MS parameters (voltages, temperatures, gas flows, etc.) are varied until optimal analyte responses are determined. The method analytes may have different optima requiring some compromise between the optima.

10.8.1.3 Optimize the product ion for each analyte by infusing approximately 0.5-1.0 µg/mL of each analyte (prepared in the initial mobile phase conditions) directly into the MS at the chosen LC mobile phase flow rate (approximately 0.4 mL/min). This tune can be done on a mix of the method analytes. The MS/MS parameters (collision gas pressure, collision energy, etc.) are varied until optimal analyte responses are determined. Typically, the carboxylic acids have very similar MS/MS conditions and the sulfonic acids have similar MS/MS conditions.

10.8.2 Establish LC operating parameters that optimize resolution and peak shape. Modifying the standard or extract composition to more aqueous content to prevent poor shape is not permitted.

Cautions: LC system components, as well as the mobile phase constituents, contain many of the method analytes in this method. Thus, these PFAS's will build up on the head of the LC column during mobile phase equilibration. To minimize the background PFAS peaks and to keep background levels constant, the time the LC column sits at initial conditions must be kept constant and as short as possible (while ensuring reproducible retention times). In addition, prior to daily use, flush the column with 100% methanol for at least 20 min before initiating a sequence. It may be necessary on some systems to flush other LC components such as wash syringes, sample needles or any other system components before daily use.

10.8.3 Inject a mid-level CAL standard under LC/MS conditions to obtain the retention times of each method analyte. If analyzing for PFTA, ensure that the LC

conditions are adequate to prevent co-elution of PFTA and the mobile phase interferants. These interferants have the same precursor and products ions as PFTA, and under faster LC conditions may co-elute with PFTA. Divide the chromatogram into retention time windows each of which contains one or more chromatographic peaks. During MS/MS analysis, fragment a small number of selected precursor ions ([M-H]-) for the analytes in each window and choose the most abundant product ion. For maximum sensitivity, small mass windows of ±0.5 daltons around the product ion mass were used for quantitation.

10.8.4 Inject a mid-level CAL standard under optimized LC/MS/MS conditions to ensure that each method analyte is observed in its MS/MS window and that there are at least 10 scans across the peak for optimum precision.

10.8.4.1 If broad, split or fronting peaks are observed for the first two eluting chromatographic peaks (if only two analytes are being analyzed, both must be evaluated), change the initial mobile phase conditions to higher aqueous content until the peak asymmetry ratio for each peak is 0.8 – 1.5. The peak asymmetry factor is calculated as described in Section 9.9.1 on a mid-level CAL standard. The peak asymmetry factor must meet the above criteria for the first two eluting peaks during the IDL and every time a new calibration curve is generated. Modifying the standard or extract composition to more aqueous content to prevent poor shape is not permitted.

NOTE: PFHxS, PFOS, NMeFOSAA, and NEtFOSAA have multiple chromatographic peaks using the LC conditions in Table 5 due to chromatographic resolution of the linear and branched isomers of these compounds. Most PFAS's are produced by two different processes. One process gives rise to linear PFAS's only while the other process produces both linear and branched isomers. Thus, both branched and linear PFAS's can potentially be found in the environment. For the aforementioned compounds that give rise to more than one peak, all the chromatographic peaks observed in the standard must be integrated and the areas totaled. Chromatographic peaks in a sample must be integrated in the same way as the CAL standard.

10.8.5 Prepare a set of CAL standards as described in Section 8.2.5. The lowest concentration CAL standard must be at or below the RL (2 ng/L), which may depend on system sensitivity.

10.8.6 The LC/MS/MS system is calibrated using the IS technique. Use the LC/MS/MS data system software to generate a linear regression or quadratic calibration curve for each of the analytes. This curve **must always** be forced through zero and may be concentration weighted, if necessary. Forcing zero allows for a better estimate of the background levels of method analytes. A minimum of 5 levels are required for a linear calibration model and a minimum of 6 levels are required for a quadratic calibration model.

10.8.7 CALIBRATION ACCEPTANCE CRITERIA – A linear fit is acceptable if the coefficient of determination (r^2) is greater than 0.99. When quantitated using the initial calibration curve, each calibration point, except the lowest point, for each analyte should calculate to be within 70-130% of its true value. The lowest CAL point should calculate to be within 50-150% of its true value. If these criteria cannot be met, the analyst will have difficulty meeting ongoing QC criteria. It is

recommended that corrective action is taken to reanalyze the CAL standards, restrict the range of calibration, or select an alternate method of calibration (forcing the curve through zero is still required).

