REMEDIAL INVESTIGATION - INTERIM REMEDIAL MEASURES – ALTERNATIVES ANALYSIS REPORT WORK PLAN

BROWNFIELD CLEANUP PROGRAM
For
27 Chandler Street, LLC and 37 Chandler Street, LLC
Chandler Incubator, 27 & 37 Chandler Street, Buffalo, New York 14207
BCP # C915336

Prepared For:
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March 13, 2019

HAZARD EVALUATIONS

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CERTIFICATION

I, Michele M. Wittman, P.G., certify that I am currently a NYS registered professional geologist and that this Remedial Investigation – Interim Remedial Measures Work Plan was prepared in accordance with applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10)

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3/14/2019
Date

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1.0 INTRODUCTION

1.1 Project Background

This Remedial Investigation (RI), Interim Remedial Measures (IRM) Work Plan presents the proposed scope of work (Work Plan) at the Chandler Incubator Site located at 27 & 37 Chandler Street located in the City of Buffalo, New York (site), as shown on Figure 1 and Figure 2. The Applicant, 27 Chandler Street, LLC and 37 Chandler Street, LLC, has been accepted into the Brownfield Cleanup Program (BCP) as a Volunteer, identified as Site Number C915336.

The RI/IRM will be completed by Hazard Evaluations Inc. (HEI) and Wittman GeoSciences, PLLC (WGS) on behalf of 27 Chandler Holdings, LLC and 37 Chandler Holdings, LLC. The work will be completed in general accordance with New York State Department of Environmental Conservation (NYSDEC) DER-10 guidelines. The work plan provides details on the site investigation and interim remedial action to be undertaken. The site investigation will be focused on subsurface conditions within the parking lot areas and beneath the existing building, and the IRM will include removal of fill soils in the existing parking lots in the southern portion of the site. Following IRM work, 27 Chandler Holdings, LLC and 37 Chandler Holdings, LLC will redevelop the property as a business incubator in cooperation with the State of New York's START-UP NY program.

1.2 Site Background

The site is addressed as 27 and 37 Chandler Street in the City of Buffalo, Erie County, New York and consists of two parcels totaling approximately 1.13 acres of land. The site is bound to the north by Chandler Street, to the south by Grote Street, to the west by residential structures, and to the east by a manufacturing facility. The property is located within an urban area, utilized for industrial, commercial, and residential purposes.

The 27 Chandler building is three-stories and 20,500 square feet of space while 37 Chandler building is 12,350 square feet spread across two stories. The parcels extend to Grote Street. The southern portions of the site including loading docks and parking areas.

The 27 Chandler site was constructed in 1902 by Charles Berricks & Sons, a brick manufacturing company. By 1916 the property was inhabited by the Jewett Refrigerator Co. Buffalo Davenport, a furniture manufacturing facility, occupied the property from at least 1930 to 1960. Since that time, various companies occupied the building including Temp-Trol Windows, Inc., Gotta Rest Mattress Co. Inc. (manufacturer), Masters Pattern Co. (industrial patterns), Warren Refining & Chemical Co. (manufacturer), Byam CP Co (paper milk container manufacturers), Acme Steel (warehouse), Atlas Steel Casting Co. (warehouse), Cople Refrigeration & Heating (service repair), Liable Colling & Heating, Inc. as well as other commercial occupants including lawyers office, leather merchandise sales, janitorial supplies sales, and office supplies sales. Most recently, the building was used for warehousing and storage, as well as used furniture sales until 2017.

The 37 Chandler site was constructed in 1902 by the Double Truss Cornice Brake Company. The site was vacant by 1930 and remained vacant until 1935 when Viner & Sons (organ builders) occupied the building, remaining at the site until the early 1940s. Acme Steel and Malleable Iron Works and Buffalo Brake Beam Co. (railroad equipment manufacturing) occupied the property from the mid-1940s into the 1980s. The property was vacant for a few years then occupied by Corr Distributors in the mid-1980s until the mid-2000s. Commercial occupants since that time included Horsefeathers Architectural Antiques and Kennel Club (dog training, grooming, and boarding). The site has been vacant since 2017.

1.3 Summary of Environmental Conditions

During due diligence work prior to property purchase, Hazard Evaluations Inc. completed a limited Phase II investigation for Signature Development at the property in December 2017. The work included completion of 12 soil borings and collection of soil and groundwater samples, at locations shown on Figure 3. Based on this limited investigation, the primary contaminants of concern in the soil/fill profile include semi-volatile organic compounds (SVOCs), and metals. Appendix A includes the sample location figure, tables summarizing analytical data and soil boring logs from the December 2017 investigation. A final report was not created for the Phase II work.

The Phase II testing identified SVOCs in the southern portion of the site at concentrations exceeding restricted residential, commercial, and industrial standards.

1.4 Site Conditions

Based on the soil borings completed, approximately 3.5 to 5 feet of granular and cohesive fill material is present throughout the site. Clay and silt was encountered below the fill material and extended the full depth drilled. Spoon refusal was encountered at two boring locations. Groundwater was not encountered during the subsurface investigation work.

The site is generally flat, with the surface covered by buildings, grass, and asphalt areas. Based on a review of the site topographic conditions as depicted on the USGS 7.5-minute Topographic Quadrangle Map of Buffalo NW, New York, shallow regional groundwater flows is expected to flow in a southwesterly direction toward Scajaquada Creek located approximately 0.48 miles south and toward the Niagara River located approximately one mile west of the Site.

The site does not have state or federal wetlands within property limits, nor is the site located within a flood plan. Figure 4, obtained from the Erie County GIS On-line Mapping System, depicts nearby wetlands and/or floodplains which include the floodplain along Scajaquada Creek, located approximately 0.5 miles south of the site.

The site is currently serviced by municipal utilities, including potable water, sanitary and storm sewers from the City of Buffalo, natural gas and electric. There are no known groundwater supply wells on-site and the surrounding area is serviced with potable water.

2.0 PROJECT OBJECTIVES

The site has not been comprehensively characterized; therefore, the Applicant intends to further investigate the soil/fill and groundwater (if encountered) at the site. Data collected during the RI/IRM will be used to identify potential health risks and to evaluate remedial alternatives. The objectives of the RI/IRM include the following:

- Define the nature and extent of on-site contamination in both soil and groundwater.
- Identify on-site source areas of contamination, if any.
- Collect data of sufficient quantity and quality to evaluate potential threats to the public health and environment.
- Collect data of sufficient quantity and quality to evaluate remedial alternatives.
- The IRM will mitigate risks at the site associated with the fill soils. The planned IRM includes excavation and off-site disposal of impacted fill soils in the vacant lot.

2.1 Regulatory Criteria

NYSDEC has applicable standards, criteria and guidance (SCG) values that will be used for this project. These goals are applicable when considering remedial alternatives. For purposes of the RI/IRM, the following SCG will be utilized:

- 6 NYCRR Part 375-3 Brownfield Cleanup Program dated December 14, 2006.
- NYSDEC Policy CP-51/Soil Cleanup Guidance dated October 21, 2010.
- NYSDEC “DER-10 Technical guidance for Investigation and Remediation”, dated May 2010.
- NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) document “Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations” dated June 1998, amended January 1999 Errata Sheet, April 2000 Addendum and June 2004 Addendum.
- State Department of Health (NYSDOH) “Guidance for Evaluating Soil Vapor Intrusion in the State of New York” dated October 2006.

In addition, sampling data will be used to evaluate remedial alternatives to meet the objectives identified above. Two data confidence levels will be considered, including field screening data and analytical level data. Field screening will include photoionization detector (PID), groundwater elevation measurement, and field groundwater analyses (pH, temperature, specific conductivity, turbidity). Analytical level data will be associated with select soil and groundwater samples submitted for chemical analysis to an independent laboratory.

Soil and groundwater samples will be collected in general accordance with NYSDEC and Environmental Protection Agency (USEPA) sample collection and handling methodologies. Samples selected for laboratory analysis will be submitted to a NYSDOH Environmental Laboratory Accreditation Program (ELAP) Contract Laboratory Protocol (CLP) certified laboratory, with a Category B deliverables package. Additionally, a Data Usability Summary Report (DUSR) will be prepared by a third-party data validator.

2.2 Project Organization

HEI/WGS will establish a project team for successful completion of the project. The project team has not been finalized and subcontractors will be determined. Once the team has been finalized, appropriate resumes and information will be provided to NYSDEC. The anticipated project team is listed below:

Company	Name	Role
27 Chandler Street, LLC 37 Chandler Street, LLC	Rocco Termini	Applicant and Property Owner
Wittman GeoSciences, PLLC	Michele Wittman	Project Director
Schenne & Associates	John Schenne, PE	Project Engineer
Hazard Evaluations	Mark Hanna, CHMM	Environmental Health & Safety Manager
Hazard Evaluations	Eric Betzold	Project Scientist/Site Safety Officer
Alpha Analytical	Candace Fox	Analytical Laboratory
TBD	TBD	Geoprobe/Drilling Contractor
TBD	TBD	Excavation Contractor
Data Validation Services	Judy Harry	Data Usability Summary Report

Michele Wittman – Michele will be the Project Director for the work and will be responsible for completion of each task, including coordination and supervision of field activities, adherence to work plan, schedule and budget. Additionally, Michele will be responsible for development of the work plan, coordination of subcontractors, field project oversight and report preparations.

3.0 INVESTIGATION SCOPE OF WORK

3.1 Introduction

The proposed RI scope of work will include investigation for potential site contaminants in the soil/fill and groundwater at the site, specifically under the existing building. The scope of work includes seventeen (17) soil boring locations, four of which will be converted to monitoring wells, as well as four surface soil samples. Additionally, IRM activities are expected to include removal of fill materials from within the vacant lot areas of the site. Proposed sampling locations are included on Figure and summary of proposed analytical testing is presented on Table 1.

3.2 Field Investigation Activities

Prior to intrusive activities, HEI/WGS and appropriate subcontractors will contact Dig Safely New York a minimum of three business days prior to the commencement of the field work. Investigative procedures are described below:

3.2.1 Surface Soil Investigation

Two existing grass surface areas will remain on site; one being located between the two buildings, and the second on the west side of 27 Chandler Street building. Two soil samples will be collected from each of the grass areas, for a total of four samples. Soil samples will not be collected from the areas south of the buildings, as those areas will be excavated and completed with asphalt paving.

Surface soil samples will be collected from 0 to 2-inches below grade. If topsoil is present, the topsoil will be removed, and the immediate 2-inches below sampled. The sampled depth interval will be screened for VOCs with a calibrated organic vapor meter equipped with a photoionization detector (PID). Organic vapor meter results and soil descriptions will be recorded on the field soil boring logs.

Surface soil samples will be selected for analysis for the following as shown on Table 1:

- Four (4) surface soil samples for Target Compound List (TCL) VOCs
- Four (4) surface soil samples for TCL semi-volatile organic compounds (SVOCs)
- Four (4) surface soil samples for Target Analyte List (TAL) metals
- Four (4) surface soil samples for Polychlorinated bi-phenyls (PCBs)
- Four (4) surface soil samples for Pesticides and herbicides
- Two (2) surface soil samples for 1,4-Dioxane
- Two (2) surface soil samples for Polyfluoroalkyl Substances (PFAS)

Actual sample locations will be selected in the field based on utility locations, field observations, screening results, and engineering judgment. Subsurface soil samples will be collected using dedicated stainless-steel sampling tools. Select representative soil samples will be place in pre-cleaned laboratory-provided sample bottles, labeled and cooled to 4^{o}C in the field, and transported under chain-of-custody to a NYSDOH ELAP certified analytical laboratory.

3.2.2 Subsurface Soil Investigation

Soil sampling which has been completed on-site identified the presence of SVOCs and metals within the fill soils at the site. The fill material is currently anticipated to be removed as part of the IRM as discussed in Section 4.0. Proposed sampling locations are included on Figure 5.

Subsurface soil sampling will include the soil constituents located beneath the building floor, as well as throughout the site. Four (4) soil borings, including two within each building, will be completed within interior areas and 13 will be completed at exterior areas. Four of the exterior soil boring locations will be converted to groundwater wells (total of 4 proposed monitoring wells). Proposed soil boring locations are shown on Figure 5.

Interior soil borings will be cored through the concrete or wooden floor or be completed with a drill rig equipped with a concrete core barrel. A drill rig capable of advancing a borehole using direct push method via a Geoprobe drill rig will be used to advance the interior locations that will not be completed as monitoring wells. The drill rig will advance the 1.5-inch diameter, 4-foot long core sample liner to the desired depth and retrieve soil core samples at four foot intervals. The total depth of interior borings is anticipated to be approximately 12 feet below grade or spoon refusal, whichever is encountered first.

The four monitoring well locations will be advanced using a drill rig or direct-push drill rig capable of advancing hollow-stem augers for installing 1-inch micro-monitoring wells which are expected to be completed with continuous sampling to depths of up to 20 to 25 feet below grade to assess if the native clay extends to greater depths.

Discrete subsurface soil samples will be field screened in approximate two-foot depth intervals the full depth drilled for VOCs with a calibrated organic vapor meter equipped with a photoionization detector (PID). Organic vapor meter results and soil descriptions will be recorded on the field soil boring logs.

Soil samples will be selected for analytical analysis based in field screening results, visual and olfactory observations. During initial investigations, granular and cohesive fill was encountered to depths of approximately 3.5 to 5 feet below grade in the southern portion of the site. Soil borings will be extended through the fill material to underlying native clay. WGS will collect representative samples from each of the identified fill types, as well as the underlying native clay soils, for appropriate laboratory analysis.

The sample interval identified as the most impacted (i.e., highest PID reading, visual/olfactory evidence of odors, staining, or product) will be selected for analysis. Should fill material be encountered, a discrete sample will be collected from each type of fill soil. In the event that no impacts were identified, the native soils directly below the fill/native interface will be selected for analysis. Additionally, attempt will be made to collected soil samples at vertical variations within the native soil.

Subsurface soil samples will be selected for analysis for the following as shown on Table 1:

- Eight (8) soil samples for TCL VOCs
- Twelve (12) soil samples for TCL SVOCs
- Twelve (12) soil samples for TAL metals
- Four (4) soil samples for PCBs
- Four (4) soil samples for pesticides and herbicides
- Four (4) soil samples for 1,4 dioxane
- Four (4) soil samples for PFAS

Actual sample locations will be selected in the field based on utility locations, field observations, screening results, and engineering judgment. Subsurface soil samples will be collected using dedicated stainless steel sampling tools. Select representative soil samples will be place in pre-cleaned laboratory-provided sample bottles, labeled and cooled to 4ºC in the field, and transported under chain-of-custody to a NYSDOH ELAP certified analytical laboratory.

3.2.3 Monitoring Well Installation

Four (4) soil boring locations will be converted to monitoring wells. The soil borings will be advanced with a drill-rig capable of advancing hollow-stem augers capable of installing 2-inch monitoring well. The wells will be utilized for measurement of groundwater depth and collection of groundwater samples. The three proposed locations are included on Figure 5.

After completion of the soil borings to depths of approximately 20 to 25 feet below grade, a 2-inch diameter, schedule 40 PVC monitoring well will be installed at each location. An approximate 10 foot length of 0.010-inch machine slotted well screen will be installed at each location attached to the riser. The well screen depth will be backfilled with silica sand filter pack (estimated at size #0) from the base to approximately 2 feet above the well screen. A bentonite seal will be placed above the sand and hydrated to limit potential for down-hole contamination. The top of the well riser will be flush with the ground surface and completed with a locking J-plug. The well will be finished with a flush-mounted road box.

Groundwater samples will be collected from each of the monitoring wells using low flow sampling techniques. The total depth of the wells is expected to be approximately 20 feet below grade.

3.2.4 Monitoring Well Development

After a minimum of 24-hours from installation, the monitoring wells will be developed using dedicated disposable polyethylene bailers via purge methodology. Field parameters, including pH, temperature, turbidity, and specific conductance will be measured periodically until they become relatively stable (approximately 10% fluctuation or less). A minimum of three well volumes will be removed from each monitoring well, unless dry well conditions are encountered. Development water will be containerized and sampled for future off-site disposal.

3.2.5 Groundwater Sampling

Prior to sample collection, static groundwater levels will be measured at each of the monitoring wells. The wells will be purged and field measurements of pH, specific conductivity, temperature and turbidity will be recorded and monitored for stabilization prior to sampling. Groundwater samples will be collected using low flow sampling techniques. If insufficient groundwater, new dedicated disposable bailers may be used to collect the groundwater samples.

The four (4) groundwater samples will be analyzed for the following parameters as summarized on Table 1:

- Target Compound List (TCL) VOCs

- TCL semi-volatile organic compounds (SVOCs)
- Target Analyte List (TAL) metals (total)
- Target Analyte List (TAL) metals (dissolved phase)
- Polychlorinated bi-phenyls (PCBs)
- Pesticides
- Herbicides
- 1,4-dioxane
- PFAS

Groundwater samples will be placed in pre-cleaned laboratory-provided sample bottles, labeled and preserved in accordance with USEPA SW-846 methodology, and transported under chain-of-custody to a NYSDOH ELAP certified analytical laboratory.

Per- and polyfluoroalkyl substances (PFAS) Sampling Protocol
Groundwater sample collection procedure for PFAS will be done in accordance with NYSDEC protocol, as included in the Quality Assurance/Quality Control (QAPP) found in Appendix B. At this time acceptable materials for sampling include stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate and polypropylene. Equipment blanks should be generated at least daily. Additional materials may be acceptable if pre-approved by NYSDEC. Requests to use alternate equipment should include clean equipment blanks. NOTE: Grunfos pumps and bladder pumps are known to contain PFC materials (e.g. Teflon™ washers for Grunfos pumps and LDPE bladders for bladder pumps). All sampling equipment components and sample containers should not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. Standard two step decontamination using detergent and clean water rinse will be performed for equipment that does come in contact with PFC materials. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFC materials must be avoided. Many food and drink packaging materials and "plumbers thread seal tape" contain PFCs.

All clothing worn by sampling personnel must have been laundered multiple times. The sampler must wear nitrile gloves while filling and sealing the sample bottles. Pre-cleaned sample bottles with closures, coolers, ice, sample labels and a chain of custody form will be provided by the laboratory.

1. Fill two pre-cleaned 500 mL HDPE or polypropylene bottle with the sample.
2. Cap the bottles with an acceptable cap and liner closure system.
3. Label the sample bottles.
4. Fill out the chain of custody.
5. Place in a cooler maintained at 4 ± 2º Celsius.

Groundwater samples will be analyzed for PFAS via EPA method 537, to achieve reporting limits of 2 ng/l (parts per trillion (ppt)).

3.2.6 Field Specific Quality Assurance/Quality Control Sampling

Field-specific quality assurance/quality control samples will be collected and analyzed, as summarized on Table 1 to support third-party data usability assessment effort. Site-specific QA/QC samples will include blind duplicate, matrix spike/matrix spike duplicate, rinsate blank, and trip blank.

3.2.7 Drainage Structure Evaluation

Drainage structures were not identified during initial site investigation work. However, an assessment of the two on-site buildings will be completed. Should a drainage structure and/or sump be identified, the structures will be assessed for presence of water and/or sediment. If present, the sediment and/or water shall be collected and analyzed for potential impacts.

3.3 Investigation- Derived Waste Management

During the completion of soil borings, removed materials will be placed into the borehole. The excess soil cuttings that cannot be replaced into the borehole will be containerized in 55-gallon drums. Based on analytical testing results, the excess soil may be utilized on-site, or disposed off-site. Development/purge water generated during well development and/or sampling activities will be containerized in 55-gallon drums for testing and future off-site disposal.

3.4 Site Mapping

A base map will be prepared by a New York State-licensed surveyor. The map will include the RI investigation/sampling locations, as well as completed IRM work. Soil/fill boring locations will be field located and incorporated within the survey. Elevations of the ground surface and top of PVC riser will be measured for each monitoring well.

4.0 INTERIM REMEDIAL MEASURES

4.1 IRM Tasks

Based on initial sampling results SVOCs and metals impacts were identified within the fill materials throughout the site. The IRM activities included below are based on current information and may be modified based on RI fieldwork or waste characterization sample results. If modification is necessary, a revised IRM work plan will be provided for NYSDEC approval prior to initiation of work. The IRM is expected to include the following work, as shown on Figure 6:

- General site cleanout of existing materials, including existing basement at 27 Chandler
- Asbestos containing materials (ACM) survey and abatement, as necessary
- Lead base paint (LBP) survey and abatement, as necessary
- Excavation and off-site disposal of impacted fill material within the parking lot areas of the site.

Due to the proposed future usage to include apartments and food services, the overall objective of the IRM is to remediate the site to Track 2 for restricted residential requirements.

4.2 Site Preparation

Prior to implementation of IRM activities, required permits, if any, will be obtained. Currently limited equipment and debris remaining from previous owner is present throughout the vacant lot that will be removed and properly disposed.

The interior of the building is generally vacant and unused, with limited storage. During the IRM process, the Applicant will remove materials store inside for proper disposal. Additionally, the Applicant will complete required ACM and LBP surveys as well as required abatement, if necessary.

An approximate 30-foot by 20-foot basement is located at the south side of the 27 Chandler Building. The basement has remnants from former coal storage, including cinders and ash. These materials will be removed from the basement, and temporarily staged on plastic, and covered for future characterization and disposal as part of below tasks.

Two soil samples will be collected from below the concrete floor to assess for underlying impacts and analyzed for the following:

- Target Compound List (TCL) VOCs
- TCL semi-volatile organic compounds (SVOCs)
- Target Analyte List (TAL) metals (total)
- Polychlorinated bi-phenyls (PCBs)

The basement will be backfilled to the ceiling with pre-approved #2 crushed concrete from Swift River, River Road, Tonawanda facility.

4.3 Pre-Characterization Sampling and Analysis

Prior to initiating IRM activities, waste characterization samples will be collected via soil borings. Due to the volume of soil and limited storage space on the subject site, the collection and analysis of the waste characterization samples will allow for the excavated soil to be directly loaded for off-site transportation and disposal.

The selected analysis will be determined based on solid waste landfill requirements (to be determined), but are expected to include toxicity characteristic leaching procedures (TLCP) VOCs, TCLP SVOCs, TCLP Metals, PCBs, pesticides, herbicides, ignitability, corrosivity, and reactivity. The soil will be disposed based on analytical testing results, and in accordance with applicable disposal regulations.

4.4 Soil Excavation

Soil/fill removal will be completed within the southern parking lot area. Fill material will be removed and transported for off-site disposal to an approved solid waste landfill.

Estimated excavation limits are included on Figure 6. Excavation is expected to extend to depths of approximately one (1) to three (3) feet below ground surface to remove fill material in the future parking area, resulting in approximately 900 to 2,800 cubic yards of fill material to be removed from the site.

Excavation limits are expected to be the property limit and/or presence of the building, as shown on Figure 6. Project oversight will be directed by experienced WGS and HEI field professional.

4.5 Excavation Water Treatment and Disposal

Due to the shallow depth of expected excavations and limited groundwater encountered during initial investigations, groundwater is not anticipated to be encountered during excavation activities. However, should groundwater management be required, the water will be pumped and stored in a portable storage tank and tested prior to disposal.

4.6 Confirmatory Soil Sample Collection and Analysis

Confirmatory soil samples will also be collected from the excavation area within the parking lot. Based on DER-10 requirements, one sample will be collected every 30 linear feet of sidewall and one sample for every 900 square feet of excavation bottom, as listed below:

- approximately 1,200 linear feet of sidewall, resulting in 40 sidewall samples
- 27,000 square feet of bottom, resulting in 30 bottom samples

The number of confirmation samples may be reduced based on field conditions, and agreed upon by NYSDEC representative. Based on known contamination, it is anticipated that sidewall and bottom samples will be analyzed for TCL SVOCs and TAL Metals. Additionally, ten samples will also be analyzed for TCL VOCs, PCBs, pesticides and herbicides, as part of site characterization. Based on findings from the RI work, 1,4-Dioxane, and PFAS analysis may be completed, as needed. A summary of expected samples is included on Table 1.

4.7 Excavation Backfill

The southern portion of the site, as shown on Figure 6, will be redeveloped with a paved parking lot, with details to be provided when finalized. Following soil excavation, the area will be backfilled with appropriate structural fill as required for construction purposes. The backfill will be approved material in accordance with DER-10 and tested, if required.

Additionally, site development plans will include storm water management, as required by City of Buffalo, as well as new parking lot surfaces. The final storm water management and parking lot surface designs will be provided to NYSDEC when finalized

4.8 Personnel Decontamination

The degree of decontamination is a function of both the particular task and the physical environment in which it takes place. Decontamination procedures will remain flexible, thereby allowing the decontamination crew to respond appropriately to changing conditions at the site. On-site sampling activities will be carried out in such a manner as to avoid gross contamination of site workers, personal protective equipment, machinery and equipment.

Between sampling locations (or sometimes between samples at one sampling location), and upon the completion of the daily field activities, site workers will proceed to the Contaminated Reduction Zone (CRZ). Equipment (e.g., sampling tubes, shovels, tools, etc.) will be decontaminated in this area. Prior to leaving the site for breaks, at the end of the work shift, or when PPE has been grossly contaminated, disposable boot covers, gloves, and suits will be removed and placed in a drum designated for the disposal of these materials. After removing PPE, each site worker will wash with soap and fresh water prior to donning new PPE or leaving the site for the day. All wash water and rinse water will be collected and disposed of in accordance with appropriate regulations.

Based on site features, a CRZ will likely be established in the southern portion of the site, providing access to the parking lot.

4.9 Decontamination of Equipment

Equipment decontamination efforts will be conducted in the CRZ. Gross contamination will first be removed with plastic scrapers or other appropriate tools. The equipment will be decontaminated at a temporary equipment decontamination pad in the CRZ via hand washing or pressure washing. Downhole tools and augers can be hand washed or pressure washed.

The decontamination of the direct push drilling rig, excavator, or other heavy equipment will be undertaken as necessary. Initially, scraping of the equipment will remove heavily caked materials prior to washing. Washing will then be accomplished by pressure washing. Water generated during decontamination activities will be collected, stored and profiled for future off-site disposal.

4.10 Disposal of Contaminated Materials

Potentially contaminated materials (gloves, clothing, sample sleeves etc.) will be bagged and segregated for proper disposal. Investigation derived waste will be managed in accordance with NYSDEC guidance regulations. All fluids collected during groundwater sampling and decontamination will be containerized and managed appropriately subsequent to field activities and decontamination procedures.

4.11 Stormwater Management

Remedial activities may result in surface water flow off site and into adjacent properties. Silt fencing will be the primary sediment control measure used in this area, if needed. Prior to extensive soil excavation or grading activities, silt fencing will be installed around the perimeter of the construction area. The positioning of the silt fencing will be adjusted as necessary as work proceeds or site conditions change. Silt fences will be maintained as deemed necessary and will remain in place until construction activities in an area are completed.

4.12 Dust Monitoring and Controls

A Community Air Monitoring Plan (CAMP) will be implemented during site investigation and includes particulate monitoring. The remediation crew will make all efforts to suppress dust and particulate matter during the handling of contaminated soil. Fugitive dust and particulate monitoring will be completed in accordance with DER-10 Appendix 1B. The following techniques have been shown to be effective for the controlling 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/or
(g) Reducing the excavation size and/or number of excavations.

Care will be taken not to use excess water, which can result in unacceptably wet site conditions. Use of atomizing sprays will prevent overly wet conditions, conserve water and provide an effective means of suppressing fugitive dust.

Weather conditions will be evaluated during remedial work. When extreme wind conditions make dust control ineffective, as a last resort, remedial actions may need to be suspended.

5.0 REMEDIAL INVESTIGATION/INTERIM REMEDIAL MEASURES/ ALTERNATIVES ANALYSIS REPORT

Upon completion of the RI/IRM tasks, a RI/IRM/AAR report will be generated in general requirements as identified in DER-10 Section 3.14. The report will include the following information.

- Background and site information.
- Description of investigation and IRM areas.
- Identify and characterize the sources of contamination.
- Comparison with cleanup levels during the alternatives analysis report (AAR).
- Describe the amount, concentration, environmental fate and transport (if necessary), location and other significant characteristics of the contaminants present.
- Define hydraulic factors, as needed.
- Provide a qualitative human exposure assessment.
- Identify actual or potential adverse impacts to fish and wildlife resources

- Conclusions regarding the IRM and its effectiveness.

An independent data validation expert will complete a third-party data view of the analytical data generated during the RI/IRM work. A Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results.

A summary of the IRM work will be included within the RI/IRM/AAR report. Details of the IRM will be included in a separate section of the report, to include:

- Limits of areas remediated; Map will identify confirmatory sample locations
- Summary of estimated quantities of excavated soil and disposal location,
- Summary of estimated quantity and source of backfill;
- Analytical testing results for confirmatory samples

The RI/IRM/AAR report will also include an alternatives analysis to evaluate a remedial approach. The planned IRM work is anticipated to be an effective and final remedy; therefore, additional remedial alternatives are not anticipated at this time. In the event that additional and/or significant contamination is identified above that expected, the AAR will evaluate the need for further remedial activities.

Remedial action objectives will be evaluated and developed to assure the selected remedy is protective of human health and the environment under the proposed future site usage. Proposed soil cleanup objectives will be based on proposed future usage. Should further remedial requirements be identified, a list of potentially applicable remedial technologies will be developed and evaluated. Criteria to be evaluated for the remedy and protectiveness to public health and the environment include:

- Overall protection of the public health and the environment
- Standards, criteria and guidance (SCG)
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility or volume of contamination through treatment
- Short-term impact and effectiveness
- Implementability
- Cost effectiveness
- Land use

Should the IRM not meet the objectives and be a final remedy, the results of the AAR a remedial alternative will be recommended for the site, which will include a discussion on the reasons for the selection. Community acceptance and comments will be evaluated within the alternative selection.

6.0 ADDITIONAL PROJECT DOCUMENTS

Various supporting documents have been prepared associated with the RI/IRM/AAR work plan and included in the appendix as listed below.

6.1 Quality Assurance Project Plan

The Quality Assurance Project Plan (QAPP) was generated in general accordance with Section 2.4 in DER-10. The QAPP describes the quality assurance/quality control (QA/QC) protocols and guidance associated with the RI/IRM/AAR Work Plan to ensure the suitability and verifiable data result from the sampling and analysis. The QAPP also provides procedures to be used during sampling of various media, field activities, and analytical laboratory testing. The QAPP is included in Appendix B.

6.2 Health and Safety Plan

A site specific Health and Safety Plan (HASP) has been prepared for this project and included in Appendix C. The HASP will be enforced by HEI, WGS and subcontractors associated with the RI/IRM field activities. The HASP covers the on-site investigation and interim remedial work. Subcontractors will be required to develop and implement their health and safety plan.

The HASP will include a Community Air Monitoring Plan (CAMP) to describe particulate and volatile organic vapor monitoring to protect nearby community during the investigative and excavation activities.

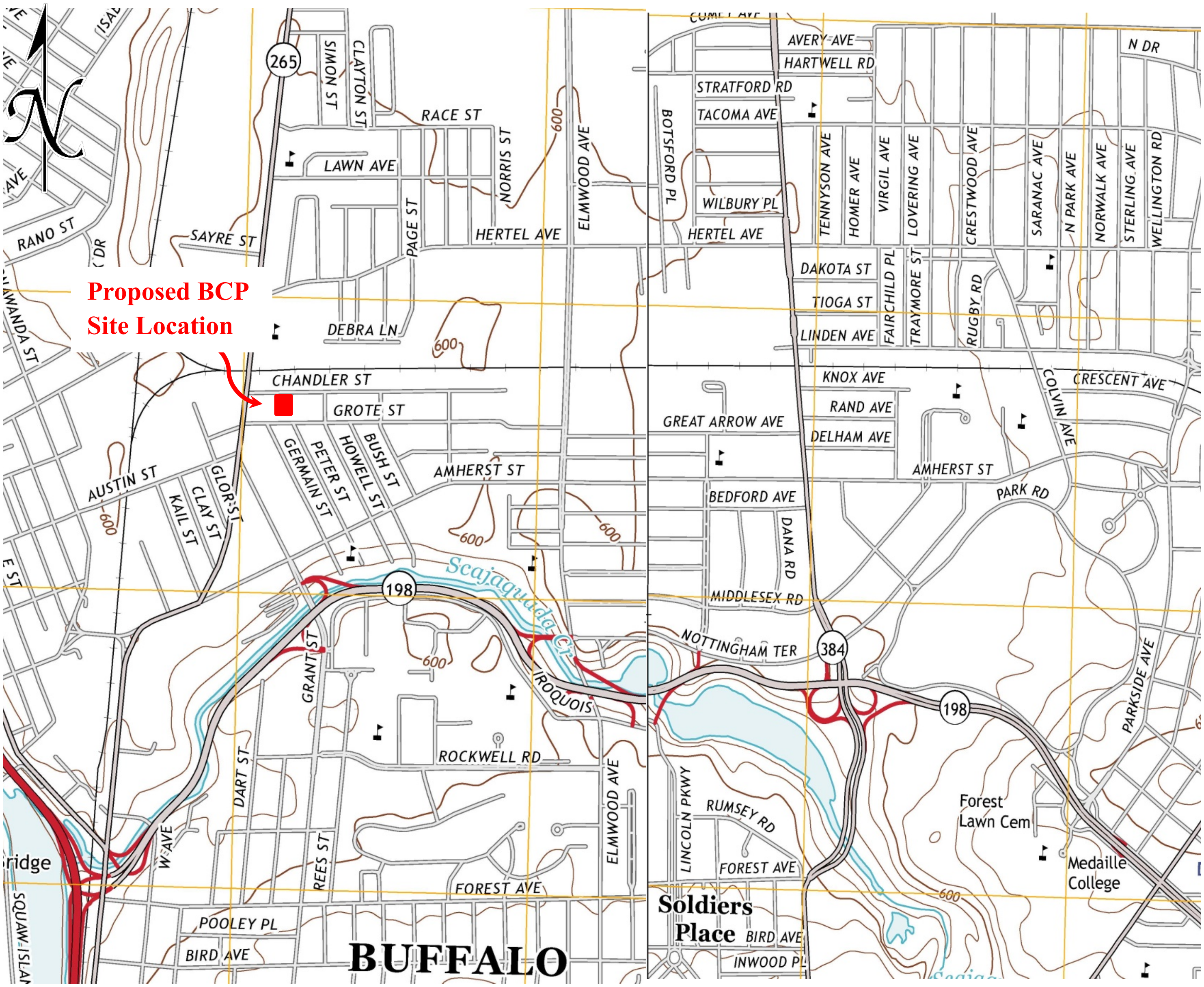
6.3 Citizens Participation Plan

A Citizens Participation Plan (CPP) was previously submitted to NYSDEC. The CPP was prepared in accordance with NYSDEC DER-23 to enable citizen participation. This plan directs responsibility for planning and conducting CP activities, as well as identifies objectives of the plan and how communication between the NYSDEC and individuals and organizations that have expressed interest in or are affected by the site, will be facilitated.

7.0 PROJECT SCHEDULE

The Applicant has requested the project be placed on a fast track. Figure 7 presents the tentative schedule for planned activities in order to meet Applicants aggressive schedule. A certificate of completion (COC) is anticipated by December 2019.

FIGURES



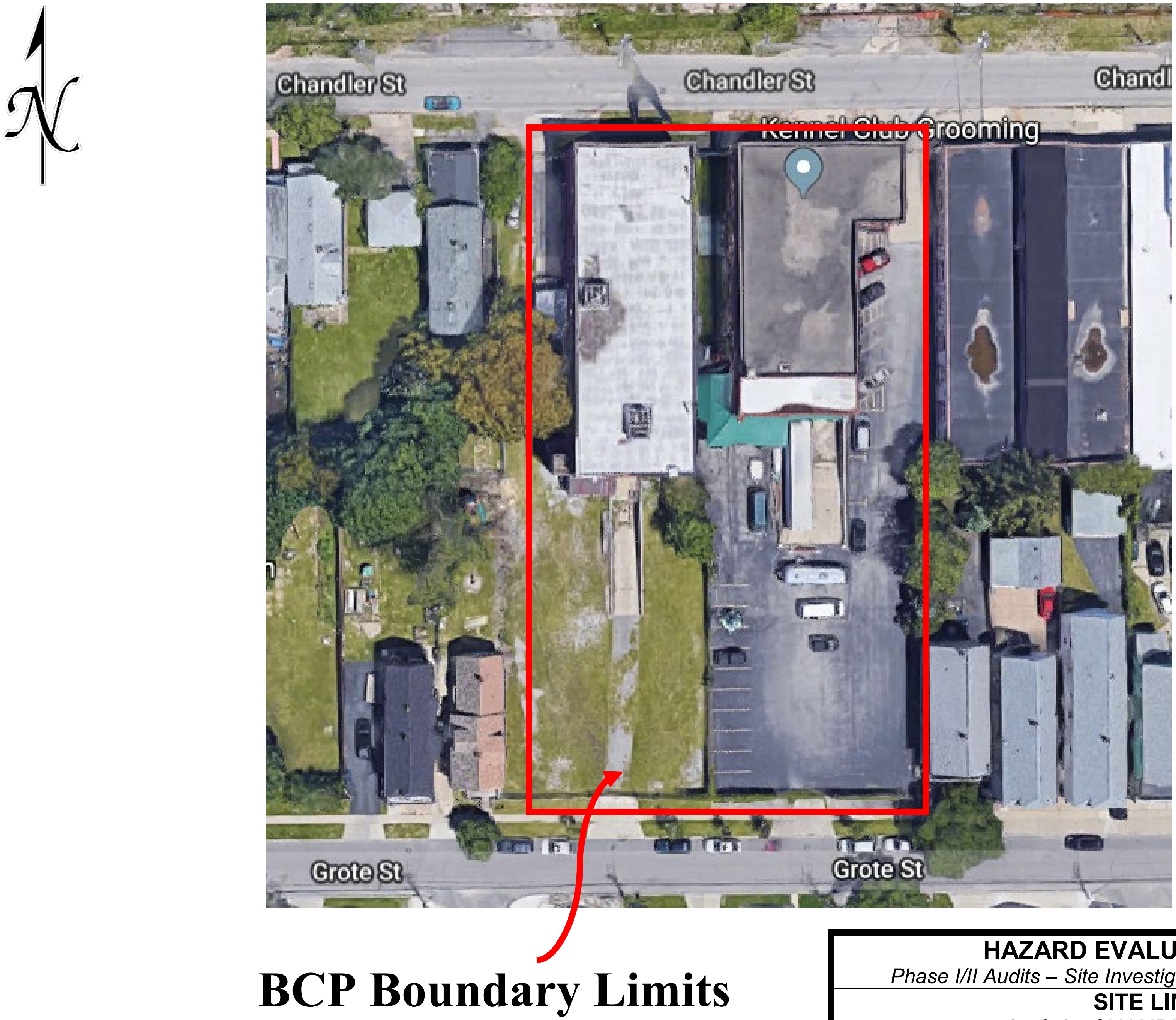
THIS DRAWING IS FOR ILLUSTRATIVE AND INFORMATIONAL PURPOSES ONLY
AND WAS ADAPTED FROM USGS, BUFFALO NE & NW, NEW YORK 2013 QUADRANGLE.

HAZARD EVALUATIONS, INC.
Phase I/II Audits – Site Investigations – Facility Inspections

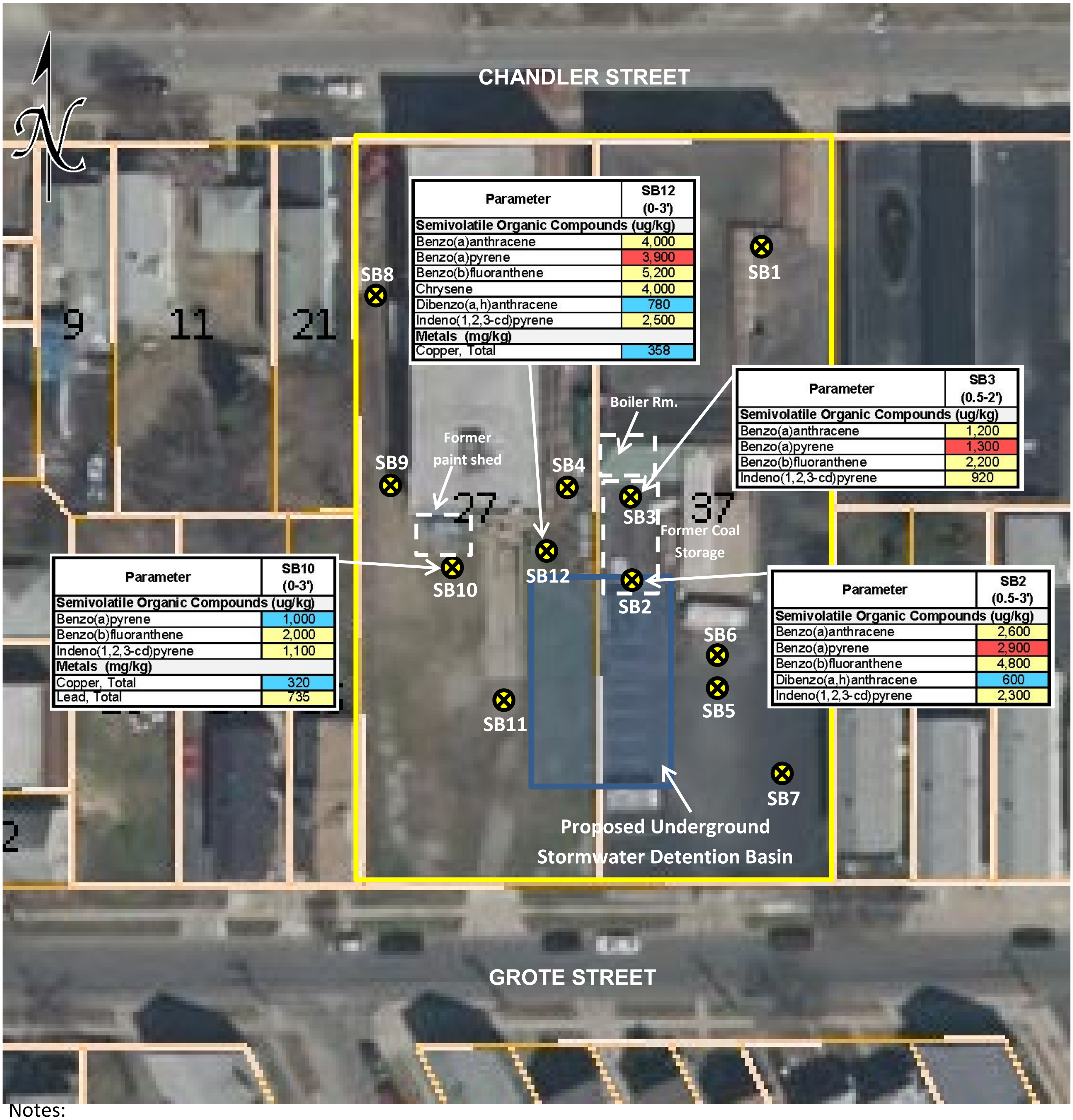
SITE LOCATION
27 & 37 CHANDLER
BUFFALO, NEW YORK

CHANDLER INCUBATOR
BUFFALO, NEW YORK

DRAWN BY: MMW	SCALE: NOT TO SCALE	PROJECT: e1646
CHECKED BY: MMW	DATE: 11/18	FIGURE NO: 1



HAZARD EVALUATIONS, INC. *Phase I/II Audits – Site Investigations – Facility Inspections*		
SITE LIMITS 27 & 37 CHANDLER STREET BUFFALO, NEW YORK		
Chandler Incubator BUFFALO, NEW YORK		
DRAWN BY: MMW	SCALE: NOT TO SCALE	PROJECT: e1646
CHECKED BY: MMW	DATE: 11/18	FIGURE NO: 2



Parameter	SB12 (0-3')
Semivolatile Organic Compounds (ug/kg)	
Benzo(a)anthracene	4,000
Benzo(a)pyrene	3,900
Benzo(b)fluoranthene	5,200
Chrysene	4,000
Dibenzo(a,h)anthracene	780
Indeno(1,2,3-cd)pyrene	2,500
Metals (mg/kg)	
Copper, Total	358

Parameter	SB3 (0.5-2')
Semivolatile Organic Compounds (ug/kg)	
Benzo(a)anthracene	1,200
Benzo(a)pyrene	1,300
Benzo(b)fluoranthene	2,200
Indeno(1,2,3-cd)pyrene	920

Parameter	SB10 (0-3')
Semivolatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1,000
Benzo(b)fluoranthene	2,000
Indeno(1,2,3-cd)pyrene	1,100
Metals (mg/kg)	
Copper, Total	320
Lead, Total	735

Parameter	SB2 (0.5-3')
Semivolatile Organic Compounds (ug/kg)	
Benzo(a)anthracene	2,600
Benzo(a)pyrene	2,900
Benzo(b)fluoranthene	4,800
Dibenzo(a,h)anthracene	600
Indeno(1,2,3-cd)pyrene	2,300

Notes:

Proposed Cleanup Standards = Restricted Residential

🟨 = exceeds Restricted Residential SCO

🟦 = exceeds Commercial SCO

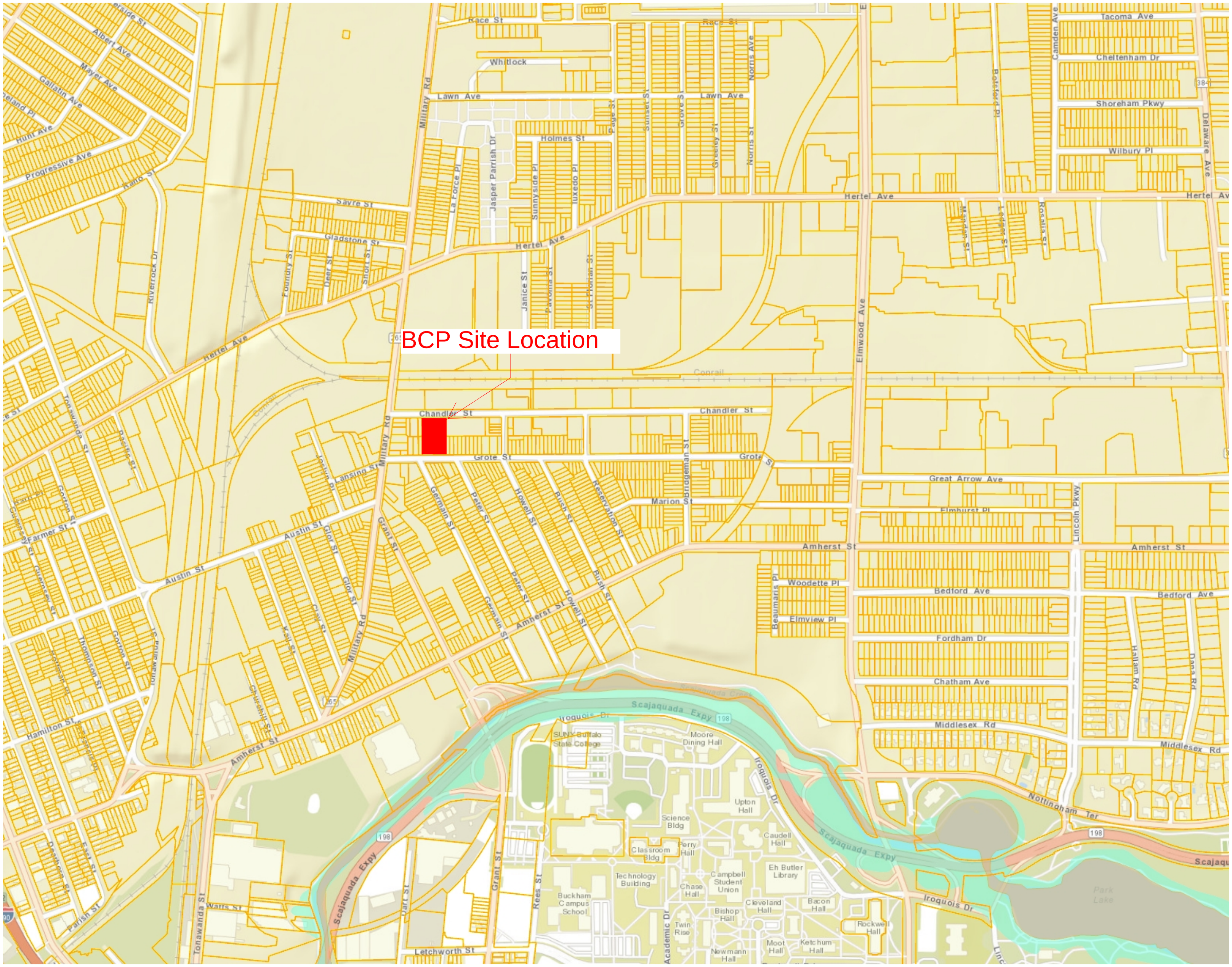
🟥 = exceeds Industrial SCO

HAZARD EVALUATIONS, INC.
Phase I/II Audits – Site Investigations – Facility Inspections

PREVIOUS SAMPLING LOCATIONS
27-37 CHANDLER STREET
BUFFALO, NEW YORK

DRAWN BY: MMW	SCALE: NOT TO SCALE	PROJECT: e1646
CHECKED BY: MMW	DATE: 11/18	FIGURE NO: 3

Erie County On-Line Mapping Application



Legend

☐ Parcels

🟩 DEC Wetlands

National Wetlands Inventory

🟧 Wetlands

🟥 No Digital Data

🟦 FEMA Floodplains

☐ Municipal Boundaries

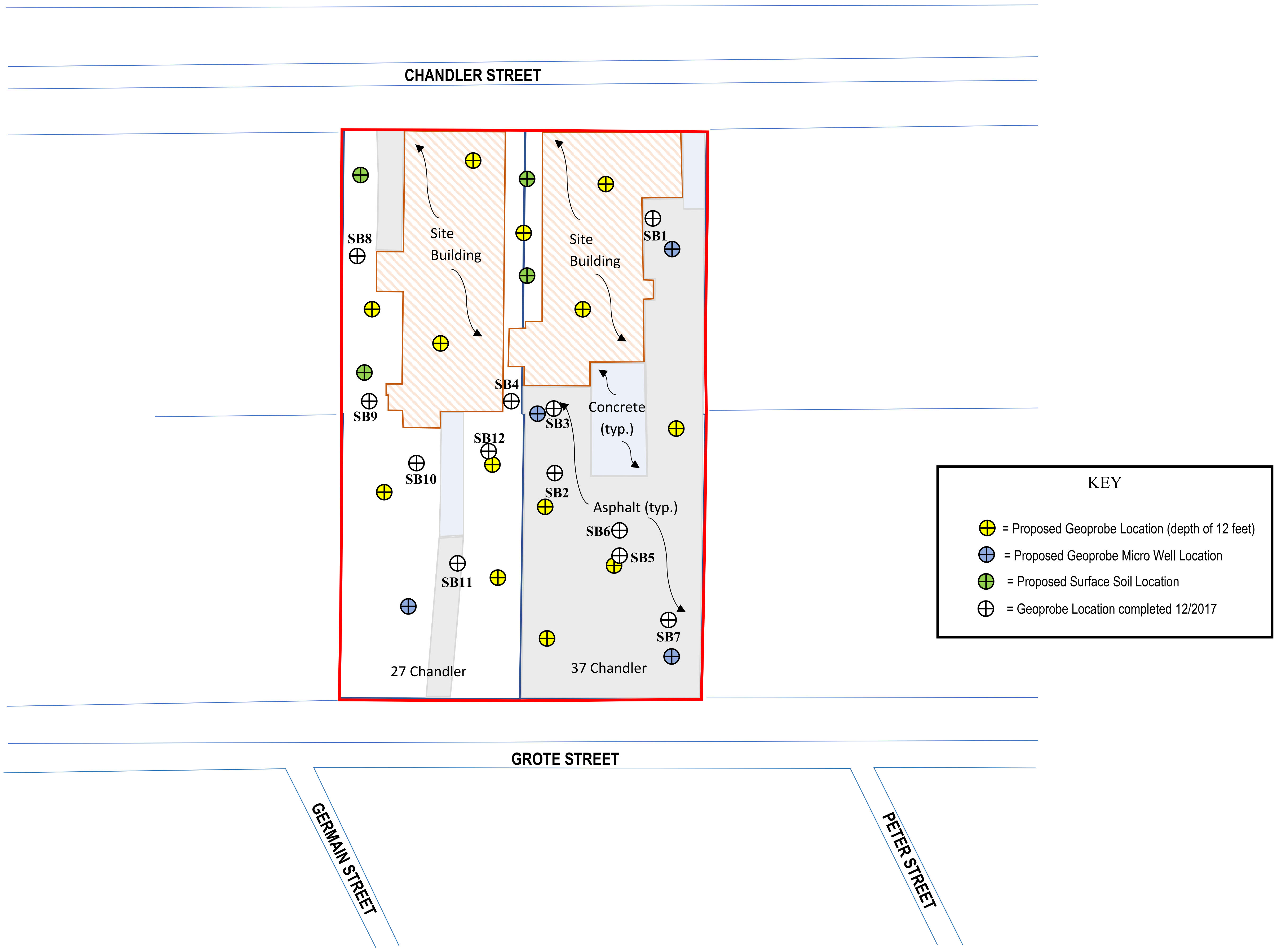
Figure 4
Nearby Wetland and Floodplain Locations

0 1,504.66 3,009.3 Feet

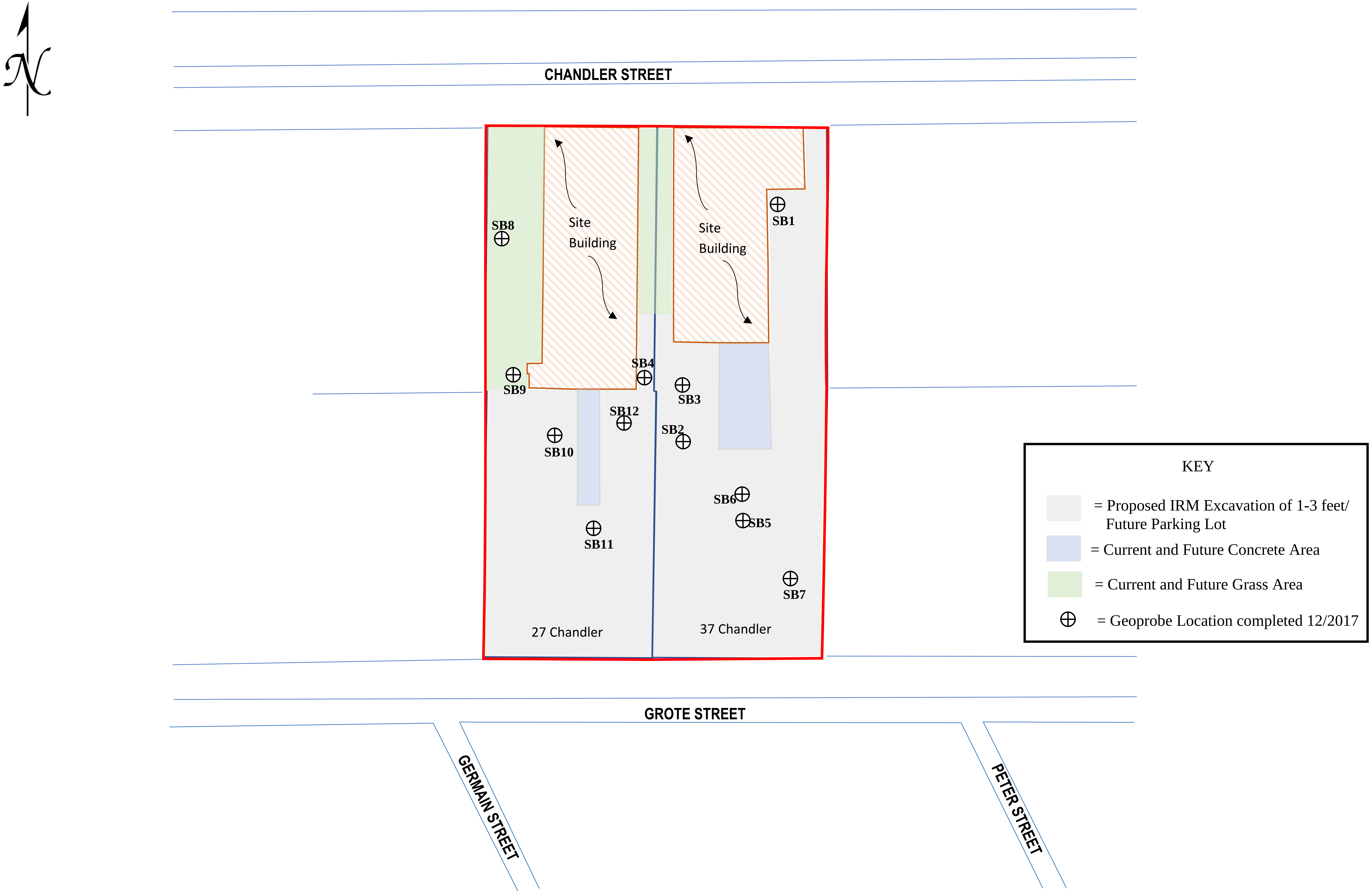
WGS_1984_Web_Mercator_Auxiliary_Sphere
THIS MAP IS NOT TO BE USED FOR NAVIGATION

ERIE COUNTY
DEPARTMENT OF ENVIRONMENT & PLANNING
OFFICE OF GIS

1: 18,056

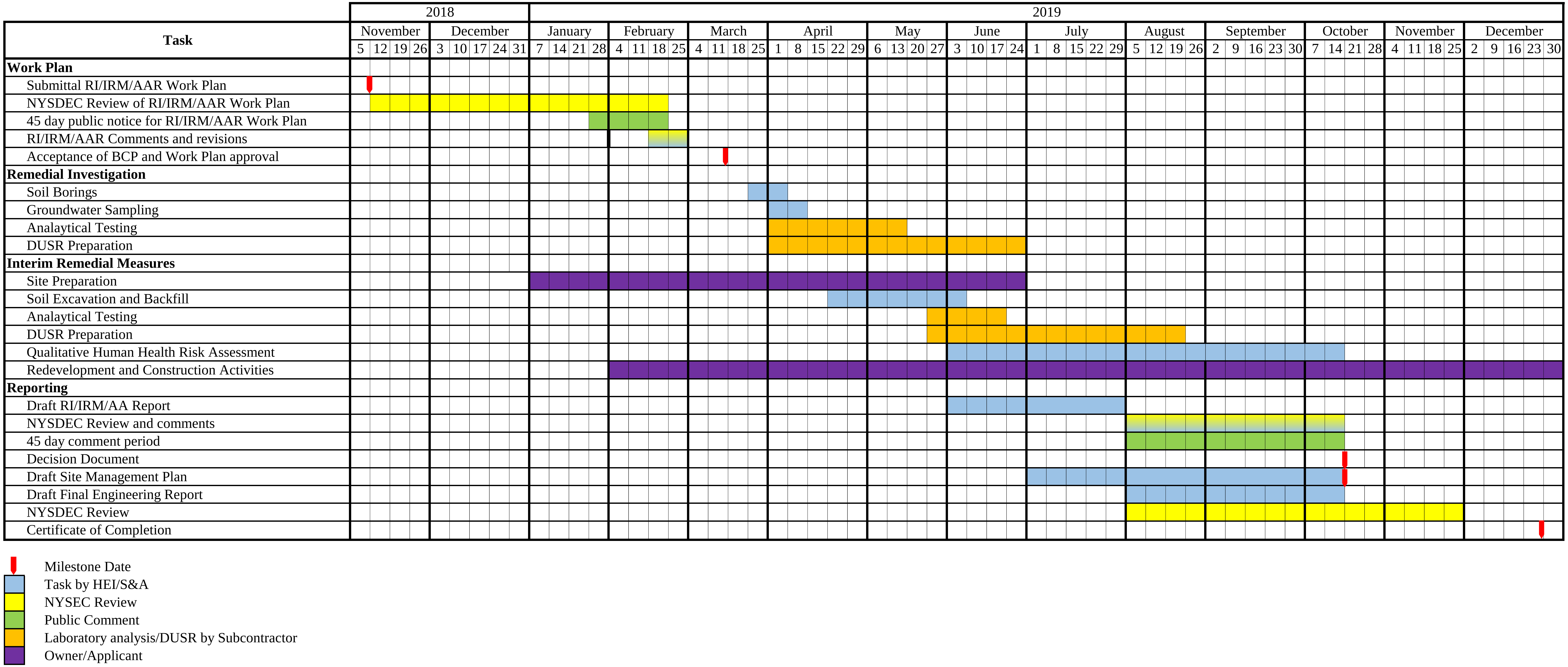


WITTMAN GEOSCIENCES, PLLC	**Proposed Investigation Locations**	DRAWN BY: MMW	SCALE: 1" = 50'	PROJECT: 18-104
	27 & 37 Chandler, Buffalo, NY	CHECKED BY: MMW	DATE: 02/2019	FIGURE NO: 5



WITTMAN GEOSCIENCES, PLLC	**Proposed IRM Excavation Areas**	DRAWN BY: MMW	SCALE: 1" = 50'	PROJECT: 18-104
	27 & 37 Chandler, Buffalo, NY	CHECKED BY: MMW	DATE: 02.2019	FIGURE NO: 6

Figure 7
BCP Project Schedule
Chandler Incubator
27 & 37 Chandler, Buffalo, NY



TABLES

TABLE 1
Analytical Testing Program Summary
Chandler Incubator
27 & 37 Chandler, Buffalo, NY
NYSDEC Brownfield Cleanup Program

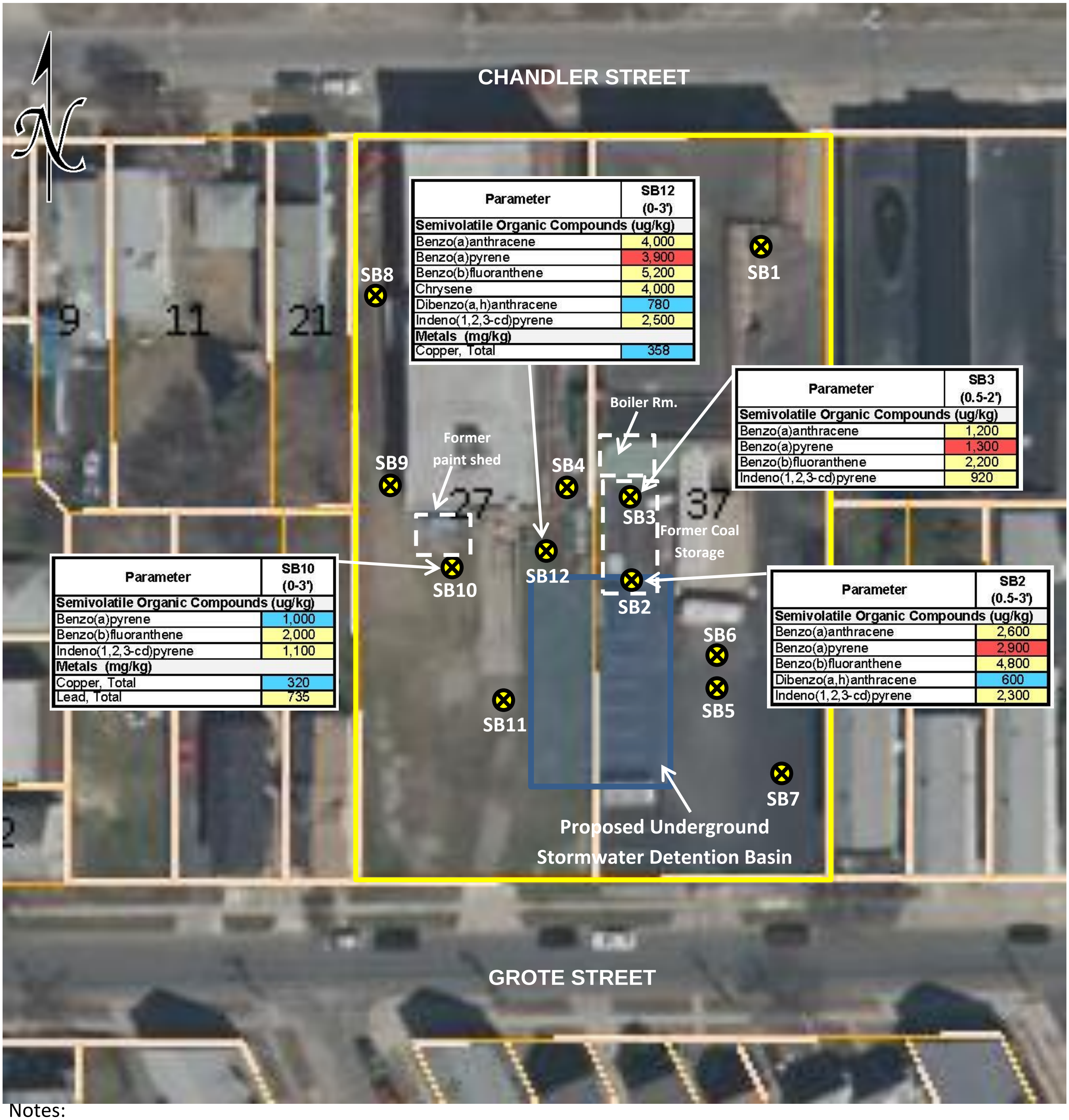
Location	Number of Proposed Locations	Matrix	TCL VOCS	TCL SVOCs	TAL METALS Total	TAL METALS dissolved	PCBs	Pest/ Herbs	VOC TO-15	1,4-dioxane	PFAS
Surface Soil Samples											
Surface Soil Sample	4	Soil	4	4	4	-	4	4	-	2	2
Duplicate		Soil	1	1	1	-	1	1	-	1	1
MS/MSD		Soil	2	2	2	-	2	2	-	2	2
Rinsate		Water	1	1	1	-	1	1	-	1	1
Total			**8**	**8**	**8**	**0**	**8**	**8**	**0**	**6**	**6**
Soil Borings - Subsurface Samples											
Soil Borings	16	Soil	8	12	12	-	4	4	-	4	4
Duplicate		Soil	1	1	1	-	1	1	-	1	1
MS/MSD		Soil	2	2	2	-	2	2	-	2	2
Rinsate		Water	1	1	1	-	1	1	-	1	1
Total			**12**	**16**	**16**	**0**	**8**	**8**	**0**	**8**	**8**
Monitoring Wells											
Monitoring Well	4	Groundwater	4	4	4	4	4	4	-	4	4
Duplicate		Groundwater	1	1	1	1	1	1	-	1	1
MS/MSD		Groundwater	2	2	2	2	2	2	-	2	2
Rinsate		Water	1	1	1	1	1	1	-	1	1
Trip Blank		Water	1	-	-	-	-	-	-	-	1
Total			**9**	**8**	**8**	**8**	**8**	**8**	**0**	**8**	**9**
Sub-slab/Ambient Air samples											
Sub-slab	0	Air	-	-	-	-	-	-	-	-	-
Ambient Air		Air	-	-	-	-	-	-	-	-	-
Outdoor		Air	-	-	-	-	-	-	-	-	-
Duplicate		Air	-	-	-	-	-	-	-	-	-
Total			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
IRM Confirmation Sampling											
Sidewall Samples	40	Soil	6	40	40	-	6	6	-	-	-
Bottom Samples	30	Soil	4	30	30	-	4	4	-	-	-
Duplicate		Soil	1	4	4	-	1	1	-	-	-
MS/MSD		Soil	2	8	8	-	2	2	-	-	-
Rinsate		Water	1	4	4	-	1	1	-	-	-
Total			**14**	**86**	**86**	**0**	**14**	**14**	**0**	**0**	**0**
			VOCs	SVOCs	METALS	METALS	PCBs	Pest/ Herbs	VOC - TO-15	Pest/ Herbs	VOC - TO-15
		TOTAL SAMPLES	**43**	**118**	**118**	**8**	**38**	**38**	**0**	**22**	**23**

Notes:

TCL VOCs - Target Compound List Volatile Organic Compounds.
TCL SVOCs - Target Compound List Semi-volatile Organic Compounds.
TAL Metals - Target Analyte List Metals.
TCL PCBs - Target Compound List Polychlorinated Biphenyls.
PFAS - Polyfluoroalkyl Substances

APPENDIX A

HISTORICAL INVETIGATION INFORMATION



Parameter	SB12 (0-3')
Semivolatile Organic Compounds (ug/kg)	
Benzo(a)anthracene	4,000
Benzo(a)pyrene	3,900
Benzo(b)fluoranthene	5,200
Chrysene	4,000
Dibenzo(a,h)anthracene	780
Indeno(1,2,3-cd)pyrene	2,500
Metals (mg/kg)	
Copper, Total	358

Parameter	SB3 (0.5-2')
Semivolatile Organic Compounds (ug/kg)	
Benzo(a)anthracene	1,200
Benzo(a)pyrene	1,300
Benzo(b)fluoranthene	2,200
Indeno(1,2,3-cd)pyrene	920

Parameter	SB10 (0-3')
Semivolatile Organic Compounds (ug/kg)	
Benzo(a)pyrene	1,000
Benzo(b)fluoranthene	2,000
Indeno(1,2,3-cd)pyrene	1,100
Metals (mg/kg)	
Copper, Total	320
Lead, Total	735

Parameter	SB2 (0.5-3')
Semivolatile Organic Compounds (ug/kg)	
Benzo(a)anthracene	2,600
Benzo(a)pyrene	2,900
Benzo(b)fluoranthene	4,800
Dibenzo(a,h)anthracene	600
Indeno(1,2,3-cd)pyrene	2,300

Notes:

Proposed Cleanup Standards = Restricted Residential

🟨 = exceeds Restricted Residential SCO
🟦 = exceeds Commercial SCO
🟥 = exceeds Industrial SCO

Wittman GeoSciences

SOIL BORING LOCATIONS
27-37 CHANDLER STREET
BUFFALO, NEW YORK

DRAWN BY: EB	SCALE: NOT TO SCALE	PROJECT: 18-105
CHECKED BY: MMW	DATE: 05/18	FIGURE NO: III-A

Table III - A
Soil Analytical Testing Results Summary
27-37 Chandler Street , Buffalo, NY
December 2017

Parameter	**UUSCO**	**RRUSCO**	**CUSCO**	**IUSCO**	**SB2 (0.5-3')**	**SB3 (0.5-2')**	**SB6 (1.5-3')**	**SB8 (0.5-2')**	**SB10 (0-3')**	**SB12 (0-3')**
Volatile Organic Compounds - EPA Method 8260C Analysis (ug/kg)										
1,2,4-Trimethylbenzene	3,600	52,000	190,000	380,000	0.66 J	0.40 J	0.13 J	0.33 J	NT	NT
1,3,5-Trimethylbenzene	8,400	52,000	190,000	380,000	0.39 J	0.18 J	ND	0.19 J	NT	NT
Acetone	50	100,000	500,000	1,000,000	29	27	4.4 J	45	NT	NT
Benzene	60	4,800	44,000	89,000	ND	0.75 J	0.19 J	ND	NT	NT
Carbon disulfide	NV	NV	NV	NV	ND	ND	ND	2.3 J	NT	NT
Cyclohexane	NV	NV	NV	NV	ND	3.0 J	ND	ND	NT	NT
Ethylbenzene	1,000	41,000	390,000	780,000	ND	0.64 J	ND	ND	NT	NT
Methyl cyclohexane	NV	NV	NV	NV	0.69 J	1.5 J	ND	0.49 J	NT	NT
n-Propylbenzene	3,900	100,000	500,000	1,000,000	ND	0.30 J	ND	ND	NT	NT
Naphthalene	12,000	100,000	500,000	1,000,000	2.0 J	0.92 J	0.19 J	0.35 J	NT	NT
o-Xylene	260	100,000	500,000	1,000,000	ND	0.62 J	ND	ND	NT	NT
p/m-Xylene	260	100,000	500,000	1,000,000	0.46 J	0.91 J	ND	ND	NT	NT
Toluene	700	100,000	500,000	1,000,000	0.52 J	1.4	0.18 J	0.49 J	NT	NT
Semivolatile Organic Compounds - EPA Method 8270D Analysis (ug/kg)										
2-Methylnaphthalene	NV	NV	NV	NV	200 J	190 J	87 J	170 J	110 J	640
3-Methylphenol/4-Methylphenol	330	100,000	500,000	1,000,000	ND	ND	ND	ND	ND	47 J
Acenaphthene	20,000	100,000	500,000	1,000,000	230	210	29 J	ND	38 J	970
Acenaphthylene	100,000	100,000	500,000	1,000,000	120 J	51 J	34 J	ND	130 J	220
Anthracene	100,000	100,000	500,000	1,000,000	550	280	83 J	ND	230	1,800
Benzaldehyde	NV	NV	NV	NV	ND	ND	ND	67 J	ND	ND
Benzo(a)anthracene	1,000	1,000	5,600	11,000	2,600	1,200	200	80 J	960	4,000
Benzo(a)pyrene	1,000	1,000	1,000	1,100	2,900	1,300	210	81 J	1,000	3,900
Benzo(b)fluoranthene	1,000	1,000	5,600	11,000	4,800	2,200	300	120	2,000	5,200
Benzo(ghi)perylene	100,000	100,000	500,000	1,000,000	2,200	870	160	98 J	900	2,400
Benzo(k)fluoranthene	800	3,900	56,000	110,000	1,500	580	98 J	35 J	580	1,500
Biphenyl	NV	NV	NV	NV	ND	ND	ND	ND	ND	140 J
Bis(2-ethylhexyl)phthalate	NV	NV	NV	NV	92 J	ND	ND	150 J	ND	ND
Carbazole	NV	NV	NV	NV	610	450	52 J	ND	120 J	850
Chrysene	1,000	3,900	56,000	110,000	3,400	1,600	240	100 J	930	4,000
Di-n-butylphthalate	NV	NV	NV	NV	ND	ND	ND	ND	82 J	ND
Dibenzo(a,h)anthracene	330	330	560	1,100	600	240	46 J	ND	260	780
Dibenzofuran	7,000	59,000	350,000	1,000,000	190 J	200	43 J	46 J	44 J	590
Fluoranthene	100,000	100,000	500,000	1,000,000	7,400	4,100	570	150	990	8,000
Fluorene	30,000	100,000	500,000	1000000	230	180	32 J	ND	48 J	870
Indeno(1,2,3-cd)pyrene	500	500	5,600	11,000	2,300	920	150	66 J	1,100	2,500
Naphthalene	12,000	100,000	500,000	1,000,000	130 J	100 J	71 J	120 J	160 J	1,200
Phenanthrene	100,000	100,000	500,000	1,000,000	3,800	2,800	430	160	510	7,500
Pyrene	100,000	100,000	500,000	1,000,000	6,000	3,100	460	160	920	6,700
Metals - EPA Method 6010 Analysis (mg/kg)										
Aluminum, Total	NV	NV	NV	NV	6,810	NT	3,260	7,000	7,040	6,760
Antimony, Total	NV	NV	NV	NV	7.72	NT	0.595 J	ND	4.69	5.97
Arsenic, Total	13	16	16	16	11.0	NT	4.37	4.03	13.8	15.3
Barium, Total	350	400	400	10,000	85.0	NT	37.0	80.9	216	156
Beryllium, Total	7.2	72	590	2,700	0.473	NT	0.155 J	1.10	0.59	0.754
Cadmium, Total	2.5	4.3	9.3	60	ND	NT	ND	0.375 J	0.387 J	ND
Calcium, Total	NV	NV	NV	NV	55,500	NT	41,400	76,700	21,600	10,200
Chromium, Total	30	180	1,500	6,800	17.4	NT	8.70	12.6	21.8	14.7
Cobalt, Total	NV	NV	NV	NV	6.18	NT	3.49	2.48	11.4	7.90
Copper, Total	50	270	270	10,000	93.4	NT	29.4	35.7	320	358
Iron, Total	NV	NV	NV	NV	61,400	NT	25,200	12,700	106,000	39,900
Lead, Total	63	400	1,000	3,900	103	NT	31.9	145	735	311
Magnesium, Total	NV	NV	NV	NV	2,830	NT	11,400	6,340	2,970	1,830
Manganese, Total	1,600	2,000	10,000	10,000	610	NT	295	820	749	520
Mercury, Total	0.18	0.81	2.8	5.7	0.10	NT	0.07 J	0.09	0.27	0.14
Nickel, Total	30	310	310	10,000	16.0	NT	13.9	8.61	81.7	78.3
Potassium, Total	NV	NV	NV	NV	808	NT	429	573	705	828
Selenium, Total	3.9	180	1,500	6,800	0.322 J	NT	ND	0.520 J	ND	ND
Sodium, Total	NV	NV	NV	NV	218	NT	91.8 J	299	199	201
Vanadium, Total	NV	NV	NV	NV	23.6	NT	8.26	8.28	31.9	23.3
Zinc, Total	109	10,000	10,000	10,000	154	NT	115	140	554	352
PCBs- EPA Method 8082 Analysis (ug/kg)										
Aroclor 1248	100	1,000	1,000	25,000	23.2 J	NT	ND	NT	ND	ND
Aroclor 1254	100	1,000	1,000	25,000	22.9 J	NT	ND	NT	ND	ND
Aroclor 1260	100	1,000	1,000	25,000	10.4 J	NT	ND	NT	ND	ND
Aroclor 1268	100	1,000	1,000	25,000	ND	NT	4.59 J	NT	ND	ND
PCBs, Total	100	1,000	1,000	25,000	56.5 J	NT	4.59 J	NT	ND	ND

Notes:

1. Analytical testing performed by Alpha Analytical. Compounds detected in one or more samples are presented in this table. Refer to Appendix for the full analytical report.
2. ug/kg = parts per billion; mg/kg = parts per million.
3. ND = not detected; NT = not tested; NV = no value.
4. Analytical results compared to NYSDEC Part 375-6; Remedial Program Soil Cleanup Objectives, Table 375-(a) Unrestricted Use Soil Cleanup Objective; and Table 375-6.8(b): Restricted Use Soil Cleanup Objectives.
5. Shading indicates:

▨	Exceeds NY-UUSCO: New York NYCRR Part 375 New York Unrestricted Use Soil Cleanup Objectives.
🟨	Exceeds NY-RUSCO: New York NYCRR Part 375 New York Restricted Residential Use Soil Cleanup Objectives.
🟦	Exceeds NY-CUSCO: New York NYCRR Part 375 Commercial Use Soil Cleanup Objectives.
🟥	Exceeds NY-IUSCO: New York NYCRR Part 375 Industrial Use Soil Cleanup Objectives.

Table III - B
Groundwater Analytical Testing Results Summary
27-37 Chandler Street, Buffalo, New York
December 2017

Parameter	SB7	SB11	Class GA Criteria (ug/L)
Volatile Organic Compounds EPA Method 8260C TCL + STARS (ug/L)			
Acetone	9.5	4.8 J	50
Cyclohexane	0.37 J	ND	NV
Trichloroethene	ND	0.65	5
Semi Volatile Organic Compounds EPA Method TCL (ug/L)			
Acenaphthene	0.09 J	ND	20
Benzo(a)anthracene	0.02 J	0.04 J	0.002
Benzo(b)fluoranthene	ND	0.05 J	0.002
Fluoranthene	ND	0.05 J	50
Indeno(1,2,3-cd)pyrene	ND	0.04 J	0.002
Naphthalene	0.08 J	ND	10
Nitrobenzene	ND	0.80 J	0.4
Phenanthrene	0.09 J	0.04 J	50
Pyrene	ND	0.04 J	50

Notes:

1. Analytical testing performed by Alpha Analytical. Compounds detected in one or more samples are presented in this table. Refer to Attachment C for the full analytical report.
2. ug/L = part per billion.
3. Analytical results compared to NYSDEC Class GA criteria obtained from the Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), dated October 1993, revised June 1999, January 1999 errata sheet, and April 2000 addendum.
4. ND= Non-Detect; NV= No value.
5. Gray shading indicates exceedance of NYSDEC Class GA Criteria.

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB1

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation
HEI Representative: E. Betzold
Project Number: e1646
Start Date: 12/12/2017
End Date: 12/12/2017
Type of Drill Rig: Track Mounted Geoprobe
GW Depth While Drilling: NWWD
Drilling Contractor: Matrix Env.
GW Depth at Completion: NWAC
Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
				Asphalt	
1	1	0.5 - 4	40	Dk. Brown f/c Sand, some Gravel, tr. Cinders, moist. (FILL)	0
2				Brown Clay & Silt, tr. f/c Sand, tr. Gravel, moist (FILL)	0.3
3				Grades to … Red/Brown	0
4	2	4 - 8	48	Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	0
5					0
6					0
7					0
8					0
				Bottom of boring 8' b.g.	
9					
10					
11					
12					
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24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB2

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation
HEI Representative: E. Betzold
Project Number: e1646
Start Date: 12/12/2017
End Date: 12/12/2017
Type of Drill Rig: Track Mounted Geoprobe
GW Depth While Drilling: 1.0'
Drilling Contractor: Matrix Env.
GW Depth at Completion: NWAC
Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
				Asphalt	
1	1	0.5 - 4	18	Dk. Brown Sand, some Cinders, little Gravel, wet. (FILL)	0.5
2					0
3				Brown Clay & Silt, tr. f/c Sand, tr. Gravel, moist. (FILL)	0
4	2	4 - 8	48		0
				Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	
5					0
6					0
7					0
8	3	8 - 12	48		0
9					0
10					0
11					0
12					0
				Bottom of boring 12' b.g.	
13					
14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB3

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation
HEI Representative: E. Betzold
Project Number: e1646
Start Date: 12/12/2017
End Date: 12/12/2017
Type of Drill Rig: Track Mounted Geoprobe
GW Depth While Drilling: NWWD
Drilling Contractor: Matrix Env.
GW Depth at Completion: NWAC
Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
				Asphalt	
1	1	0.5 - 4	40	Dk. Brown f/c Sand, little Gravel, tr. Silt, tr. Cinders, moist (FILL)	10
				Grades to … some Cinders	
2					0.3
				Brown Clay & Silt, tr. f/c Sand, tr. Gravel, moist. (FILL)	
3					0
4	2	4 - 8	48		0
				Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	
5					0
6					0
7					0
8	3	8 - 11			0
9					0
10					0
11					0
				Refusal encountered at 11' b.g.	
12					
13					
14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB4

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation

HEI Representative: E. Betzold

Project Number: e1646

Start Date: 12/12/2017

End Date: 12/12/2017

Type of Drill Rig: Track Mounted Geoprobe

GW Depth While Drilling: NWWD

Drilling Contractor: Matrix Env.

GW Depth at Completion: NWAC

Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
				Gray Gravel, moist (FILL)	
1	1	0.5 - 4	36	Brown f/c Sand, little Gravel, moist (FILL)	0
				Grades to … Dk. Brown, little Cinders	
2					0
				Brown Clay & Silt, tr. f/c Sand, tr. Gravel, moist (FILL)	
3					0
				Grades to Red/Brown	
4	2	4 - 8	48	Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	0
5					0
6					0
7					0
8					0
				Bottom of boring 8' b.g.	
9					
10					
11					
12					
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14					
15					
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24					

Notes:

General Notes:

1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB5

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation
HEI Representative: E. Betzold
Project Number: e1646
Start Date: 12/12/2017
End Date: 12/12/2017
Type of Drill Rig: Track Mounted Geoprobe
GW Depth While Drilling: 3.0'
Drilling Contractor: Matrix Env.
GW Depth at Completion: NWAC
Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
				Asphalt	
1	1	0.5 - 3.5	30	Dk. Brown f/c Sand, little Gravel, tr. Cinders, moist. (FILL)	0
2				Grades to … tr. Gravel.	0
3				Grades to … wet.	0
				Grades to … and Concrete, some Brick.	
4				Refusal encountered at 3.5' b.g.	
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB6

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation
HEI Representative: E. Betzold
Project Number: e1646
Start Date: 12/12/2017
End Date: 12/12/2017
Type of Drill Rig: Track Mounted Geoprobe
GW Depth While Drilling: 3.0'
Drilling Contractor: Matrix Env.
GW Depth at Completion: NWAC
Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
				Asphalt	
1	1	0.5 - 3.5	30	Brown f/c Sand, some Gravel, tr. Silt, moist. (FILL)	0
2				Grades to … Dk. Brown, little Cinders, tr. Gravel.	20
3				Grades to … odor, wet.	220
				Grades to … and Concrete, some Brick.	
4				Refusal encountered at 3.5' b.g.	
5					
6					
7					
8					
9					
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11					
12					
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14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB7

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation
HEI Representative: E. Betzold
Project Number: e1646
Start Date: 12/12/2017
End Date: 12/12/2017
Type of Drill Rig: Track Mounted Geoprobe
GW Depth While Drilling: 1.5'
Drilling Contractor: Matrix Env.
GW Depth at Completion: 1.6'
Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
				Asphalt	
1	1	0.5 - 4	30	Brown/Gray sub-base Gravel, and f/c Sand, tr. Silt, moist (FILL)	0
2				Grades to … little f/c Sand, saturated.	0
				Brown Clay & Silt, tr. f/c Sand, tr. Gravel, moist (FILL)	
3					0
4	2	4 - 8	40		0
				Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	
5					0
6					0
7					0
8	3	8 - 12	36		0
9					0
10					0
11					0
12					0
				Bottom of boring 12' b.g.	
13				Temporary well installed to 10' b.g.	
14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB8

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation
HEI Representative: E. Betzold
Project Number: e1646
Start Date: 12/12/2017
End Date: 12/12/2017
Type of Drill Rig: Track Mounted Geoprobe
GW Depth While Drilling: NWWD
Drilling Contractor: Matrix Env.
GW Depth at Completion: NWAC
Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
	1	0 - 4	30	Brown Topsoil, little f/c Sand, little Gravel, tr. Roots, moist. (FILL)	
1				Dk. Brown f/c Sand, some Gravel, little Silt, moist (FILL)	0
				Grades to … little Cinders	
2				Grades to … some Concrete, some Cinders	0
				Brown Clay & Silt, tr. f/c Sand, tr. Gravel, moist (FILL)	
3					0
4	2	4 - 8	36	Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	0
5					0
6					0
7					0
8					0
				Bottom of boring 8' b.g.	
9					
10					
11					
12					
13					
14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB9

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation

HEI Representative: E. Betzold

Project Number: e1646

Start Date: 12/12/2017

End Date: 12/12/2017

Type of Drill Rig: Track Mounted Geoprobe

GW Depth While Drilling: NWWD

Drilling Contractor: Matrix Env.

GW Depth at Completion: NWAC

Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
	1	0 - 4	30	Brown Topsoil, little f/c Sand, little Gravel, tr. Roots. (FILL)	
1				Brown f/c Sand, some Gravel, little Silt, moist. (FILL)	0
2				Grades to … little Gravel, tr. Cinders	0
				Grades to … tr. Gravel	
3				Brown Clay & Silt, little f/c Sand, tr. Gravel, moist. (FILL)	0
4	2	4 - 8	40	Grades to … Red/Brown, tr. f/c Sand	0
				Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	
5					0
6					0
7					0
8					0
				Bottom of boring 8' b.g.	
9					
10					
11					
12					
13					
14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:

1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD
EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB10

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation

HEI Representative: E. Betzold

Project Number: e1646

Start Date: 12/12/2017

End Date: 12/12/2017

Type of Drill Rig: Track Mounted Geoprobe

GW Depth While Drilling: NWWD

Drilling Contractor: Matrix Env.

GW Depth at Completion: NWAC

Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
	1	0 - 4	40	Brown Topsoil, little gRavel, tr. f/c Sand, moist (FILL)	
1				Grades to … Dk. Brown, and f/c Sand, little Cinders	0
				Grades to … some Gravel, some Concrete	
2					0
				Dk. Brown f/c Sand, little Cinders, little Gravel, tr. Silt, moist (FILL)	
3					0
				Grades to … little Brick	
4	2	4 - 8	48	Brown Clay & Silt, tr. f/c Sand, tr. Gravel, moist. (FILL)	0
5				Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	0
6					0
7					0
8					0
				Bottom of boring 8' b.g.	
9					
10					
11					
12					
13					
14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB11

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation
HEI Representative: E. Betzold
Project Number: e1646
Start Date: 12/12/2017
End Date: 12/12/2017
Type of Drill Rig: Track Mounted Geoprobe
GW Depth While Drilling: 2.5'
Drilling Contractor: Matrix Env.
GW Depth at Completion: 2.3'
Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
	1	0 - 4	36	Dk. Brown f/c Sand, little Gravel, little Silt, tr. Cinders, moist (FILL)	
1				Grades to … little Cinders, tr. Silt	0
2					0
				Grades to … some Cinders, saturated	
3					0
				Brown Clay & Silt, tr. F/c Sand, tr. Gravel, moist (FILL)	
4	2	4 - 8	40		0
5				Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	0
6					0
7					0
8	3	8 - 12	40		0
9					0
10					0
11					0
12				Bottom of boring 12' b.g. Temporary well installed to 10' b.g.	0
13					
14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD EVALUATIONS

3636 N. Buffalo Road
Orchard Park, NY 14127
716-667-3130

Boring No: SB12

Project Name & Location: 27-37 Chandler Street Buffalo, NY; Phase II Investigation
HEI Representative: E. Betzold
Project Number: e1646
Start Date: 12/12/2017
End Date: 12/12/2017
Type of Drill Rig: Track Mounted Geoprobe
GW Depth While Drilling: NWWD
Drilling Contractor: Matrix Env.
GW Depth at Completion: NWAC
Sampler Type: MC

Sample Depth (ft)	Sample No.	Sample Interval (feet)	Recovery (inches)	SAMPLE DESCRIPTION	OVM Reading (ppm)
	1	0 - 4	36	Brown Topsoil, little f/c Sand, little Gravel, tr. Roots, moist (FILL)	
1				Dk. Brown f/c Sand, some Silt, little Cinders, little Gravel, moist (FILL)	0
2				Grades to … some Cinders, tr. Slag	0
3				Grades to … tr. Cinders	0
				Brown Clay & Silt, tr. f/c Sand, tr. Gravel, moist (FILL)	
4	2	4 - 8	40	Grades to Red/Brown	0
				Red/Brown CLAY & SILT, tr. f/c Sand, tr. Gravel, moist.	
5					0
6					0
7					0
8					0
				Bottom of boring 8' b.g.	
9					
10					
11					
12					
13					
14					
15					
16					
18					
20					
22					
24					

Notes:

General Notes:
1 - Boundary between soil types represented with stratification line. Transitions may be gradual. Depths are approximate.
2 - Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur.
3 - f=fine; m=medium; c=coarse
4 - and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

ANALYTICAL REPORT

Lab Number:	L1746058
Client:	Hazard Evaluations, Inc. 3636 North Buffalo Road Orchard Park, NY 14127
ATTN:	Michele Wittman
Phone:	(716) 667-3130
Project Name:	PH. II ESA
Project Number:	E1646
Report Date:	12/21/17

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1746058-01	SB7	WATER	27-37 CHANDLER ST., BUFFALO, NY	12/12/17 14:30	12/13/17
L1746058-02	SB11	WATER	27-37 CHANDLER ST., BUFFALO, NY	12/12/17 15:00	12/13/17
L1746058-03	SB2 (0.5-3')	SOIL	27-37 CHANDLER ST., BUFFALO, NY	12/12/17 09:15	12/13/17
L1746058-04	SB3 (0.5-2')	SOIL	27-37 CHANDLER ST., BUFFALO, NY	12/12/17 09:45	12/13/17
L1746058-05	SB6 (1.5-3')	SOIL	27-37 CHANDLER ST., BUFFALO, NY	12/12/17 10:40	12/13/17
L1746058-06	SB8 (0.5-2')	SOIL	27-37 CHANDLER ST., BUFFALO, NY	12/12/17 11:25	12/13/17
L1746058-07	SB10 (0-3')	SOIL	27-37 CHANDLER ST., BUFFALO, NY	12/12/17 11:55	12/13/17
L1746058-08	SB12 (0-3')	SOIL	27-37 CHANDLER ST., BUFFALO, NY	12/12/17 11:30	12/13/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

The analyses performed were specified by the client.

Volatile Organics

Any reported concentrations that are below 200 ug/kg may be biased low due to the sample not being collected according to 5035-L/5035A-L low-level specifications.

Semivolatile Organics

The WG1073729-2/-3 LCS/LCSD recoveries, associated with L1746058-03 through -08, are below the acceptance criteria for benzoic acid (0%/0%); however, it has been identified as a "difficult" analyte. The results of the associated samples are reported.