10.8.7.1 CAUTION: When acquiring MS/MS data, LC operating conditions must be carefully reproduced for each analysis to provide reproducible retention times. If this is not done, the correct ions will not be monitored at the appropriate times. As a precautionary measure, the chromatographic peaks in each window must not elute too close to the edge of the segment time window.

10.9 CONTINUING CALIBRATION CHECK (CCV) – Minimum daily calibration verification is as follows. Verify the initial calibration at the beginning and end of each group of analyses, and after every tenth sample during analyses. In this context, a "sample" is considered to be a Field Sample. MBs, CCVs, LCSs, MSs, FDs FRBs and MSDs are not counted as samples. The beginning CCV of each analysis batch must be at or below the RL in order to verify instrument sensitivity prior to any analyses. If standards have been prepared such that all low CAL points are not in the same CAL solution, it may be necessary to analyze two CAL standards to meet this requirement. Alternatively, the analyte concentrations in the analyte PDS may be customized to meet these criteria. Subsequent CCVs should alternate between a medium and Low concentration CAL standard.

10.9.1 Inject an aliquot of the appropriate concentration CAL standard and analyze with the same conditions used during the initial calibration.

10.9.2 Calculate the concentration of each analyte and EIS in the CCV. The calculated amount for each analyte for medium level CCVs must be within ± 30% of the true value with an allowance of 10% of the reported analytes to be greater than 30%, but less than 40%. The calculated amount for each EIS must be within ± 50% of the true value. The calculated amount for the lowest calibration point for each analyte must be within ± 50%. If these conditions do not exist, then all data for the problem analyte must be considered invalid, and remedial action should be taken (Sect. 10.7.4) which may require recalibration. Any Field or QC Samples that have been analyzed since the last acceptable calibration verification should be reanalyzed after adequate calibration has been restored, with the following exception. **If the CCV fails because the calculated concentration is greater than 130% (150% for the low-level CCV) for a particular method analyte, and Field Sample extracts show no detection for that method analyte, non-detects may be reported without re-analysis.**

10.9.3 REMEDIAL ACTION – Failure to meet CCV QC performance criteria may require remedial action. Major maintenance, such as cleaning the electrospray probe, atmospheric pressure ionization source, cleaning the mass analyzer, replacing the LC column, etc., requires recalibration (Sect 10.6) and verification of sensitivity by analyzing a CCV at or below the RL (Sect 10.7).

10.10 EXTRACT ANALYSIS

10.10.1 Establish operating conditions equivalent to those summarized in Tables 6-8 of Section 16. Instrument conditions and columns should be optimized prior to the initiation of the IDC.

10.10.2 Establish an appropriate retention time window for each analyte. This should be based on measurements of actual retention time variation for each method analyte in CAL standard solutions analyzed on the LC over the course of time. A value of plus or minus three times the standard deviation of the retention time obtained for each method analyte while establishing the initial calibration and completing the IDC can be used to calculate a suggested window size. However, the experience of the analyst should weigh heavily on the determination of the appropriate retention window size.

10.10.3 Calibrate the system by either the analysis of a calibration curve (Sect. 10.6) or by confirming the initial calibration is still valid by analyzing a CCV as described in Section 10.7. If establishing an initial calibration, complete the IDC as described in Section 13.2.

10.10.4 Begin analyzing Field Samples, including QC samples, at their appropriate frequency by injecting the same size aliquots under the same conditions used to analyze the CAL standards.

10.10.5 At the conclusion of data acquisition, use the same software that was used in the calibration procedure to identify peaks of interest in predetermined retention time windows. Use the data system software to examine the ion abundances of the peaks in the chromatogram. Identify an analyte by comparison of its retention time with that of the corresponding method analyte peak in a reference standard.

10.10.6 The analyst must not extrapolate beyond the established calibration range. If an analyte peak area exceeds the range of the initial calibration curve, the sample should be re-extracted with a reduced sample volume in order to bring the out of range target analytes into the calibration range. If a smaller sample size would not be representative of the entire sample, the following options are recommended. Re-extract an additional aliquot of sufficient size to insure that it is representative of the entire sample. Spike it with a higher concentration of internal standard. Prior to LC/MS analysis, dilute the sample so that it has a concentration of internal standard equivalent to that present in the calibration standard. Then, analyze the diluted extract.

11. Data Evaluation, Calculations and Reporting

11.1 Complete chromatographic resolution is not necessary for accurate and precise measurements of analyte concentrations using MS/MS. In validating this method, concentrations were calculated by measuring the product ions listed in Table 7.

11.2 Calculate analyte concentrations using the multipoint calibration established in Section 10.6. Do not use daily calibration verification data to quantitate analytes in samples. Adjust final analyte concentrations to reflect the actual sample volume determined in Section 10.6 where:

C_{ex} = (Area of target analyte * Concentration of Labeled analog) / (area of labeled analog * CF)

C_s = (C_{ex} / sample volume in ml) * 1000

C_{ex} = The concentration of the analyte in the extract
CF = calibration factor from calibration.

11.3 Prior to reporting the data, the chromatogram should be reviewed for any incorrect peak identification or poor integration.

11.4 PFHxS, PFOS, PFOA, NMeFOSAA, and NEtFOSAA have multiple chromatographic peaks using the LC conditions in Table 5 due to the linear and branch isomers of these compounds (Sect. 10.6.4.1). The areas of all the linear and branched isomer peaks observed in the CAL standards for each of these analytes must be summed and the concentrations reported as a total for each of these analytes.

11.5 Calculations must utilize all available digits of precision, but final reported concentrations should be rounded to an appropriate number of significant figures (one digit of uncertainty), typically two, and not more than three significant figures.

12. Contingencies for Handling Out-of-Control Data or Unacceptable Data

12.1 Section 9.0 outlines sample batch QC acceptance criteria. If non-compliant organic compound results are to be reported, the Organic Section Head and/or the Laboratory Director, and the Operations Manager must approve the reporting of these results. The laboratory Project Manager shall be notified, and may choose to relay the non-compliance to the client, for approval, or other corrective action, such as re-sampling and re-analysis. The analyst, Data Reviewer, or Department Supervisor performing the secondary review initiates the project narrative, and the narrative must clearly document the non-compliance and provide a reason for acceptance of these results.

12.2 All results for the organic compounds of interest are reportable without qualification if extraction and analytical holding times are met, preservation requirements (including cooler temperatures) are met, all QC criteria are met, and matrix interference is not suspected during extraction or analysis of the samples. If any of the below QC parameters are not met, all associated samples must be evaluated for re-extraction and/or re-analysis.

13. Method Performance

13.1 Detection Limit Study (DL) / Limit of Detection Study (LOD) / Limit of Quantitation (LOQ)

13.1.1 The laboratory follows the procedure to determine the DL, LOD, and/or LOQ as outlined in Alpha SOP ID 1732. These studies performed by the laboratory are maintained on file for review.

13.2 Demonstration of Capability Studies

13.2.1 The IDC must be successfully performed prior to analyzing any Field Samples. Prior to conducting the IDC, the analyst must first generate an acceptable Initial Calibration following the procedure outlined in Section 10.6.

13.2.2 INITIAL DEMONSTRATION OF LOW SYSTEM BACKGROUND – Any time a new lot of SPE cartridges, solvents, centrifuge tubes, disposable pipets, and autosampler vials are used, it must be demonstrated that an MB is reasonably free of contamination and that the criteria in Section 9.2.1 are met. If an automated extraction system is used, an MB should be extracted on each port to ensure that all the valves and tubing are free from potential PFAS contamination.

13.2.3 INITIAL DEMONSTRATION OF PRECISION (IDP) – Prepare, extract, and analyze four to seven replicate LCSs fortified near the midrange of the initial calibration curve according to the procedure described in Section 10. Sample preservatives as described in Section 6.2.1 must be added to these samples. The relative standard deviation (RSD) of the results of the replicate analyses must be less than 20%.

13.2.4 INITIAL DEMONSTRATION OF ACCURACY (IDA) – Using the same set of replicate data generated for Section 13.2.3, calculate average recovery. The average recovery of the replicate values must be within ± 30% of the true value.

13.2.5 INITIAL DEMONSTRATION OF PEAK ASYMMETRY FACTOR – Peak asymmetry factors must be calculated using the equation in Section 9.10.1 for the first two eluting peaks (if only two analytes are being analyzed, both must be evaluated) in a mid-level CAL standard. The peak asymmetry factors must fall in the range of 0.8 to 1.5. See guidance in Section 10.6.4.1 if the calculated peak asymmetry factors do not meet the criteria.