Total Metals

L1746058-03, -05, -06, -07 and -08: The sample has elevated detection limits for all elements, with the exception of mercury, due to the dilution required by matrix interferences encountered during analysis.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Melissa Cripps Melissa Cripps

Title: Technical Director/Representative Date: 12/21/17

ORGANICS

VOLATILES

SAMPLE RESULTS

Lab ID: L1746058-01
Client ID: SB7
Sample Location: 27-37 CHANDLER ST., BUFFALO, NY

Date Collected: 12/12/17 14:30
Date Received: 12/13/17
Field Prep: Not Specified

Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 12/19/17 01:18
Analyst: PD

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.14	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.07	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.17	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Trichloroethene	ND		ug/l	0.50	0.18	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1

SAMPLE RESULTS

Lab ID:	L1746058-01	Date Collected:	12/12/17 14:30
Client ID:	SB7	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	9.5		ug/l	5.0	1.5	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.9	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
Methyl Acetate	ND		ug/l	2.0	0.23	1
Cyclohexane	0.37	J	ug/l	10	0.27	1
1,4-Dioxane	ND		ug/l	250	61.	1
Freon-113	ND		ug/l	2.5	0.70	1
Methyl cyclohexane	ND		ug/l	10	0.40	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	110		70-130
4-Bromofluorobenzene	114		70-130
Dibromofluoromethane	91		70-130

SAMPLE RESULTS

Lab ID:	L1746058-02	Date Collected:	12/12/17 15:00
Client ID:	SB11	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 12/19/17 01:45
Analyst: PD

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	2.5	0.70	1
1,1-Dichloroethane	ND		ug/l	2.5	0.70	1
Chloroform	ND		ug/l	2.5	0.70	1
Carbon tetrachloride	ND		ug/l	0.50	0.13	1
1,2-Dichloropropane	ND		ug/l	1.0	0.14	1
Dibromochloromethane	ND		ug/l	0.50	0.15	1
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50	1
Tetrachloroethene	ND		ug/l	0.50	0.18	1
Chlorobenzene	ND		ug/l	2.5	0.70	1
Trichlorofluoromethane	ND		ug/l	2.5	0.70	1
1,2-Dichloroethane	ND		ug/l	0.50	0.13	1
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70	1
Bromodichloromethane	ND		ug/l	0.50	0.19	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14	1
Bromoform	ND		ug/l	2.0	0.65	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17	1
Benzene	ND		ug/l	0.50	0.16	1
Toluene	ND		ug/l	2.5	0.70	1
Ethylbenzene	ND		ug/l	2.5	0.70	1
Chloromethane	ND		ug/l	2.5	0.70	1
Bromomethane	ND		ug/l	2.5	0.70	1
Vinyl chloride	ND		ug/l	1.0	0.07	1
Chloroethane	ND		ug/l	2.5	0.70	1
1,1-Dichloroethene	ND		ug/l	0.50	0.17	1
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Trichloroethene	0.65		ug/l	0.50	0.18	1
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70	1
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70	1

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-02	Date Collected:	12/12/17 15:00
Client ID:	SB11	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Methyl tert butyl ether	ND		ug/l	2.5	0.70	1
p/m-Xylene	ND		ug/l	2.5	0.70	1
o-Xylene	ND		ug/l	2.5	0.70	1
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70	1
Styrene	ND		ug/l	2.5	0.70	1
Dichlorodifluoromethane	ND		ug/l	5.0	1.0	1
Acetone	4.8	J	ug/l	5.0	1.5	1
Carbon disulfide	ND		ug/l	5.0	1.0	1
2-Butanone	ND		ug/l	5.0	1.9	1
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0	1
2-Hexanone	ND		ug/l	5.0	1.0	1
Bromochloromethane	ND		ug/l	2.5	0.70	1
1,2-Dibromoethane	ND		ug/l	2.0	0.65	1
n-Butylbenzene	ND		ug/l	2.5	0.70	1
sec-Butylbenzene	ND		ug/l	2.5	0.70	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70	1
Isopropylbenzene	ND		ug/l	2.5	0.70	1
p-Isopropyltoluene	ND		ug/l	2.5	0.70	1
Naphthalene	ND		ug/l	2.5	0.70	1
n-Propylbenzene	ND		ug/l	2.5	0.70	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70	1
Methyl Acetate	ND		ug/l	2.0	0.23	1
Cyclohexane	ND		ug/l	10	0.27	1
1,4-Dioxane	ND		ug/l	250	61.	1
Freon-113	ND		ug/l	2.5	0.70	1
Methyl cyclohexane	ND		ug/l	10	0.40	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	110		70-130
4-Bromofluorobenzene	118		70-130
Dibromofluoromethane	89		70-130

SAMPLE RESULTS

Lab ID:	L1746058-03	Date Collected:	12/12/17 09:15
Client ID:	SB2 (0.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Matrix:	Soil
Analytical Method:	1,8260C
Analytical Date:	12/19/17 13:45
Analyst:	JC
Percent Solids:	82%

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/kg	12	2.0	1
1,1-Dichloroethane	ND		ug/kg	1.8	0.33	1
Chloroform	ND		ug/kg	1.8	0.45	1
Carbon tetrachloride	ND		ug/kg	1.2	0.42	1
1,2-Dichloropropane	ND		ug/kg	4.3	0.28	1
Dibromochloromethane	ND		ug/kg	1.2	0.22	1
1,1,2-Trichloroethane	ND		ug/kg	1.8	0.38	1
Tetrachloroethene	ND		ug/kg	1.2	0.37	1
Chlorobenzene	ND		ug/kg	1.2	0.42	1
Trichlorofluoromethane	ND		ug/kg	6.1	0.51	1
1,2-Dichloroethane	ND		ug/kg	1.2	0.30	1
1,1,1-Trichloroethane	ND		ug/kg	1.2	0.43	1
Bromodichloromethane	ND		ug/kg	1.2	0.38	1
trans-1,3-Dichloropropene	ND		ug/kg	1.2	0.25	1
cis-1,3-Dichloropropene	ND		ug/kg	1.2	0.28	1
Bromoform	ND		ug/kg	4.9	0.29	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.2	0.36	1
Benzene	ND		ug/kg	1.2	0.24	1
Toluene	0.52	J	ug/kg	1.8	0.24	1
Ethylbenzene	ND		ug/kg	1.2	0.21	1
Chloromethane	ND		ug/kg	6.1	0.53	1
Bromomethane	ND		ug/kg	2.4	0.41	1
Vinyl chloride	ND		ug/kg	2.4	0.38	1
Chloroethane	ND		ug/kg	2.4	0.39	1
1,1-Dichloroethene	ND		ug/kg	1.2	0.46	1
trans-1,2-Dichloroethene	ND		ug/kg	1.8	0.29	1
Trichloroethene	ND		ug/kg	1.2	0.37	1
1,2-Dichlorobenzene	ND		ug/kg	6.1	0.22	1
1,3-Dichlorobenzene	ND		ug/kg	6.1	0.27	1
1,4-Dichlorobenzene	ND		ug/kg	6.1	0.22	1

SAMPLE RESULTS

Lab ID:	L1746058-03	Date Collected:	12/12/17 09:15
Client ID:	SB2 (0.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methyl tert butyl ether	ND		ug/kg	2.4	0.19	1
p/m-Xylene	0.46	J	ug/kg	2.4	0.43	1
o-Xylene	ND		ug/kg	2.4	0.41	1
cis-1,2-Dichloroethene	ND		ug/kg	1.2	0.42	1
Styrene	ND		ug/kg	2.4	0.49	1
Dichlorodifluoromethane	ND		ug/kg	12	0.61	1
Acetone	29		ug/kg	12	2.8	1
Carbon disulfide	ND		ug/kg	12	1.3	1
2-Butanone	ND		ug/kg	12	0.84	1
4-Methyl-2-pentanone	ND		ug/kg	12	0.30	1
2-Hexanone	ND		ug/kg	12	0.82	1
Bromochloromethane	ND		ug/kg	6.1	0.44	1
1,2-Dibromoethane	ND		ug/kg	4.9	0.24	1
n-Butylbenzene	ND		ug/kg	1.2	0.28	1
sec-Butylbenzene	ND		ug/kg	1.2	0.26	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	6.1	0.48	1
Isopropylbenzene	ND		ug/kg	1.2	0.24	1
p-Isopropyltoluene	ND		ug/kg	1.2	0.25	1
Naphthalene	2.0	J	ug/kg	6.1	0.17	1
n-Propylbenzene	ND		ug/kg	1.2	0.26	1
1,2,3-Trichlorobenzene	ND		ug/kg	6.1	0.31	1
1,2,4-Trichlorobenzene	ND		ug/kg	6.1	0.26	1
1,3,5-Trimethylbenzene	0.39	J	ug/kg	6.1	0.20	1
1,2,4-Trimethylbenzene	0.66	J	ug/kg	6.1	0.23	1
Methyl Acetate	ND		ug/kg	24	0.57	1
Cyclohexane	ND		ug/kg	24	0.53	1
1,4-Dioxane	ND		ug/kg	49	18.	1
Freon-113	ND		ug/kg	24	0.63	1
Methyl cyclohexane	0.69	J	ug/kg	4.9	0.29	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	112		70-130
Toluene-d8	104		70-130
4-Bromofluorobenzene	130		70-130
Dibromofluoromethane	108		70-130

Project Name: PH. II ESA **Lab Number:** L1746058

Project Number: E1646 **Report Date:** 12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-04	Date Collected:	12/12/17 09:45
Client ID:	SB3 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Matrix: Soil
Analytical Method: 1,8260C
Analytical Date: 12/19/17 14:11
Analyst: JC
Percent Solids: 90%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/kg	9.1	1.5	1
1,1-Dichloroethane	ND		ug/kg	1.4	0.25	1
Chloroform	ND		ug/kg	1.4	0.34	1
Carbon tetrachloride	ND		ug/kg	0.91	0.32	1
1,2-Dichloropropane	ND		ug/kg	3.2	0.21	1
Dibromochloromethane	ND		ug/kg	0.91	0.16	1
1,1,2-Trichloroethane	ND		ug/kg	1.4	0.29	1
Tetrachloroethene	ND		ug/kg	0.91	0.28	1
Chlorobenzene	ND		ug/kg	0.91	0.32	1
Trichlorofluoromethane	ND		ug/kg	4.6	0.38	1
1,2-Dichloroethane	ND		ug/kg	0.91	0.22	1
1,1,1-Trichloroethane	ND		ug/kg	0.91	0.32	1
Bromodichloromethane	ND		ug/kg	0.91	0.28	1
trans-1,3-Dichloropropene	ND		ug/kg	0.91	0.19	1
cis-1,3-Dichloropropene	ND		ug/kg	0.91	0.21	1
Bromoform	ND		ug/kg	3.6	0.22	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.91	0.27	1
Benzene	0.75	J	ug/kg	0.91	0.18	1
Toluene	1.4		ug/kg	1.4	0.18	1
Ethylbenzene	0.64	J	ug/kg	0.91	0.16	1
Chloromethane	ND		ug/kg	4.6	0.40	1
Bromomethane	ND		ug/kg	1.8	0.31	1
Vinyl chloride	ND		ug/kg	1.8	0.29	1
Chloroethane	ND		ug/kg	1.8	0.29	1
1,1-Dichloroethene	ND		ug/kg	0.91	0.34	1
trans-1,2-Dichloroethene	ND		ug/kg	1.4	0.22	1
Trichloroethene	ND		ug/kg	0.91	0.28	1
1,2-Dichlorobenzene	ND		ug/kg	4.6	0.17	1
1,3-Dichlorobenzene	ND		ug/kg	4.6	0.20	1
1,4-Dichlorobenzene	ND		ug/kg	4.6	0.17	1

SAMPLE RESULTS

Lab ID:	L1746058-04	Date Collected:	12/12/17 09:45
Client ID:	SB3 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Methyl tert butyl ether	ND		ug/kg	1.8	0.14	1
p/m-Xylene	0.91	J	ug/kg	1.8	0.32	1
o-Xylene	0.62	J	ug/kg	1.8	0.31	1
cis-1,2-Dichloroethene	ND		ug/kg	0.91	0.31	1
Styrene	ND		ug/kg	1.8	0.37	1
Dichlorodifluoromethane	ND		ug/kg	9.1	0.46	1
Acetone	27		ug/kg	9.1	2.1	1
Carbon disulfide	ND		ug/kg	9.1	1.0	1
2-Butanone	ND		ug/kg	9.1	0.63	1
4-Methyl-2-pentanone	ND		ug/kg	9.1	0.22	1
2-Hexanone	ND		ug/kg	9.1	0.61	1
Bromochloromethane	ND		ug/kg	4.6	0.33	1
1,2-Dibromoethane	ND		ug/kg	3.6	0.18	1
n-Butylbenzene	ND		ug/kg	0.91	0.21	1
sec-Butylbenzene	ND		ug/kg	0.91	0.20	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	4.6	0.36	1
Isopropylbenzene	ND		ug/kg	0.91	0.18	1
p-Isopropyltoluene	ND		ug/kg	0.91	0.18	1
Naphthalene	0.92	J	ug/kg	4.6	0.13	1
n-Propylbenzene	0.30	J	ug/kg	0.91	0.20	1
1,2,3-Trichlorobenzene	ND		ug/kg	4.6	0.23	1
1,2,4-Trichlorobenzene	ND		ug/kg	4.6	0.20	1
1,3,5-Trimethylbenzene	0.18	J	ug/kg	4.6	0.15	1
1,2,4-Trimethylbenzene	0.40	J	ug/kg	4.6	0.17	1
Methyl Acetate	ND		ug/kg	18	0.42	1
Cyclohexane	3.0	J	ug/kg	18	0.40	1
1,4-Dioxane	ND		ug/kg	36	13.	1
Freon-113	ND		ug/kg	18	0.47	1
Methyl cyclohexane	1.5	J	ug/kg	3.6	0.22	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	113		70-130
Dibromofluoromethane	102		70-130

SAMPLE RESULTS

Lab ID:	L1746058-05	Date Collected:	12/12/17 10:40
Client ID:	SB6 (1.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Matrix: Soil
Analytical Method: 1,8260C
Analytical Date: 12/19/17 14:38
Analyst: JC
Percent Solids: 92%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/kg	6.2	1.0	1
1,1-Dichloroethane	ND		ug/kg	0.93	0.17	1
Chloroform	ND		ug/kg	0.93	0.23	1
Carbon tetrachloride	ND		ug/kg	0.62	0.21	1
1,2-Dichloropropane	ND		ug/kg	2.2	0.14	1
Dibromochloromethane	ND		ug/kg	0.62	0.11	1
1,1,2-Trichloroethane	ND		ug/kg	0.93	0.19	1
Tetrachloroethene	ND		ug/kg	0.62	0.19	1
Chlorobenzene	ND		ug/kg	0.62	0.22	1
Trichlorofluoromethane	ND		ug/kg	3.1	0.26	1
1,2-Dichloroethane	ND		ug/kg	0.62	0.15	1
1,1,1-Trichloroethane	ND		ug/kg	0.62	0.22	1
Bromodichloromethane	ND		ug/kg	0.62	0.19	1
trans-1,3-Dichloropropene	ND		ug/kg	0.62	0.13	1
cis-1,3-Dichloropropene	ND		ug/kg	0.62	0.14	1
Bromoform	ND		ug/kg	2.5	0.15	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.62	0.18	1
Benzene	0.19	J	ug/kg	0.62	0.12	1
Toluene	0.18	J	ug/kg	0.93	0.12	1
Ethylbenzene	ND		ug/kg	0.62	0.10	1
Chloromethane	ND		ug/kg	3.1	0.27	1
Bromomethane	ND		ug/kg	1.2	0.21	1
Vinyl chloride	ND		ug/kg	1.2	0.20	1
Chloroethane	ND		ug/kg	1.2	0.20	1
1,1-Dichloroethene	ND		ug/kg	0.62	0.23	1
trans-1,2-Dichloroethene	ND		ug/kg	0.93	0.15	1
Trichloroethene	ND		ug/kg	0.62	0.19	1
1,2-Dichlorobenzene	ND		ug/kg	3.1	0.11	1
1,3-Dichlorobenzene	ND		ug/kg	3.1	0.14	1
1,4-Dichlorobenzene	ND		ug/kg	3.1	0.11	1

SAMPLE RESULTS

Lab ID:	L1746058-05	Date Collected:	12/12/17 10:40
Client ID:	SB6 (1.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Methyl tert butyl ether	ND		ug/kg	1.2	0.10	1
p/m-Xylene	ND		ug/kg	1.2	0.22	1
o-Xylene	ND		ug/kg	1.2	0.21	1
cis-1,2-Dichloroethene	ND		ug/kg	0.62	0.21	1
Styrene	ND		ug/kg	1.2	0.25	1
Dichlorodifluoromethane	ND		ug/kg	6.2	0.31	1
Acetone	4.4	J	ug/kg	6.2	1.4	1
Carbon disulfide	ND		ug/kg	6.2	0.68	1
2-Butanone	ND		ug/kg	6.2	0.43	1
4-Methyl-2-pentanone	ND		ug/kg	6.2	0.15	1
2-Hexanone	ND		ug/kg	6.2	0.41	1
Bromochloromethane	ND		ug/kg	3.1	0.22	1
1,2-Dibromoethane	ND		ug/kg	2.5	0.12	1
n-Butylbenzene	ND		ug/kg	0.62	0.14	1
sec-Butylbenzene	ND		ug/kg	0.62	0.13	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	3.1	0.24	1
Isopropylbenzene	ND		ug/kg	0.62	0.12	1
p-Isopropyltoluene	ND		ug/kg	0.62	0.12	1
Naphthalene	0.19	J	ug/kg	3.1	0.09	1
n-Propylbenzene	ND		ug/kg	0.62	0.13	1
1,2,3-Trichlorobenzene	ND		ug/kg	3.1	0.16	1
1,2,4-Trichlorobenzene	ND		ug/kg	3.1	0.13	1
1,3,5-Trimethylbenzene	ND		ug/kg	3.1	0.10	1
1,2,4-Trimethylbenzene	0.13	J	ug/kg	3.1	0.12	1
Methyl Acetate	ND		ug/kg	12	0.29	1
Cyclohexane	ND		ug/kg	12	0.27	1
1,4-Dioxane	ND		ug/kg	25	8.9	1
Freon-113	ND		ug/kg	12	0.32	1
Methyl cyclohexane	ND		ug/kg	2.5	0.15	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	112		70-130
Dibromofluoromethane	104		70-130

SAMPLE RESULTS

Lab ID:	L1746058-06	Date Collected:	12/12/17 11:25
Client ID:	SB8 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Matrix:	Soil
Analytical Method:	1,8260C
Analytical Date:	12/19/17 15:04
Analyst:	JC
Percent Solids:	88%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/kg	9.6	1.6	1
1,1-Dichloroethane	ND		ug/kg	1.4	0.26	1
Chloroform	ND		ug/kg	1.4	0.36	1
Carbon tetrachloride	ND		ug/kg	0.96	0.33	1
1,2-Dichloropropane	ND		ug/kg	3.4	0.22	1
Dibromochloromethane	ND		ug/kg	0.96	0.17	1
1,1,2-Trichloroethane	ND		ug/kg	1.4	0.30	1
Tetrachloroethene	ND		ug/kg	0.96	0.29	1
Chlorobenzene	ND		ug/kg	0.96	0.33	1
Trichlorofluoromethane	ND		ug/kg	4.8	0.40	1
1,2-Dichloroethane	ND		ug/kg	0.96	0.24	1
1,1,1-Trichloroethane	ND		ug/kg	0.96	0.34	1
Bromodichloromethane	ND		ug/kg	0.96	0.30	1
trans-1,3-Dichloropropene	ND		ug/kg	0.96	0.20	1
cis-1,3-Dichloropropene	ND		ug/kg	0.96	0.22	1
Bromoform	ND		ug/kg	3.8	0.23	1
1,1,2,2-Tetrachloroethane	ND		ug/kg	0.96	0.29	1
Benzene	ND		ug/kg	0.96	0.18	1
Toluene	0.49	J	ug/kg	1.4	0.19	1
Ethylbenzene	ND		ug/kg	0.96	0.16	1
Chloromethane	ND		ug/kg	4.8	0.42	1
Bromomethane	ND		ug/kg	1.9	0.32	1
Vinyl chloride	ND		ug/kg	1.9	0.30	1
Chloroethane	ND		ug/kg	1.9	0.30	1
1,1-Dichloroethene	ND		ug/kg	0.96	0.36	1
trans-1,2-Dichloroethene	ND		ug/kg	1.4	0.23	1
Trichloroethene	ND		ug/kg	0.96	0.29	1
1,2-Dichlorobenzene	ND		ug/kg	4.8	0.17	1
1,3-Dichlorobenzene	ND		ug/kg	4.8	0.21	1
1,4-Dichlorobenzene	ND		ug/kg	4.8	0.17	1

SAMPLE RESULTS

Lab ID:	L1746058-06	Date Collected:	12/12/17 11:25
Client ID:	SB8 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Volatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Methyl tert butyl ether	ND		ug/kg	1.9	0.15	1
p/m-Xylene	ND		ug/kg	1.9	0.34	1
o-Xylene	ND		ug/kg	1.9	0.32	1
cis-1,2-Dichloroethene	ND		ug/kg	0.96	0.33	1
Styrene	ND		ug/kg	1.9	0.38	1
Dichlorodifluoromethane	ND		ug/kg	9.6	0.48	1
Acetone	45		ug/kg	9.6	2.2	1
Carbon disulfide	2.3	J	ug/kg	9.6	1.0	1
2-Butanone	ND		ug/kg	9.6	0.66	1
4-Methyl-2-pentanone	ND		ug/kg	9.6	0.23	1
2-Hexanone	ND		ug/kg	9.6	0.64	1
Bromochloromethane	ND		ug/kg	4.8	0.34	1
1,2-Dibromoethane	ND		ug/kg	3.8	0.19	1
n-Butylbenzene	ND		ug/kg	0.96	0.22	1
sec-Butylbenzene	ND		ug/kg	0.96	0.21	1
1,2-Dibromo-3-chloropropane	ND		ug/kg	4.8	0.38	1
Isopropylbenzene	ND		ug/kg	0.96	0.19	1
p-Isopropyltoluene	ND		ug/kg	0.96	0.19	1
Naphthalene	0.35	J	ug/kg	4.8	0.13	1
n-Propylbenzene	ND		ug/kg	0.96	0.21	1
1,2,3-Trichlorobenzene	ND		ug/kg	4.8	0.24	1
1,2,4-Trichlorobenzene	ND		ug/kg	4.8	0.21	1
1,3,5-Trimethylbenzene	0.19	J	ug/kg	4.8	0.15	1
1,2,4-Trimethylbenzene	0.33	J	ug/kg	4.8	0.18	1
Methyl Acetate	ND		ug/kg	19	0.44	1
Cyclohexane	ND		ug/kg	19	0.42	1
1,4-Dioxane	ND		ug/kg	38	14.	1
Freon-113	ND		ug/kg	19	0.49	1
Methyl cyclohexane	0.49	J	ug/kg	3.8	0.23	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	104		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	119		70-130
Dibromofluoromethane	99		70-130

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 12/19/17 08:17
Analyst: JC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 03-06 Batch: WG1074397-5					
Methylene chloride	ND		ug/kg	10	1.6
1,1-Dichloroethane	ND		ug/kg	1.5	0.27
Chloroform	ND		ug/kg	1.5	0.37
Carbon tetrachloride	ND		ug/kg	1.0	0.34
1,2-Dichloropropane	ND		ug/kg	3.5	0.23
Dibromochloromethane	ND		ug/kg	1.0	0.18
1,1,2-Trichloroethane	ND		ug/kg	1.5	0.31
Tetrachloroethene	ND		ug/kg	1.0	0.30
Chlorobenzene	ND		ug/kg	1.0	0.35
Trichlorofluoromethane	ND		ug/kg	5.0	0.42
1,2-Dichloroethane	ND		ug/kg	1.0	0.25
1,1,1-Trichloroethane	ND		ug/kg	1.0	0.35
Bromodichloromethane	ND		ug/kg	1.0	0.31
trans-1,3-Dichloropropene	ND		ug/kg	1.0	0.21
cis-1,3-Dichloropropene	ND		ug/kg	1.0	0.23
Bromoform	ND		ug/kg	4.0	0.24
1,1,2,2-Tetrachloroethane	ND		ug/kg	1.0	0.30
Benzene	ND		ug/kg	1.0	0.19
Toluene	ND		ug/kg	1.5	0.20
Ethylbenzene	ND		ug/kg	1.0	0.17
Chloromethane	ND		ug/kg	5.0	0.44
Bromomethane	0.43	J	ug/kg	2.0	0.34
Vinyl chloride	ND		ug/kg	2.0	0.32
Chloroethane	ND		ug/kg	2.0	0.32
1,1-Dichloroethene	ND		ug/kg	1.0	0.37
trans-1,2-Dichloroethene	ND		ug/kg	1.5	0.24
Trichloroethene	ND		ug/kg	1.0	0.30
1,2-Dichlorobenzene	ND		ug/kg	5.0	0.18
1,3-Dichlorobenzene	ND		ug/kg	5.0	0.22

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 12/19/17 08:17
Analyst: JC

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 03-06 Batch: WG1074397-5					
1,4-Dichlorobenzene	ND		ug/kg	5.0	0.18
Methyl tert butyl ether	ND		ug/kg	2.0	0.15
p/m-Xylene	ND		ug/kg	2.0	0.35
o-Xylene	ND		ug/kg	2.0	0.34
cis-1,2-Dichloroethene	ND		ug/kg	1.0	0.34
Styrene	ND		ug/kg	2.0	0.40
Dichlorodifluoromethane	ND		ug/kg	10	0.50
Acetone	ND		ug/kg	10	2.3
Carbon disulfide	ND		ug/kg	10	1.1
2-Butanone	ND		ug/kg	10	0.69
4-Methyl-2-pentanone	ND		ug/kg	10	0.24
2-Hexanone	ND		ug/kg	10	0.67
Bromochloromethane	ND		ug/kg	5.0	0.36
1,2-Dibromoethane	ND		ug/kg	4.0	0.20
n-Butylbenzene	ND		ug/kg	1.0	0.23
sec-Butylbenzene	ND		ug/kg	1.0	0.22
1,2-Dibromo-3-chloropropane	ND		ug/kg	5.0	0.40
Isopropylbenzene	ND		ug/kg	1.0	0.19
p-Isopropyltoluene	ND		ug/kg	1.0	0.20
Naphthalene	0.42	J	ug/kg	5.0	0.14
n-Propylbenzene	ND		ug/kg	1.0	0.22
1,2,3-Trichlorobenzene	ND		ug/kg	5.0	0.25
1,2,4-Trichlorobenzene	ND		ug/kg	5.0	0.22
1,3,5-Trimethylbenzene	0.20	J	ug/kg	5.0	0.16
1,2,4-Trimethylbenzene	0.24	J	ug/kg	5.0	0.19
Methyl Acetate	ND		ug/kg	20	0.46
Cyclohexane	ND		ug/kg	20	0.43
1,4-Dioxane	ND		ug/kg	40	14.
Freon-113	ND		ug/kg	20	0.51

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

Method Blank Analysis
Batch Quality Control

Analytical Method:	1,8260C
Analytical Date:	12/19/17 08:17
Analyst:	JC

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**
Volatile Organics by 8260/5035 - Westborough Lab for sample(s): 03-06 Batch: WG1074397-5					
Methyl cyclohexane	ND		ug/kg	4.0	0.24

Tentatively Identified Compounds		
No Tentatively Identified Compounds	ND	ug/kg

Surrogate	**%Recovery**	**Qualifier**	**Acceptance Criteria**
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	103		70-130
Dibromofluoromethane	100		70-130

Method Blank Analysis
Batch Quality Control

Analytical Method:	1,8260C
Analytical Date:	12/18/17 20:41
Analyst:	PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1074480-5					
Methylene chloride	ND		ug/l	2.5	0.70
1,1-Dichloroethane	ND		ug/l	2.5	0.70
Chloroform	ND		ug/l	2.5	0.70
Carbon tetrachloride	ND		ug/l	0.50	0.13
1,2-Dichloropropane	ND		ug/l	1.0	0.14
Dibromochloromethane	ND		ug/l	0.50	0.15
1,1,2-Trichloroethane	ND		ug/l	1.5	0.50
Tetrachloroethene	ND		ug/l	0.50	0.18
Chlorobenzene	ND		ug/l	2.5	0.70
Trichlorofluoromethane	ND		ug/l	2.5	0.70
1,2-Dichloroethane	ND		ug/l	0.50	0.13
1,1,1-Trichloroethane	ND		ug/l	2.5	0.70
Bromodichloromethane	ND		ug/l	0.50	0.19
trans-1,3-Dichloropropene	ND		ug/l	0.50	0.16
cis-1,3-Dichloropropene	ND		ug/l	0.50	0.14
Bromoform	ND		ug/l	2.0	0.65
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	0.17
Benzene	ND		ug/l	0.50	0.16
Toluene	ND		ug/l	2.5	0.70
Ethylbenzene	ND		ug/l	2.5	0.70
Chloromethane	ND		ug/l	2.5	0.70
Bromomethane	ND		ug/l	2.5	0.70
Vinyl chloride	ND		ug/l	1.0	0.07
Chloroethane	ND		ug/l	2.5	0.70
1,1-Dichloroethene	ND		ug/l	0.50	0.17
trans-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Trichloroethene	ND		ug/l	0.50	0.18
1,2-Dichlorobenzene	ND		ug/l	2.5	0.70
1,3-Dichlorobenzene	ND		ug/l	2.5	0.70

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 12/18/17 20:41
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1074480-5					
1,4-Dichlorobenzene	ND		ug/l	2.5	0.70
Methyl tert butyl ether	ND		ug/l	2.5	0.70
p/m-Xylene	ND		ug/l	2.5	0.70
o-Xylene	ND		ug/l	2.5	0.70
cis-1,2-Dichloroethene	ND		ug/l	2.5	0.70
Styrene	ND		ug/l	2.5	0.70
Dichlorodifluoromethane	ND		ug/l	5.0	1.0
Acetone	ND		ug/l	5.0	1.5
Carbon disulfide	ND		ug/l	5.0	1.0
2-Butanone	ND		ug/l	5.0	1.9
4-Methyl-2-pentanone	ND		ug/l	5.0	1.0
2-Hexanone	ND		ug/l	5.0	1.0
Bromochloromethane	ND		ug/l	2.5	0.70
1,2-Dibromoethane	ND		ug/l	2.0	0.65
n-Butylbenzene	ND		ug/l	2.5	0.70
sec-Butylbenzene	ND		ug/l	2.5	0.70
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	0.70
Isopropylbenzene	ND		ug/l	2.5	0.70
p-Isopropyltoluene	ND		ug/l	2.5	0.70
Naphthalene	ND		ug/l	2.5	0.70
n-Propylbenzene	ND		ug/l	2.5	0.70
1,2,3-Trichlorobenzene	ND		ug/l	2.5	0.70
1,2,4-Trichlorobenzene	ND		ug/l	2.5	0.70
1,3,5-Trimethylbenzene	ND		ug/l	2.5	0.70
1,2,4-Trimethylbenzene	ND		ug/l	2.5	0.70
Methyl Acetate	ND		ug/l	2.0	0.23
Cyclohexane	ND		ug/l	10	0.27
1,4-Dioxane	ND		ug/l	250	61.
Freon-113	ND		ug/l	2.5	0.70

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 12/18/17 20:41
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1074480-5					
Methyl cyclohexane	ND		ug/l	10	0.40

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	111		70-130
4-Bromofluorobenzene	116		70-130
Dibromofluoromethane	89		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: PH. II ESA
Lab Number: L1746058
Project Number: E1646
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 03-06 Batch: WG1074397-3 WG1074397-4								
Methylene chloride	81		81		70-130	0		30
1,1-Dichloroethane	110		110		70-130	0		30
Chloroform	100		99		70-130	1		30
Carbon tetrachloride	101		100		70-130	1		30
1,2-Dichloropropane	115		115		70-130	0		30
Dibromochloromethane	91		93		70-130	2		30
1,1,2-Trichloroethane	91		94		70-130	3		30
Tetrachloroethene	87		86		70-130	1		30
Chlorobenzene	87		87		70-130	0		30
Trichlorofluoromethane	90		87		70-139	3		30
1,2-Dichloroethane	111		115		70-130	4		30
1,1,1-Trichloroethane	99		99		70-130	0		30
Bromodichloromethane	100		102		70-130	2		30
trans-1,3-Dichloropropene	96		99		70-130	3		30
cis-1,3-Dichloropropene	108		109		70-130	1		30
Bromoform	86		90		70-130	5		30
1,1,2,2-Tetrachloroethane	80		85		70-130	6		30
Benzene	97		97		70-130	0		30
Toluene	83		81		70-130	2		30
Ethylbenzene	85		84		70-130	1		30
Chloromethane	106		102		52-130	4		30
Bromomethane	108		104		57-147	4		30
Vinyl chloride	90		87		67-130	3		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 03-06 Batch: WG1074397-3 WG1074397-4								
Chloroethane	102		98		50-151	4		30
1,1-Dichloroethene	94		92		65-135	2		30
trans-1,2-Dichloroethene	97		96		70-130	1		30
Trichloroethene	98		97		70-130	1		30
1,2-Dichlorobenzene	81		81		70-130	0		30
1,3-Dichlorobenzene	81		80		70-130	1		30
1,4-Dichlorobenzene	81		81		70-130	0		30
Methyl tert butyl ether	108		112		66-130	4		30
p/m-Xylene	87		86		70-130	1		30
o-Xylene	90		90		70-130	0		30
cis-1,2-Dichloroethene	100		101		70-130	1		30
Styrene	86		86		70-130	0		30
Dichlorodifluoromethane	77		75		30-146	3		30
Acetone	119		129		54-140	8		30
Carbon disulfide	93		93		59-130	0		30
2-Butanone	103		123		70-130	18		30
4-Methyl-2-pentanone	96		105		70-130	9		30
2-Hexanone	96		104		70-130	8		30
Bromochloromethane	107		109		70-130	2		30
1,2-Dibromoethane	88		93		70-130	6		30
n-Butylbenzene	77		76		70-130	1		30
sec-Butylbenzene	78		76		70-130	3		30
1,2-Dibromo-3-chloropropane	78		86		68-130	10		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by 8260/5035 - Westborough Lab Associated sample(s): 03-06 Batch: WG1074397-3 WG1074397-4								
Isopropylbenzene	80		78		70-130	3		30
p-Isopropyltoluene	79		77		70-130	3		30
Naphthalene	86		91		70-130	6		30
n-Propylbenzene	78		76		70-130	3		30
1,2,3-Trichlorobenzene	87		89		70-130	2		30
1,2,4-Trichlorobenzene	85		86		70-130	1		30
1,3,5-Trimethylbenzene	81		80		70-130	1		30
1,2,4-Trimethylbenzene	82		80		70-130	2		30
Methyl Acetate	122		133		51-146	9		30
Cyclohexane	115		114		59-142	1		30
1,4-Dioxane	106		111		65-136	5		30
Freon-113	95		92		50-139	3		30
Methyl cyclohexane	95		95		70-130	0		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	103		106		70-130
Toluene-d8	97		97		70-130
4-Bromofluorobenzene	104		103		70-130
Dibromofluoromethane	106		108		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1074480-3 WG1074480-4

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Methylene chloride	85		87		70-130	2		20
1,1-Dichloroethane	99		100		70-130	1		20
Chloroform	86		89		70-130	3		20
Carbon tetrachloride	89		89		63-132	0		20
1,2-Dichloropropane	100		100		70-130	0		20
Dibromochloromethane	87		92		63-130	6		20
1,1,2-Trichloroethane	100		110		70-130	10		20
Tetrachloroethene	85		88		70-130	3		20
Chlorobenzene	94		99		75-130	5		20
Trichlorofluoromethane	86		86		62-150	0		20
1,2-Dichloroethane	91		95		70-130	4		20
1,1,1-Trichloroethane	84		85		67-130	1		20
Bromodichloromethane	80		84		67-130	5		20
trans-1,3-Dichloropropene	100		110		70-130	10		20
cis-1,3-Dichloropropene	85		89		70-130	5		20
Bromoform	**52**	Q	64		54-136	**21**	Q	20
1,1,2,2-Tetrachloroethane	100		120		67-130	18		20
Benzene	97		99		70-130	2		20
Toluene	100		110		70-130	10		20
Ethylbenzene	100		100		70-130	0		20
Chloromethane	100		100		64-130	0		20
Bromomethane	**37**	Q	**33**	Q	39-139	11		20
Vinyl chloride	85		84		55-140	1		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1074480-3 WG1074480-4								
Chloroethane	91		96		55-138	5		20
1,1-Dichloroethene	86		88		61-145	2		20
trans-1,2-Dichloroethene	83		84		70-130	1		20
Trichloroethene	86		89		70-130	3		20
1,2-Dichlorobenzene	90		110		70-130	20		20
1,3-Dichlorobenzene	94		110		70-130	16		20
1,4-Dichlorobenzene	93		110		70-130	17		20
Methyl tert butyl ether	79		85		63-130	7		20
p/m-Xylene	95		100		70-130	5		20
o-Xylene	110		115		70-130	4		20
cis-1,2-Dichloroethene	83		84		70-130	1		20
Styrene	**48**	Q	**50**	Q	70-130	4		20
Dichlorodifluoromethane	91		90		36-147	1		20
Acetone	89		91		58-148	2		20
Carbon disulfide	90		88		51-130	2		20
2-Butanone	110		120		63-138	9		20
4-Methyl-2-pentanone	100		110		59-130	10		20
2-Hexanone	110		120		57-130	9		20
Bromochloromethane	82		84		70-130	2		20
1,2-Dibromoethane	89		96		70-130	8		20
n-Butylbenzene	100		130		53-136	**26**	Q	20
sec-Butylbenzene	100		120		70-130	18		20
1,2-Dibromo-3-chloropropane	76		92		41-144	19		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1074480-3 WG1074480-4								
Isopropylbenzene	100		120		70-130	18		20
p-Isopropyltoluene	100		120		70-130	18		20
Naphthalene	83		100		70-130	19		20
n-Propylbenzene	100		130		69-130	**26**	Q	20
1,2,3-Trichlorobenzene	70		88		70-130	**23**	Q	20
1,2,4-Trichlorobenzene	74		93		70-130	**23**	Q	20
1,3,5-Trimethylbenzene	100		120		64-130	18		20
1,2,4-Trimethylbenzene	120		**150**	Q	70-130	**22**	Q	20
Methyl Acetate	120		120		70-130	0		20
Cyclohexane	120		120		70-130	0		20
1,4-Dioxane	78		80		56-162	3		20
Freon-113	110		110		70-130	0		20
Methyl cyclohexane	100		100		70-130	0		20

Surrogate	*LCS %Recovery*	*Qual*	*LCSD %Recovery*	*Qual*	*Acceptance Criteria*
1,2-Dichloroethane-d4	99		96		70-130
Toluene-d8	109		112		70-130
4-Bromofluorobenzene	106		118		70-130
Dibromofluoromethane	90		90		70-130

SEMIVOLATILES

SAMPLE RESULTS

Lab ID: L1746058-01
Client ID: SB7
Sample Location: 27-37 CHANDLER ST., BUFFALO, NY

Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 12/20/17 04:16
Analyst: CB

Date Collected: 12/12/17 14:30
Date Received: 12/13/17
Field Prep: Not Specified
Extraction Method:EPA 3510C
Extraction Date: 12/19/17 05:15

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.67	1
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.4	1
2,4-Dinitrotoluene	ND		ug/l	5.0	0.84	1
2,6-Dinitrotoluene	ND		ug/l	5.0	1.1	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.62	1
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.73	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.70	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.63	1
Hexachlorocyclopentadiene	ND		ug/l	20	7.8	1
Isophorone	ND		ug/l	5.0	0.60	1
Nitrobenzene	ND		ug/l	2.0	0.75	1
NDPA/DPA	ND		ug/l	2.0	0.64	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.70	1
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	0.91	1
Butyl benzyl phthalate	ND		ug/l	5.0	1.3	1
Di-n-butylphthalate	ND		ug/l	5.0	0.69	1
Di-n-octylphthalate	ND		ug/l	5.0	1.1	1
Diethyl phthalate	ND		ug/l	5.0	0.63	1
Dimethyl phthalate	ND		ug/l	5.0	0.65	1
Biphenyl	ND		ug/l	2.0	0.76	1
4-Chloroaniline	ND		ug/l	5.0	0.63	1
2-Nitroaniline	ND		ug/l	5.0	1.1	1
3-Nitroaniline	ND		ug/l	5.0	1.2	1
4-Nitroaniline	ND		ug/l	5.0	1.3	1
Dibenzofuran	ND		ug/l	2.0	0.66	1
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.67	1
Acetophenone	ND		ug/l	5.0	0.85	1
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.68	1
p-Chloro-m-cresol	ND		ug/l	2.0	0.62	1
2-Chlorophenol	ND		ug/l	2.0	0.63	1

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-01	Date Collected:	12/12/17 14:30
Client ID:	SB7	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4-Dichlorophenol	ND		ug/l	5.0	0.77	1
2,4-Dimethylphenol	ND		ug/l	5.0	1.6	1
2-Nitrophenol	ND		ug/l	10	1.5	1
4-Nitrophenol	ND		ug/l	10	1.8	1
2,4-Dinitrophenol	ND		ug/l	20	5.5	1
4,6-Dinitro-o-cresol	ND		ug/l	10	2.1	1
Phenol	ND		ug/l	5.0	1.9	1
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	1.1	1
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.72	1
Carbazole	ND		ug/l	2.0	0.63	1
Atrazine	ND		ug/l	10	1.8	1
Benzaldehyde	ND		ug/l	5.0	1.1	1
Caprolactam	ND		ug/l	10	3.6	1
2,3,4,6-Tetrachlorophenol	ND		ug/l	5.0	0.93	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	41		21-120
Phenol-d6	31		10-120
Nitrobenzene-d5	61		23-120
2-Fluorobiphenyl	73		15-120
2,4,6-Tribromophenol	75		10-120
4-Terphenyl-d14	88		41-149

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-01	Date Collected:	12/12/17 14:30
Client ID:	SB7	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3510C
Matrix:	Water	Extraction Date:	12/19/17 05:26
Analytical Method:	1,8270D-SIM		
Analytical Date:	12/20/17 13:14		
Analyst:	DV		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	0.09	J	ug/l	0.10	0.04	1
2-Chloronaphthalene	ND		ug/l	0.20	0.04	1
Fluoranthene	ND		ug/l	0.10	0.04	1
Hexachlorobutadiene	ND		ug/l	0.50	0.04	1
Naphthalene	0.08	J	ug/l	0.10	0.04	1
Benzo(a)anthracene	0.02	J	ug/l	0.10	0.02	1
Benzo(a)pyrene	ND		ug/l	0.10	0.04	1
Benzo(b)fluoranthene	ND		ug/l	0.10	0.02	1
Benzo(k)fluoranthene	ND		ug/l	0.10	0.04	1
Chrysene	ND		ug/l	0.10	0.04	1
Acenaphthylene	ND		ug/l	0.10	0.04	1
Anthracene	ND		ug/l	0.10	0.04	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.04	1
Fluorene	ND		ug/l	0.10	0.04	1
Phenanthrene	0.09	J	ug/l	0.10	0.02	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.04	1
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.04	1
Pyrene	ND		ug/l	0.10	0.04	1
2-Methylnaphthalene	ND		ug/l	0.10	0.05	1
Pentachlorophenol	ND		ug/l	0.80	0.22	1
Hexachlorobenzene	ND		ug/l	0.80	0.03	1
Hexachloroethane	ND		ug/l	0.80	0.03	1

SAMPLE RESULTS

Lab ID:	L1746058-01	Date Collected:	12/12/17 14:30
Client ID:	SB7	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS-SIM - Westborough Lab						

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	39		21-120
Phenol-d6	29		10-120
Nitrobenzene-d5	63		23-120
2-Fluorobiphenyl	69		15-120
2,4,6-Tribromophenol	78		10-120
4-Terphenyl-d14	83		41-149

SAMPLE RESULTS

Lab ID: L1746058-02
Client ID: SB11
Sample Location: 27-37 CHANDLER ST., BUFFALO, NY

Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 12/20/17 12:31
Analyst: TT

Date Collected: 12/12/17 15:00
Date Received: 12/13/17
Field Prep: Not Specified
Extraction Method:EPA 3510C
Extraction Date: 12/19/17 05:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.67	1
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.4	1
2,4-Dinitrotoluene	ND		ug/l	5.0	0.84	1
2,6-Dinitrotoluene	ND		ug/l	5.0	1.1	1
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.62	1
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.73	1
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.70	1
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.63	1
Hexachlorocyclopentadiene	ND		ug/l	20	7.8	1
Isophorone	ND		ug/l	5.0	0.60	1
Nitrobenzene	0.80	J	ug/l	2.0	0.75	1
NDPA/DPA	ND		ug/l	2.0	0.64	1
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.70	1
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	0.91	1
Butyl benzyl phthalate	ND		ug/l	5.0	1.3	1
Di-n-butylphthalate	ND		ug/l	5.0	0.69	1
Di-n-octylphthalate	ND		ug/l	5.0	1.1	1
Diethyl phthalate	ND		ug/l	5.0	0.63	1
Dimethyl phthalate	ND		ug/l	5.0	0.65	1
Biphenyl	ND		ug/l	2.0	0.76	1
4-Chloroaniline	ND		ug/l	5.0	0.63	1
2-Nitroaniline	ND		ug/l	5.0	1.1	1
3-Nitroaniline	ND		ug/l	5.0	1.2	1
4-Nitroaniline	ND		ug/l	5.0	1.3	1
Dibenzofuran	ND		ug/l	2.0	0.66	1
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.67	1
Acetophenone	ND		ug/l	5.0	0.85	1
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.68	1
p-Chloro-m-cresol	ND		ug/l	2.0	0.62	1
2-Chlorophenol	ND		ug/l	2.0	0.63	1