13.2.6 Refer to Alpha SOP ID 1739 for further information regarding IDC/DOC Generation.

13.2.7 The analyst must make a continuing, annual, demonstration of the ability to generate acceptable accuracy and precision with this method.

14. Pollution Prevention and Waste Management

14.1 Refer to Alpha's Chemical Hygiene Plan and Hazardous Waste Management and Disposal SOP for further pollution prevention and waste management information.

14.2 This method utilizes SPE to extract analytes from water. It requires the use of very small volumes of organic solvent and very small quantities of pure analytes, thereby minimizing the potential hazards to both the analyst and the environment as compared to the use of large volumes of organic solvents in conventional liquid-liquid extractions.

14.3 The analytical procedures described in this method generate relatively small amounts of waste since only small amounts of reagents and solvents are used. The matrices of concern are finished drinking water or source water. However, laboratory waste management practices must be conducted consistent with all applicable rules and regulations, and that laboratories protect the air, water, and land by minimizing and controlling all releases from fume hoods and bench operations. Also, compliance is required with any sewage discharge permits and regulations, particularly the hazardous waste identification rules and land disposal restrictions.

15. Referenced Documents

Chemical Hygiene Plan – ID 2124

SOP ID 1732 Detection Limit (DL), Limit of Detection (LOD) & Limit of Quantitation (LOQ) SOP

SOP ID 1739 Demonstration of Capability (DOC) Generation SOP

SOP ID 1728 Hazardous Waste Management and Disposal SOP

16. Attachments

Table 7: LC Method Conditions

Time (min)	2 mM Ammonium Acetate (5:95 MeOH/H_2O)	100% Methanol
Initial	100.0	0.0
1.0	100.0	0.0
2.2	85.0	15.0
11	20.0	80.0
11.4	0.0	100.0
12.4	100.0	00.0
15.5	100.0	0.0
Waters Aquity UPLC ® BEHC_{18} 2.1 x 50 mm packed with 1.7 µm BEH C_{18} stationary phase Flow rate of 0.4 mL/min 2-5 µL injection		

Table 8: ESI-MS Method Conditions

ESI Conditions	
Polarity	Negative ion
Capillary needle voltage	.5 kV
Cone Gas Flow	25 L/hr
Nitrogen desolvation gas	1000 L/hr
Desolvation gas temp.	500 ºC

Table 9: Method Analyte Source, Retention Times (RTs), and EIS References

#	Analyte	Transition	RT	IS	Type
1	M3PBA	216>171	2.65		REC
2	PFBA	213 > 169	2.65	2: M4PFBA	
3	M4PFBA	217 > 172	2.65	1: M3PBA	EIS
4	PFPeA	263 > 219	5.67	4: M5PFPEA	
5	M5PFPEA	268 > 223	5.66	1: M3PBA	EIS
6	PFBS	299 > 80	6.35	6: M3PFBS	
7	M3PFBS	302 > 80	6.35	29:M4PFOS	EIS
8	FtS 4:2	327 > 307	7.47	9: M2-4:2FTS	