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-02	Date Collected:	12/12/17 15:00
Client ID:	SB11	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
2,4-Dichlorophenol	ND		ug/l	5.0	0.77	1
2,4-Dimethylphenol	ND		ug/l	5.0	1.6	1
2-Nitrophenol	ND		ug/l	10	1.5	1
4-Nitrophenol	ND		ug/l	10	1.8	1
2,4-Dinitrophenol	ND		ug/l	20	5.5	1
4,6-Dinitro-o-cresol	ND		ug/l	10	2.1	1
Phenol	ND		ug/l	5.0	1.9	1
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	1.1	1
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.72	1
Carbazole	ND		ug/l	2.0	0.63	1
Atrazine	ND		ug/l	10	1.8	1
Benzaldehyde	ND		ug/l	5.0	1.1	1
Caprolactam	ND		ug/l	10	3.6	1
2,3,4,6-Tetrachlorophenol	ND		ug/l	5.0	0.93	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	43		21-120
Phenol-d6	32		10-120
Nitrobenzene-d5	75		23-120
2-Fluorobiphenyl	90		15-120
2,4,6-Tribromophenol	98		10-120
4-Terphenyl-d14	98		41-149

SAMPLE RESULTS

Lab ID:	L1746058-02	Date Collected:	12/12/17 15:00
Client ID:	SB11	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3510C
Matrix:	Water	Extraction Date:	12/19/17 05:26
Analytical Method:	1,8270D-SIM		
Analytical Date:	12/20/17 13:40		
Analyst:	DV		

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Semivolatile Organics by GC/MS-SIM - Westborough Lab						
Acenaphthene	ND		ug/l	0.10	0.04	1
2-Chloronaphthalene	ND		ug/l	0.20	0.04	1
Fluoranthene	0.05	J	ug/l	0.10	0.04	1
Hexachlorobutadiene	ND		ug/l	0.50	0.04	1
Naphthalene	ND		ug/l	0.10	0.04	1
Benzo(a)anthracene	0.04	J	ug/l	0.10	0.02	1
Benzo(a)pyrene	ND		ug/l	0.10	0.04	1
Benzo(b)fluoranthene	0.05	J	ug/l	0.10	0.02	1
Benzo(k)fluoranthene	ND		ug/l	0.10	0.04	1
Chrysene	ND		ug/l	0.10	0.04	1
Acenaphthylene	ND		ug/l	0.10	0.04	1
Anthracene	ND		ug/l	0.10	0.04	1
Benzo(ghi)perylene	ND		ug/l	0.10	0.04	1
Fluorene	ND		ug/l	0.10	0.04	1
Phenanthrene	0.04	J	ug/l	0.10	0.02	1
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.04	1
Indeno(1,2,3-cd)pyrene	0.04	J	ug/l	0.10	0.04	1
Pyrene	0.04	J	ug/l	0.10	0.04	1
2-Methylnaphthalene	ND		ug/l	0.10	0.05	1
Pentachlorophenol	ND		ug/l	0.80	0.22	1
Hexachlorobenzene	ND		ug/l	0.80	0.03	1
Hexachloroethane	ND		ug/l	0.80	0.03	1

SAMPLE RESULTS

Lab ID:	L1746058-02	Date Collected:	12/12/17 15:00
Client ID:	SB11	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Semivolatile Organics by GC/MS-SIM - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	40		21-120
Phenol-d6	31		10-120
Nitrobenzene-d5	75		23-120
2-Fluorobiphenyl	77		15-120
2,4,6-Tribromophenol	77		10-120
4-Terphenyl-d14	86		41-149

SAMPLE RESULTS

Lab ID:	L1746058-03	Date Collected:	12/12/17 09:15
Client ID:	SB2 (0.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3546
Matrix:	Soil	Extraction Date:	12/17/17 19:06
Analytical Method:	1,8270D		
Analytical Date:	12/19/17 17:36		
Analyst:	CB		
Percent Solids:	82%		

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	230		ug/kg	160	21.	1
Hexachlorobenzene	ND		ug/kg	120	22.	1
Bis(2-chloroethyl)ether	ND		ug/kg	180	27.	1
2-Chloronaphthalene	ND		ug/kg	200	20.	1
3,3'-Dichlorobenzidine	ND		ug/kg	200	54.	1
2,4-Dinitrotoluene	ND		ug/kg	200	40.	1
2,6-Dinitrotoluene	ND		ug/kg	200	34.	1
Fluoranthene	7400		ug/kg	120	23.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	200	22.	1
4-Bromophenyl phenyl ether	ND		ug/kg	200	31.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	240	34.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	220	20.	1
Hexachlorobutadiene	ND		ug/kg	200	29.	1
Hexachlorocyclopentadiene	ND		ug/kg	580	180	1
Hexachloroethane	ND		ug/kg	160	32.	1
Isophorone	ND		ug/kg	180	26.	1
Naphthalene	130	J	ug/kg	200	24.	1
Nitrobenzene	ND		ug/kg	180	30.	1
NDPA/DPA	ND		ug/kg	160	23.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	200	31.	1
Bis(2-ethylhexyl)phthalate	92	J	ug/kg	200	70.	1
Butyl benzyl phthalate	ND		ug/kg	200	51.	1
Di-n-butylphthalate	ND		ug/kg	200	38.	1
Di-n-octylphthalate	ND		ug/kg	200	68.	1
Diethyl phthalate	ND		ug/kg	200	19.	1
Dimethyl phthalate	ND		ug/kg	200	42.	1
Benzo(a)anthracene	2600		ug/kg	120	23.	1
Benzo(a)pyrene	2900		ug/kg	160	49.	1
Benzo(b)fluoranthene	4800		ug/kg	120	34.	1
Benzo(k)fluoranthene	1500		ug/kg	120	32.	1

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-03	Date Collected:	12/12/17 09:15
Client ID:	SB2 (0.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Chrysene	3400		ug/kg	120	21.	1
Acenaphthylene	120	J	ug/kg	160	31.	1
Anthracene	550		ug/kg	120	39.	1
Benzo(ghi)perylene	2200		ug/kg	160	24.	1
Fluorene	230		ug/kg	200	20.	1
Phenanthrene	3800		ug/kg	120	24.	1
Dibenzo(a,h)anthracene	600		ug/kg	120	23.	1
Indeno(1,2,3-cd)pyrene	2300		ug/kg	160	28.	1
Pyrene	6000		ug/kg	120	20.	1
Biphenyl	ND		ug/kg	460	47.	1
4-Chloroaniline	ND		ug/kg	200	37.	1
2-Nitroaniline	ND		ug/kg	200	39.	1
3-Nitroaniline	ND		ug/kg	200	38.	1
4-Nitroaniline	ND		ug/kg	200	83.	1
Dibenzofuran	190	J	ug/kg	200	19.	1
2-Methylnaphthalene	200	J	ug/kg	240	24.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	200	21.	1
Acetophenone	ND		ug/kg	200	25.	1
2,4,6-Trichlorophenol	ND		ug/kg	120	38.	1
p-Chloro-m-cresol	ND		ug/kg	200	30.	1
2-Chlorophenol	ND		ug/kg	200	24.	1
2,4-Dichlorophenol	ND		ug/kg	180	32.	1
2,4-Dimethylphenol	ND		ug/kg	200	66.	1
2-Nitrophenol	ND		ug/kg	430	76.	1
4-Nitrophenol	ND		ug/kg	280	82.	1
2,4-Dinitrophenol	ND		ug/kg	970	94.	1
4,6-Dinitro-o-cresol	ND		ug/kg	520	97.	1
Pentachlorophenol	ND		ug/kg	160	44.	1
Phenol	ND		ug/kg	200	30.	1
2-Methylphenol	ND		ug/kg	200	31.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	290	32.	1
2,4,5-Trichlorophenol	ND		ug/kg	200	38.	1
Carbazole	610		ug/kg	200	20.	1
Atrazine	ND		ug/kg	160	70.	1
Benzaldehyde	ND		ug/kg	260	54.	1
Caprolactam	ND		ug/kg	200	61.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	200	41.	1

SAMPLE RESULTS

Lab ID:	L1746058-03	Date Collected:	12/12/17 09:15
Client ID:	SB2 (0.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Semivolatile Organics by GC/MS - Westborough Lab						

Surrogate	**% Recovery**	**Qualifier**	**Acceptance Criteria**
2-Fluorophenol	66		25-120
Phenol-d6	67		10-120
Nitrobenzene-d5	77		23-120
2-Fluorobiphenyl	73		30-120
2,4,6-Tribromophenol	75		10-136
4-Terphenyl-d14	68		18-120

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-04	Date Collected:	12/12/17 09:45
Client ID:	SB3 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3546
Matrix:	Soil	Extraction Date:	12/17/17 19:06
Analytical Method:	1,8270D		
Analytical Date:	12/19/17 18:02		
Analyst:	CB		
Percent Solids:	90%		

Semivolatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Acenaphthene	210		ug/kg	150	19.	1
Hexachlorobenzene	ND		ug/kg	110	21.	1
Bis(2-chloroethyl)ether	ND		ug/kg	170	25.	1
2-Chloronaphthalene	ND		ug/kg	180	18.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	49.	1
2,4-Dinitrotoluene	ND		ug/kg	180	37.	1
2,6-Dinitrotoluene	ND		ug/kg	180	32.	1
Fluoranthene	4100		ug/kg	110	21.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	20.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	28.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	32.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	19.	1
Hexachlorobutadiene	ND		ug/kg	180	27.	1
Hexachlorocyclopentadiene	ND		ug/kg	530	170	1
Hexachloroethane	ND		ug/kg	150	30.	1
Isophorone	ND		ug/kg	170	24.	1
Naphthalene	100	J	ug/kg	180	23.	1
Nitrobenzene	ND		ug/kg	170	27.	1
NDPA/DPA	ND		ug/kg	150	21.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	29.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	180	64.	1
Butyl benzyl phthalate	ND		ug/kg	180	47.	1
Di-n-butylphthalate	ND		ug/kg	180	35.	1
Di-n-octylphthalate	ND		ug/kg	180	63.	1
Diethyl phthalate	ND		ug/kg	180	17.	1
Dimethyl phthalate	ND		ug/kg	180	39.	1
Benzo(a)anthracene	1200		ug/kg	110	21.	1
Benzo(a)pyrene	1300		ug/kg	150	45.	1
Benzo(b)fluoranthene	2200		ug/kg	110	31.	1
Benzo(k)fluoranthene	580		ug/kg	110	30.	1

SAMPLE RESULTS

Lab ID: L1746058-04 Date Collected: 12/12/17 09:45

Client ID: SB3 (0.5-2') Date Received: 12/13/17

Sample Location: 27-37 CHANDLER ST., BUFFALO, NY Field Prep: Not Specified

Semivolatile Organics by GC/MS - Westborough Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Chrysene	1600		ug/kg	110	19.	1
Acenaphthylene	51	J	ug/kg	150	29.	1
Anthracene	280		ug/kg	110	36.	1
Benzo(ghi)perylene	870		ug/kg	150	22.	1
Fluorene	180		ug/kg	180	18.	1
Phenanthrene	2800		ug/kg	110	22.	1
Dibenzo(a,h)anthracene	240		ug/kg	110	21.	1
Indeno(1,2,3-cd)pyrene	920		ug/kg	150	26.	1
Pyrene	3100		ug/kg	110	18.	1
Biphenyl	ND		ug/kg	420	43.	1
4-Chloroaniline	ND		ug/kg	180	34.	1
2-Nitroaniline	ND		ug/kg	180	36.	1
3-Nitroaniline	ND		ug/kg	180	35.	1
4-Nitroaniline	ND		ug/kg	180	77.	1
Dibenzofuran	200		ug/kg	180	18.	1
2-Methylnaphthalene	190	J	ug/kg	220	22.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	19.	1
Acetophenone	ND		ug/kg	180	23.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	35.	1
p-Chloro-m-cresol	ND		ug/kg	180	28.	1
2-Chlorophenol	ND		ug/kg	180	22.	1
2,4-Dichlorophenol	ND		ug/kg	170	30.	1
2,4-Dimethylphenol	ND		ug/kg	180	61.	1
2-Nitrophenol	ND		ug/kg	400	70.	1
4-Nitrophenol	ND		ug/kg	260	76.	1
2,4-Dinitrophenol	ND		ug/kg	890	86.	1
4,6-Dinitro-o-cresol	ND		ug/kg	480	89.	1
Pentachlorophenol	ND		ug/kg	150	41.	1
Phenol	ND		ug/kg	180	28.	1
2-Methylphenol	ND		ug/kg	180	29.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	270	29.	1
2,4,5-Trichlorophenol	ND		ug/kg	180	36.	1
Carbazole	450		ug/kg	180	18.	1
Atrazine	ND		ug/kg	150	65.	1
Benzaldehyde	ND		ug/kg	240	50.	1
Caprolactam	ND		ug/kg	180	56.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	180	38.	1

SAMPLE RESULTS

Lab ID:	L1746058-04	Date Collected:	12/12/17 09:45
Client ID:	SB3 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	72		25-120
Phenol-d6	71		10-120
Nitrobenzene-d5	73		23-120
2-Fluorobiphenyl	73		30-120
2,4,6-Tribromophenol	76		10-136
4-Terphenyl-d14	74		18-120

SAMPLE RESULTS

Lab ID:	L1746058-05	Date Collected:	12/12/17 10:40
Client ID:	SB6 (1.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3546
Matrix:	Soil	Extraction Date:	12/17/17 19:06
Analytical Method:	1,8270D		
Analytical Date:	12/19/17 20:09		
Analyst:	CB		
Percent Solids:	92%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	29	J	ug/kg	140	18.	1
Hexachlorobenzene	ND		ug/kg	110	20.	1
Bis(2-chloroethyl)ether	ND		ug/kg	160	24.	1
2-Chloronaphthalene	ND		ug/kg	180	18.	1
3,3'-Dichlorobenzidine	ND		ug/kg	180	47.	1
2,4-Dinitrotoluene	ND		ug/kg	180	36.	1
2,6-Dinitrotoluene	ND		ug/kg	180	30.	1
Fluoranthene	570		ug/kg	110	20.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	180	19.	1
4-Bromophenyl phenyl ether	ND		ug/kg	180	27.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	210	30.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	190	18.	1
Hexachlorobutadiene	ND		ug/kg	180	26.	1
Hexachlorocyclopentadiene	ND		ug/kg	510	160	1
Hexachloroethane	ND		ug/kg	140	29.	1
Isophorone	ND		ug/kg	160	23.	1
Naphthalene	71	J	ug/kg	180	22.	1
Nitrobenzene	ND		ug/kg	160	26.	1
NDPA/DPA	ND		ug/kg	140	20.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	180	28.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	180	62.	1
Butyl benzyl phthalate	ND		ug/kg	180	45.	1
Di-n-butylphthalate	ND		ug/kg	180	34.	1
Di-n-octylphthalate	ND		ug/kg	180	61.	1
Diethyl phthalate	ND		ug/kg	180	16.	1
Dimethyl phthalate	ND		ug/kg	180	37.	1
Benzo(a)anthracene	200		ug/kg	110	20.	1
Benzo(a)pyrene	210		ug/kg	140	44.	1
Benzo(b)fluoranthene	300		ug/kg	110	30.	1
Benzo(k)fluoranthene	98	J	ug/kg	110	28.	1

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-05	Date Collected:	12/12/17 10:40
Client ID:	SB6 (1.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Chrysene	240		ug/kg	110	18.	1
Acenaphthylene	34	J	ug/kg	140	28.	1
Anthracene	83	J	ug/kg	110	35.	1
Benzo(ghi)perylene	160		ug/kg	140	21.	1
Fluorene	32	J	ug/kg	180	17.	1
Phenanthrene	430		ug/kg	110	22.	1
Dibenzo(a,h)anthracene	46	J	ug/kg	110	21.	1
Indeno(1,2,3-cd)pyrene	150		ug/kg	140	25.	1
Pyrene	460		ug/kg	110	18.	1
Biphenyl	ND		ug/kg	410	41.	1
4-Chloroaniline	ND		ug/kg	180	32.	1
2-Nitroaniline	ND		ug/kg	180	34.	1
3-Nitroaniline	ND		ug/kg	180	34.	1
4-Nitroaniline	ND		ug/kg	180	74.	1
Dibenzofuran	43	J	ug/kg	180	17.	1
2-Methylnaphthalene	87	J	ug/kg	210	22.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	180	19.	1
Acetophenone	ND		ug/kg	180	22.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	34.	1
p-Chloro-m-cresol	ND		ug/kg	180	26.	1
2-Chlorophenol	ND		ug/kg	180	21.	1
2,4-Dichlorophenol	ND		ug/kg	160	29.	1
2,4-Dimethylphenol	ND		ug/kg	180	59.	1
2-Nitrophenol	ND		ug/kg	380	67.	1
4-Nitrophenol	ND		ug/kg	250	73.	1
2,4-Dinitrophenol	ND		ug/kg	860	83.	1
4,6-Dinitro-o-cresol	ND		ug/kg	460	86.	1
Pentachlorophenol	ND		ug/kg	140	39.	1
Phenol	ND		ug/kg	180	27.	1
2-Methylphenol	ND		ug/kg	180	28.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	260	28.	1
2,4,5-Trichlorophenol	ND		ug/kg	180	34.	1
Carbazole	52	J	ug/kg	180	17.	1
Atrazine	ND		ug/kg	140	62.	1
Benzaldehyde	ND		ug/kg	240	48.	1
Caprolactam	ND		ug/kg	180	54.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	180	36.	1

SAMPLE RESULTS

Lab ID:	L1746058-05	Date Collected:	12/12/17 10:40
Client ID:	SB6 (1.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**

Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	**% Recovery**	**Qualifier**	**Acceptance Criteria**
2-Fluorophenol	63		25-120
Phenol-d6	62		10-120
Nitrobenzene-d5	66		23-120
2-Fluorobiphenyl	70		30-120
2,4,6-Tribromophenol	59		10-136
4-Terphenyl-d14	59		18-120

SAMPLE RESULTS

Lab ID:	L1746058-06	Date Collected:	12/12/17 11:25
Client ID:	SB8 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3546
Matrix:	Soil	Extraction Date:	12/17/17 19:06
Analytical Method:	1,8270D		
Analytical Date:	12/19/17 20:34		
Analyst:	CB		
Percent Solids:	88%		

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	ND		ug/kg	150	19.	1
Hexachlorobenzene	ND		ug/kg	110	21.	1
Bis(2-chloroethyl)ether	ND		ug/kg	170	25.	1
2-Chloronaphthalene	ND		ug/kg	190	18.	1
3,3'-Dichlorobenzidine	ND		ug/kg	190	50.	1
2,4-Dinitrotoluene	ND		ug/kg	190	37.	1
2,6-Dinitrotoluene	ND		ug/kg	190	32.	1
Fluoranthene	150		ug/kg	110	21.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	190	20.	1
4-Bromophenyl phenyl ether	ND		ug/kg	190	28.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	220	32.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	200	19.	1
Hexachlorobutadiene	ND		ug/kg	190	27.	1
Hexachlorocyclopentadiene	ND		ug/kg	530	170	1
Hexachloroethane	ND		ug/kg	150	30.	1
Isophorone	ND		ug/kg	170	24.	1
Naphthalene	120	J	ug/kg	190	23.	1
Nitrobenzene	ND		ug/kg	170	28.	1
NDPA/DPA	ND		ug/kg	150	21.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	190	29.	1
Bis(2-ethylhexyl)phthalate	150	J	ug/kg	190	65.	1
Butyl benzyl phthalate	ND		ug/kg	190	47.	1
Di-n-butylphthalate	ND		ug/kg	190	35.	1
Di-n-octylphthalate	ND		ug/kg	190	64.	1
Diethyl phthalate	ND		ug/kg	190	17.	1
Dimethyl phthalate	ND		ug/kg	190	39.	1
Benzo(a)anthracene	80	J	ug/kg	110	21.	1
Benzo(a)pyrene	81	J	ug/kg	150	46.	1
Benzo(b)fluoranthene	120		ug/kg	110	31.	1
Benzo(k)fluoranthene	35	J	ug/kg	110	30.	1

SAMPLE RESULTS

Lab ID:	L1746058-06	Date Collected:	12/12/17 11:25
Client ID:	SB8 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Chrysene	100	J	ug/kg	110	19.	1
Acenaphthylene	ND		ug/kg	150	29.	1
Anthracene	ND		ug/kg	110	36.	1
Benzo(ghi)perylene	98	J	ug/kg	150	22.	1
Fluorene	ND		ug/kg	190	18.	1
Phenanthrene	160		ug/kg	110	23.	1
Dibenzo(a,h)anthracene	ND		ug/kg	110	22.	1
Indeno(1,2,3-cd)pyrene	66	J	ug/kg	150	26.	1
Pyrene	160		ug/kg	110	18.	1
Biphenyl	ND		ug/kg	420	43.	1
4-Chloroaniline	ND		ug/kg	190	34.	1
2-Nitroaniline	ND		ug/kg	190	36.	1
3-Nitroaniline	ND		ug/kg	190	35.	1
4-Nitroaniline	ND		ug/kg	190	77.	1
Dibenzofuran	46	J	ug/kg	190	18.	1
2-Methylnaphthalene	170	J	ug/kg	220	22.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	190	20.	1
Acetophenone	ND		ug/kg	190	23.	1
2,4,6-Trichlorophenol	ND		ug/kg	110	35.	1
p-Chloro-m-cresol	ND		ug/kg	190	28.	1
2-Chlorophenol	ND		ug/kg	190	22.	1
2,4-Dichlorophenol	ND		ug/kg	170	30.	1
2,4-Dimethylphenol	ND		ug/kg	190	62.	1
2-Nitrophenol	ND		ug/kg	400	70.	1
4-Nitrophenol	ND		ug/kg	260	76.	1
2,4-Dinitrophenol	ND		ug/kg	900	87.	1
4,6-Dinitro-o-cresol	ND		ug/kg	480	90.	1
Pentachlorophenol	ND		ug/kg	150	41.	1
Phenol	ND		ug/kg	190	28.	1
2-Methylphenol	ND		ug/kg	190	29.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	270	29.	1
2,4,5-Trichlorophenol	ND		ug/kg	190	36.	1
Carbazole	ND		ug/kg	190	18.	1
Atrazine	ND		ug/kg	150	65.	1
Benzaldehyde	67	J	ug/kg	250	50.	1
Caprolactam	ND		ug/kg	190	57.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	190	38.	1

SAMPLE RESULTS

Lab ID:	L1746058-06	Date Collected:	12/12/17 11:25
Client ID:	SB8 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	37		25-120
Phenol-d6	60		10-120
Nitrobenzene-d5	63		23-120
2-Fluorobiphenyl	64		30-120
2,4,6-Tribromophenol	18		10-136
4-Terphenyl-d14	65		18-120

SAMPLE RESULTS

Lab ID:	L1746058-07	Date Collected:	12/12/17 11:55
Client ID:	SB10 (0-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3546
Matrix:	Soil	Extraction Date:	12/17/17 19:06
Analytical Method:	1,8270D		
Analytical Date:	12/19/17 21:00		
Analyst:	CB		
Percent Solids:	83%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	38	J	ug/kg	160	20.	1
Hexachlorobenzene	ND		ug/kg	120	22.	1
Bis(2-chloroethyl)ether	ND		ug/kg	180	27.	1
2-Chloronaphthalene	ND		ug/kg	200	19.	1
3,3'-Dichlorobenzidine	ND		ug/kg	200	52.	1
2,4-Dinitrotoluene	ND		ug/kg	200	39.	1
2,6-Dinitrotoluene	ND		ug/kg	200	34.	1
Fluoranthene	990		ug/kg	120	22.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	200	21.	1
4-Bromophenyl phenyl ether	ND		ug/kg	200	30.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	240	34.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	210	20.	1
Hexachlorobutadiene	ND		ug/kg	200	29.	1
Hexachlorocyclopentadiene	ND		ug/kg	560	180	1
Hexachloroethane	ND		ug/kg	160	32.	1
Isophorone	ND		ug/kg	180	26.	1
Naphthalene	160	J	ug/kg	200	24.	1
Nitrobenzene	ND		ug/kg	180	29.	1
NDPA/DPA	ND		ug/kg	160	22.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	200	30.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	200	68.	1
Butyl benzyl phthalate	ND		ug/kg	200	50.	1
Di-n-butylphthalate	82	J	ug/kg	200	37.	1
Di-n-octylphthalate	ND		ug/kg	200	67.	1
Diethyl phthalate	ND		ug/kg	200	18.	1
Dimethyl phthalate	ND		ug/kg	200	41.	1
Benzo(a)anthracene	960		ug/kg	120	22.	1
Benzo(a)pyrene	1000		ug/kg	160	48.	1
Benzo(b)fluoranthene	2000		ug/kg	120	33.	1
Benzo(k)fluoranthene	580		ug/kg	120	31.	1

SAMPLE RESULTS

Lab ID: L1746058-07 Date Collected: 12/12/17 11:55

Client ID: SB10 (0-3') Date Received: 12/13/17

Sample Location: 27-37 CHANDLER ST., BUFFALO, NY Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Chrysene	930		ug/kg	120	20.	1
Acenaphthylene	130	J	ug/kg	160	30.	1
Anthracene	230		ug/kg	120	38.	1
Benzo(ghi)perylene	900		ug/kg	160	23.	1
Fluorene	48	J	ug/kg	200	19.	1
Phenanthrene	510		ug/kg	120	24.	1
Dibenzo(a,h)anthracene	260		ug/kg	120	23.	1
Indeno(1,2,3-cd)pyrene	1100		ug/kg	160	27.	1
Pyrene	920		ug/kg	120	20.	1
Biphenyl	ND		ug/kg	450	46.	1
4-Chloroaniline	ND		ug/kg	200	36.	1
2-Nitroaniline	ND		ug/kg	200	38.	1
3-Nitroaniline	ND		ug/kg	200	37.	1
4-Nitroaniline	ND		ug/kg	200	81.	1
Dibenzofuran	44	J	ug/kg	200	18.	1
2-Methylnaphthalene	110	J	ug/kg	240	24.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	200	20.	1
Acetophenone	ND		ug/kg	200	24.	1
2,4,6-Trichlorophenol	ND		ug/kg	120	37.	1
p-Chloro-m-cresol	ND		ug/kg	200	29.	1
2-Chlorophenol	ND		ug/kg	200	23.	1
2,4-Dichlorophenol	ND		ug/kg	180	32.	1
2,4-Dimethylphenol	ND		ug/kg	200	65.	1
2-Nitrophenol	ND		ug/kg	420	74.	1
4-Nitrophenol	ND		ug/kg	280	80.	1
2,4-Dinitrophenol	ND		ug/kg	940	92.	1
4,6-Dinitro-o-cresol	ND		ug/kg	510	94.	1
Pentachlorophenol	ND		ug/kg	160	43.	1
Phenol	ND		ug/kg	200	30.	1
2-Methylphenol	ND		ug/kg	200	30.	1
3-Methylphenol/4-Methylphenol	ND		ug/kg	280	31.	1
2,4,5-Trichlorophenol	ND		ug/kg	200	38.	1
Carbazole	120	J	ug/kg	200	19.	1
Atrazine	ND		ug/kg	160	69.	1
Benzaldehyde	ND		ug/kg	260	53.	1
Caprolactam	ND		ug/kg	200	60.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	200	40.	1

SAMPLE RESULTS

Lab ID: L1746058-07
Client ID: SB10 (0-3')
Sample Location: 27-37 CHANDLER ST., BUFFALO, NY
Date Collected: 12/12/17 11:55
Date Received: 12/13/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	70		25-120
Phenol-d6	73		10-120
Nitrobenzene-d5	72		23-120
2-Fluorobiphenyl	75		30-120
2,4,6-Tribromophenol	71		10-136
4-Terphenyl-d14	65		18-120

SAMPLE RESULTS

Lab ID: L1746058-08
Client ID: SB12 (0-3')
Sample Location: 27-37 CHANDLER ST., BUFFALO, NY

Matrix: Soil
Analytical Method: 1,8270D
Analytical Date: 12/19/17 21:25
Analyst: CB
Percent Solids: 78%

Date Collected: 12/12/17 11:30
Date Received: 12/13/17
Field Prep: Not Specified
Extraction Method: EPA 3546
Extraction Date: 12/17/17 19:06

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Semivolatile Organics by GC/MS - Westborough Lab						
Acenaphthene	970		ug/kg	170	22.	1
Hexachlorobenzene	ND		ug/kg	130	24.	1
Bis(2-chloroethyl)ether	ND		ug/kg	190	28.	1
2-Chloronaphthalene	ND		ug/kg	210	21.	1
3,3'-Dichlorobenzidine	ND		ug/kg	210	56.	1
2,4-Dinitrotoluene	ND		ug/kg	210	42.	1
2,6-Dinitrotoluene	ND		ug/kg	210	36.	1
Fluoranthene	8000		ug/kg	130	24.	1
4-Chlorophenyl phenyl ether	ND		ug/kg	210	22.	1
4-Bromophenyl phenyl ether	ND		ug/kg	210	32.	1
Bis(2-chloroisopropyl)ether	ND		ug/kg	250	36.	1
Bis(2-chloroethoxy)methane	ND		ug/kg	230	21.	1
Hexachlorobutadiene	ND		ug/kg	210	31.	1
Hexachlorocyclopentadiene	ND		ug/kg	600	190	1
Hexachloroethane	ND		ug/kg	170	34.	1
Isophorone	ND		ug/kg	190	27.	1
Naphthalene	1200		ug/kg	210	26.	1
Nitrobenzene	ND		ug/kg	190	31.	1
NDPA/DPA	ND		ug/kg	170	24.	1
n-Nitrosodi-n-propylamine	ND		ug/kg	210	32.	1
Bis(2-ethylhexyl)phthalate	ND		ug/kg	210	73.	1
Butyl benzyl phthalate	ND		ug/kg	210	53.	1
Di-n-butylphthalate	ND		ug/kg	210	40.	1
Di-n-octylphthalate	ND		ug/kg	210	72.	1
Diethyl phthalate	ND		ug/kg	210	20.	1
Dimethyl phthalate	ND		ug/kg	210	44.	1
Benzo(a)anthracene	4000		ug/kg	130	24.	1
Benzo(a)pyrene	3900		ug/kg	170	51.	1
Benzo(b)fluoranthene	5200		ug/kg	130	35.	1
Benzo(k)fluoranthene	1500		ug/kg	130	34.	1

SAMPLE RESULTS

Lab ID:	L1746058-08	Date Collected:	12/12/17 11:30
Client ID:	SB12 (0-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**
Semivolatile Organics by GC/MS - Westborough Lab						
Chrysene	4000		ug/kg	130	22.	1
Acenaphthylene	220		ug/kg	170	32.	1
Anthracene	1800		ug/kg	130	41.	1
Benzo(ghi)perylene	2400		ug/kg	170	25.	1
Fluorene	870		ug/kg	210	20.	1
Phenanthrene	7500		ug/kg	130	26.	1
Dibenzo(a,h)anthracene	780		ug/kg	130	24.	1
Indeno(1,2,3-cd)pyrene	2500		ug/kg	170	29.	1
Pyrene	6700		ug/kg	130	21.	1
Biphenyl	140	J	ug/kg	480	49.	1
4-Chloroaniline	ND		ug/kg	210	38.	1
2-Nitroaniline	ND		ug/kg	210	41.	1
3-Nitroaniline	ND		ug/kg	210	40.	1
4-Nitroaniline	ND		ug/kg	210	87.	1
Dibenzofuran	590		ug/kg	210	20.	1
2-Methylnaphthalene	640		ug/kg	250	25.	1
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	210	22.	1
Acetophenone	ND		ug/kg	210	26.	1
2,4,6-Trichlorophenol	ND		ug/kg	130	40.	1
p-Chloro-m-cresol	ND		ug/kg	210	31.	1
2-Chlorophenol	ND		ug/kg	210	25.	1
2,4-Dichlorophenol	ND		ug/kg	190	34.	1
2,4-Dimethylphenol	ND		ug/kg	210	70.	1
2-Nitrophenol	ND		ug/kg	450	79.	1
4-Nitrophenol	ND		ug/kg	290	86.	1
2,4-Dinitrophenol	ND		ug/kg	1000	98.	1
4,6-Dinitro-o-cresol	ND		ug/kg	550	100	1
Pentachlorophenol	ND		ug/kg	170	46.	1
Phenol	ND		ug/kg	210	32.	1
2-Methylphenol	ND		ug/kg	210	33.	1
3-Methylphenol/4-Methylphenol	47	J	ug/kg	300	33.	1
2,4,5-Trichlorophenol	ND		ug/kg	210	40.	1
Carbazole	850		ug/kg	210	20.	1
Atrazine	ND		ug/kg	170	74.	1
Benzaldehyde	ND		ug/kg	280	57.	1
Caprolactam	ND		ug/kg	210	64.	1
2,3,4,6-Tetrachlorophenol	ND		ug/kg	210	42.	1

SAMPLE RESULTS

Lab ID:	L1746058-08	Date Collected:	12/12/17 11:30
Client ID:	SB12 (0-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**

Semivolatile Organics by GC/MS - Westborough Lab

Surrogate	**% Recovery**	**Qualifier**	**Acceptance Criteria**
2-Fluorophenol	59		25-120
Phenol-d6	59		10-120
Nitrobenzene-d5	60		23-120
2-Fluorobiphenyl	72		30-120
2,4,6-Tribromophenol	55		10-136
4-Terphenyl-d14	59		18-120

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 12/18/17 20:34
Analyst: EK

Extraction Method: EPA 3546
Extraction Date: 12/17/17 19:06

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 03-08 Batch: WG1073729-1					
Acenaphthene	ND		ug/kg	130	17.
Hexachlorobenzene	ND		ug/kg	97	18.
Bis(2-chloroethyl)ether	ND		ug/kg	140	22.
2-Chloronaphthalene	ND		ug/kg	160	16.
3,3'-Dichlorobenzidine	ND		ug/kg	160	43.
2,4-Dinitrotoluene	ND		ug/kg	160	32.
2,6-Dinitrotoluene	ND		ug/kg	160	28.
Fluoranthene	ND		ug/kg	97	18.
4-Chlorophenyl phenyl ether	ND		ug/kg	160	17.
4-Bromophenyl phenyl ether	ND		ug/kg	160	25.
Bis(2-chloroisopropyl)ether	ND		ug/kg	190	28.
Bis(2-chloroethoxy)methane	ND		ug/kg	170	16.
Hexachlorobutadiene	ND		ug/kg	160	24.
Hexachlorocyclopentadiene	ND		ug/kg	460	150
Hexachloroethane	ND		ug/kg	130	26.
Isophorone	ND		ug/kg	140	21.
Naphthalene	ND		ug/kg	160	20.
Nitrobenzene	ND		ug/kg	140	24.
NDPA/DPA	ND		ug/kg	130	18.
n-Nitrosodi-n-propylamine	ND		ug/kg	160	25.
Bis(2-ethylhexyl)phthalate	ND		ug/kg	160	56.
Butyl benzyl phthalate	ND		ug/kg	160	41.
Di-n-butylphthalate	ND		ug/kg	160	31.
Di-n-octylphthalate	ND		ug/kg	160	55.
Diethyl phthalate	ND		ug/kg	160	15.
Dimethyl phthalate	ND		ug/kg	160	34.
Benzo(a)anthracene	ND		ug/kg	97	18.
Benzo(a)pyrene	ND		ug/kg	130	39.
Benzo(b)fluoranthene	ND		ug/kg	97	27.

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 12/18/17 20:34
Analyst: EK

Extraction Method: EPA 3546
Extraction Date: 12/17/17 19:06

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 03-08 Batch: WG1073729-1					
Benzo(k)fluoranthene	ND		ug/kg	97	26.
Chrysene	ND		ug/kg	97	17.
Acenaphthylene	ND		ug/kg	130	25.
Anthracene	ND		ug/kg	97	32.
Benzo(ghi)perylene	ND		ug/kg	130	19.
Fluorene	ND		ug/kg	160	16.
Phenanthrene	ND		ug/kg	97	20.
Dibenzo(a,h)anthracene	ND		ug/kg	97	19.
Indeno(1,2,3-cd)pyrene	ND		ug/kg	130	22.
Pyrene	ND		ug/kg	97	16.
Biphenyl	ND		ug/kg	370	38.
4-Chloroaniline	ND		ug/kg	160	29.
2-Nitroaniline	ND		ug/kg	160	31.
3-Nitroaniline	ND		ug/kg	160	30.
4-Nitroaniline	ND		ug/kg	160	67.
Dibenzofuran	ND		ug/kg	160	15.
2-Methylnaphthalene	ND		ug/kg	190	20.
1,2,4,5-Tetrachlorobenzene	ND		ug/kg	160	17.
Acetophenone	ND		ug/kg	160	20.
2,4,6-Trichlorophenol	ND		ug/kg	97	31.
p-Chloro-m-cresol	ND		ug/kg	160	24.
2-Chlorophenol	ND		ug/kg	160	19.
2,4-Dichlorophenol	ND		ug/kg	140	26.
2,4-Dimethylphenol	ND		ug/kg	160	53.
2-Nitrophenol	ND		ug/kg	350	61.
4-Nitrophenol	ND		ug/kg	230	66.
2,4-Dinitrophenol	ND		ug/kg	780	75.
4,6-Dinitro-o-cresol	ND		ug/kg	420	78.
Pentachlorophenol	ND		ug/kg	130	36.

Method Blank Analysis
Batch Quality Control

Analytical Method:	1,8270D	Extraction Method:	EPA 3546
Analytical Date:	12/18/17 20:34	Extraction Date:	12/17/17 19:06
Analyst:	EK		

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 03-08 Batch: WG1073729-1					
Phenol	ND		ug/kg	160	24.
2-Methylphenol	ND		ug/kg	160	25.
3-Methylphenol/4-Methylphenol	ND		ug/kg	230	25.
2,4,5-Trichlorophenol	ND		ug/kg	160	31.
Carbazole	ND		ug/kg	160	16.
Atrazine	ND		ug/kg	130	57.
Benzaldehyde	ND		ug/kg	210	44.
Caprolactam	ND		ug/kg	160	49.
2,3,4,6-Tetrachlorophenol	ND		ug/kg	160	33.

Tentatively Identified Compounds			
No Tentatively Identified Compounds	ND		ug/kg

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	66		25-120
Phenol-d6	68		10-120
Nitrobenzene-d5	62		23-120
2-Fluorobiphenyl	72		30-120
2,4,6-Tribromophenol	55		10-136
4-Terphenyl-d14	85		18-120

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

Method Blank Analysis
Batch Quality Control

Analytical Method:	1,8270D	Extraction Method:	EPA 3510C
Analytical Date:	12/20/17 01:18	Extraction Date:	12/19/17 05:15
Analyst:	CB		

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1074207-1					
Bis(2-chloroethyl)ether	ND		ug/l	2.0	0.67
3,3'-Dichlorobenzidine	ND		ug/l	5.0	1.4
2,4-Dinitrotoluene	ND		ug/l	5.0	0.84
2,6-Dinitrotoluene	ND		ug/l	5.0	1.1
4-Chlorophenyl phenyl ether	ND		ug/l	2.0	0.62
4-Bromophenyl phenyl ether	ND		ug/l	2.0	0.73
Bis(2-chloroisopropyl)ether	ND		ug/l	2.0	0.70
Bis(2-chloroethoxy)methane	ND		ug/l	5.0	0.63
Hexachlorocyclopentadiene	ND		ug/l	20	7.8
Isophorone	ND		ug/l	5.0	0.60
Nitrobenzene	ND		ug/l	2.0	0.75
NDPA/DPA	ND		ug/l	2.0	0.64
n-Nitrosodi-n-propylamine	ND		ug/l	5.0	0.70
Bis(2-ethylhexyl)phthalate	ND		ug/l	3.0	0.91
Butyl benzyl phthalate	ND		ug/l	5.0	1.3
Di-n-butylphthalate	ND		ug/l	5.0	0.69
Di-n-octylphthalate	ND		ug/l	5.0	1.1
Diethyl phthalate	ND		ug/l	5.0	0.63
Dimethyl phthalate	ND		ug/l	5.0	0.65
Biphenyl	ND		ug/l	2.0	0.76
4-Chloroaniline	ND		ug/l	5.0	0.63
2-Nitroaniline	ND		ug/l	5.0	1.1
3-Nitroaniline	ND		ug/l	5.0	1.2
4-Nitroaniline	ND		ug/l	5.0	1.3
Dibenzofuran	ND		ug/l	2.0	0.66
1,2,4,5-Tetrachlorobenzene	ND		ug/l	10	0.67
Acetophenone	ND		ug/l	5.0	0.85
2,4,6-Trichlorophenol	ND		ug/l	5.0	0.68
p-Chloro-m-cresol	ND		ug/l	2.0	0.62

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 12/20/17 01:18
Analyst: CB

Extraction Method: EPA 3510C
Extraction Date: 12/19/17 05:15

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1074207-1					
2-Chlorophenol	ND		ug/l	2.0	0.63
2,4-Dichlorophenol	ND		ug/l	5.0	0.77
2,4-Dimethylphenol	ND		ug/l	5.0	1.6
2-Nitrophenol	ND		ug/l	10	1.5
4-Nitrophenol	ND		ug/l	10	1.8
2,4-Dinitrophenol	ND		ug/l	20	5.5
4,6-Dinitro-o-cresol	ND		ug/l	10	2.1
Phenol	ND		ug/l	5.0	1.9
3-Methylphenol/4-Methylphenol	ND		ug/l	5.0	1.1
2,4,5-Trichlorophenol	ND		ug/l	5.0	0.72
Carbazole	ND		ug/l	2.0	0.63
Atrazine	ND		ug/l	10	1.8
Benzaldehyde	ND		ug/l	5.0	1.1
Caprolactam	ND		ug/l	10	3.6
2,3,4,6-Tetrachlorophenol	ND		ug/l	5.0	0.93

Tentatively Identified Compounds			
Total TIC Compounds	5.87	J	ug/l
Aldol Condensates	5.87	J	ug/l

Project Name: PH. II ESA **Lab Number:** L1746058
Project Number: E1646 **Report Date:** 12/21/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 12/20/17 01:18
Analyst: CB

Extraction Method: EPA 3510C
Extraction Date: 12/19/17 05:15

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1074207-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	38		21-120
Phenol-d6	26		10-120
Nitrobenzene-d5	54		23-120
2-Fluorobiphenyl	66		15-120
2,4,6-Tribromophenol	83		10-120
4-Terphenyl-d14	93		41-149

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 12/20/17 11:28
Analyst: DV

Extraction Method: EPA 3510C
Extraction Date: 12/19/17 05:26

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-02 Batch: WG1074210-1					
Acenaphthene	ND		ug/l	0.10	0.04
2-Chloronaphthalene	ND		ug/l	0.20	0.04
Fluoranthene	ND		ug/l	0.10	0.04
Hexachlorobutadiene	ND		ug/l	0.50	0.04
Naphthalene	ND		ug/l	0.10	0.04
Benzo(a)anthracene	ND		ug/l	0.10	0.02
Benzo(a)pyrene	ND		ug/l	0.10	0.04
Benzo(b)fluoranthene	ND		ug/l	0.10	0.02
Benzo(k)fluoranthene	ND		ug/l	0.10	0.04
Chrysene	ND		ug/l	0.10	0.04
Acenaphthylene	ND		ug/l	0.10	0.04
Anthracene	ND		ug/l	0.10	0.04
Benzo(ghi)perylene	ND		ug/l	0.10	0.04
Fluorene	ND		ug/l	0.10	0.04
Phenanthrene	ND		ug/l	0.10	0.02
Dibenzo(a,h)anthracene	ND		ug/l	0.10	0.04
Indeno(1,2,3-cd)pyrene	ND		ug/l	0.10	0.04
Pyrene	ND		ug/l	0.10	0.04
2-Methylnaphthalene	ND		ug/l	0.10	0.05
Pentachlorophenol	ND		ug/l	0.80	0.22
Hexachlorobenzene	ND		ug/l	0.80	0.03
Hexachloroethane	ND		ug/l	0.80	0.03

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D-SIM
Analytical Date: 12/20/17 11:28
Analyst: DV

Extraction Method: EPA 3510C
Extraction Date: 12/19/17 05:26

Parameter	Result	Qualifier	Units	RL	MDL
Semivolatile Organics by GC/MS-SIM - Westborough Lab for sample(s): 01-02 Batch: WG1074210-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Fluorophenol	36		21-120
Phenol-d6	24		10-120
Nitrobenzene-d5	55		23-120
2-Fluorobiphenyl	62		15-120
2,4,6-Tribromophenol	84		10-120
4-Terphenyl-d14	84		41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 03-08 Batch: WG1073729-2 WG1073729-3								
Acenaphthene	76		80		31-137	5		50
Hexachlorobenzene	76		83		40-140	9		50
Bis(2-chloroethyl)ether	73		71		40-140	3		50
2-Chloronaphthalene	72		79		40-140	9		50
3,3'-Dichlorobenzidine	**35**	Q	44		40-140	23		50
2,4-Dinitrotoluene	79		87		40-132	10		50
2,6-Dinitrotoluene	76		85		40-140	11		50
Fluoranthene	80		88		40-140	10		50
4-Chlorophenyl phenyl ether	78		83		40-140	6		50
4-Bromophenyl phenyl ether	77		84		40-140	9		50
Bis(2-chloroisopropyl)ether	80		81		40-140	1		50
Bis(2-chloroethoxy)methane	72		74		40-117	3		50
Hexachlorobutadiene	77		76		40-140	1		50
Hexachlorocyclopentadiene	77		79		40-140	3		50
Hexachloroethane	68		63		40-140	8		50
Isophorone	72		73		40-140	1		50
Naphthalene	74		76		40-140	3		50
Nitrobenzene	71		72		40-140	1		50
NDPA/DPA	77		85		36-157	10		50
n-Nitrosodi-n-propylamine	70		73		32-121	4		50
Bis(2-ethylhexyl)phthalate	78		88		40-140	12		50
Butyl benzyl phthalate	78		87		40-140	11		50
Di-n-butylphthalate	78		85		40-140	9		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA
Lab Number: L1746058
Project Number: E1646
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 03-08 Batch: WG1073729-2 WG1073729-3								
Di-n-octylphthalate	78		88		40-140	12		50
Diethyl phthalate	76		83		40-140	9		50
Dimethyl phthalate	73		83		40-140	13		50
Benzo(a)anthracene	78		87		40-140	11		50
Benzo(a)pyrene	79		89		40-140	12		50
Benzo(b)fluoranthene	76		90		40-140	17		50
Benzo(k)fluoranthene	81		88		40-140	8		50
Chrysene	78		88		40-140	12		50
Acenaphthylene	72		79		40-140	9		50
Anthracene	78		84		40-140	7		50
Benzo(ghi)perylene	79		89		40-140	12		50
Fluorene	75		81		40-140	8		50
Phenanthrene	77		85		40-140	10		50
Dibenzo(a,h)anthracene	80		90		40-140	12		50
Indeno(1,2,3-cd)pyrene	77		88		40-140	13		50
Pyrene	78		86		35-142	10		50
Biphenyl	77		84		54-104	9		50
4-Chloroaniline	**26**	Q	**36**	Q	40-140	32		50
2-Nitroaniline	72		82		47-134	13		50
3-Nitroaniline	47		53		26-129	12		50
4-Nitroaniline	72		81		41-125	12		50
Dibenzofuran	75		80		40-140	6		50
2-Methylnaphthalene	73		78		40-140	7		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA

Project Number: E1646

Lab Number: L1746058

Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 03-08 Batch: WG1073729-2 WG1073729-3								
1,2,4,5-Tetrachlorobenzene	80		84		40-117	5		50
Acetophenone	75		76		14-144	1		50
2,4,6-Trichlorophenol	77		83		30-130	8		50
p-Chloro-m-cresol	76		83		26-103	9		50
2-Chlorophenol	76		76		25-102	0		50
2,4-Dichlorophenol	76		78		30-130	3		50
2,4-Dimethylphenol	72		74		30-130	3		50
2-Nitrophenol	73		76		30-130	4		50
4-Nitrophenol	84		95		11-114	12		50
2,4-Dinitrophenol	29		32		4-130	10		50
4,6-Dinitro-o-cresol	67		78		10-130	15		50
Pentachlorophenol	78		90		17-109	14		50
Phenol	74		74		26-90	0		50
2-Methylphenol	75		75		30-130.	0		50
3-Methylphenol/4-Methylphenol	76		77		30-130	1		50
2,4,5-Trichlorophenol	80		89		30-130	11		50
Carbazole	79		87		54-128	10		50
Atrazine	76		86		40-140	12		50
Benzaldehyde	68		66		40-140	3		50
Caprolactam	82		91		15-130	10		50
2,3,4,6-Tetrachlorophenol	90		96		40-140	6		50

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA

Project Number: E1646

Lab Number: L1746058

Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 03-08 Batch: WG1073729-2 WG1073729-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	78		78		25-120
Phenol-d6	77		79		10-120
Nitrobenzene-d5	70		73		23-120
2-Fluorobiphenyl	74		83		30-120
2,4,6-Tribromophenol	82		93		10-136
4-Terphenyl-d14	81		91		18-120

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1074207-2 WG1074207-3								
Bis(2-chloroethyl)ether	69		75		40-140	8		30
3,3'-Dichlorobenzidine	65		66		40-140	2		30
2,4-Dinitrotoluene	87		87		48-143	0		30
2,6-Dinitrotoluene	86		88		40-140	2		30
4-Chlorophenyl phenyl ether	82		83		40-140	1		30
4-Bromophenyl phenyl ether	85		83		40-140	2		30
Bis(2-chloroisopropyl)ether	78		84		40-140	7		30
Bis(2-chloroethoxy)methane	73		80		40-140	9		30
Hexachlorocyclopentadiene	73		73		40-140	0		30
Isophorone	74		80		40-140	8		30
Nitrobenzene	69		76		40-140	10		30
NDPA/DPA	84		84		40-140	0		30
n-Nitrosodi-n-propylamine	71		77		29-132	8		30
Bis(2-ethylhexyl)phthalate	86		88		40-140	2		30
Butyl benzyl phthalate	89		85		40-140	5		30
Di-n-butylphthalate	86		85		40-140	1		30
Di-n-octylphthalate	86		88		40-140	2		30
Diethyl phthalate	83		85		40-140	2		30
Dimethyl phthalate	84		85		40-140	1		30
Biphenyl	81		86		40-140	6		30
4-Chloroaniline	54		60		40-140	11		30
2-Nitroaniline	84		86		52-143	2		30
3-Nitroaniline	65		66		25-145	2		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: PH. II ESA

Project Number: E1646

Lab Number: L1746058

Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1074207-2 WG1074207-3								
4-Nitroaniline	82		81		51-143	1		30
Dibenzofuran	78		82		40-140	5		30
1,2,4,5-Tetrachlorobenzene	78		84		2-134	7		30
Acetophenone	74		81		39-129	9		30
2,4,6-Trichlorophenol	86		88		30-130	2		30
p-Chloro-m-cresol	81		83		23-97	2		30
2-Chlorophenol	70		76		27-123	8		30
2,4-Dichlorophenol	79		84		30-130	6		30
2,4-Dimethylphenol	71		80		30-130	12		30
2-Nitrophenol	76		84		30-130	10		30
4-Nitrophenol	60		58		10-80	3		30
2,4-Dinitrophenol	77		76		20-130	1		30
4,6-Dinitro-o-cresol	88		86		20-164	2		30
Phenol	38		40		12-110	5		30
3-Methylphenol/4-Methylphenol	65		68		30-130	5		30
2,4,5-Trichlorophenol	91		92		30-130	1		30
Carbazole	84		85		55-144	1		30
Atrazine	82		81		40-140	1		30
Benzaldehyde	69		78		40-140	12		30
Caprolactam	28		26		10-130	7		30
2,3,4,6-Tetrachlorophenol	96		98		40-140	2		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: PH. II ESA
Lab Number: L1746058
Project Number: E1646
Report Date: 12/21/17

Parameter	*LCS %Recovery*	*Qual*	*LCSD %Recovery*	*Qual*	*%Recovery Limits*	*RPD*	*Qual*	*RPD Limits*

Semivolatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1074207-2 WG1074207-3

Surrogate	*LCS %Recovery*	*Qual*	*LCSD %Recovery*	*Qual*	*Acceptance Criteria*
2-Fluorophenol	51		56		21-120
Phenol-d6	36		39		10-120
Nitrobenzene-d5	70		78		23-120
2-Fluorobiphenyl	79		83		15-120
2,4,6-Tribromophenol	94		96		10-120
4-Terphenyl-d14	92		91		41-149

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA
Lab Number: L1746058
Project Number: E1646
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-02 Batch: WG1074210-2 WG1074210-3								
Acenaphthene	73		68		40-140	7		40
2-Chloronaphthalene	74		68		40-140	8		40
Fluoranthene	81		78		40-140	4		40
Hexachlorobutadiene	70		63		40-140	11		40
Naphthalene	68		62		40-140	9		40
Benzo(a)anthracene	78		74		40-140	5		40
Benzo(a)pyrene	86		82		40-140	5		40
Benzo(b)fluoranthene	81		78		40-140	4		40
Benzo(k)fluoranthene	82		78		40-140	5		40
Chrysene	74		71		40-140	4		40
Acenaphthylene	81		74		40-140	9		40
Anthracene	82		78		40-140	5		40
Benzo(ghi)perylene	80		76		40-140	5		40
Fluorene	78		72		40-140	8		40
Phenanthrene	73		69		40-140	6		40
Dibenzo(a,h)anthracene	84		80		40-140	5		40
Indeno(1,2,3-cd)pyrene	86		82		40-140	5		40
Pyrene	77		74		40-140	4		40
2-Methylnaphthalene	72		66		40-140	9		40
Pentachlorophenol	93		88		40-140	6		40
Hexachlorobenzene	77		73		40-140	5		40
Hexachloroethane	63		57		40-140	10		40

Lab Control Sample Analysis
Batch Quality Control

Project Name: PH. II ESA
Lab Number: L1746058
Project Number: E1646
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Semivolatile Organics by GC/MS-SIM - Westborough Lab Associated sample(s): 01-02 Batch: WG1074210-2 WG1074210-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Fluorophenol	49		44		21-120
Phenol-d6	33		30		10-120
Nitrobenzene-d5	74		68		23-120
2-Fluorobiphenyl	77		71		15-120
2,4,6-Tribromophenol	91		84		10-120
4-Terphenyl-d14	85		82		41-149

PCBS

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-03	Date Collected:	12/12/17 09:15
Client ID:	SB2 (0.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3546
Matrix:	Soil	Extraction Date:	12/17/17 20:57
Analytical Method:	1,8082A	Cleanup Method:	EPA 3665A
Analytical Date:	12/18/17 23:14	Cleanup Date:	12/18/17
Analyst:	HT	Cleanup Method:	EPA 3660B
Percent Solids:	82%	Cleanup Date:	12/18/17

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**	**Column**
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/kg	40.7	4.62	1	A
Aroclor 1221	ND		ug/kg	40.7	6.20	1	A
Aroclor 1232	ND		ug/kg	40.7	4.01	1	A
Aroclor 1242	ND		ug/kg	40.7	4.98	1	A
Aroclor 1248	23.2	J	ug/kg	40.7	4.57	1	A
Aroclor 1254	22.9	J	ug/kg	40.7	3.32	1	A
Aroclor 1260	10.4	J	ug/kg	40.7	4.25	1	B
Aroclor 1262	ND		ug/kg	40.7	3.35	1	A
Aroclor 1268	ND		ug/kg	40.7	2.88	1	A
PCBs, Total	56.5	J	ug/kg	40.7	2.88	1	B

Surrogate	**% Recovery**	**Qualifier**	**Acceptance Criteria**	**Column**
2,4,5,6-Tetrachloro-m-xylene	86		30-150	A
Decachlorobiphenyl	87		30-150	A
2,4,5,6-Tetrachloro-m-xylene	79		30-150	B
Decachlorobiphenyl	89		30-150	B

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-05	Date Collected:	12/12/17 10:40
Client ID:	SB6 (1.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3546
Matrix:	Soil	Extraction Date:	12/17/17 20:57
Analytical Method:	1,8082A	Cleanup Method:	EPA 3665A
Analytical Date:	12/18/17 23:30	Cleanup Date:	12/18/17
Analyst:	HT	Cleanup Method:	EPA 3660B
Percent Solids:	92%	Cleanup Date:	12/18/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/kg	35.6	4.04	1	A
Aroclor 1221	ND		ug/kg	35.6	5.42	1	A
Aroclor 1232	ND		ug/kg	35.6	3.50	1	A
Aroclor 1242	ND		ug/kg	35.6	4.36	1	A
Aroclor 1248	ND		ug/kg	35.6	3.99	1	A
Aroclor 1254	ND		ug/kg	35.6	2.90	1	A
Aroclor 1260	ND		ug/kg	35.6	3.72	1	A
Aroclor 1262	ND		ug/kg	35.6	2.92	1	A
Aroclor 1268	4.59	J	ug/kg	35.6	2.52	1	A
PCBs, Total	4.59	J	ug/kg	35.6	2.52	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	98		30-150	A
Decachlorobiphenyl	109		30-150	A
2,4,5,6-Tetrachloro-m-xylene	91		30-150	B
Decachlorobiphenyl	117		30-150	B

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-07	Date Collected:	12/12/17 11:55
Client ID:	SB10 (0-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3546
Matrix:	Soil	Extraction Date:	12/17/17 20:57
Analytical Method:	1,8082A	Cleanup Method:	EPA 3665A
Analytical Date:	12/18/17 23:46	Cleanup Date:	12/18/17
Analyst:	HT	Cleanup Method:	EPA 3660B
Percent Solids:	83%	Cleanup Date:	12/18/17

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**	**Column**
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/kg	38.9	4.41	1	A
Aroclor 1221	ND		ug/kg	38.9	5.92	1	A
Aroclor 1232	ND		ug/kg	38.9	3.83	1	A
Aroclor 1242	ND		ug/kg	38.9	4.76	1	A
Aroclor 1248	ND		ug/kg	38.9	4.36	1	A
Aroclor 1254	ND		ug/kg	38.9	3.17	1	A
Aroclor 1260	ND		ug/kg	38.9	4.06	1	A
Aroclor 1262	ND		ug/kg	38.9	3.20	1	A
Aroclor 1268	ND		ug/kg	38.9	2.75	1	A
PCBs, Total	ND		ug/kg	38.9	2.75	1	A

Surrogate	**% Recovery**	**Qualifier**	**Acceptance Criteria**	**Column**
2,4,5,6-Tetrachloro-m-xylene	71		30-150	A
Decachlorobiphenyl	72		30-150	A
2,4,5,6-Tetrachloro-m-xylene	74		30-150	B
Decachlorobiphenyl	85		30-150	B

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-08	Date Collected:	12/12/17 11:30
Client ID:	SB12 (0-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, NY	Field Prep:	Not Specified
		Extraction Method:	EPA 3546
Matrix:	Soil	Extraction Date:	12/17/17 20:57
Analytical Method:	1,8082A	Cleanup Method:	EPA 3665A
Analytical Date:	12/19/17 00:02	Cleanup Date:	12/18/17
Analyst:	HT	Cleanup Method:	EPA 3660B
Percent Solids:	78%	Cleanup Date:	12/18/17

Parameter	**Result**	**Qualifier**	**Units**	**RL**	**MDL**	**Dilution Factor**	**Column**
Polychlorinated Biphenyls by GC - Westborough Lab							
Aroclor 1016	ND		ug/kg	41.8	4.74	1	A
Aroclor 1221	ND		ug/kg	41.8	6.36	1	A
Aroclor 1232	ND		ug/kg	41.8	4.11	1	A
Aroclor 1242	ND		ug/kg	41.8	5.12	1	A
Aroclor 1248	ND		ug/kg	41.8	4.69	1	A
Aroclor 1254	ND		ug/kg	41.8	3.41	1	A
Aroclor 1260	ND		ug/kg	41.8	4.36	1	A
Aroclor 1262	ND		ug/kg	41.8	3.44	1	A
Aroclor 1268	ND		ug/kg	41.8	2.96	1	A
PCBs, Total	ND		ug/kg	41.8	2.96	1	A

Surrogate	**% Recovery**	**Qualifier**	**Acceptance Criteria**	**Column**
2,4,5,6-Tetrachloro-m-xylene	79		30-150	A
Decachlorobiphenyl	82		30-150	A
2,4,5,6-Tetrachloro-m-xylene	71		30-150	B
Decachlorobiphenyl	73		30-150	B

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

Method Blank Analysis
Batch Quality Control

Analytical Method:	1,8082A	Extraction Method:	EPA 3546
Analytical Date:	12/18/17 21:54	Extraction Date:	12/17/17 20:57
Analyst:	HT	Cleanup Method:	EPA 3665A
		Cleanup Date:	12/18/17
		Cleanup Method:	EPA 3660B
		Cleanup Date:	12/18/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
Polychlorinated Biphenyls by GC - Westborough Lab for sample(s): 03,05,07-08 Batch: WG1073732-1						
Aroclor 1016	ND		ug/kg	31.9	3.61	A
Aroclor 1221	ND		ug/kg	31.9	4.85	A
Aroclor 1232	ND		ug/kg	31.9	3.14	A
Aroclor 1242	ND		ug/kg	31.9	3.90	A
Aroclor 1248	ND		ug/kg	31.9	3.58	A
Aroclor 1254	ND		ug/kg	31.9	2.60	A
Aroclor 1260	ND		ug/kg	31.9	3.33	A
Aroclor 1262	ND		ug/kg	31.9	2.62	A
Aroclor 1268	ND		ug/kg	31.9	2.26	A
PCBs, Total	ND		ug/kg	31.9	2.26	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	94		30-150	A
Decachlorobiphenyl	98		30-150	A
2,4,5,6-Tetrachloro-m-xylene	95		30-150	B
Decachlorobiphenyl	99		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
Polychlorinated Biphenyls by GC - Westborough Lab Associated sample(s): 03,05,07-08 Batch: WG1073732-2 WG1073732-3									
Aroclor 1016	88		88		40-140	0		50	A
Aroclor 1260	86		92		40-140	7		50	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	103		103		30-150	A
Decachlorobiphenyl	105		111		30-150	A
2,4,5,6-Tetrachloro-m-xylene	101		101		30-150	B
Decachlorobiphenyl	108		112		30-150	B

METALS

Project Name: PH. II ESA
Lab Number: L1746058
Project Number: E1646
Report Date: 12/21/17

SAMPLE RESULTS

Lab ID: L1746058-03
Date Collected: 12/12/17 09:15
Client ID: SB2 (0.5-3')
Date Received: 12/13/17
Sample Location: 27-37 CHANDLER ST., BUFFALO, N
Field Prep: Not Specified
Matrix: Soil
Percent Solids: 82%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	6810		mg/kg	9.46	2.55	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Antimony, Total	7.72		mg/kg	4.73	0.359	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Arsenic, Total	11.0		mg/kg	0.946	0.197	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Barium, Total	85.0		mg/kg	0.946	0.164	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Beryllium, Total	0.473		mg/kg	0.473	0.031	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Cadmium, Total	ND		mg/kg	0.946	0.093	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Calcium, Total	55500		mg/kg	9.46	3.31	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Chromium, Total	17.4		mg/kg	0.946	0.091	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Cobalt, Total	6.18		mg/kg	1.89	0.157	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Copper, Total	93.4		mg/kg	0.946	0.244	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Iron, Total	61400		mg/kg	47.3	8.54	20	12/15/17 21:15	12/18/17 18:51	EPA 3050B	1,6010C	AB
Lead, Total	103		mg/kg	4.73	0.254	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Magnesium, Total	2830		mg/kg	9.46	1.46	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Manganese, Total	610		mg/kg	0.946	0.150	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Mercury, Total	0.10		mg/kg	0.08	0.02	1	12/19/17 16:58	12/19/17 20:00	EPA 7471B	1,7471B	EA
Nickel, Total	16.0		mg/kg	2.36	0.229	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Potassium, Total	808		mg/kg	236	13.6	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Selenium, Total	0.322	J	mg/kg	1.89	0.244	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Silver, Total	ND		mg/kg	0.946	0.268	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Sodium, Total	218		mg/kg	189	2.98	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Thallium, Total	ND		mg/kg	1.89	0.298	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Vanadium, Total	23.6		mg/kg	0.946	0.192	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS
Zinc, Total	154		mg/kg	4.73	0.277	2	12/15/17 21:15	12/18/17 13:30	EPA 3050B	1,6010C	PS

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-05	Date Collected:	12/12/17 10:40
Client ID:	SB6 (1.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, N	Field Prep:	Not Specified
Matrix:	Soil		
Percent Solids:	92%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	3260		mg/kg	8.63	2.33	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Antimony, Total	0.595	J	mg/kg	4.31	0.328	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Arsenic, Total	4.37		mg/kg	0.863	0.179	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Barium, Total	37.0		mg/kg	0.863	0.150	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Beryllium, Total	0.155	J	mg/kg	0.431	0.029	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Cadmium, Total	ND		mg/kg	0.863	0.085	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Calcium, Total	41400		mg/kg	8.63	3.02	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Chromium, Total	8.70		mg/kg	0.863	0.083	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Cobalt, Total	3.49		mg/kg	1.72	0.143	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Copper, Total	29.4		mg/kg	0.863	0.222	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Iron, Total	25200		mg/kg	4.31	0.779	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Lead, Total	31.9		mg/kg	4.31	0.231	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Magnesium, Total	11400		mg/kg	8.63	1.33	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Manganese, Total	295		mg/kg	0.863	0.137	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Mercury, Total	0.07	J	mg/kg	0.09	0.02	1	12/19/17 16:58	12/19/17 20:02	EPA 7471B	1,7471B	EA
Nickel, Total	13.9		mg/kg	2.16	0.209	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Potassium, Total	429		mg/kg	216	12.4	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Selenium, Total	ND		mg/kg	1.72	0.222	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Silver, Total	ND		mg/kg	0.863	0.244	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Sodium, Total	91.8	J	mg/kg	172	2.72	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Thallium, Total	ND		mg/kg	1.72	0.272	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Vanadium, Total	8.26		mg/kg	0.863	0.175	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS
Zinc, Total	115		mg/kg	4.31	0.253	2	12/15/17 21:15	12/18/17 13:35	EPA 3050B	1,6010C	PS

Project Name: PH. II ESA
Lab Number: L1746058
Project Number: E1646
Report Date: 12/21/17

SAMPLE RESULTS

Lab ID: L1746058-06
Date Collected: 12/12/17 11:25
Client ID: SB8 (0.5-2')
Date Received: 12/13/17
Sample Location: 27-37 CHANDLER ST., BUFFALO, N
Field Prep: Not Specified
Matrix: Soil
Percent Solids: 88%

Total Metals - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Aluminum, Total	7000		mg/kg	8.52	2.30	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Antimony, Total	ND		mg/kg	4.26	0.324	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Arsenic, Total	4.03		mg/kg	0.852	0.177	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Barium, Total	80.9		mg/kg	0.852	0.148	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Beryllium, Total	1.10		mg/kg	0.426	0.028	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Cadmium, Total	0.375	J	mg/kg	0.852	0.084	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Calcium, Total	76700		mg/kg	8.52	2.98	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Chromium, Total	12.6		mg/kg	0.852	0.082	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Cobalt, Total	2.48		mg/kg	1.70	0.142	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Copper, Total	35.7		mg/kg	0.852	0.220	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Iron, Total	12700		mg/kg	4.26	0.770	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Lead, Total	145		mg/kg	4.26	0.228	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Magnesium, Total	6340		mg/kg	8.52	1.31	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Manganese, Total	820		mg/kg	0.852	0.136	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Mercury, Total	0.09		mg/kg	0.08	0.02	1	12/19/17 16:58	12/19/17 20:04	EPA 7471B	1,7471B	EA
Nickel, Total	8.61		mg/kg	2.13	0.206	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Potassium, Total	573		mg/kg	213	12.3	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Selenium, Total	0.520	J	mg/kg	1.70	0.220	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Silver, Total	ND		mg/kg	0.852	0.241	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Sodium, Total	299		mg/kg	170	2.68	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Thallium, Total	ND		mg/kg	1.70	0.268	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Vanadium, Total	8.28		mg/kg	0.852	0.173	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS
Zinc, Total	140		mg/kg	4.26	0.250	2	12/15/17 21:15	12/18/17 13:39	EPA 3050B	1,6010C	PS

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-07	Date Collected:	12/12/17 11:55
Client ID:	SB10 (0-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, N	Field Prep:	Not Specified
Matrix:	Soil		
Percent Solids:	83%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	7040		mg/kg	9.22	2.49	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Antimony, Total	4.69		mg/kg	4.61	0.350	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Arsenic, Total	13.8		mg/kg	0.922	0.192	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Barium, Total	216		mg/kg	0.922	0.160	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Beryllium, Total	0.590		mg/kg	0.461	0.030	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Cadmium, Total	0.387	J	mg/kg	0.922	0.090	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Calcium, Total	21600		mg/kg	9.22	3.23	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Chromium, Total	21.8		mg/kg	0.922	0.089	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Cobalt, Total	11.4		mg/kg	1.84	0.153	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Copper, Total	320		mg/kg	0.922	0.238	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Iron, Total	106000		mg/kg	46.1	8.33	20	12/15/17 21:15	12/18/17 18:55	EPA 3050B	1,6010C	AB
Lead, Total	735		mg/kg	4.61	0.247	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Magnesium, Total	2970		mg/kg	9.22	1.42	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Manganese, Total	749		mg/kg	0.922	0.147	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Mercury, Total	0.27		mg/kg	0.09	0.02	1	12/19/17 16:58	12/19/17 20:09	EPA 7471B	1,7471B	EA
Nickel, Total	81.7		mg/kg	2.31	0.223	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Potassium, Total	705		mg/kg	231	13.3	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Selenium, Total	ND		mg/kg	1.84	0.238	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Silver, Total	ND		mg/kg	0.922	0.261	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Sodium, Total	199		mg/kg	184	2.90	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Thallium, Total	ND		mg/kg	1.84	0.290	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Vanadium, Total	31.9		mg/kg	0.922	0.187	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS
Zinc, Total	554		mg/kg	4.61	0.270	2	12/15/17 21:15	12/18/17 14:47	EPA 3050B	1,6010C	PS

Project Name: PH. II ESA **Lab Number:** L1746058

Project Number: E1646 **Report Date:** 12/21/17

SAMPLE RESULTS

Lab ID: L1746058-08 Date Collected: 12/12/17 11:30

Client ID: SB12 (0-3') Date Received: 12/13/17

Sample Location: 27-37 CHANDLER ST., BUFFALO, N Field Prep: Not Specified

Matrix: Soil

Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Aluminum, Total	6760		mg/kg	9.92	2.68	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Antimony, Total	5.97		mg/kg	4.96	0.377	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Arsenic, Total	15.3		mg/kg	0.992	0.206	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Barium, Total	156		mg/kg	0.992	0.172	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Beryllium, Total	0.754		mg/kg	0.496	0.033	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Cadmium, Total	ND		mg/kg	0.992	0.097	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Calcium, Total	10200		mg/kg	9.92	3.47	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Chromium, Total	14.7		mg/kg	0.992	0.095	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Cobalt, Total	7.90		mg/kg	1.98	0.165	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Copper, Total	358		mg/kg	0.992	0.256	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Iron, Total	39900		mg/kg	4.96	0.896	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Lead, Total	311		mg/kg	4.96	0.266	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Magnesium, Total	1830		mg/kg	9.92	1.53	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Manganese, Total	520		mg/kg	0.992	0.158	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Mercury, Total	0.14		mg/kg	0.10	0.02	1	12/19/17 16:58	12/19/17 20:11	EPA 7471B	1,7471B	EA
Nickel, Total	78.3		mg/kg	2.48	0.240	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Potassium, Total	828		mg/kg	248	14.3	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Selenium, Total	ND		mg/kg	1.98	0.256	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Silver, Total	ND		mg/kg	0.992	0.281	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Sodium, Total	201		mg/kg	198	3.12	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Thallium, Total	ND		mg/kg	1.98	0.312	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Vanadium, Total	23.3		mg/kg	0.992	0.201	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS
Zinc, Total	352		mg/kg	4.96	0.291	2	12/15/17 21:15	12/18/17 14:51	EPA 3050B	1,6010C	PS

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 03,05-08 Batch: WG1073340-1										
Aluminum, Total	ND		mg/kg	4.00	1.08	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Antimony, Total	ND		mg/kg	2.00	0.152	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Arsenic, Total	0.084	J	mg/kg	0.400	0.083	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Barium, Total	ND		mg/kg	0.400	0.070	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Beryllium, Total	ND		mg/kg	0.200	0.013	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Cadmium, Total	ND		mg/kg	0.400	0.039	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Calcium, Total	ND		mg/kg	4.00	1.40	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Chromium, Total	ND		mg/kg	0.400	0.038	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Cobalt, Total	ND		mg/kg	0.800	0.066	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Copper, Total	ND		mg/kg	0.400	0.103	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Iron, Total	ND		mg/kg	2.00	0.361	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Lead, Total	ND		mg/kg	2.00	0.107	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Magnesium, Total	ND		mg/kg	4.00	0.616	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Manganese, Total	ND		mg/kg	0.400	0.064	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Nickel, Total	ND		mg/kg	1.00	0.097	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Potassium, Total	ND		mg/kg	100	5.76	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Selenium, Total	ND		mg/kg	0.800	0.103	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Silver, Total	ND		mg/kg	0.400	0.113	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Sodium, Total	ND		mg/kg	80.0	1.26	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Thallium, Total	ND		mg/kg	0.800	0.126	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Vanadium, Total	ND		mg/kg	0.400	0.081	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS
Zinc, Total	ND		mg/kg	2.00	0.117	1	12/15/17 21:15	12/18/17 13:06	1,6010C	PS

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 03,05-08 Batch: WG1074485-1										
Mercury, Total	ND		mg/kg	0.08	0.02	1	12/19/17 16:58	12/19/17 19:24	1,7471B	EA

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 7471B

Lab Control Sample Analysis
Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 03,05-08 Batch: WG1073340-2 SRM Lot Number: D098-540								
Aluminum, Total	82		-		47-153	-		
Antimony, Total	143		-		6-194	-		
Arsenic, Total	105		-		83-117	-		
Barium, Total	102		-		82-118	-		
Beryllium, Total	100		-		83-117	-		
Cadmium, Total	99		-		82-117	-		
Calcium, Total	96		-		81-118	-		
Chromium, Total	101		-		83-119	-		
Cobalt, Total	100		-		84-116	-		
Copper, Total	101		-		84-116	-		
Iron, Total	105		-		60-140	-		
Lead, Total	101		-		82-117	-		
Magnesium, Total	87		-		76-124	-		
Manganese, Total	94		-		82-118	-		
Nickel, Total	98		-		82-117	-		
Potassium, Total	90		-		69-131	-		
Selenium, Total	102		-		78-121	-		
Silver, Total	105		-		80-120	-		
Sodium, Total	96		-		74-126	-		
Thallium, Total	102		-		80-119	-		
Vanadium, Total	101		-		79-121	-		

Lab Control Sample Analysis
Batch Quality Control

Project Name: PH. II ESA

Project Number: E1646

Lab Number: L1746058

Report Date: 12/21/17

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 03,05-08 Batch: WG1073340-2 SRM Lot Number: D098-540					
Zinc, Total	100	-	81-119	-	
Total Metals - Mansfield Lab Associated sample(s): 03,05-08 Batch: WG1074485-2 SRM Lot Number: D098-540					
Mercury, Total	102	-	50-149	-	

Matrix Spike Analysis
Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646
Lab Number: L1746058
Report Date: 12/21/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 03,05-08 QC Batch ID: WG1073340-3 QC Sample: L1746131-01 Client ID: MS Sample												
Aluminum, Total	9300	227	9700	**176**	Q	-	-		75-125	-		20
Antimony, Total	1.10J	56.8	51.6	91		-	-		75-125	-		20
Arsenic, Total	6.30	13.6	19.5	97		-	-		75-125	-		20
Barium, Total	78.4	227	279	88		-	-		75-125	-		20
Beryllium, Total	0.304	5.68	5.19	86		-	-		75-125	-		20
Cadmium, Total	1.70	5.8	6.69	86		-	-		75-125	-		20
Calcium, Total	3890	1140	4350	**40**	Q	-	-		75-125	-		20
Chromium, Total	92.0	22.7	131	**172**	Q	-	-		75-125	-		20
Cobalt, Total	5.92	56.8	54.6	86		-	-		75-125	-		20
Copper, Total	17.4	28.4	45.9	100		-	-		75-125	-		20
Iron, Total	10200	114	10700	**440**	Q	-	-		75-125	-		20
Lead, Total	3820	58	4260	**759**	Q	-	-		75-125	-		20
Magnesium, Total	1820	1140	2770	84		-	-		75-125	-		20
Manganese, Total	179.	56.8	228	86		-	-		75-125	-		20
Nickel, Total	11.3	56.8	59.0	84		-	-		75-125	-		20
Potassium, Total	845.	1140	1880	91		-	-		75-125	-		20
Selenium, Total	0.608J	13.6	14.5	106		-	-		75-125	-		20
Silver, Total	ND	34.1	33.9	99		-	-		75-125	-		20
Sodium, Total	97.9J	1140	1220	107		-	-		75-125	-		20
Thallium, Total	ND	13.6	11.4	84		-	-		75-125	-		20
Vanadium, Total	24.4	56.8	76.2	91		-	-		75-125	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: PH. II ESA

Project Number: E1646

Lab Number: L1746058

Report Date: 12/21/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery		MSD Found	MSD %Recovery		Recovery Limits	RPD		RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 03,05-08 QC Batch ID: WG1073340-3 QC Sample: L1746131-01 Client ID: MS Sample												
Zinc, Total	1450	56.8	1490	**70**	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 03,05-08 QC Batch ID: WG1074485-3 WG1074485-4 QC Sample: L1746039-10 Client ID: MS Sample												
Mercury, Total	0.08J	0.155	0.23	**148**	Q	0.27	**152**	Q	80-120	16		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: PH. II ESA
Project Number: E1646

Lab Number: L1746058
Report Date: 12/21/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 03,05-08 QC Batch ID: WG1073340-4 QC Sample: L1746131-01 Client ID: DUP Sample						
Lead, Total	3820	4480	mg/kg	16		20

INORGANICS
&
MISCELLANEOUS

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-03	Date Collected:	12/12/17 09:15
Client ID:	SB2 (0.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, N	Field Prep:	Not Specified
Matrix:	Soil		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	81.7		%	0.100	NA	1	-	12/15/17 15:06	121,2540G	RI

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-04	Date Collected:	12/12/17 09:45
Client ID:	SB3 (0.5-2')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, N	Field Prep:	Not Specified
Matrix:	Soil		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	89.6		%	0.100	NA	1	-	12/15/17 15:06	121,2540G	RI

SAMPLE RESULTS

Lab ID:	L1746058-05	Date Collected:	12/12/17 10:40
Client ID:	SB6 (1.5-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, N	Field Prep:	Not Specified
Matrix:	Soil		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	91.7		%	0.100	NA	1	-	12/15/17 15:06	121,2540G	RI

SAMPLE RESULTS

Lab ID: L1746058-06
Client ID: SB8 (0.5-2')
Sample Location: 27-37 CHANDLER ST., BUFFALO, N
Matrix: Soil

Date Collected: 12/12/17 11:25
Date Received: 12/13/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	88.2		%	0.100	NA	1	-	12/16/17 07:50	121,2540G	RI

SAMPLE RESULTS

Lab ID:	L1746058-07	Date Collected:	12/12/17 11:55
Client ID:	SB10 (0-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, N	Field Prep:	Not Specified
Matrix:	Soil		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	83.0		%	0.100	NA	1	-	12/15/17 15:06	121,2540G	RI

Project Name:	PH. II ESA	**Lab Number:**	L1746058
Project Number:	E1646	**Report Date:**	12/21/17

SAMPLE RESULTS

Lab ID:	L1746058-08	Date Collected:	12/12/17 11:30
Client ID:	SB12 (0-3')	Date Received:	12/13/17
Sample Location:	27-37 CHANDLER ST., BUFFALO, N	Field Prep:	Not Specified
Matrix:	Soil		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Solids, Total	78.4		%	0.100	NA	1	-	12/15/17 15:06	121,2540G	RI

Lab Duplicate Analysis

Batch Quality Control

Project Name: PH. II ESA

Project Number: E1646

Lab Number: L1746058

Report Date: 12/21/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 03-05,07-08 QC Batch ID: WG1073201-1 QC Sample: L1743216-11 Client ID: DUP Sample						
Solids, Total	87.7	89.4	%	2		20
General Chemistry - Westborough Lab Associated sample(s): 06 QC Batch ID: WG1073456-1 QC Sample: L1746527-01 Client ID: DUP Sample						
Solids, Total	65.7	66.5	%	1		20

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	*Custody Seal*
A	Absent

Container Information

Container ID	*Container Type*	*Cooler*	*Initial pH*	*Final pH*	*Temp deg C*	*Pres*	*Seal*	*Frozen Date/Time*	*Analysis(*)*
L1746058-01A	Vial HCl preserved	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-01B	Vial HCl preserved	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-01C	Vial HCl preserved	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-01D	Amber 1000ml unpreserved	A	7	7	2.9	Y	Absent		NYTCL-8270(7),NYTCL-8270-SIM(7)
L1746058-01E	Amber 1000ml unpreserved	A	7	7	2.9	Y	Absent		NYTCL-8270(7),NYTCL-8270-SIM(7)
L1746058-02A	Vial HCl preserved	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-02B	Vial HCl preserved	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-02C	Vial HCl preserved	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-02D	Amber 1000ml unpreserved	A	7	7	2.9	Y	Absent		NYTCL-8270(7),NYTCL-8270-SIM(7)
L1746058-02E	Amber 1000ml unpreserved	A	7	7	2.9	Y	Absent		NYTCL-8270(7),NYTCL-8270-SIM(7)
L1746058-03A	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1746058-03B	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-03C	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8270(14),TS(7),NYTCL-8082(14)
L1746058-03X	Vial MeOH preserved split	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-03Y	Vial Water preserved split	A	NA		2.9	Y	Absent	**19-DEC-17 07:08**	NYTCL-8260-R2(14)
L1746058-03Z	Vial Water preserved split	A	NA		2.9	Y	Absent	**18-DEC-17 13:50**	NYTCL-8260-R2(14)
L1746058-04A	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-04B	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8270(14),TS(7)
L1746058-04X	Vial MeOH preserved split	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-04Y	Vial Water preserved split	A	NA		2.9	Y	Absent	**19-DEC-17 07:08**	NYTCL-8260-R2(14)
L1746058-04Z	Vial Water preserved split	A	NA		2.9	Y	Absent	**18-DEC-17 13:50**	NYTCL-8260-R2(14)

*Values in parentheses indicate holding time in days

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1746058-05A	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1746058-05B	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-05C	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8270(14),TS(7),NYTCL-8082(14)
L1746058-05D	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8270(14),TS(7),NYTCL-8082(14)
L1746058-05X	Vial MeOH preserved split	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-05Y	Vial Water preserved split	A	NA		2.9	Y	Absent	**18-DEC-17 13:50**	NYTCL-8260-R2(14)
L1746058-05Z	Vial Water preserved split	A	NA		2.9	Y	Absent	**18-DEC-17 13:50**	NYTCL-8260-R2(14)
L1746058-06A	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1746058-06B	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8270(14),NYTCL-8260-R2(14),TS(7)
L1746058-06X	Vial MeOH preserved split	A	NA		2.9	Y	Absent		NYTCL-8260-R2(14)
L1746058-06Y	Vial Water preserved split	A	NA		2.9	Y	Absent	**18-DEC-17 13:50**	NYTCL-8260-R2(14)
L1746058-06Z	Vial Water preserved split	A	NA		2.9	Y	Absent	**18-DEC-17 13:50**	NYTCL-8260-R2(14)
L1746058-07A	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1746058-07B	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8270(14),TS(7),NYTCL-8082(14)
L1746058-07C	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8270(14),TS(7),NYTCL-8082(14)
L1746058-08A	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		BE-TI(180),AS-TI(180),BA-TI(180),AG-TI(180),AL-TI(180),CR-TI(180),NI-TI(180),TL-TI(180),CU-TI(180),PB-TI(180),SB-TI(180),SE-TI(180),ZN-TI(180),CO-TI(180),V-TI(180),FE-TI(180),HG-T(28),MG-TI(180),MN-TI(180),CA-TI(180),CD-TI(180),K-TI(180),NA-TI(180)
L1746058-08B	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8270(14),TS(7),NYTCL-8082(14)
L1746058-08C	Glass 120ml/4oz unpreserved	A	NA		2.9	Y	Absent		NYTCL-8270(14),TS(7),NYTCL-8082(14)

*Values in parentheses indicate holding time in days

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,
3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

ALPHA

NEW YORK CHAIN OF CUSTODY

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

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Date Rec'd in Lab 12/14/17

ALPHA Job # L1746058

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Project Information

Project Name: Ph. II ESA
Project Location: 27-37 chandler st. Buffalo, NY
Project # e1646
(Use Project name as Project #) ☐
Project Manager:
ALPHAQuote #:

Client Information

Client: Hazard Evaluations Inc.
Address: 3636 N. Buffalo Rd
Orchard Park, NY 14127
Phone: 716-667-3130
Fax: 716-667-3156
Email: mwittman@hazardevaluations.com

Turn-Around Time

Standard ☒
Rush (only if pre approved) ☐
Due Date:
# of Days: 5 day Firm

Deliverables

☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Billing Information

☒ Same as Client Info
PO #

Regulatory Requirement

☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Disposal Site Information

Please identify below location of applicable disposal facilities.
Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

Sample Filtration
☐ Done
☐ Lab to do
Preservation
☐ Lab to do
(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Voc 8260 TCL+ STARS	SVoc 8270 ~~STARS~~ TCL	Voc 8260 TCL+ STARS	SVoc 8270 TCL	TAL Metals	T. PCBs			Sample Specific Comments	Total Bottle
46058-01	SB7	12/12/17	2:30pm	GW	EB	X	X								5
02	SB11	12/12/17	3:00pm	GW	EB	X	X								5
03	SB2(0.5-3')	12/12/17	9:15am	Soil	EB			~~X~~	X	X	X				3
04	SB3(0.5-2')	12/12/17	9:45am	Soil	EB			X	X						2
05	SB6 (1.5-3')	12/12/17	10:40am	Soil	EB			X	X	X	X				4
06	SB8 (0.5-2')	12/12/17	11:25am	Soil	EB			~~X~~	X	X					2
07	SB10 (0-3')	12/12/17	11:55am	Soil	EB				X	X	X				3
08	SB12 (0-3')	12/12/17	10:30am	Soil	EB				X	X	X				3

Container Type	V	A	A	A	A	A		
Preservative	B	A	A	A	A	A		

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Relinquished By:	Date/Time	Received By:	Date/Time
	12/13/17 1700		12/13/17 1700
	12/13/17 17:30		12/14/17 0125

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

BROWNFIELD CLEANUP PROGRAM
For
27 Chandler Street, LLC and 37 Chandler Street, LLC
Chandler Incubator, 27 & 37 Chandler Street, Buffalo, New York 14207
BCP # C915336

Prepared For:
27 Chandler Street, LLC and 37 Chandler Street, LLC
391 Washington Street, Buffalo, New York 14203
HEI Project No: e1646

Prepared By:

Hazard Evaluations, Inc.
3636 North Buffalo Road
Orchard Park, New York 14127
(716) 667-3130

Wittman GeoSciences, PLLC
3636 North Buffalo Road
Orchard Park, New York 14127
716-574-1513

March 13, 2019

HAZARD EVALUATIONS

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been cooperatively developed by Hazard Evaluations Inc. (HEI) and Wittman GeoSciences, PLLC (WGS) as prepared for proposed 166 Chandler Street at Chandler Incubator Site located at 27 & 37 Chandler Street located in the City of Buffalo, New York. The QAPP was prepared in general accordance with the requirements of Section 2.4 of the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation, dated May 2010 (DER-10).

The QAPP is designed to produce data of the quality necessary to achieve the project objectives. The objective of the QA/QC protocol and procedures is to ensure the information, data, and decisions associated with the project are technically sound and properly documented.

1.1 Project Scope

This QAPP presents the project scope, objectives, organization, planned activities, data quality objectives, quality assurance/quality control (QA/QC) procedures and sampling procedures. This project involves test borings, monitoring well installation, monitoring well development, subsurface soil and groundwater sample collection, as well as interim remedial measures (IRM) to include soil excavation. Proposed sampling locations are included on Figure 1 and a summary of the anticipated number of samples and analytical testing is included on Table 1. The project goal associated with the RI/IRM includes the following:

- Define the nature and extent of on-site contamination in both soil and groundwater.
- Identify on-site source areas of contamination, if any.
- Collect data of sufficient quantity and quality to evaluate potential threats to the public health and environment.
- Collect data of sufficient quantity and quality to evaluate remedial alternatives.
- The IRM will mitigate risks at the site associated with the fill soils. The planned IRM includes excavation and off-site disposal of impacted fill soils in the southern parking lot area.

1.2 Project Organization

The general responsibilities of key project personnel are listed below. Resumes are included in Attachment 1.

Project Manager:	Ms. Michele Wittman, WGS Principal, will have responsibility for overall program/project management and coordination with NYSDEC and subcontractors.
Engineering:	Mr. John Schenne, PE, is responsible for engineering aspects and responsibilities.

QA Officer:	Mark Hanna, CHMM, HEI Principal, will serve as Quality Assurance Officer (QAO), and will be responsible for laboratory and data validation, subcontractor procurement and assignment, as well as data usability reports. The QAO may conduct audits of the operations at the site to ensure that work is being performed in accordance with the QAAP.
Field Team:	Eric Betzold will have overall responsibility for on-site implementation of the Site Investigation project activities. The technical team will consist of experienced professionals (i.e.; engineers, geologists, scientists) to gather and analyze data, prepare project documentation and collection of various soil and groundwater samples.

1.3 Project Sub-Contractors

Subcontractor specialists will be contracted for services relating to drilling and monitoring well installation, laboratory/analytical services, data validation services, field surveying, and waste transportation and disposal. The subcontractors will be determined approved by NYSDEC prior to beginning of site work:

Laboratory Analysis -	Alpha Analytical - A laboratory certified under the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) will perform the analysis
Data Validation -	Data Validation Services
Exploration Services -	To be determined.
Surveying -	To be determined

2.0 FIELD INVESTIGATION PROCEDURES

Field sampling at the proposed 27 & 37 Chandler Street site has been designed to obtain representative samples of various environmental media to assess impact that the site may have to human health and the environment. The field investigation procedures include sampling for subsurface soils and groundwater.

Proposed sampling locations are included within the RI/IRM Work Plan. Environmental sampling and other field activities will be performed in general accordance with the appropriate techniques presented in the following guidance document.

- DRAFT DER-10: Technical Guidance for Site Investigations and Remediation; NYSDEC Division of Environmental Remediation, May 2010.

Field activities are described in the following sections and in the RI/IRM/AAR Work Plan.

2.1 Air Monitoring

Air monitoring/screening of volatile compounds for health and safety concerns will be performed with a portable organic vapor meter (OVM) equipped with a photoionization detector (PID) that is using a 10.6 electron volt (eV) bulb. Monitoring will be done during invasive activities such as soil borings, monitoring well installation, well development, sampling, and IRM activities. Detections above background during air monitoring will require that the work be stopped until air monitoring levels decrease to background levels or until health and safety protocol are upgraded and approved by NYSDEC. On-site personnel will be outfitted in modified Level D personnel protection (hardhat, safety glasses, work boots and gloves).

2.2 Soil Screening and Logging

Subsurface soil samples will be collected from direct push macro-core samplers in general accordance with American Society for Testing and Material (ASTM) D6282-98 Standard Guide for Direct Push Soil Samples for Environmental Site Characteristics. Subsurface soil sampling from split-spoon samples advanced ahead of hollow steam augers will be completed in general accordance with ASTM D1586-99. A soil boring log will be prepared for each location to include date, boring location, drill rig type, blow counts, sample identification, sample depth interval, percent recovery, OVM reading, stratigraphic boundaries, and well installation information.

Subsurface soil will be sampled by opening the split spoon sampler (borings) or slicing the core vertically down the middle with a sharp blade. Soil samples will be visually examined for evidence of suspect contamination (e.g., staining, odor) and field screened with a calibrated OVM. Portions of the soil samples may be placed in containers for future analytical testing. Different portions of the soil samples will be placed within sealable plastic bags and will be field screened the same day as collected. Prior to screening, the soil samples will be allowed to equilibrate to ambient temperature. The OVM sampling port will be placed within a corner of the bag. The peak reading will be recorded on the boring log.

2.3 Soil Sample Collection

Soil samples selected for VOC analysis will be collected using an Encore or Terracore sampling kit, limiting headspace by compacting the soil into the container. Samples for VOC will be placed into the appropriate container immediately after opening of sampler, prior to making any field measurements or sample homogenization.

Remaining soil samples will be homogenized using a "coning and quartering" procedure. The soil will be removed from the sampling equipment and transferred to a clean surface (metal foil, steel pan, bowl, etc.) and thoroughly mixed to provide a more homogeneous sample to the lab. An aliquot of the sample will then be transferred to the required sample containers and sealed with the appropriate cap.

Due to emergent contaminant sampling requirements, at this time acceptable materials for sampling include stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate and polypropylene. Additional materials may be acceptable if pre-approved by NYSDEC. All sampling equipment components and sample containers should not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFC materials must be avoided. Many food and drink packaging materials and "plumbers thread seal tape" contain PFCs.

All clothing worn by sampling personnel must have been laundered multiple times. The sampler must wear nitrile gloves while filling and sealing the sample bottles.

2.4 Soil Borings

Soil borings will be completed using either direct push subsurface investigation techniques or rotary drilling with continuous split spoon sampling and hollow stem augers. Drilling cuttings will be visually inspected and screened with an OVM and managed consistent with DER-10 requirements. Soil sampling will be conducted to define the subsurface conditions. During continuous sampling process, soil samples will be field screened for the presence of VOCs using an OVM. Soil samples for laboratory analysis will be selected in the field based on visual/olfactory observations and OVM screening results.

The drill rig/ soil probe rig, tools, augers, etc. will be decontaminated between holes at an on-site temporary decontamination pad or area. Decontamination will be accomplished using steam cleaning or high pressure wash equipment. Direct push sampling equipment and split spoon sampling devices will be cleaned manually with non-phosphate detergent (i.e., Alconox) wash and potable water followed by a potable water rinse or a second steam cleaning followed by a distilled/deionized water rinse. All equipment will be cleaned prior to leaving the Site.

2.5 Monitoring Well Installation

Monitoring wells will be constructed of 2-inch ID flush coupled Schedule 40, polyvinyl chloride (PVC) riser and screen. The actual installation depth and screen depth will be selected based on groundwater depth, observation of subsurface materials and headspace screening test results. In general, the screen will consist of a maximum 10 foot length of 0.010-inch machine slotted well screen. A schematic of the well construction detail is provided as Figure 3.

Following placement of the assembled screen and riser, the borehole will be backfilled. The well screen depth will be backfilled with silica sand filter pack (estimated at size #0) from the base to a minimum of one (1) foot above the well screen. A minimum 1-foot layer of bentonite pellets will be placed above the sand filter and allowed to hydrate. A mixture of cement/bentonite water will be placed above the bentonite seal. The monitoring well will be completed by placing a locking steel casing or road box over the riser. Concrete will be then placed in the borehole around the protective casing and sloped away from the casing.

2.6 Monitoring Well Development and Sampling

2.6.1 Monitoring Well Development

Monitoring wells will be developed by utilizing either a dedicated tubing or new dedicated disposable bailer, depending on the field conditions. Fluids will not be added during development process. New, dedicated well development equipment will be utilized prior to development of each well. The well development procedure is listed below.

- Well cover will be unlocked. OVM will be used to survey the ambient air and air directly at the top of the well.
- A pre-development static water level measurement will be taken.
- Sound the bottom of the well and agitate/loosen accumulated sediment.
- Calculate water volume in the well.
- Obtain initial field water quality measurements, including pH, specific conductance, turbidity, and temperature obtained using a Horiba U-22 water quality meter (or equivalent).
- Alternate water agitation methods such as moving a bailer or pump tubing up and down inside screened interval coupled with water removal methods (pumping or bailing) in order to suspend and remove solids/sediment from the wells.
- Water quality meter measurements should be recorded every one to three gallons of water removed. Record water quantities removed and water quality measurements.
- Development can cease when the following water quality criteria are met, or at least 5 well volumes have been removed.
  - Water is clear and free of sediment and turbidity is less than 50 nephelometric turbity units (NTUs)
  - pH is +/- 0.1 standard unit between readings
  - Specific conductivities is +/-3% between readings
  - Temperature is +/-10% between readings
- Record post-development water level readings. Development information will be recorded on well development logs.

After the water level has returned to its pre-purge level (or within a maximum of two hours, if the well has recharged sufficiently to allow sampling), samples will be collected from the middle of the screened portion of the well for overburden wells. If the water level is slow to recharge and does not reach to its pre-purge level within two hours, then samples can be collected after sufficient water has recharged, and the degree of recharge indicated in field notes with time and depth to water noted.

2.6.2 Groundwater Sampling

Groundwater samples will be collected by utilizing low-flow sampling techniques with dedicated tubing or by conventional methods using a new dedicated disposable bailer. A peristaltic pump and new disposable high density polyethylene (HDPE) tubing will be used at each location. Tubing and sampling equipment will be clean upon arrival at the Site. After removal of three well volumes or well purging, the well should be sampled.

A Well Data Sheet should be completed during groundwater sampling. Each well to be sampled will have designated pre-labeled, certified clean, sample bottles. The following steps describe the groundwater sample procedure.

- Unlock and remove well cap. Test the air at the wellhead with the OVM.
- Measure the static water level. Determine the total well volume.
- Slowly lower the dedicated bailer or tubing into the well. Purge the well, minimum of three well volumes. If the well goes dry during bailing, allow for full recovery and sample. If recovery takes longer than 20 minutes, proceed to next well but return to sample within 24 hours.
- Fill the appropriate sample bottles. Two or three (depending on laboratory-specific requirements) 40-ml glass vials (with Teflon septa) will be used to collect samples for VOCs. Sample collection with the following sample collection order: volatile organic compounds, semi-volatile organic compounds, PCBs/pesticides/herbicides and metals. If the well should go dry during sampling, the well should to be re-sampled the next day. The second attempt to sample the well will proceed with the same sample order.
- Preservative for the various sampling preservatives will be added by the laboratory provided jars. The following parameters required additional special handling.
    - VOC samples must be free of air bubbles. When the container is determined to be bubble free, the sample containers should be immediately chilled.
    - Metals analysis should be preserved with nitric acid to a pH less than 2.
- Record pertinent information in the field logbook and well data sheet.
- Lock well, inspect well site, and note any maintenance required.
- Purge water will be containerized for future disposal.

Per- and polyfluoroalkyl substances (PFAS) Sampling Protocol

Groundwater sample collection procedure for PFAS will be done in accordance with NYSDEC protocol, as included in the Quality Assurance/Quality Control (QAPP) found in Appendix B. At this time acceptable materials for sampling include stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate and polypropylene. Equipment blanks should be generated at least daily. Additional materials may be acceptable if pre-approved by NYSDEC. Requests to use alternate equipment should include clean equipment blanks. NOTE: Grunfos pumps and bladder pumps are known to contain PFC materials (e.g. Teflon™ washers for Grunfos pumps and LDPE bladders for bladder pumps). All sampling equipment components and sample containers should not come in contact with aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. Standard two step decontamination using detergent and clean water rinse will be performed for equipment that does come in contact with PFC materials. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFC materials must be avoided. Many food and drink packaging materials and "plumbers thread seal tape" contain PFCs.

All clothing worn by sampling personnel must have been laundered multiple times. The sampler must wear nitrile gloves while filling and sealing the sample bottles.

Pre-cleaned sample bottles with closures, coolers, ice, sample labels and a chain of custody form will be provided by the laboratory.

1. Fill two pre-cleaned 500 mL HDPE or polypropylene bottle with the sample.
2. Cap the bottles with an acceptable cap and liner closure system.
3. Label the sample bottles.
4. Fill out the chain of custody.
5. Place in a cooler maintained at 4 ± 2º Celsius.

2.7 Background Samples

Due to the historical industrial usage of the site and industrial nature of the site contaminants, soils and groundwater samples have not been pre-designed as likely to characterize site background conditions.

2.8 Equipment Decontamination

In order to reduce the potential for cross-contamination of samples collected during the project, sampling equipment will be decontaminated to ensure that data is acceptable. It is anticipated that most of the materials used in sample collection will be disposable one-time use materials, such as sampling containers, bailers, tubing, gloves, etc.

Non-dedicated material such as split spoon samples, stainless steel mixing bowls, drill rig, water-level indicator, etc., will be decontaminated by the following methods:

- Steam clean the equipment within a dedicated decontamination area; or
- Decontamination typically involves scrubbing/washing with a laboratory grade detergent (e.g. alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used from any treated municipal water system.

The effectiveness of the equipment decontamination of non-dedicated sampling equipment will be evaluated via analytical testing of rinsate blanks. Decontamination liquids, disposable equipment, and PPE will be containerized for future disposal.

2.9 IRM Activities

IRM activities are planned as part of the RI/IRM field activities to include soil excavation. Specific information on location and depth of excavation areas are include within the RI/IRM Work Plan.

Soil/fill removal will be completed within the southern parking lot area. Fill material will be removed and transported for off-site disposal to an approved solid waste landfill. Estimated excavation limits are included on Figure 2. Excavation is expected to extend to depths of approximately one (1) to two (2) feet below ground surface to remove fill material in the future parking area, resulting in approximately 960 to 1,900 cubic yards. Additionally, soil excavation will be completed in the central area of the site, anticipated to extend 3 to 5 feet below grade to remove fill material in the area of the future stone storm detection basis, resulting in approximately 165 to 275 cubic yards. An estimate total of 1,125 to 2,200 cubic yards is anticipated to be removed from the site.

IRM confirmation soil samples are anticipated to be collected from the soil excavation areas. IRM confirmation samples will be collected using disposable or dedicated stainless steel spoons or hand trowels from excavation walls and floor. Based on DER-10 requirements, one sample will be collected every 30 linear feet of sidewall and one sample for every 900 square feet of excavation bottom. To minimize volatilization, confirmation samples will be collected from the soils located two to four inches inside the walls or floor of the excavation. The retrieved soil sample will be placed directly into parameter specific glass containers. Each sample container will be appropriately labeled and transported to the contracted laboratory.

2.10 Storage and Disposal of Investigation-Derived Waste

The sampling methods and equipment have been selected to limit the need for decontamination and the volume of waste material to be generated. Investigation-derived material (e.g., drill cuttings and purge water) generated will be presumed to be non-hazardous waste and will be disposed at the boring or well from which the material was derived. Excess auger cuttings will be drummed and stored on-Site for future disposal. Monitoring well development/purge water will be containerized in 55-gallon drums for testing and future off-site disposal.

Personal protective equipment and disposable sampling equipment will be placed in plastic garbage bags for disposal as a non-hazardous waste.

Decontamination water used in steam cleaning and/or spoon washing, and rinse water, including detergent, may be generated during Site work. Tap and analyte-free water used for rinsing will be allowed to percolate back into the ground, or will be disposed into a sanitary system. Non-phosphate detergent and water rinse will be disposed into a sanitary system.

2.11 Survey/Site Mapping

A base map will be prepared by a New York State licensed surveyor. This will allow measurement of the actual exploration locations and elevations. The base map will include property lines, buildings, fence lines, and other key site features. The surveyor may establish the horizontal location and vertical elevations. The map will include the RI investigation/sampling locations, as well as completed IRM work excavation limits. Monitoring well vertical measurements will include the ground surface at exploration locations, plus the top of casing and top of riser at monitoring well locations. The top of riser will serve as the water level monitoring point. Soil/fill boring locations will be field located and incorporated within the survey. Elevations of the ground surface and top of PVC riser will be measured for each monitoring well.

3.0 SAMPLE HANDLING and MANAGEMENT

Various environmental samples will be collected during the RI/IRM investigation work. The procedures below will assist in documentation and tracing of the various samples. During sampling, field personnel will wear disposable or latex or nitrile gloves. Gloves will be changed and discarded between sampling locations.

Laboratory analysis samples will be placed in new laboratory-grade containers. Appropriate sample preservatives will be added to the sample containers by the laboratory prior to delivery to the project site. The specific volume and preservation of samples, if any, is summarized on Table 2. Samples will be shipped to the laboratory within 48-hours from sample collection. Samples will be kept in coolers, on ice, for shipment to the analytical laboratory.

3.1 Sample Label and Identification

Each field and QC sample will be identified by a self-adhesive, non-removable label placed on the sample containers. The label information will include, at a minimum, client name, site location, data and time of collection, sample identification number, sampler’s name, and notes, as needed recorded in waterproof ink. All sample bottles within each shipping container will be individually labeled with the laboratory provided label.

Each sample will with a unique identification using the following test location designations:

Designation	Media Type	Sample Location	Example
SB	Soil	Soil boring number with sample depth interval (x-x’)	SB1 (8-10’)
MW	Groundwater	Monitoring well with well number	MW2

EX	Soil	Excavation confirmation sample with sample depth interval	EX3 (1-2')
TB	Trip blank	None – include day/month/year	TB1 – 10/25/16
RB	Rinsate blank	Any – rinsate of sampling equipment; include day/month/year	RB2 – 10/25/16
MS/MSD	Matrix spike/ matrix spike duplicate	Any – identify original sample location	SB1 MS MW2 MSD

Quality control (QC) field duplicate samples will be submitted blind to the laboratory; a fictitious sample identification will be created using the same system as the original. The sample identifications (of the original sample and its field duplicate) will be marked in the project specific field book and on the copy of the chain-of-custody kept by the sampler and copied to the project manager.

3.2 Chain of Custody

A chain-of-custody form will trace the path of sample containers from the project site to the laboratory. An example Chain of Custody is included in Attachment 2. The chain-of-custody documentation will accompany the samples from their inception until analysis. Pertinent field information will be included on the chain-of-custody, including client name, project name/location, sampler name, sample identification number, date, time, media, grab/composite, number of containers, analysis required, and preservation.

Samples will be packaged into coolers used for shipment. The cooler will be packed with ice (or equivalent) to maintain sample temperature at 4 ^{o}C. The chain of custody forms will be signed and placed in a sealed plastic bag in the cooler. The cooler will be sealed and custody seal placed over the cooler opening, designed to break if opened or disturbed. The custody seal will be signed and dated. Shipping tape will be wrapped around the cooler and over the custody seal. Sample receipt personnel at the laboratory will document whether the custody seals remained intact upon arrival and lab personnel will sign the chain-of-custody form.

4.0 FIELD DOCUMENTATION

Daily field activities will be recorded in a bound field notebook. The field notebook will include the following daily information for Site activities:

- Date, time of arrival, time of departure, weather conditions.
- Field staff, sub-contractors or other personnel on site.
- Description of field activities and location of work area.
- Equipment used on site (such as drill rig, operator)
- Field observations and descriptions, such as soil descriptions, well/piezometer installation information, evidence of contamination, staining, odors, etc.

- Field measurements (OVM, water quality readings) and calibration
- Sampling locations, depths, identification numbers, time, etc.
- Sampling location measurements.
- Chain of custody information
- Modifications to scope of work or issues encountered.

Field notes may be transferred to soil boring logs, or monitoring well forms as part of the RI/IRM. Typical forms to be utilized during the field investigation are presented in Attachment 2 and include:

- Daily Field Report
- Soil Boring Log
- Monitoring Well Installation Log
- Well Development Data Sheet
- Chain of Custody
- Building Inventory

5.0 ANALYTICAL LABORATORY QA/QC PROTOCOLS

This section describes the analytical methods, principles and procedures that will be used to generate quality data. These protocols include laboratory calibration, field equipment calibration, QC sample collection and analysis, quantitative evaluation of data quality protocols and data qualification, if necessary.

5.1 Analytical Methods, Procedures and Calibration

Chemical analysis for samples collected during the field work will be completed by a laboratory capable of performing project specific analysis as included in this QAAP.

5.1.2 Analytical Methods

Sample analytical analysis will be consistent with the NYSDEC ASP Category B requirements. Specific methods and references for each parameter including sample preservation and holding times are shown on Table 2. Quantification and detections limits for all analysis are those specified under the appropriate test methods.

NYSDEC has provided specific laboratory requirements associated with 1,4-dioxane and PFSA analytical methods, which are included in Attachment 3.

5.1.3 Laboratory Instrumentation & Equipment

Laboratory instruments and equipment will be calibrated following SW-846 analytical methods protocol and laboratory requirements.

5.1.3 Field Equipment

Various field equipment will be used during the project. Calibration of the field equipment will be complete in accordance with manufacture's specifications, prior to the start of each day.

Organic Vapor Meter – Real-time monitoring for VOCs will be done with an organic vapor meter (OVM) equipped with a photoionization detector (PID) to evaluate the nature and extent of potential petroleum or solvent impacts at the site. The OVM will be calibrated on a daily basis in accordance with manufacturer's specifications.

Particulate Monitoring Equipment – Particulate air monitoring will be completed during soil excavation activities as part of the IRM as noted in the Community Air Monitoring Program (CAMP). Measurements will be collected along the upwind perimeter of the excavation areas to assess the amount of particulates naturally occurring in the air. The particulate meter will be regularly calibrated in accordance with the manufacturer's specifications.

Additional Field Equipment – Additional field equipment will be used as part of the project including an electric static water level indicator and Horiba U-22 water quality meter that measures pH, specific conductivity, temperature, dissolved oxygen, oxygen reduction potential and turbidity. The meters will be calibrated in accordance with the manufacturer's specifications.

5.2 Quality Control Samples

Analytical methods, summarized on Table 2, to be utilized for laboratory sample analysis address the quality control to be used and the frequency of replicates, blanks and calibration standards for laboratory analytical equipment. Several types of field QC samples will be collected and submitted for laboratory analysis including trip blanks, sample duplicate, matrix spike and matrix spike duplicate.

Trip blanks – A trip blank sample monitors for potential impacts due to handling, transport, cross contamination from other samples during storage or laboratory contamination. The trip blanks, for aqueous VOCs only, will consist of analyte free reagent grade water in VOC sampling containers to be used for the project. Trip blanks will be prepared at the laboratory, sealed, transported to the Site and returned without being opened to assess contamination that may have occurred during transport. Trip blanks will be submitted at a rate of one per cooler when aqueous VOCs are shipped to the laboratory.

Blind duplicates – Blind duplicate samples are used to monitor field and laboratory precision, as well as matrix heterogeneity. The samples are separate aliquots of the same sample, collected from the same location, at the same time, in the same manner as the first, and placed into a separate container. Each duplicate sample will be analyzed for the same parameters as the original sample collected that day. Blind duplicates will be collected at a frequency of 1 per 20 environmental samples of a given matrices (i.e. soil or groundwater).

Matrix spike/matrix spike duplicate (MS/MSD) are used to monitor precision and accuracy of the analytical method on various matrices. The samples are spiked with known quantities of target analytes at the laboratory. The MS/MSD will be collected at a frequency of 1 pair per 20 environmental samples of a given matrices (i.e. soil or groundwater).

Rinsate Blanks – Rinsate blank is used to indicate potential contamination from sample instruments used to collect and/or transfer samples. The rinsate blank will be generated by passing distilled water through and over cleaned sampling equipment. Rinsate blank samples will not be performed when dedicated disposal equipment is used. The rinsate blank will be collected at a frequency of 1 per 20 environmental samples of a given matrices (i.e. soil or groundwater).

5.3 Corrective Actions

If instrument performance or data fall outside acceptable limits, then corrective actions will be taken to resolve problems and restore proper functioning of the analytical system. Actions may include recalibration or standardization of instruments, acquiring new standards, replacing equipment, repairing equipment, and reanalyzing samples or redoing sections of work. Subcontractors providing analytical services should perform their own internal laboratory audits and calibration procedures with data review conducted at a frequency so that errors and problems are detected early, thus avoiding the prospect of redoing large segments of work.

6.0 DATA USABILITY

The main objective of the DUSR is to determine whether the data presented meets the project-specific needs for data quality and data use. Data validation will be performed and a Data Usability Summary Report (DUSR) will be prepared to meet the NYSDEC requirements for analytical data generated during the RI/IRM. The DUSR will be completed in general accordance with Appendix 2B of DER-10. The findings of the DUSR will be incorporated in the RI/IRM/AAR report. Waste characterization and/or delineation samples will not be validated.

TABLES

TABLE 1
Analytical Testing Program Summary
Chandler Incubator
27 & 37 Chandler, Buffalo, NY
NYSDEC Brownfield Cleanup Program

Location	**Number of Proposed Locations**	**Matrix**	**TCL VOCS**	**TCL SVOCs**	**TAL METALS Total**	**TAL METALS dissolved**	**PCBs**	**Pest/ Herbs**	**VOC TO-15**	**1,4-dioxane**	**PFAS**
Surface Soil Samples											
Surface Soil Sample	4	Soil	4	4	4	-	4	4	-	2	2
Duplicate		Soil	1	1	1	-	1	1	-	1	1
MS/MSD		Soil	2	2	2	-	2	2	-	2	2
Rinsate		Water	1	1	1	-	1	1	-	1	1
Total			**8**	**8**	**8**	**0**	**8**	**8**	**0**	**6**	**6**
Soil Borings - Subsurface Samples											
Soil Borings	16	Soil	8	12	12	-	4	4	-	4	4
Duplicate		Soil	1	1	1	-	1	1	-	1	1
MS/MSD		Soil	2	2	2	-	2	2	-	2	2
Rinsate		Water	1	1	1	-	1	1	-	1	1
Total			**12**	**16**	**16**	**0**	**8**	**8**	**0**	**8**	**8**
Monitoring Wells											
Monitoring Well	4	Groundwater	4	4	4	4	4	4	-	4	4
Duplicate		Groundwater	1	1	1	1	1	1	-	1	1
MS/MSD		Groundwater	2	2	2	2	2	2	-	2	2
Rinsate		Water	1	1	1	1	1	1	-	1	1
Trip Blank		Water	1	-	-	-	-	-	-	-	1
Total			**9**	**8**	**8**	**8**	**8**	**8**	**0**	**8**	**9**
Sub-slab/Ambient Air samples											
Sub-slab	0	Air	-	-	-	-	-	-	-	-	-
Ambient Air		Air	-	-	-	-	-	-	-	-	-
Outdoor		Air	-	-	-	-	-	-	-	-	-
Duplicate		Air	-	-	-	-	-	-	-	-	-
Total			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
IRM Confirmation Sampling											
Sidewall Samples	40	Soil	6	40	40	-	6	6	-	-	-
Bottom Samples	30	Soil	4	30	30	-	4	4	-	-	-
Duplicate		Soil	1	4	4	-	1	1	-	-	-
MS/MSD		Soil	2	8	8	-	2	2	-	-	-
Rinsate		Water	1	4	4	-	1	1	-	-	-
Total			**14**	**86**	**86**	**0**	**14**	**14**	**0**	**0**	**0**
			VOCs	SVOCs	METALS	METALS	PCBs	Pest/ Herbs	VOC - TO-15	Pest/ Herbs	VOC - TO-15
		TOTAL SAMPLES	**43**	**118**	**118**	**8**	**38**	**38**	**0**	**22**	**23**

Notes:
- TCL VOCs - Target Compound List Volatile Organic Compounds.
- TCL SVOCs - Target Compound List Semi-volatile Organic Compounds.
- TAL Metals - Target Analyte List Metals.
- TCL PCBs - Target Compound List Polychlorinated Biphenyls.
- PFAS - Polyfluoroalkyl Substances

TABLE 2
Sample Container, Volume, Preserving and Holding Time Requirements
Chandler Incubator
27 & 37 Chandler Street, Buffalo, NY
NYSDEC Brownfield Cleanup Program

PARAMETER DESCRIPTION	MATRIX	METHOD NO.	Quantity/ Bottle Type	Preservation	Holding Time
Soil Samples					
Volatiles, TCL list	Soil	5035/3035A/8260	Encore or Terracore Samplers	Freeze withint 48 hours	Freeze within 48 hours 14 days
Semi-Volatiles, TCL list	Soil	8270	(1) 4oz glass jar	Cool, 4 C	14 days
Metals, TAL (no CN)	Soil	6010/7000	(1) 4oz glass jar	none	180 days, Mercury 28 days
PCBs	Soil	8082	(1) 4oz glass jar	Cool, 4 C	365 days/40 days from extraction
Pesticides	Soil	8081	(1) 4oz glass jar	Cool, 4 C	14 days/40 days from extraction
Herbicides	Soil	8151	(1) 4oz glass jar	Cool, 4 C	14 days/40 days from extraction
1,4-Dioxane	Soil	8270D-SIM	(1) 8oz glass jar	Cool, 4 C	14 days
Polyfluoroalkyl Substances (PFAS)	Soil	Method 537	(1) 8oz plastic	Cool, 4 C	28 days
Monitoring Wells					
Volatiles, TCL list	Water	8260	(3) 40ml vial	Cool, 4 C, HCL	14 days
Semi-Volatiles, TCL list	Water	8270	(2) 1 liter amber	Cool, 4 C	7 days
PCBs	Water	8082	(2) 1 liter amber	Cool, 4 C	7 days/40 days from extraction
Pesticides	Water	8081	(2) 500ml amber	Cool, 4 C	7 days/40 days from extraction
Herbicides	Water	8151	(2) 1 liter amber	Cool, 4 C	7 days/40 days from extraction
Metals, TAL	Water	6010	(1) 250ml plastic	HNO3	180 days
Mercury, Total	Water	7000	(1) 250ml plastic	HNO3	28 days
Metals, TAL (dissolved) field filtered	Water	6010	(1) 250ml plastic	HNO3	180 days
Mercury, Dissolved	Water	7000	(1) 250ml plastic	HNO3	28 days
1,4-Dioxane	Water	8270D-SIM	(2) 500ml amber	Cool, 4 C	7 days
Polyfluoroalkyl Substances (PFAS)	Water	Method 537	2 plastic/1 plastic/1 H20 plastic*	Cool, 4 C	14 days
Air Samples - Sub-slab; Ambient Air; Soil Vapor					
Volatiles	Air	TO-15	1 liter canister	none	30 days

* Three bottles in kit provided by lab. These bottles will be kept separate from other bottles that may have teflon lids

FIGURES

KEY

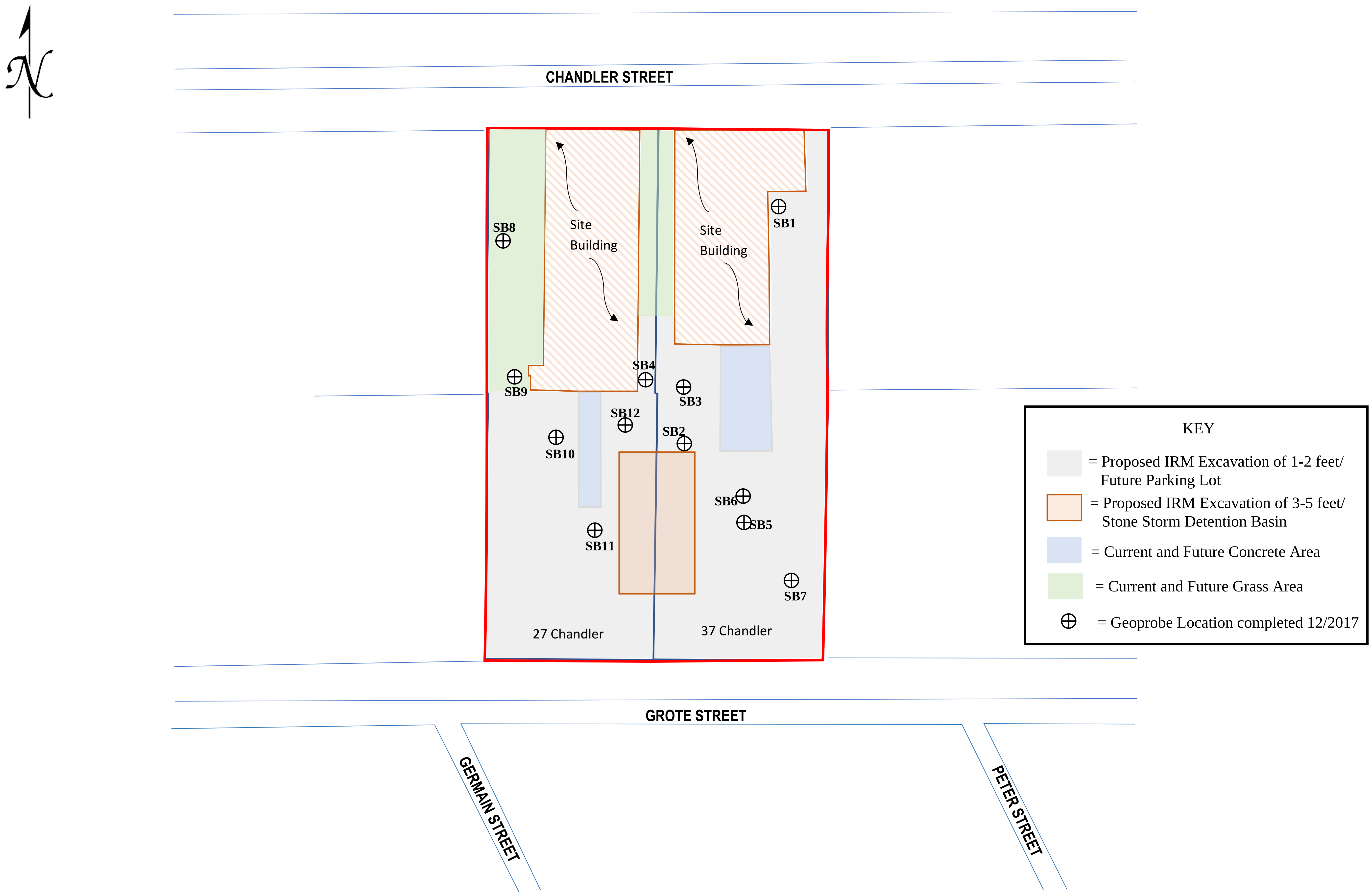
🟡 = Proposed Geoprobe Location (depth of 12 feet)

🔵 = Proposed Geoprobe Micro Well Location

🟢 = Proposed Surface Soil Location

⊕ = Geoprobe Location completed 12/2017

WITTMAN GEOSCIENCES, PLLC	**Proposed Investigation Locations**	DRAWN BY: MMW	SCALE: 1" = 50'	PROJECT: 18-104
	27 & 37 Chandler, Buffalo, NY	CHECKED BY: MMW	DATE: 02/2019	FIGURE NO: 1

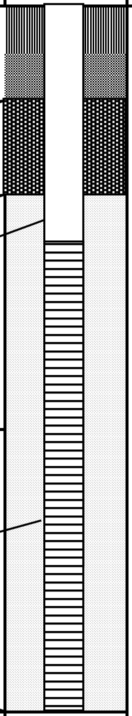


WITTMAN GEOSCIENCES, PLLC	**Proposed IRM Excavation Areas**	DRAWN BY: MMW	SCALE: 1" = 50'	PROJECT: 18-104
	27 & 37 Chandler, Buffalo, NY	CHECKED BY: MMW	DATE: 02.2019	FIGURE NO: 2

Wittman GeoSciences, PLLC	Date started: Date finished:	Hole No.: Sheet 1 of 1

location:
Location:

Project No.: Proj. Mgr:	Drilling Co. Driller: Drill Rig:	Weather:



Depth (ft.)	Sample No.	Sample Depth (ft.)	Blows /6"	Well Construction Details	Field Analytical Readings	Well Details	Groundwater and Other Observations
				1" well completed w/ flush road box			
				Cement/bentonite mix (1' - 2')			
4	2	4-8					
				Bentonite pellets (2'-4')			
				1" sch. 40 PVC riser (0'-5')			
8	3	8-12					
				#0 sand (4'-15')			
12	4	12-15	N/A: Well completed w/ geoprobe drill rig	1" sch. 40 PVC (.010 slot screen).			
				Bottom of screen 15 feet bg.			
				Bottom of borehole 15 feet bg.			
16							
24							
30							

S=Split Spoon: ________ T= Shelby Tube: ________
R= Rock Core: ________ WH = Weight of Hammer
N = ASTM D1586

Backfill Well Key:

▥	Grout	▒	Cement/ Bentonite
░	Sand	▓	Bentonite

Attachment 1

Resumes

Wittman GeoSciences, PLLC
3636 N. Buffalo Road, Orchard Park, NY 14127
michelewittmangeo@gmail.com 716-574-1513

Michele M. Wittman, P.G.
Principal

Education

B.A., 1994, Geology, State University of New York at Buffalo

B.S., 1994, Social Sciences-Environmental Studies, State University of New York at Buffalo

Professional Registrations

2018, Professional Geologist, New York, #000726

2002, Professional Geologist, Washington, #1772

Affiliations and Certifications

New York State Council of Professional Geologists, Member
Buffalo Association of Professional Geologists, Member
Air and Waste Management Association of Western New York, Member
OSHA 40 Hour 29 CFR 1910. (HAZWOPER) Certification

Ms. Wittman is a Professional Geologist with over 24 years of professional experience in conducting a variety of environmental projects for both private and public clients. Clients have included industry, governmental agencies, developers, legal firms, financial institutions, and engineering firms. Project work has included conducting and managing Phase I and Phase II Environmental Site Assessments throughout New York and surrounding states, Brownfield Cleanup Program project investigations and site remediation, hydrogeologic investigations, remedial option evaluation and cost estimating, and remediation of soil and groundwater.

Ms. Wittman's responsibilities have ranged from supervising field and technical activities, completion of field work including soil classification, well installation, collection of environmental laboratory samples, excavation oversight; training staff, data analysis, report preparation and review, and client contact. Additionally, responsible for developing and maintaining client relationships, account and project management, bidding, contracting and scheduling and financial management including budgets, proposals, profit/loss assessment. Ms. Wittman has also acted as business manager which included business development and client management, generation of marketing materials; supervising administration staff, and office management.

Ms. Wittman also previously held the position as Assistant Vice President and Environmental Risk Analysis Officer at an international financial institution. During her tenure at this position, Ms. Wittman reviewed hundreds of environmental reports and provided remedial cost estimates to evaluate the potential risk and future losses.

Areas of Specialization

- ✓ Brownfield Cleanup Program
- ✓ Remedial Investigations
- ✓ Feasibility Studies
- ✓ Hydrogeologic Investigations
- ✓ Petroleum and Chemical Bulk Storage
- ✓ Environmental Site Assessments
- ✓ Geologic Evaluations
- ✓ Soil Testing
- ✓ Budgeting & Cost Controls
- ✓ Subcontractor/Crew Management

Environmental Project Highlights

Phase I Environmental Site Assessments – Various
Ms. Wittman has performed, completed, managed or reviewed over 1,500 Phase I Environmental Site Assessments (ESAs) from areas throughout the United States, with focus in the north east and Western New York area. Site assessments have ranged from small, vacant properties, apartment complexes, office buildings, commercial buildings, shopping plaza, automotive dealerships, gasoline stations, as well as small to large 1,000,000-square foot manufacturing and industrial facilities. Ms. Wittman has completed all aspects of Phase I ESAs including site visits, historical review, municipal agency review, database evaluations, and report preparation.

Phase II Environmental Site Assessments – Various
Ms. Wittman has been involved with hundreds of Phase II ESAs at various commercial, manufacturing, industrial and gasoline station properties. Work has included completion of soil borings and/or test pits, installation of groundwater monitoring wells, collection of soil and/or groundwater samples, and vapor intrusion sampling. Ms. Wittman completes data evaluation including with a final report with conclusions and recommendations, if appropriate.

Brownfield Cleanup Program – Commercial Facility, Cheektowaga, New York
Project Manager and Geologist for the investigation and remediation of a former gasoline station for future commercial and residential usage. Site work involved remedial investigation and an interim remedial measure including removal of two underground storage tanks and petroleum impacted soil. Limited remedial work is required and the facility is anticipated to receive certificate of completion in Fall 2018.

Brownfield Cleanup Program – Commercial Facility, Buffalo, New York
Project Manager and Geologist for the investigation and remediation of a former industrial facility for future proposed commercial and residential usage. Site work included remedial investigation, which identified high concentrations of PCBs and hazardous concentrations of lead within site soil. Remedial design included removal and out-of-state disposal of PCB soils and on-site stabilization and off-site disposal of lead impacted soils. Remedial work also included excavation of underground storage tank, and removal of impacted soil and concrete within the building. Additionally, significant asbestos abatement was completed. Remedial design included installation of a sub-slab vapor mitigation system. Facility received certificate of completion in less than nine months from work plan approval.

Remedial Cleanup - Commercial Facility, Amherst, New York
Project Manager and Geologist for the remedial oversight during new building construction, which resulted in identifying former oil/water separator pits, hydraulic lifts, and underground tanks. Each underground structure was evaluated upon discovery, removed, and appropriate samples collected for laboratory analysis. NYSDEC oversight was present during the construction process and one NY Spill was assigned to the site. Upon completion of the project, a final report was done to summarize the findings and the NY Spill was closed.

Remedial Action Plan Evaluation – Former Bulk Petroleum Terminal, Rochester, New York

Developed Remedial Action Plan for former terminal property that underwent extensive subsurface investigations resulting in over 70 borings and 80 soil sample analyses. Initial remedial estimates (by others) included significant soil excavation and remedial costs. Our evaluation included comparison to NYSDEC CP-51 soil guidance for assessment of potential remediation. As such, based on minimal groundwater contamination and identification of significant impacts at greater depths, and negotiation with NYSDEC, no soil remediation was needed.

Management of Environmental Conditions – Retail Gasoline Chain, Western New York

Evaluated environmental concerns associated with 75 different retail gasoline stations. Reviewed regulatory information, previous reports, and data analysis to assess current environmental status. Developed a summary of findings and recommendation of action for each property. Further evaluations included Phase II investigation and continued monitoring of remedial efforts. Developed remedial cost estimate ranges for locations current undergoing remedial work.

Voluntary Cleanup Program - Commercial Facility, Hamburg, New York

Completed a Phase I ESA and identified historical dry cleaner. Conducted investigation and identified contamination beneath the building floor slab and behind the building (i.e. back door). Interim remedial measures (IRM) included soil removal, resulting in approximately 200 tons of soil that was disposed at a hazardous waste landfill. A soil vapor intrusion study was done and identified the presence of compounds To achieve site closure, negotiated a remedial solution that included confirmation sampling of soils around the building structure and installation of a sub-slab depressurization/vent system.

Contract to Closure, Remedial Activities, Commercial Facility, Rochester, New York.

Two former gasoline stations were located at adjoining properties. Our client wanted to develop the Site for commercial use. Completed a Site Investigation and identified subsurface soil contamination, groundwater contamination and separate phase product. Developed a Remedial Work Plan that included removal of separate phase product and implementation of in-situ chemical oxidation via hydrogen peroxide injections to further reduce contaminants in soil and groundwater. Remedial action also included asbestos abatement and building. The Site received a “no further action” letter and has been developed as a retail bank.

True Bethel Baptist Church – Technical Consultant

Senior Project Manager on the NYSDEC first ever Technical Assistance Grant (TAG) to a community group impacted by a brownfield site. Reviewed site technical documents, attended public meetings and interacted on behalf of the community with NYSDEC and its representatives and contractors on the Site.

JOHN A. SCHENNE, P.E.

REGISTRATION

Registered Professional Engineer -- Texas, New York and Florida
Licensed Fire Protection II Contractor - Florida

EDUCATION/ TRAINING

BS - Civil Engineering - Clarkson University (1975)
BA - Geology - State University of New York at Potsdam (1976)
MS - Environmental Engineering - Clarkson University (1977)
Architectural and Planning Courses - State University of New York at Buffalo (1982-87)
U.S. Army Corps of Engineers – Engineer Officer Basic Course (1977)
Earth and Rock fill Dam Construction (1979)
Contract Management (1979)
Oil Field and Hazardous Environment Safety (1986)
Petroleum Production Repair (1984-1986)
Engineer Officer Advanced Course (1987)
U.S. Army Medical Service Corps – Officer Advanced Course (1993)

PUBLICATIONS

Earthen Manure Storage Design Considerations, US NRCS, 1997, co Author

MILITARY EXPIERENCE

23 years of experience, 2LT thru LTC, USAR officer, retired 1999 as 0-5. Various staff and command positions including Equipment officer responsible the maintenance of 4000 Army vehicles, to include Humves, Trucks to 80 ton, heavy equipment, bridging equipment, NBC decontamination equipment, repair equipment, generators air compressors, and various other diesel and gas fire equipment. I was also a safety engineer for the US Army for 12 years.

EXPERIENCE SUMMARY

Thirty five years of professional experience in design, construction, and management of multi-disciplined projects involving major earthworks, tunnels, buildings, treatment plants, and site developments. Responsibility as Project Engineer/Manager for feasibility, environmental, and design studies, supervision of field and laboratory investigations, field inspections, providing technical support, and liaison with regulatory agencies. Areas of experience and training include: Environmental Engineering, Sanitary Engineering, Hydrology, Geological Exploration and Mapping; Site Investigation and Assessment, Hazardous Waste Remediation & Testing; Earthwork; Rock Excavation and Blasting; Concrete Design and Construction; Structural Design; Mechanical Design, Corrosion Protection; Facility Planning and Design, and Construction Management.

As a Licensed Fire Protection Contractor I have designed hundreds of water and chemical based fire sprinkler systems and coordinated the work with various fire departments and water utilities. I am familiar with NFPA specifications and codes including rating and testing of potable water systems and fire services. I am very familiar with the New York State Building Code as it relates to fire safety in structures.

<u>KEY PROJECTS</u>

Project-Engineer - Responsible for Draft Environmental Impact Study for 100 unit Residential Development in Orchard Park, New York. Work included traffic studies and investigation of Electro-Magnetic Radiation near power lines.

Project Engineer-Responsible for completion of a chrominum contamination study on twenty (20) miles of Cattaraugus Creek.

Project Engineer – Phase II Environmental hazardous waste investigation and remediation for the Seneca Nation of Indians Elderly Housing Complex, (former U.S. Leather Tannery Site).

Project Engineer - Responsible for the design and construction certification for the U. S. Army Corps of Engineers for over 80 miles of small diameter (four to eight inch) water and sewer lines. Work included approximately 50 lift stations, three 50,000 gpd package water treatment plants, and five land application sewage treatment systems.

Design Engineer - Responsible for the structural design of a high capacity sewage lift station handling extremely corrosive industrial sewage. Project was designed using 8000 psi chemically resistant concrete.

Project Engineer - Responsible for repairs to a 200 mgd water intake in Buffalo Harbor for the City of Buffalo. Repairs included underwater grouting of a 110 year old concrete foundation and installation of a zebra mussel suppression system.

Senior Design Engineer - Erie County Water Authority Sturgeon Point Water Treatment Plant, upgrade of sedimentation basins, sludge removal system and rehabilitation of rapid sand filters at a 100 mgd water plant.

Senior Design Engineer - Responsible for plant and structural design of slow sand water filtration plants at Ripley and Woodridge, New York. Plant sizes 0.3 mgd and 0.5 mgd

Project Engineer - Underwater inspection and emergency repairs to 70 mgd, 90 year old concrete and timber drinking water intake in the Niagara River for the City of Niagara Falls. Work included analysis of intake structure to resist dynamic water and ice loads

Design Engineer - Responsible for investigations and preparation of Phase I Site Assessments for Residential and Commercial Properties in Western New York.

Design Engineer - Responsible for foundation design for a 100 foot tall 300,000 gallon elevated water storage tank.

Design Engineer – Prepared design specifications for more than 50 fire pumps and more than 200 fire sprinkler systems in New York and Florida.

Design Engineer – Prepared designs for 10 –FM 200 fire suppression systems

Design Engineer – Prepared designs for s more than 250 commercial fire detection and alarms systems.

C. Mark Hanna, CHMM
President, Principal

Mr. Hanna has over 34 years of experience in environmental pollution control and health/safety services. As principal for Hazard Evaluations, Inc., Mr. Hanna is responsible for all technical services. He specializes in hazardous materials/wastes management, site assessment and remediation, industrial compliance auditing, chemical exposure assessment, safety program development and implementation, and Process Safety Management and Risk Management Planning programs.

Mr. Hanna's career has included over 40 federal/state Superfund projects and over 1,500 due diligence projects. His industrial experience focuses on air, water, waste and chemical management compliance aspects at metal working, wood working, foundry, electroplating, printing and food production facilities.

Education

B.A., 1975, Biology, S.U.C. at Oswego, N.Y.

M.S., 1977, Natural Sciences (Toxicology Concentration), S.U.N.Y. at Buffalo, N.Y.

MEPC, 1982, Pollution Control, Pennsylvania State University

M.S., 1983 Forest Hydrology (Hydrogeology Minor), Pennsylvania State University

Professional Registrations

1985, Certified Hazardous Materials Manager, Senior Level

1989-1998, Registered Environmental Professional

1997, Certified Hazardous Materials Manager, Master Level

Key Skills

- Industrial Emission Permits and Controls
- Hazardous/Solid Waste Management
- Industrial Wastewater Pretreatment and Discharge Permits
- Waste Reduction and Pollution Prevention Programs
- Petroleum and Chemical Bulk Storage
- Industrial Stormwater Management
- Environmental Site Assessments
- Environmental Compliance Assessment
- Industrial Risk Management Program and Audit
- Remedial Investigations
- Brownfield Cleanup Program
- Budgeting & Cost Controls

Affiliations and Certifications

Academy of Hazardous Materials Management, Member
Erie County Local Emergency Planning Committee, Member
New York Water Environment Association, Member
International Institute of Ammonia Refrigeration, Member
OSHA 40 Hour 29 CFR 1910. (HAZWOPER) Certification

Environmental Project Highlights

- Performed site characterization for subsurface TCE contamination from historical improper disposal via septic system. Developed Interim Remedial Measures and Remedial Alternatives Reports and Work Plan for this Voluntary Brownfield Cleanup. Installed two banks of piezometers to allow both extraction of contaminated groundwater and injection of Potassium permanganate using continuously operating metering pumps. Recovered over 60 gallons of free product and significantly reduced contamination in groundwater in one year.

- Project Manager for the remediation of numerous (85+) underground petroleum storage tank sites located throughout Western New York. The primary method of remediation has been excavation/removal with appropriate management of tank contents and/or residues, cleaning and scrapping of the tanks and piping, and site restoration. Where petroleum releases were detected, excavation/removal of contaminated soil/fill was completed the majority of the time, with soil management including off-site disposal or on-site bio-treatment. In several cases, on-site vapor extraction systems or chemical oxidation systems with groundwater monitoring have been installed as the recommended remedial method.