#	Analyte	Transition	RT	IS	Type
9	M2-4:2FTS	329 > 81	7.47	29:M4PFOS	EIS
10	PFHxA	303 > 269	7.57	10: M5PFHxA	
11	M5PFHxA	318 > 273	7.57	19:M2PFOA	EIS
12	PFPeS	349 > 80	7.88	18: M3PFHxS	
13	PFHpA	363 > 319	8.80	14: M4PFHpA	
14	M4PFHpA	367 > 322	8.80	19:M2PFOA	EIS
15	L-PFHxS	399 > 80	8.94	18: M3PFHxS	
16	br-PFHxS	399 > 80	8.72	18: M3PFHxS	
17	PFHxS Total	399 > 80	8.94	18: M3PFHxS	
18	M3PFHxS	402 > 80	8.94	29:M4PFOS	EIS
19	MPFOA	415 > 370	9.7		REC
20	PFOA	413 > 369	9.7	23: M8PFOA	
21	br-PFOA	413 > 369	9.48	23: M8PFOA	
22	PFOA Total	413 > 369	9.7	23: M8PFOA	
23	M8PFOA	421 > 376	9.7	19: M2PFOA	EIS
24	FtS 6:2	427 > 407	9.66	25: M2-6:2FTS	
25	M2-6:2FTS	429 > 409	9.66	29:M4PFOS	EIS
26	PFHpS	449 > 80	9.78	33: M8PFOS	
27	PFNA	463 > 419	10.41	33: M8PFOS	
28	M9PFNA	472 > 427	10.41	19: M2PFOA	EIS
29	M4PFOS	501 > 80	10.45		REC
30	PFOS	499 > 80	10.45	33: M8PFOS	
31	br-PFOS	499 > 80	10.27	33: M8PFOS	
32	PFOS Total	499 > 80	10.45	33: M8PFOS	
33	M8PFOS	507 > 80	10.45	29: M4PFOS	EIS
34	FtS 8:2	527 > 507	10.99	38: M2-8:2FTS	
35	M2-8:2FTS	529 > 509	10.99	29:M4PFOS	EIS
36	M2PFDA	515 > 470	11.00		REC
37	PFDA	513 > 469	11.00	38: M6PFDA	
38	M6PFDA	519 > 474	11.00	36: M2PFDA	EIS
39	PFNS	549 > 80	11.02	33:M8PFOS	
40	NMeFOSAA	570 > 419	11.41	41: D3-NMeFOSAA	
41	d3-NMeFOSAA	573 > 419	11.41	36: M2PFDA	EIS
42	PFOSA	498 > 78	11.48	29: M8FOSA	
43	M8FOSA	506 > 78	11.48	19: M2PFOA	EIS
44	PFUnDA	563 > 519	11.51	41: M7-PFUDA	
45	M7-PFUDA	570 > 525	11.51	36: M2PFDA	EIS
46	PFDS	599 > 80	11.51	33:M8PFOS	
47	NEtFOSAA	584 > 419	11.68	48: d5-NEtFOSAA	

#	Analyte	Transition	RT	IS	Type
48	d5-NEtFOSAA	589 > 419	11.68	36: M2PFDA	EIS
49	PFDoA	613 > 569	11.96	50: MPFDOA	
50	MPFDOA	615 > 570	11.96	36: M2PFDA	EIS
51	PFTriA	663 > 619	12.34	50: MPFDOA	
52	PFTeA	713 > 669	12.6	53: M2PFTEDA	
53	M2PFTEDA	715 > 670	12.6	36: M2PFDA	EIS
54	M3HFPO-DA	329>285	7.97	19: M2PFOA	EIS
55	HFPO-DA	332>287	7.97	54: M3HFPO-DA	
56	ADONA	377>251	8.00	23: M8PFOA	
57	PFHxDA	813>769	13.20	59: M2PFHxDA	
58	PFODA	913>869	13.50	59: M2PFHxDA	
59	M2PFHxDA	815>770	13.20	36:M2PFDA	EIS
60	NEtFOSA	526>169	11.00	61: NMeFOSA	
61	NMeFOSA	512>169	10.50	63: d3-NMeFOSA	
62	d3-NMeFOSA	515>169	10.50	29: M4PFOS	EIS
63	d5-NEtFOSA	531>169	11.00	29: M4PFOS	EIS
64	NMeFOSE	556>122	11.25	66: d7-NMeFOSE	
65	NEtFOSE	570>136	10.75	67: d9-NEtFOSE	
66	d7-NMeFOSE	563>126	11.25	29: M4PFOS	EIS
67	d9-NEtFOSE	579>142	10.75	29: M4PFOS	EIS
68	FtS 10:2	627>607	11.50	25: M2-6:2FTS	
69	PFDoS	699>99	12.50	33: M8PFOS	

Appendix H
Site Management Forms

C&S ENGINEERS - DAILY WORK REPORT (DWR)

Client:	Project Name:	Address:
Date:		
Weather Conditions:		
High Temp:	Low Temp:	
AM Wind Speed/Direction:	PM Wind Speed / Direction:	

C&S Personnel:	Drive In:	Onsite:	Offsite:	Drive Out:	Total:

Visitor Name & Company:		Onsite:	Offsite:	Purpose:

Contractor Personnel:	Equipment	Hours	Work Description

Daily Work Description:

Upcoming Work:

C&S ENGINEERS - DAILY WORK REPORT (DWR)

Client: **Project Name:** **Address:**

Date:

SAMPLE LOG

Sample ID	MS/MSD	Material Type	Depth	PID	Analysis

Additional Notes:

C&S ENGINEERS - DAILY WORK REPORT (DWR)

Client:	Project Name:	Address:
Date:		

SITE SKETCH:

4435-4445 Military Road Site
Annual Inspection Form
Town of Niagara, New York

Inspector's Name: Weather Conditions:

Inspector's Company and Title: Temperature (^{o}f):

Inspection Date:

Inspection Time:

Comments:

Pre Inspection Checklist

1. Review previous annual inspections.
2. Verify that groundwater monitoring reports were submitted to DEC.
3. Meet with site reps to solicit comments/concerns regarding the operation of the ICs and ECs for the past reporting period.

Comments:

Cover System - Inspection

1. Walk and inspect the Site.

a. Are there signs of significant cracks, settlement or deterioration of the remaining asphalt / concrete?	Yes	No
b. Has any asphalt / concrete pavement been removed?	Yes	No
c. Have any structures been constructed?	Yes	No
d. Are there any signs of soil washing, erosion, settlement, or deterioration of the soil cover?	Yes	No
e. Are there any signs of intrusive activities (drilling, digging, trenching, grading, excavating, etc.)?	Yes	No

Comments:

Well Network - Inspection

1. Walk and inspect each well location / riser.

a. Are there any signs of vandalism or poor maintenance practices?	Yes	No
b. Are covers and plugs secure / intact?	Yes	No

Comments:

Overall Comments:

Repair:

Summarize needed/completed repairs to the Engineering Controls:

Inspector's Signature:

Summary of Green Remediation Metrics for Site Management

Site Name: _____ Site Code: _____
Address: _____ City: _____
State: _____ Zip Code: _____ County: _____

Initial Report Period (Start Date of period covered by the Initial Report submittal)
Start Date: _____

Current Reporting Period
Reporting Period From: _____ To: _____

Contact Information
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____

I. Energy Usage: Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	**Total to Date**
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	**Total to Date (tons)**
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		
Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	**Total to Date (miles)**
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

IV. Water Usage: Quantify the volume of water used on-site from various sources.

	Current Reporting Period (gallons)	**Total to Date (gallons)**
Total quantity of water used on-site		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	**Total to Date (acres)**
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Other:

CERTIFICATION BY CONTRACTOR
I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including that last day of the period covered by this application. _____ **Date** **Contractor**

Appendix I
Remedial System Optimization Table of Contents

REMEDIAL SYSTEM OPTIMIZATION TABLE OF CONTENTS FOR 4435-4445 MMILITARY ROAD BCP SITE

TABLE OF CONTENTS

1.0 INTRODUCTION
1.1 SITE OVERVIEW
1.2 PROJECT OBJECTIVES AND SCOPE OF WORK
1.3 REPORT OVERVIEW
2.0 REMEDIAL ACTION DESCRIPTION
2.1 SITE LOCATION AND HISTORY
2.2 REGULATORY HISTORY AND REQUIREMENTS
2.3 CLEAN-UP GOALS AND SITE CLOSURE CRITERIA
2.4 PREVIOUS REMEDIAL ACTIONS
2.5 DESCRIPTION OF EXISTING REMEDY
2.5.1 System Goals and Objectives
2.5.2 System Description
2.5.3 Operation and Maintenance Program
3.0 FINDINGS AND OBSERVATIONS
3.1 SUBSURFACE PERFORMANCE
3.2 TREATMENT SYSTEM PERFORMANCE
3.3 REGULATORY COMPLIANCE
3.4 MAJOR COST COMPONENTS OR PROCESSES
3.5 SAFETY RECORD
4.0 RECOMMENDATIONS
4.1 RECOMMENDATIONS TO ACHIEVE OR ACCELERATE SITE CLOSURE
4.1.1 Source Reduction/Treatment
4.1.2 Sampling
4.1.3 Conceptual Site Model (Risk Assessment)
4.2 RECOMMENDATIONS TO IMPROVE PERFORMANCE
4.2.1 Maintenance Improvements
4.2.2 Monitoring Improvements

4.2.3 Process Modifications
4.3 RECOMMENDATIONS TO REDUCE COSTS
4.3.1 Supply Management
4.3.2 Process Improvements or Changes
4.3.3 Optimize Monitoring Program
4.3.4 Maintenance and Repairs
4.4 RECOMMENDATIONS FOR IMPLEMENTATION