- Project Manager for industrial site restoration project which involved the characterization of Lead-contaminated kiln brick surfaces. Appropriate characterization allowed demolition debris from kiln to be disposed of in-place on-site as solid waste material as authorized by NYSDEC. Area was then backfilled with structural flowable fill to allow reuse of floor space for manufacturing.

- Completed investigation and remediation (excavate and remove) of subsurface Lead contamination at an historical industrial site in Buffalo (NY).

- Project Manager for non-hazardous aspects of site remediation at former Frontier Chemical-Pendleton Site. Remedial tasks included sampling/analysis of wastes, emptying, cleaning and scrapping of bulk storage tanks and collecting/disposing of various on-site residuals.

- Project Manager for the installation of groundwater monitoring wells at AL Tech Specialty Steel's solid waste management unit located in Watervliet, NY. Prepared Closure Plan and Bid Specifications for the related RCRA surface impoundment. Addressed technical impact of surface run-off from adjacent landfill, steep terrain and on-site source for cover material. Prepared response package required by NYSDEC regarding the basis of design and construction practices completed during closure.

- Project Manager for the remediation of a cutting oil spill at a Lockport, NY machine shop. Cleanup activities included an underground storage tank removal, scarification of surface soils and inoculation of contaminated soils with petroleum biodegrading bacteria. Responsibilities included coordination of subcontractors, soil sampling, and preparation of report certifying contamination removal.

- Project Manager for industrial site restoration project for solid waste materials abandoned on-site in the on-site production of flowable fill as authorized by a NYSDEC Beneficial Use Determination. Flowable fill produced was used as structural fill to backfill subfloor tanks and large vaults to grade within the facility to allow reuse of the floor space. Tasks included CBS-registered process tank fluid removal and management, basement vault water management, chemical lab packing and disposal, PCBs-contaminated concrete characterization and disposal, UST closure and soil management, scrap and demolition debris management, and subsequent SEQR filing and Phase I Environmental Site Assessment.

Regulatory Compliance Project Highlights

- Project Manager for the development of numerous Process Safety Management and/or Risk Management Plan programs utilizing anhydrous ammonia for refrigeration, including Sorrento Lactalis, Inc.'s South Park (Buffalo, NY), Goshen, NY, Nampa, ID and San Jose, CA facilities, Upstate Niagara Cooperative, Inc.'s Culture (West Seneca, NY), Dale Road (Cheektowaga, NY) and Fulton (Rochester, NY) facilities, as well as Rosina Foods, Inc. (West Seneca, NY), Steuben Foods, Inc. (Elma, NY), Elmhurst Dairy, Inc. (Jamaica, NY), and Sodus Cold Storage, Inc. (Sodus, NY). Responsibilities included coordinating written program preparation, Process Hazard Analysis development, preparing release scenarios, evaluating and upgrading SOPs, developing MOC methods, etc.

- Provided consulting services to over 75 facilities nationwide regarding SARA Title III reporting requirements. Services included regulations and process reviews, mass balance calculations, purchasing and process data evaluation, database development and USEPA Tier Two and Form R preparation.

- Project Manager for numerous environmental compliance audits including, Mod-Pac Corp., Buffalo, NY (commercial printing), Sahlen Packing Co., Inc., Buffalo, NY (meat packing), Upstate Niagara Cooperative, Inc., Buffalo, NY (dairy products), MoldTech, Inc., Lancaster, NY (plastics), Sorrento Lactalis, Inc., Buffalo, NY (cheese manufacturing), Chautauqua Hardware Corp., Jamestown, NY (brass hardware), Thomson Professional Publishing, Webster, NY (printed media), Buffalo China, Inc., Buffalo, NY (lead glazed china), Brainerd Manufacturing Co., East Rochester, NY (electroplating and finishing), Falconer Die Casting Co., Inc., Lakewood, NY (aluminum and zinc casting), and Jensen Fittings Corp., North Tonawanda, NY (stainless pipe fittings). These audits emphasized the inspection of all manufacturing operations, hazardous materials and hazardous waste handling, wastewater treatment operations, air emissions and facility records to evaluate current practices with regard to RCRA, SARA, New York State Parts 200 (air), 360 (solid waste) and 370 (hazardous waste) regulations, USEPA Categorical Pretreatment Standards, UIC NESHAP & CFATS regulations, New York State SPDES regulations, and local sewer authority and fire and building department codes.

- Oversaw the modification of an industrial wastewater pre-treatment system for Whiting Door Manufacturing. Evaluated plant manufacturing wastewater sources, modified existing pretreatment system, developed wastewater pretreatment schedule, and completed wastewater discharge monitoring. Developed a Toxic Organics Management Plan to reduce cost of wastewater monitoring. Evaluated and assisted with the revision of municipal Industrial User Permit.

- Project Manager for Title V Clean Air Act permit development for Whiting Door Manufacturing Corp., Dinaire, Inc., Metalico Aluminum Recovery, Inc. and Flexo Transparent, Inc. Continued services include annual emission statements, 12-month rolling emissions determinations and semi-annual compliance reporting.

- Project Manager for Clean Air Act and/or NYSDEC Part 228 determinations and State Air Facility Permit or Air Facility Registration development for numerous industrial clients including Niagara Ceramics Corporation, Buffalo Metal Casting Co., Inc., ITT Standard/XYLEM, Metalico Rochester, Inc., Ulrich Planfiling Equipment Corp., United Silicone, Inc., U.S. Chrome Corp., Metalico Aluminum Recovery, Inc., Truck-Lite Co., Inc., Jensen Fittings Corp., API Delavan, Inc., Tapecon Inc., Dura-Plating, Inc., Buffalo China, Inc., Forsyth Industries, Inc., Jamestown Laminating Co., Classic Brass Inc., Ivaco Steel Processing (New York), LLC, Innovative Tool & Machine Co., Inc., and Whiting Door Manufacturing, Inc.

Eric J. Betzold
Project Geologist

Mr. Betzold is a Geologist with over four years of experience in conducting a variety of environmental investigations and remediation at various types of properties. As a Project Geologist, Mr. Betzold has performed Phase I Environmental Site Assessments to include historical review, site reconnaissance and report preparation. Mr. Betzold's responsibilities with Phase II Environmental Site Assessments include soil borings, test pits, soil sampling, groundwater monitoring well installation and samplings. Additionally, Mr. Betzold completed evaluation and reporting requirements.

In addition to his duties in the site assessment field, Mr. Betzold is involved in local Western New York Stormwater and Wastewater compliance work, including sampling and data interpretations. Mr. Betzold plays a key role in report preparation under a multitude of environmental compliance requirements.

Education

B.A., Geology, 2012, State University of New York at Buffalo

Key Skills

- Environmental Site Assessments
- NYSDEC Stormwater Compliance
- BSA & ECSA Wastewater Compliance
- NYSDEC MSGP Compliance
- Geologic Interpretation
- Soil Testing
- Field Technology
- Project Management
- Assessment of Vapor Intrusion

Affiliations and Certifications

OSHA 40 Hour 20 CFR 1910. (HAZWOPER) Certification

Attachment 2

Field Forms

Wittman GeoSciences, PLLC
3636 N. Buffalo Road, Orchard Park, NY 14127
michelewittmangeo@gmail.com 716-574-1513

Boring No:

Project Name & Location ____________________
WGS Project Number: ____________________
Start Date __________ End Date __________
GW Depth While Drilling __________
GW Depth at Completion __________

WGS Representative: __________
WGS Reviewed & Approved by: M. Wittman, P.G.
Drilling Contractor __________
Type of Drill Rig __________
Sampler Type: __________

Sample Depth (ft)	Sample No.	Sample Depth (feet)	Recovery (%)	SAMPLE DESCRIPTION	OVM Reading (ppm)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
18					
20					
22					
24					

Notes:	1) Organic vapor meter used to field screen and headspace soil samples. 2) ND - non detect on OVM
General Notes:	1) Stratification lines represent approximate boundary between soil. Transitions may be gradual. Depths are approximate. 2) Groundwater (GW) depths approximate at time of sampling. Fluctuations in groundwater may occur. 3) f=fine; m=medium; c=coarse 4) and (36-50%); some (21-35%); little (11-20%); trace (1-10%)

MC - Geoprobe Macrocore SS - Split Spoon SH - Shelby Tube BC - Bedrock Core

HAZARD
EVALUATIONS

3752 N. Buffalo Rd.
Orchard Park, NY 14127
P (716) 667-3130
F (716) 667-3156

Date: ____________ Project No.: ____________

Client: ____________

Project: ____________

Site: ____________

Weather: ____________

FIELD INVESTIGATION REPORT

(Start typing here making sure underline is on and text is justified. Hit tab at the end of the very last row to extend the underline to the right margin).

Signature ____________ Title ____________

Well Data Sheet

Date: Job #:

Crew:

Well Depth:

Initial *Phase* Level:

Initial *Water* Level:

Volume Calculation:

DTB-DTW*__________=1-well vol

Purge Record

Time	Volume	pH	Cond.	Temp.	Turbidity

Purge Method: Bailer/Submersible Pump

Initial Water Quality

Final Water Quality

SAMPLE RECORD

Date:

Time:

Crew:

Method:

Sample ID:

Water Quality:

pH:

Conductivity:

Temperature:

Turbidity:

Volume:

Analysis:

Chain of Custody #:

Sample Type:

Diameter	Multiply by
1"	0.041
2"	0.163
3"	0.367
4"	0.653
6"	1.468
8"	2.61

Comments:

Signature:

NEW YORK CHAIN OF CUSTODY

Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page
of

Date Rec'd in Lab

ALPHA Job #

Client Information

Client:
Address:

Phone:
Fax:
Email:

Project Information

Project Name:
Project Location:
Project #
(Use Project name as Project #) ☐
Project Manager:
ALPHAQuote #:

Turn-Around Time

Standard ☐ Due Date:
Rush (only if pre approved) ☐ # of Days:

Deliverables

☐ ASP-A ☐ ASP-B
☐ EQuIS (1 File) ☐ EQuIS (4 File)
☐ Other

Regulatory Requirement

☐ NY TOGS ☐ NY Part 375
☐ AWQ Standards ☐ NY CP-51
☐ NY Restricted Use ☐ Other
☐ NY Unrestricted Use
☐ NYC Sewer Discharge

Billing Information

☐ Same as Client Info
PO #

Disposal Site Information

Please identify below location of applicable disposal facilities.

Disposal Facility:
☐ NJ ☐ NY
☐ Other:

These samples have been previously analyzed by Alpha ☐

Other project specific requirements/comments:

Please specify Metals or TAL.

ANALYSIS

Sample Filtration
☐ **Done**
☐ **Lab to do**
Preservation
☐ **Lab to do**

(Please Specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials									**Sample Specific Comments**	Total Bottle

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Container Type								
Preservative								

Relinquished By:	Date/Time	Received By:	Date/Time

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

Soil Vapor Intrusion - Structure Sampling Building Questionnaire **Structure ID :** ______________

Site No. : ______________________ **Site Name** : ____

Date: ______________________ **Time:** ____

Structure Address : ____

Preparer's Name & Affiliation : ____

Residential ? ☐ **Yes** ☐ **No** **Owner Occupied ?** ☐ **Yes** ☐ **No** **Owner Interviewed ?** ☐ **Yes** ☐ **No**

Commercial ? ☐ **Yes** ☐ **No** **Industrial ?** ☐ **Yes** ☐ **No** **Mixed Uses ?** ☐ **Yes** ☐ **No**

Identify all non-residential use(s) : ____

Owner Name : ____ **Owner Phone** : ( ) __________ - ___________

Secondary Owner Phone : ( ) __________ - ___________

Owner Address (if different) : ____

Occupant Name : ______________________________________ **Occupant Phone** : ( ) __________ - __________

Secondary Occupant Phone : ( ) __________ - ___________

Number & Age of All Persons Residing at this Location : ____

Additional Owner/Occupant Information : ____

Describe Structure (style, number floors, size) : ____

____

Approximate **Year Built** : ______________________ Is the building **Insulated**? ☐ Yes ☐ No

Lowest level : ☐ Slab-on-grade ☐ Basement ☐ Crawlspace

Describe Lowest Level (finishing, use, time spent in space) : ____

____

Floor Type: ☐ Concrete Slab ☐ Dirt ☐ Mixed : ____

Floor Condition : ☐ Good (few or no cracks) ☐ Average (some cracks) ☐ Poor (broken concrete or dirt)

Sumps/Drains? ☐ Yes ☐ No Describe : ____

Identify other floor penetrations & details : ____

____

Wall Construction : ☐ Concrete Block ☐ Poured Concrete ☐ Laid-Up Stone

Identify any wall penetrations : ____

____

Identify water, moisture, or seepage: location & severity (sump, cracks, stains, etc) : ______________________________

____

Heating Fuel : ☐ Oil ☐ Gas ☐ Wood ☐ Electric ☐ Other : ____________________________

Heating System : ☐ Forced Air ☐ Hot Water ☐ Other : ____

Hot Water System : ☐ Combustion ☐ Electric ☐ Boilermate ☐ Other: __________________________

Clothes Dryer : ☐ Electric ☐ Gas Where is dryer **vented** to? ______________________________

If combustion occurs, describe where air is drawn from (cold air return, basement, external air, etc.) : _________________

____

Fans & Vents (identify where fans/vents pull air from and where they vent/exhaust to) : ________________________________

____

Describe factors that may affect indoor air quality (chemical use/storage, unvented heaters, smoking, workshop):

Attached garage ? ☐ Yes ☐ No Air fresheners ? ☐ Yes ☐ No

New carpet or furniture ? ☐ Yes ☐ No What/Where ? ____________________

Recent **painting** or **staining** ? ☐ Yes ☐ No Where ? : ____________________

Any **solvent** or **chemical-like** odors ? ☐ Yes ☐ No Describe : ____________________

Last time **Dry Cleaned** fabrics brought in ? __________________ What / Where ? ____________________

Do any building occupants use solvents at work ? ☐ Yes ☐ No Describe : ____________________

Any testing for Radon ? ☐ Yes ☐ No Results : ____________________

Radon System/Soil Vapor Intrusion Mitigation System present ? ☐ Yes ☐ No If yes, describe below

---

Lowest Building Level Layout Sketch

- ■ Identify and label the locations of all sub-slab, indoor air, and outdoor air samples on the layout sketch.
- ■ Measure the distance of all sample locations from identifiable features, and include on the layout sketch.
- ■ Identify room use (bedroom, living room, den, kitchen, etc.) on the layout sketch.
- ■ Identify the locations of the following features on the layout sketch, using the appropriate symbols:

B or **F**	Boiler or Furnace	o	Other floor or wall penetrations (label appropriately)
HW	Hot Water Heater	**xxxxxxx**	Perimeter Drains (draw inside or outside outer walls as appropriate)
FP	Fireplaces	**######**	Areas of broken-up concrete
WS	Wood Stoves	● SS-1	Location & label of sub-slab vapor samples
W/D	Washer / Dryer	● IA-1	Location & label of indoor air samples
S	Sumps	● OA-1	Location & label of outdoor air samples
@	Floor Drains	● PFET-1	Location and label of any pressure field test holes.

Structure Sampling - Product Inventory

Page _____ of _____

Homeowner Name & Address: ______________________________ **Date:** __________

Samplers & Company: ______________________________ **Structure ID:** __________

Site Number & Name: ______________________________ **Phone Number:** __________

Make & Model of PID: ______________________ **Date of PID Calibration:** __________

Identify any Changes from Original Building Questionnaire : ______________________________

Product Name/Description	Quantity	Chemical Ingredients	PID Reading	Location

HAZARD EVALUATIONS

AIR/VAPOR SAMPLING FIELD DATA SHEET

Client: ____________________________ Project No.: _________________

Site Name & Address: ____

Person(s) Performing Sampling: ____

Sample Identification: ______________

Sample Type: ☐Indoor Air (ambient) ☐Outdoor Air ☐Soil Vapor ☐Sub-slab Vapor

Date of Collection: _______________ Setup Time:___________ Stop Time:___________

Sample Depth: ____________________

Sample Height: ____________________

Sampling Method(s) & Device(s): ____

Purge Volume: ____________________

Sample Volume: __________________

Sampling Canister Type & Size (if applicable): ________________________________

Canister # __________________ Regulator # __________________

Vacuum Pressure of Canister Prior to Sampling: _________________

Vacuum Pressure of Canister After Sampling: __________________

Temperature in Sampling Zone: __________________

Apparent Moisture Content of Sampling Zone: _________________________

Soil Type in Sampling Zone: _______________________

Standard Chain of Custody Procedures Used for Handling & Delivery of Samples to Laboratory:

☐Yes ☐No. If no, provide reason(s) why?________________________

Laboratory Name:____

Analysis:____

Comments:

____

____

____

____

Sampler's Signature ___________________________________ Date:________________

Attachment 3

Emergent Contaminant Sampling and Laboratory Analysis

February 2019

Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DEC's Part 375 Remedial Programs

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Objective

The Department of Environmental Conservation (DEC) is requiring sampling of all environmental media and subsequent analysis for the emerging contaminants 1,4-Dioxane and PFAS as part of all remedial programs implemented under 6 NYCRR Part 375, as further described in the guidance below.

Sample Planning

The number of samples required for emerging contaminant analyses is to be the same number of samples where "full TAL/TCL sampling" would typically be required in an investigation or remedial action compliance program.

Upon a new site being brought into any program (e.g., SSF, BCP), PFAS and 1,4-dioxane will be incorporated into the investigation of potentially affected media, including soil, groundwater, surface water, and sediment as an addition to the standard "full TAL/TCL sampling." Biota sampling may be necessary based upon the potential for biota to be affected as determined pursuant to a Fish and Wildlife Impact analysis. Soil vapor sampling for PFAS and 1,4-dioxane is not required.

Upon an emerging contaminant being identified as a contaminant of concern (COC) for a site, those compounds must be assessed as part of the remedy selection process in accordance with Part 375 and DER-10 and included as part of the monitoring program upon entering the site management phase.

Soil imported to a site for use in a soil cap, soil cover, or as backfill must be sampled for 1,4-dioxane and PFAS contamination in general conformance with DER-10, section 5.4(e). Assessment of the soil data will be made on a site-specific basis to determine appropriateness for use.

The work plan should explicitly describe analysis and reporting requirements, including laboratory analytical procedures for modified methods discussed below.

Analysis and Reporting

Labs should provide a full category B deliverable, and a DUSR should be prepared by an independent 3rd party data validator. QA/QC samples should be collected as required in DER-10, Section 2.3(c). The electronic data submission should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

PFAS analysis and reporting: DEC has developed a *PFAS Analyte List* (below) for remedial programs. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any compounds, the DEC project manager, in consultation with the DEC remedial program chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site.

Currently, ELAP does not offer certification for PFAS compounds in matrices other than finished drinking water. However, laboratories analyzing environmental samples (e.g., soil, sediments, and groundwater) are required by DER to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537 or ISO 25101.

Modified EPA Method 537 is the preferred method to use for environmental samples due to its ability to achieve very low detection limits. Reporting limits for PFAS in groundwater and soil are to be 2 ng/L (ppt) and 1 ug/kg (ppb), respectively. If contract labs or work plans submitted by responsible parties indicate that they are not able to achieve these reporting limits for the entire list of 21 PFAS, site-specific decisions will need to be made by the DEC project manager in consultation with the DEC remedial program chemist. Note: Reporting limits for PFOA and PFOS in groundwater should not exceed 2 ng/L.

Additional laboratory methods for analysis of PFAS may be warranted at a site. These methods include Synthetic Precipitation Leaching Procedure (SPLP) by EPA Method 1312 and Total Oxidizable Precursor Assay (TOP Assay).

SPLP is a technique for determining the potential for chemicals in soil to leach to groundwater and may be helpful in determining the need for addressing PFAS-containing soils or other solid material as part of the remedy. SPLP sampling need not be considered if there are no elevated PFAS levels in groundwater. If elevated levels of PFAS are detected in water, and PFAS are also seen in soil, then an SPLP test should be considered to better understand the relationship between the PFAS in the two media.

The TOP Assay can assist in determining the potential PFAS risk at a site. For example, some polyfluoroalkyl substances may transform to form perfluoroalkyl substances, resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from the site. To conceptualize the amount and type of oxidizable perfluoroalkyl substances which could be liberated in the environment, a “TOP Assay” analysis can be performed, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized.

PFAS-containing materials can be made up of per- and polyfluoroalkyl substances that are not analyzable by routine analytical methodology (LC-MS/MS). The TOP assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by current analytical methodology. Please note that analysis of highly contaminated samples, such as those from an AFFF site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. Please consult with a DEC remedial program chemist for assistance interpreting the results.

<u>1,4-Dioxane analysis and reporting:</u> The reporting limit for 1,4-dioxane in groundwater should be no higher than 0.35 µg/L (ppb) and no higher than 0.1 mg/kg (ppm) in soil. Although ELAP offers certification for both EPA Method 8260 SIM and EPA Method 8270 SIM in waters, DER is advising the use of Method 8270 SIM because it provides a more robust extraction procedure, uses a larger sample volume, and is less vulnerable to interference from chlorinated solvents. The analysis currently performed for SVOCs in soil is adequate for evaluation of 1,4-dioxane in soil, which already has an established SCO.

Refinement of sample analyses

As with other contaminants that are analyzed for at a site, the emerging contaminant analyte list may be refined for future sampling events based on investigative findings. Initially, however, sampling using this PFAS Analyte List and 1,4-dioxane is needed to understand the nature of contamination.

PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanessulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	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	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluroroctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

February 2019

Laboratory Guidance for Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Non-Potable Water and Solids

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The Division of Environmental Remediation (DER) developed the following guidance for laboratories submitting PFAS data to DER. If laboratories cannot comply with any of the following requirements, they must contact Dana Maikels at dana.maikels@dec.ny.gov prior to analysis of samples.

1. Standards containing both branched and linear isomers must be used when standards are commercially available. Currently, quantitative standards are available for PFHxS, PFOS, NMeFOSAA, and NEtFOSAA. All isomer peaks present in the standard must be integrated and the areas summed. Samples must be integrated in the same manner as the standards.

   Since a quantitative standard does not exist for branched isomers of PFOA, the instrument must be calibrated using just the linear isomer and a technical (qualitative) PFOA standard must be used to identify the retention time of the branched PFOA isomers in the sample. The total response of PFOA branched and linear isomers must be integrated in the samples and quantitated using the calibration curve of the linear standard.

2. Quantifier and qualifier ions must be monitored for all target analytes (PFPeA and PFBA are an exception). The ratio of quantifier ion response to qualifier ion response must be calculated for each target analyte and the ratio compared to standards. Lab derived criteria can be used to determine if the ratios are acceptable.

3. The ion transitions below must be used for the following PFASs:

PFOA	413 > 369
PFOS	499 > 80
PFHxS	399 > 80
PFBS	299 > 80
6:2 FTS	427 > 407
8:2 FTS	527 > 507
NEtFOSAA	584 > 419
NMeFOSAA	570 > 419

4. For all target analyte ions used for quantification, signal to noise ratio must be 3:1 or greater.

5. For water samples, the entire sample bottle must be extracted, and the sample bottle rinsed with appropriate solvent to remove any residual PFAS.

6. Detections below the reporting limit should be reported and qualified with a J qualifier.

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 I 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 ($PIR = Mean \pm HR_{PIR}$) 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

$$\text{RPD} = \frac{|\text{LCS} - \text{LCSD}|}{(\text{LCS} + \text{LCSD}) / 2} \times 100$$

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

$$\mathrm{RPD} = \frac{|\mathrm{FD1} - \mathrm{FD2}|}{(\mathrm{FD1} + \mathrm{FD2})/2} \times 100$$

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

$$\mathrm{RPD} = \frac{|\mathrm{MS} - \mathrm{MSD}|}{(\mathrm{MS} + \mathrm{MSD})/2} \times 100$$

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 ±

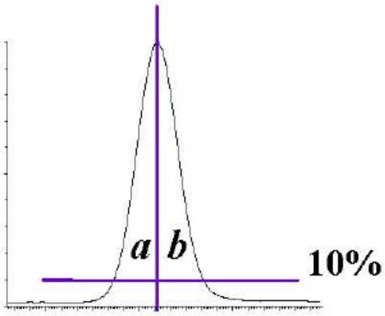
30% of the expected value. If measured analyte concentrations are not of acceptable accuracy, check the entire analytical procedureto locate and correct the problem.

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 °C

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	

1,4-Dioxane

By Gas Chromatography / Mass Spectrometry in Selected Ion Mode (GC/MS-SIM) with Isotope Dilution Modification

References:

Method 8270D, Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 4, February 2007, Test Methods for Evaluating Solid Waste, SW-846.

EPA 8000C, SW-846,Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA SW-846. Update III, March 2003.

1,4-Dioxane Analytical Notes, Appendix II-B-4, WSC-CAM-II-B, Revision 1, July 2010, (Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup).

1. Scope and Application

Matrices: Aqueous, soil/sediment and non-aqueous waste matrices

Definitions: Refer to Alpha Analytical Quality Manual.

This method is applicable to the quantification of 1,4-Dioxane extracted from aqueous samples in methylene chloride and analyzed by GC/MS-SIM. The extraction method is listed below and should be referenced for more details. Detection limits will vary with instrument calibration range, and volume of sample analyzed. 1,4-Dioxane detected over the calibration ranges of the instrument it is being analyzed on will be diluted and re-analyzed for accurate quantification.

The following extraction method applies:

- *Extraction of Water Samples by Separatory Funnel* (SOP 2165)
- *Microscale Solvent Extraction (MSE)* (SOP 2172)
- *Organic Waste Dilution Extraction* (SOP 2265)

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.

This method is restricted to use by or under the supervision of analysts experienced in the operation of the GC/MS-SIM and in the interpretation of GC/MS-SIM 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

Generally 1000 or 500ml of aqueous samples are serially extracted with methylene chloride in a 2 Liter Separatory Funnel (Method 3510) at a neutral pH. The extract is concentrated in MeCl2 to a 10 or 5ml final volume respectively depending on the volume of sample extracted. Soil/sediment samples are extracted by Microscale Solvent Extraction (MSE Method 3570). Approximately 5g of sample is extracted and concentrated to a 4mL final volume. Non-aqueous waste samples are extracted by Organic Waste Dilution Extraction (Method 3580). Approximately 1g is diluted to 10mL final volume.

Analytes are introduced into the GC/MS using a large volume injector and injecting 3ul of the calibration standards, quality control samples, and sample extracts into the GC equipped with a narrow-bore capillary column. The GC column is temperature programmed to separate the analytes, which are then detected with a mass spectrometer (MS) in selective ion mode. Identification of target analytes is accomplished by comparing their mass spectra with the electron impact spectra of the calibration standards. Concentrations are determined using mean relative response factors from a multi-level calibration curve. Response factors for target analytes and surrogate compounds are determined relative to the internal standards.

Isotope dilution quantification is achieved by spiking 1,4-Dioxane-d8 at extraction which is then in turn used as both an internal standard (IS) and surrogate. For quantification, the 1,4-Dioxane-d8 IS quantifies 1,4-Dioxane in samples. An additional IS added prior to analysis, 1,4-Dichlorobenzene-d4, quantifies 1,4-Dioxane-d8 as a surrogate.

2.1 Method Modifications from Reference

SIM option with Isotope dilution is utilized to increase sensitivity for this analyte. Note that while this method may be used for the evaluation of 1,4-Dioxane in soil/sediment samples, the MA DEP CAM does not approve of this method for determining presumptive certainty for MA DEP cleanup sites. Method 8260 should be employed in these cases.

3. Reporting Limits

Concentrations for 1,4-Dioxane can be detected in water samples in the range of 150ng/L to 100,000ng/L. Soil/sediment samples can be detected in the range of 8ug/Kg to 8,000ug/Kg. Standard reporting limits for aqueous samples are 150ng/L and for soil/sediment samples 8ug/kg respectively.

4. Interferences

4.1 Phthalate esters can be a major source of contamination if any material containing plasticizers (phthalates) comes in contact with the sample during the extraction process. Use of plastic or any material containing plasticizers (phthalates) should be avoided during extraction or analysis.

4.2 The injection port of the gas chromatograph can become contaminated with high boiling compounds resulting in the loss of sensitivity. It may be necessary to replace the injection port liner routinely to prevent this loss of sensitivity. Clipping off approximately four inches of the column at the injection end may also increase sensitivity. Low instrument response can be detected during the daily tuning procedure by including pentachlorophenol and benzidine in the daily tuning mix.

4.3 Raw GC/MS data from all blanks, samples, and spikes must be evaluated for interferences or carryover. Contamination by carryover can occur whenever high-concentration and low-concentration samples are sequentially analyzed.

4.4 Solvents, reagents and glassware may introduce interferences. These must be demonstrated to be free of interferences by the analysis of a method blank. See the SOP *Reagent, Solvent and Standard Control* (G-008) and *Laboratory Glassware Cleaning* (G-002), for additional details.

4.5 It should be noted that there are some chromatographic consequences observed due to the acetone used in the MSE extraction process. This is characterized by a shift in retention time for 1,4-Dioxane and the 1,4-Dioxane-d8 surrogate (~0.4minutes), as well as the presence of a large peak (likely acetone) in all chromatograms.

5. Health and Safety

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.

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.

6. Sample Collection, Preservation, Shipping and Handling

6.1 Sample Collection

Solid samples; A minimum of 100grams of sample must be collected in a glass jar with a Teflon lined screw cap.

Water samples: A minimum of 0.5 to 2 liters of sample must be collected in amber glass bottles.

6.2 Sample Preservation

Solid samples: The sample must be refrigerated and maintained at 4±2 °C until extraction and analysis. Sediment samples can be frozen at -20±5 °C until extraction to extend hold time. The extracts must be refrigerated and maintained at 4±2 °C until analysis.

Water samples: The samples must not be preserved except by refrigeration at 4±2 °C until extraction and analysis. The extracts must be refrigerated and maintained at 4±2 °C until analysis.

Non-aqueous waste samples: Concentrated sample extracts must be stored in contaminant-free containers and preserved in a refrigerator when not used for more than four hours.

6.3 Sample Shipping

No special shipping requirements.

6.4 Sample Handling

Solid samples: All solid samples must be extracted within 14 days from the date of collection. Frozen sample hold times are monitored up to 14 days from the date removed from freezer. The extracts must be refrigerated and maintained at 4±2 °C until analysis. Sample extracts must be analyzed within 40 days from date of extraction.

Water samples: All water samples must be extracted within 7 days from the date of collection. Sample extracts must be analyzed within 40 days from date of extraction.

Non-aqueous waste samples: Hold times do not apply to neat oils/NAPL/product samples.

7. Equipment and Supplies

7.1 Gas chromatograph – Programmable, heating range from 40C to 350C; splitless-type inlet system, (Hewlett Packard 6890N Series II or similar); mass selective detector (Hewlett

Packard 5973, or similar); automatic injector (Hewlett Packard 7683B or similar).

7.2 Chromatography Column – Fused silica capillary column, 0.25mm ID x 60m length, 0.25um film thickness RTX-5, Restek Corporation, 5% diphenyl-95% dimethyl polysiloxane, Fused silica capillary column, 0.18mm ID x 60m length, 0.18um film thickness RTX-PCB, Restek Corporation, Fused silica capillary column, 0.25mm ID x 30m length, .25um film thickness (Zebron ZB-SemiVolatiles, Phenomenex Corporation, 5% Polysilarylene - 95% Polydimethylsiloxane) , or equivalent.

7.3 Gerstel Large Volume Injection System – Temperature programmable range from 0C to 350C; pressure programmable; capable of split or splitless injection; Injection volumes range from 1 to 50uL and Cryo cooling availability to allow for cold injections.

7.4 Agilent Split/Splitless injector System

7.5 Data Acquisition System - Computerized system for collecting, storing, and processing detector output (Hewlett Packard Enviroquant target software) or equivalent.

7.6 Gases - BIP Ultra high purity helium (99.9995%); Compressed nitrogen for N-Evap. Carbon dioxide (siphon type) for Gerstel.

7.7 Syringes – 10uL to 1.0mL

7.8 Vials- including 2ml, 4ml, 10ml, 40ml and other sizes as necessary.

7.9 Hamilton Gas tight Syringes - varying sizes

7.10 Gerstel Single baffle injection port liners- packed lightly with glass wool.

7.11 GC Injection Port Liner: Phenomenex Direct Connect Top Hole

7.12 Class A Volumetric flasks: Including 10ml, 20 ml, 50 ml, 100ml and other sizes as necessary

8. Reagents and Standards

Use reagent grade chemicals for all reagents. Deionized (DI) water is ASTM Type II laboratory reagent grade water.

8.1 Solvents: All solvent expirations determined as indicated by manufacturer guidelines

8.1.1 Methylene Chloride, ACS approved, Pesticide grade, see SOP *Reagent, Solvent and Standard Control* (SOP 1816) for additional details regarding solvent purity. Used to extract samples and prepare instrument/analytical standards.

8.1.2 Acetone, ACS approved, Pesticide grade, see SOP *Reagent, Solvent and Standard Control* (SOP 1816) for additional details regarding solvent purity. This water soluble solvent is used for surrogate and LCS/MS preparation.

8.1.3 Methanol, ACS approved, Pesticide grade, *Reagent, Solvent and Standard Control SOP* (SOP 1816) for additional details regarding solvent purity.

8.2 Analytical Standards: Standards should be stored at –10C or less, away from light when not in use. They should be discarded after 1 year unless the vendor expiration date states otherwise or, if degradation is observed. Stock standards are given a 1 year expiration from the preparation date or the expiration of the primary vendor solution, whichever occurs first. Working standards are given six month expiration from the preparation date or the expiration of the primary solution whichever occurs first. All analytical standards are made up in Methylene Chloride. All prep standards are made up in Acetone.

8.3 Surrogate/Internal Standard (IS):

8.3.1 A 1,4-Dioxane-d8 Primary neat standard is commercially obtained from Cambridge Isotope (Cat #DLM-28-10 or equivalent). A stock surrogate/internal standard solution is prepared by weighing 0.1 g of the primary neat standard and diluting volumetrically in 10 mls methylene chloride (or equivalent preparation) to obtain a concentration of ~10,000 ug/ml.

8.3.2 From this stock (Section 8.3.1), the Surrogate spiking solution is made by a serial dilution (1 ml diluted up in a 50 ml volumetric flask, followed by a 0.5 ml of this solution diluted up in a 20 ml volumetric flask or equivalent preparations) in Acetone to achieve a concentration of 5 ug/mL. Of this surrogate solution, 1 mL is spiked into each water sample, and 0.4 mL is spiked into each soil/sediment sample for a surrogate/IS concentration of 500 ng/mL in samples.

8.3.3 The initial stock solution (Section 8.3.1) is diluted volumetrically (250 uL diluted up in a 100 ml volumetric flask or equivalent preparation) in methylene chloride to obtain an IS solution at a concentration of 25 ug/ml for the spiking of only the analytical standards (i.e. calibration curve and continuing calibration).

8.4 Internal Standard: 1,4-Dichlorobenzene-d4 commercially obtained from Restek (Cat #31206 or equivalent). This primary solution is at 2000 ug/mL and contains other Semivolatile Internal standards, however this method only utilizes the 1,4-Dichlorobenzene-d4. This solution is diluted volumetrically (250 uL diluted up in a 50 ml volumetric flask or equivalent preparation) in methylene chloride to obtain a SIM-IS solution at a concentration of 25 ug/ml. All samples and standards are spiked with 20uL of internal standard before analysis. This IS is intended to be used for both quantitation (of the surrogate 1,4-Dioxane-d8) and the establishment of relative retention times.

8.5 Matrix Spike/Laboratory Control Spike Solutions (MS/LCS) – 1,4-Dioxane primary spike solution is commercially obtained from Restek at 2000 ug/mL (Cat #31853 or equivalent). To prepare the working spike solution, syringe measure 0.25 mL of stock and bring to 100 mL in acetone (or equivalent preparation) for a 5 ug/mL concentration. From this solution, 1 mL is spiked into each MS/LCS QC water sample and 0.4 mL is spiked into each soil/sediment sample. The final concentration in a 10 mL water extract and in a 4 mL soil/sediment sample will be 500 ng/mL.

8.6 Stock Calibration Standards are prepared from a primary standard commercially obtained from Restek at a concentration of 2000 ug/ml (Cat #31853 or equivalent). The primary standard is used to appropriately prepare a stock standard at a concentration of 10,000 ng/ml (125 uL diluted up in a 25 ml volumetric flask or equivalent preparation). The stock solution is generally made up in 25 ml increments. The stock solution then doubles as a high level standard for the calibration curve, as well as a stock solution by which to serially dilute to prepare the other calibration standards. Except for the high level standard, the calibration curve levels are generally each made at 10 ml. Refer to the table below for example calibration curve levels. All the calibration curve levels, once aliquoted at 1 ml increments for injection, have 20 ul of 1,4 Dichlorobenzene IS (SIM IS – Section 8.4) added as well as 20 uL of 1,4 Dioxane-d8 IS/Surrogate (Section 8.3.3) added.

8.7 Curve Preparation: The following 7 levels are the possible levels that can be analyzed for an ICAL.

Calibration Level	*Volume of Stock Std Added Into 10 ml of DCM*
Level 1 (10 ng/mL)	10 uL
Level 2 (50 ng/mL)	50 uL
Level 3 (100 ng/mL)	100 uL
Level 4 (500 ng/mL)	500 uL
Level 5 (1000 ng/mL) - CCV	1.0 mL
Level 6 (5000 ng/mL)	5.0 mL
Level 7 (10,000 ng/mL)	NA

8.8 The Independent Check Verification Standard is prepared from a Primary standard solution commercially obtained from Ultra (Cat NV-150-1 or equivalent) at a concentration of 100 ug/ml. The primary solution is diluted volumetrically (100 ul diluted up in a 10 ml volumetric flask or equivalent preparation) in methylene chloride to create a working ICV solution at a concentration of 1000 ng/ml. The working ICV solution is aliquoted into 1 ml increments as needed to inject with each calibration curve. Additionally, 20 ul of SIM IS (Section 8.4) and 20 ul of 1,4-Dioxane-d8 IS (Section 8.3.3) is added into the 1 ml aliquot.

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 Blank(s)

A method blank must be prepared once per every 20 samples or per extraction batch, whichever is more frequent.

Organic compounds of interest must not be detectable in the method blank at a concentration greater than the reporting limit.

Corrective Action: For contaminated blanks, all efforts must be made to identify and eliminate the source of contamination. The presence of analytes at concentrations at or above the reporting limit will warrant application of a "B" qualifier to that target compound(s) on all associated report forms, and perhaps re-extraction of all associated samples. Re-extraction of the method blank and all associated samples must be performed until the blank is in control. Surrogate recoveries must meet the QC limits for the method blank. Re-extraction must be initiated immediately so that minimum time is wasted before re-extraction can occur - if at all possible-this re-extraction should take place within holding time. Re-extraction *corrective action* that would exceed the sample holding time criteria should be discussed with the Organics Supervisor, Project Manager, client, and Operations Manager prior to implementation. Exceptions may be made with approval of the Organics Section Supervisor if the samples associated with an out of control method blank are non-detect for the affected compound(s) or if the concentration of the affected compound(s)in the sample is greater than 10x the blank level. In such cases, the sample results are accepted without corrective action for the high method blank result. The client must be notified, via the project narrative, of any method blank non-compliance associated with sample results

9.2 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Laboratory control samples (LCS/LCSD) must be prepared once per every 20 samples or per extraction batch, whichever is more frequent, and spiked with 1,4 Dioxane spike solution (Section 8.5) and surrogate (Section 8.3.2) before extraction. The IS (Section 8.4) is spiked after extraction and before the analysis.

Acceptable Recovery limits are 40% - 140%. The relative percent difference (RPD) between the LCS/LCSD is 30%. Limits are adapted from MCP protocol and are generally monitored and documented in-house through control charts.

Corrective Action: Analysis must be repeated if an analytical error is suspected. If the LCS/LCSD recoveries and/or %RPD are still out of control, re-extract and re-analyze the LCS/LCSD and all associated samples. Samples cannot be reported until an acceptable LCS is obtained.

9.3 Initial Calibration Verification (ICV)

Refer to Section 10.2.

9.4 Continuing Calibration Verification (CCV)

Refer to Section 10.4.

9.5 Matrix Spike / Matrix Spike Duplicate (MS/MSD)

Matrix spike / matrix spike duplicate (MS/MSD) samples are performed upon project specifications. They are performed per client request. The sample is spiked with 1,4-Dioxane spike solution (Section 8.5) and surrogate (Section 8.3.2) before extraction. The IS (Section 8.4) is spiked after extraction and before the analysis. The recovery limits are 40% - 140% and the RPD limit is 30%. Limits are adapted from MCP protocol and are generally monitored and documented in-house through control charts.

Corrective Action: Analysis must be repeated if an analytical error is suspected. If the % recovery and/or %RPD still exceeds the control limits and the LCS/LCSD is compliant; include a project narrative with the results to client noting that there may be potential matrix effects on the accuracy or precision of the reported results as evidenced by MS/MSD recoveries and/or %RPD outside of QC limits.

9.6 Laboratory Duplicate

Duplicate analyses are performed upon client and/or workplan request. *For Organic analyses, the matrix duplicate is usually in the form of the matrix spike duplicate, see Section 9.5.*

Acceptable relative percent difference (RPD) of duplicates is 30%. Acceptance criterion is not applicable to sample concentrations less than 5 times the reporting limit. Calculate the RPD as follows:

$$RPD = \frac{R1 - R2}{\frac{[R1 + R2]}{2}} \times 100$$

where:

R1 = sample Replicate #1
R2 = sample Replicate #2

The RPD limits should be monitored and documented in-house through control charts and updated as needed.

Corrective Action: Analysis must be repeated if an analytical error is suspected.. If the % RPD still exceeds the control limits; include a project narrative with the results to client noting that there may be potential matrix effects on the precision of the reported results as evidenced by the matrix duplicate % RPD exceedence.

9.7 Method-specific Quality Control Samples

9.7.1 Surrogates

Surrogate spikes (Section 8.3.2 and Section 8.3.3) must be added to QC and field samples to evaluate the extraction method performance.

The acceptable surrogate recovery limits are 15% - 110%. Limits are adapted from MCP protocol.

Corrective Action: Analysis must be repeated if an analytical error is suspected. If the % recovery still exceeds the control limits the sample must be re-extracted and re-analyzed to confirm the sample matrix. If *obvious* matrix interferences are noted, consultation with the Organic Supervisor or Operations Manager may be in order to confirm the need for sample re-extraction. If no re-extraction occurs, the surrogate results and reasons for the decision not to re-extract must be discussed in the project narrative to the client. Due to the isotope dilution nature of this method, the analyst must pay close attention to surrogate recoveries and areas as this recovery is then used to surrogate correct (as an Internal standard) the response of 1,4-Dioxane.

9.7.2 Internal Standards

Internal standards must be added to all sample extracts, QC samples and standards for quantitation purposes. For sample extracts, only the 1,4-Dichlorbenzene-d4 IS (SIM IS – Section 8.4) should be added since the extraction surrogate is then used as an Internal Standard upon analysis. However, all Calibration standards must be spiked with both 1,4-Dichlorobenzene-d4 as well as 1,4-Dioxane-d8 (Section 8.3.3). In the sample extracts the area counts for 1,4-Dioxane-d8 will vary based on the extraction, however the 1,4-Dichlorobenzene-d4 area counts should remain fairly constant. The 1,4-Dichlorobenzene-d4 internal standard should also remain constant with respect to the continuing calibration analyzed at the beginning of the run. Sample IS areas must be –50% to +100% of the Internal Standards in the Continuing Calibration – applies only to 1,4-Dichlorobenzene-d4. Additionally, the IS retention times should not differ more than 30 seconds from the Continuing Calibration.

Corrective Action: Analysis must be repeated once unless there are obvious samples matrix interferences, i.e., the sample extract was very colored and viscous, or there are obvious chromatographic interferences. If *obvious* matrix interferences are noted, consultation with the Organic Supervisor or Operations Manager may be in order to confirm the need for sample re-analysis or re-extraction.

9.8 Method Sequence

- Tune
- CCV
- Method Blank
- LCS
- LCSD
- Samples

10. Procedure

10.1 Equipment Set-up

10.1.1 The instrument used for the analysis is a HP 6890N Series gas chromatograph. The HP system is equipped with a Gerstel large volume injection system, and a 7683B-type autosampler or equivalent. The mass spectrometer is an HP 5973 or 5975 with the HP Enviroquant data system. The method is modified for selective ion monitoring. The table below lists the ions monitored in one SIM window. This method must only be set up and analyzed by an experienced mass spectrometrist.

Compound	*Primary Ion*	*Secondary Ion*
1,4-Dioxane	88	58, 43
1,4-Dioxane-d8	64	96
1,4-Dichlorobenzene-d4	152	115

10.1.2 The basic GC parameters are as follows for the Gerstel Large Volume Injection System:

Oven Equib Time: 0.10 min
Oven Max: 325
Initial Temp.: 45°C
Initial Time: 6.00 min

Level	Rate (°C/min)	Final Temp. (°C)	Final Time (min)
1	19.00	120	1.0
2	11.00	150	1.00
3	19.00	305	4.00

Final Time: 26.83

10.1.3 The basic injection port parameters are as follows for the Gerstel Large Volume Injection System:

"Splitless" mode
Initial Temp: 46 °C
Initial Time: 0.30 min
Ramp Rate: 300°/second
Final Temp: 300°C
Final Time: 30.0
Cryo: ON
Cryo Use temp: 25 °C
Cryo Timeout: 30.0 min
Cryo Fault: ON

Purge Flow: 25 ml/min
Purge Time: 2.50 min
Gas Saver: off
Gas: Helium

Mode: Constant Pressure
Average Velocity: 30cm/sec
Initial flow: 1.3 ml/min

10.1.4 The basic GC parameters are as follows for the Agilent Split/Splitless injector System:

Oven Equib Time: 0.20 min
Oven Max: 325°C
Initial Temp.: 30°C

Level	Rate (°C/min)	Final Temp. (°C)	Final Time (min)
1	0	30	2.00
2	5	50	0.00
3	50	300	2.00

Final Time: 13.00

10.1.5 The basic injection port parameters are as follows for the Agilent Split/Splitless injector System:

:

Mode: Splitless
Temperatuire: 200 °C
Flow: 1.0 mL/min
Velocity: 36.074 cm/sec
Septum Purge: 3mL/min
Purge Flow to Split Vent: 60 mL/min at 0.3 min

10.1.6 MS Acquisition Information:

Tune file: dftpp.u
Acquisition Mode: SIM
Solvent Delay: 7.70 min
MS Source temp: 280°C

10.1.7 Tuning

10.1.7.1 Before the analytical standards are analyzed the mass spectrometer must be adjusted to meet the proper ion criteria for DFTPP. This is demonstrated by injecting into the GC/MS system 1uL of a 50ug/mL DFTPP solution. After the analysis of the DFTPP, evaluate the tune as follows:

- Enter into the “Environmental Data Analysis” (off-line) screen.
- Go to “File” and select the tune data file.
- Go into “Tuner” and select “Eval DFTPP”, then select “AutoFind DFTPP to Screen,” to evaluate the tune file, based on the pre-set SW-846 criteria. The

software will evaluate the tune by selecting three scans of the DFTPP peak and will display the ion intensities on the screen. That is, one scan at the apex, one scan directly preceding the apex and one scan following the apex and averages them, then takes one background subtracted scan, 20 seconds before the beginning of the DFTPP peak. If the criteria below are met, repeat, select "AutoFind to Printer", for a hardcopy of the tune evaluation for the record.

If the "AutoFind" tune evaluation does not meet the criteria below, manual evaluation of the tune can be performed by attempting either of the options below:

- Blow up the DFTPP peak on the screen and select either one single scan at the apex of the peak, or a scan immediately preceding or following the apex. Go into "Tuner" and select "Evaluate DFTPP to Screen," or "Evaluate DFTPP to Printer," as described above, <u>OR</u>,
- Take the average of the scans across the entire peak. Go into "Tuner" and select "Evaluate DFTPP to Screen," or "Evaluate DFTPP to Printer," as described above.

10.1.7.2 The following DFTPP mass intensity criteria should be used.

DFTPP KEY MASSES AND ABUNDANCE CRITERIA

Mass	m/z Abundance criteria
51	10-80 percent of mass 198.
68	Less than 2 percent of mass 69.
70	Less than 2 percent of mass 69.
127	10-80 percent of mass 198.
197	Less than 2 percent of mass 198.
198	Base peak, or >50 percent of Mass 442.
199	5-9 percent of mass 198.
275	10-60 percent of mass 198.
365	Greater than 1 percent of mass 198.
441	Present but less than 24 percent of mass 442.
442	Base Peak, or > 50 percent of mass 198.
443	15-24 percent of mass 442.

10.1.8 Tune acceptance should be verified at the beginning of every 12 hour analytical shift. The DFTPP may be combined with the calibration verification standard as long as both tuning and calibration acceptance criteria are met.

10.2 Initial Calibration

10.2.1 After the DFTPP passes criteria, a set of multi-level calibration standards listed in Section 8.7 are analyzed, from low concentration to high. A minimum of five calibration levels are analyzed. The calibration standards are stored in amber vials in the standards freezer. The labeling convention allows each standard to have a unique identifier which distinguishes it from field samples. The naming convention used throughout the laboratory identifies the standard as semivolatile, hydrocarbon, pesticide/PCB or volatile. An example of this would be SW042407E, meaning it is a semivolatile (S) working (W) standard made on April 24, 2007 and that it was the fifth standard made that day. All certificates of analysis that are shipped with standards are filed with their receipt ID written on it to insure traceability.

10.2.2 Once the standards have been analyzed, they are reduced by the search software of the Enviroquant data system. Once all the components are identified, a linear curve is calculated for the components. The criteria for evaluation are as follows:

10.2.2.1 The average RF for each compound must be greater than 0.05.

10.2.2.2 The %RSD of each compound must not exceed 20%. If they do this may be an indication that the chromatographic system is too reactive for analysis to begin. This indicates the instrument may need maintenance.

10.2.2.3 Alternatively, a linear regression model may be employed, provided that the coefficient of determination (COD or r2) is $\geq$0.99. Otherwise, construct a nonlinear calibration of no more than a third order equation. Statistical considerations in developing a non-linear calibration model require more data than the more traditional linear approach. A quadratic (second order) model requires six standards, and a third order polynomial requires seven standards. In setting model parameters, do not force the line through the origin. The COD or r^2 must be greater than or equal to 0.99.

10.2.2.4 Once the calibration curve is reviewed, an Initial Calibration Checklist must be completed.

10.2.3 All samples and standards are spiked with Internal Standards (IS) before analysis. Refer to section 8.4 for specific internal standard spiking information. The IS is intended to be used for both quantitation and the establishment of relative retention times. Internal standard acceptance criteria can be found in Section 9.7.2.

10.2.4 Independent check standards (Section 8.8) from a separate source or different lot are analyzed after every initial calibration for evaluation against calibration standard solutions. The % Difference (%D) should not be greater than ±30%.

10.3 Equipment Operation and Sample Processing

10.3.1 Tuning

A DFTPP standard must be analyzed and pass criteria before a continuing calibration verification standard or any samples are analyzed. The DFTPP may be combined with the calibration verification standard as long as both tuning and calibration acceptance criteria are met. A DFTPP tune standard must be analyzed before each 12 hour analytical shift. Please refer to Section 10.1.5 for tuning criteria and other information.

10.3.2 Daily Calibration

On a daily basis after the DFTPP has passed, a mid-level (usually 1000 ng/mL) continuing calibration standard which contains all of the analytes of interest is analyzed. The criteria for acceptance are:

10.3.2.1 All analytes must have response factors greater than 0.05.

10.3.2.2 The % D must be ±20% D from the initial calibration.

10.3.3 Sample Analysis

10.3.3.1 The prep lab staff will transfer the samples to the instrument laboratory. The samples are generally brought to a 10 mL final volume for liquids or 4 ml for soil samples; 1 mL is transferred and the remaining sample volume is archived. One aliquot of each sample is then placed in the sample extract holding refrigerator located in the instrument laboratory.

10.3.3.2 All of the samples at 1 mL (including the batch QC samples) are spiked with 20 uL internal standard (see section 8.4 for specifics regarding the internal standard). The samples are shaken briefly after the internal standard is added to ensure mixing. A sample will need a dilution for target analytes that are over calibration.

10.3.3.3 After the daily tune and CCAL have passed criteria, the analyst places the samples onto the autosampler tray. (Generally, the samples will be analyzed in order of color (lightest to darkest.) with QC samples being analyzed first. The instrument sequence is typed into the HP Chemstation Software. Next run "Simulate Sequence" (also under the "Sequence" dropdown list) without clicking the "Overwrite Files" box. Compare the order of the vials on the instrument versus the sequence to confirm all the samples and standards are in the right places. Next click "Run Sequence" also under the HP Chemstation "Sequence" dropdown list.

10.3.3.4 After the samples have been analyzed, the data files from the MS are quantitated versus the proper quantitation method. The QCPRN1.MAC macro creates a form with which to easily check internal standard and surrogate criteria are met. The following should be reviewed initially:

10.3.3.4.1 Are all the surrogates within QC criteria? Please see Section 9.7.1 for surrogate information.

10.3.3.4.2 Is the internal standard- 1,4 Dichlorobenzene-d4, within 50-200% of the daily CCAL? If not, the samples should be checked for matrix interferences that may be causing these issues. The IS peaks should also be evaluated for peak splitting or incorrect integration by the software. A sample may not need to be reanalyzed if it can be determined (with guidance from a supervisor) that the QC is exceeded due to matrix interference.

10.3.3.4.3 Are all target analytes within calibration range? If not, the sample(s) should be diluted and re-analyzed. If a dilution is performed after the internal standard has already been added, it will be necessary to add additional IS in order to make up for the impact of the original IS added also being diluted. Conversely, if a sample has been over-diluted, it may need to be analyzed at less of a dilution to detect target analytes that may have been diluted out. Note: for this method, due to the isotope dilution, it is necessary to refer to area counts to determine if dilution is required. The area response for 1,4-Dioxane should be compared to the area of the highest level of the ICAL standard for that target. If the area of 1,4-Dioxane in the extract is greater than the area of 1,4-Dioxane in the Highest level of the Calibration Curve, then a dilution is necessary. The analyst **CAN NOT** use the concentration of 1,4-Dioxane found in the extract to determine if dilution is required because the concentration of 1,4-Dioxane in the sample is surrogate corrected in Chemstation based on the use of the extraction surrogate as an Internal Standard. Once it is determined based on the peak area that a sample requires a dilution, the analyst must pay attention to the concentration of IS in the dilution. Although the analyst will adjust the 1,4-Dichlorobenzene-d4 concentration by adding the appropriate amount of additional IS to the dilution, there is no way for the analyst to make up for the dilution of the extraction surrogate 1,4 dioxane-d8 (also used as internal standard). To account for this the analyst must change the concentration of the 1,4-Dioxane-d8 within the calibration table to a value which accounts for the dilution. (Example: If the analyst performs a 10x dilution then the concentration of 1,4-Dioxane–d8 must be changed within the ICAL to 50.) The analyst must ensure that only the diluted sample is calculated against this value and that the method is returned to the proper concentration once the analysis of the dilution is complete.

10.3.3.4.4 Are all analyses within 12 hour tune time? If a sample is analyzed outside tune time, it will need to be re-analyzed in another tune clock.

10.3.3.4.5 The sequence should also be printed out from Chemstation, initialed and dated, and placed in the logbook.

10.3.3.4.5.1 If anything in the initial review of the data indicates that there should be a re-analysis, the reason for re-analysis should be noted on the sequence.

10.3.3.4.5.2 Also, note the time the tune standard was analyzed, the time of the last sample analysis. If there are samples analyzed outside tune time, the time the last sample within tune time ran should be noted, as well as the last sample analyzed.

10.3.3.4.5.3 If a re-extract is required, the "Request for Repreparation/Reclean" book should be filled out and a photocopy of the appropriate page should be given to the Preparation Group leader or the Organics Section Head.

10.4 Continuing Calibration

Continuing Calibration Criteria is outlined in section 10.3.2

10.5 Preventive Maintenance

If performing any maintenance on any piece of equipment it must be documented in the *Instrument Maintenance Logbook* located in the laboratory specific to each instrument.

Daily

Injection port maintenance: Maintenance should be done when the daily CCAL starts to demonstrate degradation either by %D outliers or area responses <50% as compared to the ICAL areas. Several tune clocks may be injected before maintenance is needed. The type of samples analyzed will have an effect on how soon maintenance should be performed. Injection port maintenance should be done as needed. General maintenance includes replacing the single baffle liner packed lightly with glass wool, cutting about 2-4 inches off the head of the column, and replacing the septa. Refer to maintenance log for more specific information.

The Gerstel Injection port should be handled with care. The liners are quite thin. Do not force the Gerstel weldmen into place as the threads are soft metal and will cross thread. Always make sure the weldmen goes on straight. The Gerstel injection port does not require significant tightening of either the weldmen or column nut, tighten enough to seal but there is no need to crank down on it.

11. Data Evaluation, Calculations and Reporting

11.1 Qualitative Analysis

11.1.1 The qualitative identification of compounds determined by this method is based on retention time and on comparison of mass spectrum, after background correction, with characteristic ions in a reference mass spectrum. The reference mass spectrum must be generated by the laboratory using the conditions of this method. The characteristic ions from the reference mass spectrum are defined as the two ions of greatest relative intensity, and are over 30% relative intensity. Compounds are identified when the following criteria are met.

11.1.2 The intensities of the characteristic ions of a compound must maximize in the same scan or within one scan of each other. A peak selected by the data system, based on the presence of target specific ions at a target specific retention time will be accepted as meeting these criteria.

11.1.3 The relative retention time of the sample component is within ± 0.06 RRT units of the RRT of the standard component.

11.1.4 The relative intensities of the characteristic ions agree within 30% of the relative intensities of these ions in the reference spectrum (Example: For an ion with an abundance of 50% in the reference spectrum, the corresponding abundance in a sample spectrum can range between 20% and 80%.) The relative intensities are monitored daily. The relative intensities will be updated when they exceed established values from the reference spectrum.

11.1.5 Structural isomers that produce very similar mass spectra should be identified as individual isomers if they have sufficiently different GC retention times. Sufficient GC resolution is achieved if the height of the valley between two isomer peaks is less than 25% of the sum of the two peak heights. Otherwise, structural isomers are identified as isomeric pairs.

11.1.6 Identification is hampered when sample components are not resolved chromatographically and produce mass spectra containing ions contributed by more than one analyte. When gas chromatographic peaks obviously represent more than one sample component (i.e. a broadened peak with shoulder(s) or a valley between two or more maxima), appropriate selection of analyte spectra and background spectra is important. Selective ion monitoring eliminates this potential.

11.2 Quantitative Analysis

11.2.1 Response factors and % RSD to evaluate Initial Calibration acceptability.

Calculate RF by:

$$RF = \frac{area_{cmp}}{area_{is}} \times \frac{conc_{is}}{conc_{cmp}}$$

where:

area cmp = Area of the characteristic ion for the compound being measured.
area is = Area of the characteristic ion for the specific internal standard.
conc is = Concentration of the specific internal standard.
conc cmp = Concentration of the compound being measured.

Calculate % RSD by: $\%RSD = \frac{SD}{\overline{x}} \times 100$ $SD = \sqrt{\sum_{i=1}^{N} \frac{(x_i - \overline{x})^2}{N-1}}$

where:

% RSD = percent relative standard deviation
x = average of RF's
SD = standard deviation
xi = analytical results of each level in the final reporting units
N = number of results (levels)

11.2.2 Calculate % Difference (%D) by:

$$\%D = \frac{\overline{RF_i} - RF_c}{\overline{RF_i}} \times 100$$

where:

RFi - Initial Calibration average RF
RFc = Continuing Calibration RF

11.2.3 Results of Water Analysis - calculation as performed in report form:

$$\text{Concentration (ug/L)} = \frac{\text{(Conc) (Vf) (DF)}}{\text{(Vi)}} \times 1000$$

11.2.4 Results of Soil/Sediment Analysis – calculation as performed in report form:

$$\text{Concentration (ug/Kg)} = \frac{\text{(Conc) (Vf) (DF)}}{\text{(Vi) \%S}} \times 1000$$

where:
Conc = Raw on-column concentration obtained from the quantitation report using Initial Calibration results.
Vf = Final volume of extract (mL)
Vi = Volume of sample extracted (mL), or weight of sample extracted in grams (g)
DF = Dilution factor, for manually prepared dilutions, not instrumental “dilutions”.
%S = percent solids, as a decimal

12. Contingencies for Handling Out-of-Control Data or Unacceptable Data

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 chose 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.

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 defined in the table below 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.

QC Parameter	Acceptance Criteria
Method Blank	No analyte above the reporting limit The results are qualified with a "B" for any associated sample concentrations that are less than 10x the blank concentration for this analyte
Surrogate Recovery	15% - 110%
Laboratory Control Samples	40% - 140% and 30% RPD
Matrix Duplicate	30% RPD
Matrix Spike	40% - 140%
Matrix Spike Duplicate	30% - 140% and 30% RPD

13. Method Performance

13.1 Method Detection Limit Study (MDL) / Limit of Detection Study (LOD) / Limit of Quantitation (LOQ)

The laboratory follows the procedure to determine the MDL, LOD, and/or LOQ as outlined in Alpha SOP 1732. These studies performed by the laboratory are maintained on file for review.

13.2 Demonstration of Capability Studies

Refer to Alpha SOP 1739 for further information regarding IDC/DOC Generation.

13.2.1 Initial (IDC)

The analyst must make an initial, one-time, demonstration of the ability to generate acceptable accuracy and precision with this method, prior to the processing of any samples.

13.2.2 Continuing (DOC)

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

Refer to Alpha's Chemical Hygiene Plan and Waste Management and Disposal SOP for further pollution prevention and waste management information.

15. Referenced Documents

Chemical Hygiene Plan

SOP 1732 Detection Limit (DL), Limit of Detection (LOD) & Limit of Quantitation (LOQ)
SOP 1739 Demonstration of Capability (DOC) Generation
SOP 1731 Manual Integration & Compound Rejection
SOP 1797 Hazardous Waste and Sample Disposal

SOP 1816 Reagent, Solvent and Standard Control

16. Attachments

None

APPENDIX C

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

BROWNFIELD CLEANUP PROGRAM
For
27 Chandler Street, LLC and 37 Chandler Street, LLC
Chandler Incubator, 27 & 37 Chandler Street, Buffalo, New York 14207
BCP # C915336

Prepared For:
27 Chandler Street, LLC and 37 Chandler Street, LLC
391 Washington Street, Buffalo, New York 14203
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November 6, 2018

HAZARD EVALUATIONS

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LIST OF ATTACHMENTS

1.0 INTRODUCTION

This Health & Safety Plan (HASP) has been developed for the Remedial Investigation/Interim Remedial Measures/Alternatives Analysis Report (RI/IRM/AAR) to be completed by Hazard Evaluations, Inc. (HEI) and Wittman GeoSciences, PLLC (WGS) behalf of 27 Chandler Holdings, LLC and 37 Chandler Holdings, LLC (Applicant) as part of the Brownfield Cleanup Program (BCP). The proposed work will include completion of soil boring, installation of monitoring wells, soil and groundwater sampling, soil excavation and sampling, and report preparation. Such activities mandate the performance of tasks with a potential to expose remediation workers to various environmental contaminants previously identified on-site, primarily involving historical industrial fill potentially including semi-volatile organic compounds (SVOCs) and metals. Limited exposure potential may be related to commercial substances used for equipment decontamination. A general listing of the work tasks to be completed is as follows:

1. Soil sampling using a direct push method (Geoprobe) and hollow stem auger equipment
2. Soil sample collection and analysis
3. Monitoring well installation, purging and development
4. Groundwater sampling using disposable bailers, and analysis
5. Soil vapor intrusion sampling and analysis
6. Excavation, stockpiling and off-site disposal of contaminated soil
7. Backfilling of excavated area with clean fill and regrading

The intent of this HASP is to identify and present appropriate safety procedures to be followed by investigation/remediation workers involved with project activities throughout the performance of the RI/IRM. Such procedures are designed to reduce the risk of remediation worker exposure to the primary substances of concern.

The procedures also address several other physical hazards that may be encountered during the RI/IRM activities. Recommended safety procedures presented herein may be modified as the RI/IRM proceeds based upon conditions encountered at the site, with the mutual agreement of HEI, WGS, NYSDEC, NYSDOH and Applicant. A copy of this HASP (including any modifications) will be maintained on-site throughout the RI/IRM field work to be used as a reference by HEI, WGS and their subcontractors. An initial safety meeting will be conducted at the site prior to the initiation of the sampling activities to inform all affected remediation workers of potential exposures and hazards.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The site is addressed as 27 and 37 Chandler Street in the City of Buffalo, Erie County, New York and consists of two parcels totaling approximately 1.13 acres of land. The site is bound to the north by Chandler Street, to the south by Grote Street, to the west by residential structures, and to the east by a manufacturing facility. The property is located within an urban area, utilized for industrial, commercial, and residential purposes. The 27 Chandler building is three-stories and 20,500 square feet of space while 37 Chandler building is 12,350 square feet spread across two stories. The parcels extend to Grote Street. The southern portions of the site including loading docks and parking areas.

2.2 Site History

The 27 Chandler site was constructed in 1902 by Charles Berricks & Sons, a brick manufacturing company. By 1916 the property was inhabited by the Jewett Refrigerator Co. Buffalo Davenport, a furniture manufacturing facility, occupied the property from at least 1930 to 1960. Since that time, various companies occupied the building including Temp-Trol Windows, Inc., Gotta Rest Mattress Co. Inc. (manufacturer), Masters Pattern Co. (industrial patterns), Warren Refining & Chemical Co. (manufacturer), Byam CP Co (paper milk container manufacturers), Acme Steel (warehouse), Atlas Steel Casting Co. (warehouse), Cople Refridgeration & Heating (service repair), Liable Colling & Heating, Inc. as well as other commercial occupants including lawyers office, leather merchandise sales, janitorial supplies sales, and office supplies sales. Most recently, the building was used for warehousing and storage, as well as used furniture sales until 2017.

The 37 Chandler site was constructed in 1902 by the Double Truss Cornice Brake Company. The site was vacant by 1930 and remained vacant until 1935 when Viner & Sons (organ builders) occupied the building, remaining at the site until the early 1940s. Acme Steel and Malleable Iron Works and Buffalo Brake Beam Co. (railroad equipment manufacturing) occupied the property from the mid-1940s into the 1980s. The property was vacant for a few years then occupied by Corr Distributors in the mid-1980s until the mid-2000s. Commercial occupants since that time included Horsefeathers Architectural Antiques and Kennel Club (dog training, grooming, and boarding). The site has been vacant since 2017

During due diligence work prior to property purchase, Hazard Evaluations Inc. completed a limited Phase II investigation for Signature Development at the property in December 2017. The work included completion of 12 soil borings and collection of soil and groundwater samples. Based on this limited investigation, the primary contaminants of concern in the soil/fill profile include semi-volatile organic compounds (SVOCs), and metals.

3.0 ASSIGNED RESPONSIBILITIES

Specific safety responsibilities have been established for the performance of the RI/IRM as indicated below:

3.1 Environmental Health & Safety Manager

The Environmental Health & Safety Manager (EHSM) has the authority to commit any resources necessary to implement an effective RI/IRM safety program, thereby protecting the health of affected site workers. The EHSM will delegate responsibilities, as necessary, to the Project Manager (PM) in order to facilitate various aspects of this HASP. The resolution of any on-site safety issues encountered during the RI/IRM will be coordinated by the EHSM.

3.2 Project Manager

The Project Manager (PM) will be responsible for the overall project including implementation of the HASP. The PM will coordinate with the Site Safety Officer (SSO) to ensure that project goals of the project are met in a manner consistent with the HASP requirements.

3.3 Site Safety Officer

The Site Safety Officer (SSO) will be responsible for ensuring that the recommended safety procedures are followed during sampling activities. The SSO will supervise HEI/WGS employees and subcontractors throughout the field work. The SSO is knowledgeable of general construction safety practices and remediation worker protection techniques. Responsibilities will include:

- Ensuring day to day compliance with HASP safety procedures;
- Maintaining adequate PPE supplies
- Calibration and maintenance of monitoring instruments
- Authority to stop work activities any time unsafe work conditions are identified;
- Implementing personnel decontamination procedures;
- Initiate emergency response procedures; and
- Maintain a diary of activities with safety relevance;
- Establishing and assuring adequate records of all:
    - Occupational injuries and illnesses;
    - Accident investigations;
    - Reports to insurance carrier or state compensation agencies;
    - Records and reports required by local, state and/or federal agencies;
    - Property or equipment damage.

3.4 Site Workers

Affected site workers will include HEI/WGS employee and subcontractor employees. Site workers must comply with aspects of the HASP and its safety procedures. Personnel entering the site will have completed training requirements for hazardous waste site operations in accordance with OSHA 29CFR 1910.120 (c); 29CRF 1910.146 (d) and 29CFR 1910.147 (c). Site workers and SSO must have completed appropriate medical surveillance as required by OSHA 29CRF 1910.120(f).

3.5 Subcontractors

Various subcontractors will be utilized on the site during RI/IRM activities, such as driller and excavation contractor. Subcontractors are responsible for development of their own HASP that is at least as stringent. A copy of this HASP will be provided to the subcontractors for information purposes. Subcontractors will be informed of potential health and safety hazards, as well as environmental monitoring data collected during field activities.

4.0 TRAINING and SAFTETY MEETINGS

4.1 Training

Site personnel assigned to the site will be in compliance with the training requirements of 29 CFR 1910and 1926 as listed below. Site personnel will have met one of the following requirements prior to the start of on-site activities.

- A 40 hour minimum hazardous materials safety and health course, as stipulated in 29 CFR 1926.65 e(3); and
- An 8 hour minimum refresher course per year after the 40 hour minimum training has occurred (29 CFR 1926.65.e[8]).

On-site managers and supervisors must be in compliance with the additional supervisory training requirements of 29 CFR 1926.65.e(4). Emergency responders must be in compliance with the additional training requirements of 29 CFR 1926.65.e(7). Appropriate certificates of participating in training programs will be maintained at HEI/WGS offices.

4.2 Safety Meetings

Site workers and subcontractors will be familiar with the site and facility layout, have an understanding of known and potential hazards, and details within this HASP. On-site safety meetings will occur daily, or as needed to assist site workers and subcontractors in conducting activities safely. Attending personnel must sign an attendance sheet. Site workers must attend a safety meeting prior to being allowed to work on-site.

5.0 PERSONAL PROTECTIVE EQUIPMENT

An important aspect for site worker safety is correct selection of personal protective equipment (PPE). The levels of protection listed below are based on 29 DFR 1910.120. The majority of site activities will be conducted in Level D protection. This level of protection was selected based on the types and measured concentrations of the hazardous substances in the samples previously collected and their associated hazards and/or toxicity; and potential or measured exposure to substances in air, splashes of liquids or others indirect contact with material due to the task being performed.

- Level D will generally consist of the following:
  - Coveralls; or long pants and long sleeve shirt to provide protection from dermal contact with soil
  - High visibility safety vest
  - Steel toe work boots
  - Safety glasses
  - Hard hat
  - Chemical-resistant gloves

  Additional equipment can be donned at SSO requirements, including disposable boots, hearing protection, safety vest, or disposable outer chemical coveralls (Tyvek suits).

- Level C will generally consist of the following:
  - Full or half face air purifying respirator (APR) equipped with appropriate organic vapor canisters and/or other chemical cartridges.
  - Chemical resistant clothing, such as Tyvek suit. Suits will be one piece with booties, hood, and elastic wristbands.
  - High visibility safety vest (disposable)
  - Outer chemical-resistant gloves (i.e. nitrile or neoprene) and inner latex gloves
  - Steel toe work boots
  - Hard hat

- Level B will generally consist of the following:
  - Self-contained breathing apparatus (SCBA) in a pressure demand mode, or supplied air with escape SCBA.
  - Chemical resistant closing, such as Tyvek suit. Suits will be one piece with booties, hood, and elastic wristbands.
  - High visibility safety vest (disposable)
  - Outer chemical-resistant gloves (i.e. nitrile or neoprene) and inner latex gloves
  - Chemical resistant tape over PPE as needed (i.e. at glove/Tyvek location)
  - Steel toe work boots
  - Hard hat

6.0 HAZARD ANALYSIS

Many hazards are associated with environmental work on a site. The hazards listed below deal specifically with those hazards associated with the management of potentially contaminated soil, air, and groundwater, physical hazards, as well as environmental hazards.

6.1 Chemical Hazards

The primary contaminants of concern in the soil include semi-volatile organic compounds (SVOCs) including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene and metals including copper and lead, primarily within the fill which varies from 3 to 5 feet below ground surface. A summary of hazards associated with these chemicals is include on Table 1. The list has been developed based on planned activities and potential site conditions. The most likely routes of chemical exposure during site work includes skin absorption and inhalation of airborne dust particles. The information was used to develop the levels of personal protective equipment (PPE).

6.2 Physical/General Hazards

Based on the proposed scope of work to be completed, the following potential physical hazards have been identified:

- Slip/Trip/Fall – Due to the timing of the project, some areas may have icy surfaces that will increase the possibility of accidental falls. Additionally, good housekeeping practices such as cleaning up garbage, and stored materials from the work area are essential to reduce the occurrence of trips and falls the trip hazards.

- Vehicle and machinery in motion hazards – A drill rig will be utilized for soil sample collection. To minimize potential hazards, the drilling subcontractor will be responsible for health and safety of its personnel, equipment and operations. Utilities must be called in via Dig Safely New York and/or site owner. Cones and flags will be set up around each work area, as necessary. Workers must be aware of pinch points when setting the rig and lowering mast/pull rods. PPE must be worn to prevent eye injury. All body parts, clothing and manual tools must be kept 3-5 feet from moving equipment when possible. Gloves and PPE must be worn when working with rods and cleaning equipment. Monitoring of the breathing zone will be completed as necessary to ensure vapors are below action levels. Each worker must have an awareness of muscle strain. All sampling liners must be opened in a motion away from body and hands. The rig cannot be moved with the mast in a raised position.

- Electrical – Heavy equipment (e.g., excavator, backhoe, drill rig) shall not be operated within 10 feet of high voltage lines. Working near wet areas should also be taken into consideration when working with electrical equipment; Surge protectors and ground fault protectors must be used in such conditions.

- Noise – Heavy machinery creates excessive and loud noise levels. Over exposure can result in hearing damage or loss. Proper hearing protection shall be worn during exposure to noise from heavy equipment.

- Underground utilities– The proper utility clearance will be obtained before conducting any digging or drilling operations.

- Excavation and soil sampling through use of heavy equipment – Excavations that are greater than 4 feet in depth require a protective system prior to entry into the excavation. The Project Manager will be responsible for determining if the excavation requires safety shoring. Personnel will not be permitted to work under suspended or raised loads, and shall always wear highly visible clothing. Personal protective equipment (PPE), including steel-toed boots, safety glasses, hard hats must be worn; personnel should not walk directly in back of, or to the side of, heavy equipment without the operator's knowledge. Engineering controls can be implemented such as water for particulate control.

- Cold Stress – Site work is scheduled during the early spring to summer months; therefore cold weather are not anticipated. Frostbite and hypothermia can occur quickly and the signs and symptoms of such should be known. Signs of hypothermia include slurred speech, confusion, and an overall warm sensation. Frostbite can be identified by red/frozen skin, numbness, and lack of sensation on the skin. In each case, the victim should be moved to a warm place. With frostbite, the affected area should be placed in warm water and wrapped with a warm towel. Medical attention is necessary after initial treatment.

- Heat stress - Site work is scheduled during the early spring to early summer months; therefore extreme hot weather is not anticipated. Heat stress is a severe hazard that can result in heat fatigue or even heat stroke. Signs and symptoms of heat stroke include red, dry, and hot skin as well as confusion, a rapid pulse, and nausea. Adequate shade and drinking liquids should be provided to personnel working in hot weather conditions. If a person is suspected to be suffering from heat fatigue or stroke, transport to a cool place and place cold compresses on the neck and armpits; call 911 immediately.

- Weather (i.e. lightning storm) – On-site personnel shall cease operation at the first sign of a thunderstorm/lightning strike. Workers should seek shelter within a permanent building and stay away from tall structures trees, telephone poles, and drill rigs/equipment.

6.3 Biological Hazards

Biological hazards can be caused by contact with land animals, birds, insects, and plants. Irritation, illness, and, in extreme cases, permanent disability or death can occur. The site is located in an urban area within the City of Buffalo and field work will occur in spring/early summer. Rodents are considered the most likely biological hazards at this site. Contact with rodents, more specifically rats, shall be avoided. If bitten or scratched by any type of rodent or fur-bearing animal, medical treatment should be sought immediately. Insect bites and stings are not considered a serious threat due to time of year. Insect bites and stings can cause irritation and transmit disease. If stung by an insect, apply cold water and soap and immediately apply a cold compress to the area to limit swelling. If the victim is allergic to such bite or sting, immediate medical care may be necessary.

7.0 SITE MONITORING

Air monitoring will be performed on-site in order to track contamination levels. By knowing these levels, safety is insured for personnel working on-site. A Photoionization Detector (PID) equipped with a 10.6 eV lamp will be utilized during field monitoring.

7.1 Soil Borings and Monitoring Wells

On-site monitoring will be completed by the SSO or site worker assigned to oversee drilling operations, soil sampling and monitoring well installation/sampling. The PID will be utilized to monitor the breathing zone, the borehole, and subsurface samples for the presence of volatile organic compounds (VOCs). Auger spoils will also be monitored. Fluids produced from monitoring well development and sampling will also be monitored with the PID.

7.2 Interim Remedial Measures

Interim remedial measures (IRM) are planned as part of the site remedy and expected to including soil excavation to depths of 1 feet up to 5 feet at certainly locations. Excavation will be completed throughout the vacant lot area of the site. Monitoring will be done during excavation and sampling activities when HEI/WGS site workers are within the work zone. Historical investigation results did not identify VOCs within the fill material. However, the PID will be used during subsurface excavation activities.

7.3 Action Levels

Work area ambient air monitoring for VOCs will be completed within the breathing zone periodically. Action levels will be based on the PID readings. The action level assumes that background level of organics is close to non-detect. Background VOC readings will be recorded daily. Action levels are listed below.

Sustained PID Reading	**Action**	**Minimum Respiratory Protection**
0 to 10 ppm	None	None – Level D
10 to 25 ppm	Monitor for 15 minutes; if concentration does not decrease to under 10 ppm, upgrade PPE; consider venting area	Full-face Air-purifying respirator with organic vapor cartridges – Level C
>25 ppm	Monitor for 15 minutes; Consider venting area, upgrade PPE	Suspend work or supplied-air full face respirator – Level B

7.4 Particulate Monitoring

Monitoring for particulates will be completed periodically in the site worker breathing zone. The decision to upgrade levels of PPE will be made in conjunction with consideration for weather conditions, wind conditions and anticipated duration of field activity. Background particulate concentrations will be measured and recorded on a daily basis.

8.0 COMMUNITY AIR MONITORING PLAN

A Community Air Monitoring Program (CAMP) requires monitoring of VOCs and particulates at downwind locations and is intended to provide a level of protection for neighboring residences and businesses. Continuous monitoring will during ground intrusive activities. The completed CAMP is attached in Attachment A.

9.0 SITE ACTIVITY AREAS AND ACCESS CONTROL

Prior to the initiation of the RI/IRM, three work zones will be established to facilitate the implementation of the HASP. Prior to commencement of field work, a further definition of where these zones will be set up will be established. Guidelines for establishing work areas follows.

- Exclusion Zone (EZ) – Primary exclusion zones will be established around each intrusive field activity, such as soil boring or excavation area. Locations will be identified by the placement of orange cones. Site workers in these areas must wear appropriate PPE. Upon leaving Work Zone, if PPE becomes contaminated, site workers must remove and dispose of gloves and any other disposable PPE. After removing the PPE, site workers should thoroughly wash their hands. Access to the EZ will be limited to site workers only for both safety and data integrity purposes.

- Contamination Reduction Zone (CRZ) – A CRZ will be established between the EX and property limit, and provides an area for decontamination of site equipment. The specific location of this pad will be field determined, but will be out of the way of site activities and sampling activities. Portable wash stations will be set up in the CRZ and will consist of a potable water supply, hand soap and disposable towels. An Alconox solution will be available to decontaminate equipment used in the sampling locations. The SSO will monitor equipment cleaning procedures to ensure their effectiveness. Equipment will be adequately cleaned and site workers will remove contaminated PPE prior to either entering the Support Zone or leaving the site for the day once sampling activities have been completed. A fire extinguisher and first aid kit will be located in this area.

- Support Zone (SZ) – The SZ is considered to be clean, and PPE are not required. The SZ will be an area on-site adjacent to the CRZ in which supplies or equipment are stored and maintained. PPE is donned in the SZ prior to entering the CRZ.

10.0 DECONTAMINATION PROCEDURES

Decontamination procedures for personal and equipment will be implemented when exiting work area. Decontamination involves physically removing contaminants and general include removal of contamination, avoiding spreading contamination from the work zone, and avoiding exposure of unprotected personnel outside the work zone to contaminants.

10.1 Prevention of Contamination

The first step in decontamination is to establish standard operating procedures that minimize contact with hazardous substances, and thereby the potential for contamination. Site workers should be aware of the importance of minimizing contact with hazardous substances and the use of appropriate practices and procedures for site operations. HEI/WGS utilizes this approach by ensuring site workers:

- Stress work practices that minimize contact with hazardous substances (e.g., do not walk through areas of obvious contamination, do not directly touch potentially hazardous substances, etc.);
- Protect sampling instruments from gross contamination by bagging; make openings in the bag for sample ports and sensors that contact site materials;
- Wear disposable outer garments and use disposable equipment where appropriate.

10.2 Personal Decontamination

The degree of contamination exposure is a function of both a particular task and the physical environment in which it takes place. The following decontamination procedures will remain flexible, thereby allowing the decontamination crew to respond appropriately to changing conditions at the site. It is expected that site workers will be exposed to soil/fill potentially contaminated with SVOCs, metals, PCBs, and petroleum compounds. On-site sampling activities will be carried out in such a manner as to avoid gross contamination of site workers, personal protective equipment, machinery and equipment.

Between sampling locations (or sometimes between samples at one sampling location), and upon the completion of the daily field activities, site workers will proceed to the CRZ. Equipment (e.g., sampling tubes, shovels, tools, etc.) will be decontaminated in this area. Prior to leaving the site for breaks, at the end of the work shift, or when PPE has been grossly contaminated, disposable boot covers, gloves, and suits will be removed and placed in a drum designated for the disposal of these materials. After removing PPE, each site worker will wash with soap and fresh water prior to donning new PPE or leaving the site for the day. All wash water and rinse water will be collected and disposed of in accordance with appropriate regulations.

10.3 Decontamination during Medical Emergencies

In the event of a minor, non-life-threatening injury or medical problem, site workers should follow the decontamination procedures as defined above and then administer first aid. If prompt, live-saving first aid is required, decontamination procedures should be omitted and immediate first aid should be administered, unless the environmental conditions are considered immediately dangerous to Life or Health (IDLH). In this case, the victim should be moved to a clean area and life-saving care should be instituted immediately without considering decontamination.

Outside garments can be removed (depending on the weather) if they do not cause delays, interfere with treatment or aggravate the problem. Respirators and backpacks must always be removed. Chemical-resistant clothing can be cut away. If the outer contaminated garments cannot be safely removed, the individual should be wrapped in plastic, rubber or blankets to help prevent contaminating the insides of ambulances and medical personnel. Outside garments will then be removed at the medical facility. No attempt should be made to wash or rinse the victim at the site. One exception would be if it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life.

10.4 Decontamination of Equipment

Decontamination efforts will be conducted in the CRZ. Gross contamination will first be removed with plastic scrapers or other appropriate tools. The equipment will be decontaminated at a temporary equipment decontamination pad in the CRZ via hand washing or pressure washing. Alconox and water will then be used to wash the equipment with a cleaning brush. The equipment will then be rinsed with deionized water. The equipment will then be allowed to air dry for a sufficient time prior to reuse or removal from the site. Downhole tools and augers can be hand washed or pressure washed.

The decontamination of the direct push drilling rig will be undertaken (if necessary) when all on-site activities have been completed. Initially, scraping of the equipment will remove heavily caked materials prior to washing. Washing will then be accomplished Alconox and water or pressure washing. Water generated during decontamination activities will be collected, stored and profiled for future off-site disposal.

10.5 Disposal of the Contaminated Materials

Potentially contaminated materials (gloves, clothing, sample sleeves etc.) will be bagged and segregated for proper disposal. Investigation derived waste will be managed in accordance with NYSDEC guidance regulations. For this project, it is expected that soils will be disposed as part of the IRM. All fluids collected during groundwater sampling will be containerized and managed appropriately subsequent to field activities.

11.0 EMERGENCY RESPONSE

In the event of an emergency, the SSO will coordinate on-site emergency response activities. Appropriate authorities will be immediately notified of the nature and extent of the emergency. Emergency contact list is include on Table 2. The route and directions to the hospital are included as Figure 2.

11.1 Response Procedures

In the event of an emergency or acute exposure symptom, remediation workers will signal distress to the SSO. The SSO will be responsible for the response to emergencies and must:

- Have available a summary of the associated risk potential of the project so that it can be provided to any authorities or response personnel in the event of an emergency;
- Maintain an Emergency Contact List (Table 2) and post in a visible location a map detailing directions to the nearest hospital (Figure 2); and
- Ensure appropriate safety equipment is available at the site.

11.2 Communications

Cell phones will be the primary means of communicating with emergency support services/facilities.

11.3 Evacuation

In the event of an emergency situation, such as fire, explosion, etc., all personnel will evacuate and assemble in a designated assembly area. The SSO will contact outside services (i.e. police, fire, etc.) as required. Under no circumstances will personnel be allowed to re-enter the area once the emergency signal has been given. The SSO must see that emergency equipment is available and emergency personnel notified.

11.4 Fire or Explosion

Immediately evaluate the site. The Buffalo Fire Department will then be notified immediately, and advised of the situation and the identification of any hazardous materials involved.

11.5 Personal Injury

Only basic emergency first aid will be applied on-site as deemed necessary. The SSO will supply available chemical specific information to appropriate medical personnel, as requested. First Aid kits supplied by HEI/WGS and its subcontractors will conform to Red Cross and other applicable good health standards, and will consist of a weatherproof container with individually sealed packages for each type of item. First Aid kits will be fully equipped before being sent to the site.

11.6 Adverse Weather Conditions

In the event of adverse weather conditions, the SSO will determine if work can continue without sacrificing the safety of remediation workers. Some of the items to be considered prior to determining if work should continue are the potential for heat stress, inclement weather-related working conditions (heavy snow) and the operation of field instruments.

11.7 Traffic, Heavy Equipment & Machinery

Site workers must remain aware of the heavy equipment and machinery being used during RI/IRM activities. Site workers will be required to wear a high visibility safety vest during on-site work activities.

11.8 Utilities

Prior to the beginning site activities, all available drawings of the facility will be examined to determine the presence of underground or sub-slab utilities. HEI anticipates that a magnetic pipe and cable locator will be effective in the prevention of encountering underground utilities.

11.9 Emergency Contingency Plan

In the case of a spill emergency (e.g., tank/drum release, spill, fire, etc.), this section will describe the procedures to be followed during the event.

11.9.1 Contamination Emergency

It is unlikely that a contamination emergency will occur; however, if such an emergency does occur, the specific work area shall be shut down and immediately secured. The area in which the contamination occurred shall not be entered until the arrival of trained personnel who are properly equipped with the appropriate PPE and monitoring instrumentation.

11.9.2 Spill/Air Release

In the event of a spill or air release of hazardous materials on-site, the specific area of the spill or release shall be shut down and immediately secured. The area in which the spill or release occurred shall not be entered until the cause can be determined and site safety can be evaluated. The NYSDEC Spill Response unit shall be notified immediately. The spilled material shall be immediately contained.

11.9.3 Unknown Drums or USTs

In the event that unidentified containerized substances, including USTs, are discovered during soil sampling or soil excavation, work will be ceased immediately until hazards are addressed. The SSO will then visually assess the situation and identify any leaks or releases from the container. If leaking is identified, the spilled material shall be immediately contained. Upon visual assessment of releases and safety, properly trained personnel will then sample and remove/dispose of the waste/container.

11.10 Additional Safety Practices

The following are important safety precautions and practices that will be enforced during the field activities.

- Eating, drinking, smoking, chewing gum or tobacco or any activity that increases the probability of hand-to mouth transfer and ingestion of hazardous substances is prohibited during the RI/IRM activities.
- Remediation worker hands and face must be thoroughly washed before leaving

the CRZ or before eating, drinking or other activity.

- Contact with potentially contaminated surfaces should be avoided whenever possible.
- The number of remediation workers and the amount of equipment should be minimized.
- Alcoholic beverages will not be consumed during work hours by site personnel; Personnel using prescription drugs may be limited in performing specific task (i.e. operating heavy equipment) without written authorization from physician.

12.0 RECORDS AND REPORTING

The SSO will be responsible for establishing and maintaining adequate records of activities which take place at the site. The records will pertain to site workers involved in the project, regardless of their employer, as well as any agency personnel. A basic list of the information to be maintained is as follows:

- Occupational injuries or illnesses.
- Accident investigations.
- Reports to insurance carrier or State Compensation agencies.
- Records and reports required by local, state and federal agencies.
- Property or equipment damage.
- Third party injury or damage claims.
- Environmental testing logs.
- Explosive and hazardous substances inventories and records.
- Records of inspections and citations.
- Related correspondence.
- Safety training level.

Tables

Table 1
Hazard Characteristics of Potential Contaminants of Concern

Contaminant	Potentially Impacted Media	Carcinogenicity/Symptoms of Acute Exposure	Occupational Exposure Values* ACGIH TLV OSHA PEL NIOSH IDLH
Benzene	Soil, Groundwater	Confirmed human carcinogen. Symptoms include irritation to eyes, skin, nose, respiratory system; headache; nausea; giddiness, fatigue.	PEL - 10 ppm; IDLH - 500 ppm; TLV - 0.5 ppm; STEL - 2.5 ppm
Chlorinated Organic Compounds	Soil, Groundwater	Exposure to the vapors of many chlorinated organic compounds such as vinyl chloride, tetrachloroethylene, 1,1,1-trichloroethane, trichloroethylene and 1,2-dichloroethylene and other chlorinated hydrocarbons may result in various symptoms including irritation of the eyes, nose and throat, drowsiness, dizziness, headache, blurred vision, uncoordination, mental confusion, flushed skin, tremors, nausea, vomiting, fatigue and cardiac arrhythmia. The liquid if splashed in the eyes, may cause burning irritation and damage. Repeated or prolonged skin contact with the liquid may cause dermatitis. Some of these compounds are considered to be potential human car-cinogens.	Refer to 29 CFR 1910.1017 for exposure values
Toluene	Soil, Groundwater	Insufficient data from carcinogenic studies to classify substance as a potential carcinogen. Symptoms include irritation to eyes, nose; fatigue; weakness; euphoria; headache; lacrimation.	PEL - 10 ppm; IDLH - 500 ppm; TLV - 20 ppm; STEL - 150 ppm
Ethyl Benzene	Soil, Groundwater	Confirmed animal carcinogen with unknown relevance to humans. Symptoms include irritation to eyes, skin, mucous membranes; headache; narcosis.	PEL - 5 ppm; IDLH - 800 ppm; TLV - 20 ppm; STEL - 30 ppm
o-, m-, and p-Xylenes	Soil, Groundwater	Insufficient data from carcinogenic studies to classify substance as a potential carcinogen. Symptoms include irritation to eyes, nose, throat; dizziness; excitement; drowsiness; nausea; vomiting.	PEL - 100 ppm; IDLH - 900 ppm; TLV - 100 ppm; STEL - 150 ppm
Polynuclear Aromatic Hydrocarbons (PAH's)	Soil, Groundwater	Many PAH's found in fuel oil and coal tar pitch volatiles (creosote) are confirmed human carcinogens. Symptoms include dermatitis and bronchitis.	Some PAH's have no established exposure values. Others considered coal tar pitch volatiles have an ACGIH TLV and OSHA PEL value of 0.2 mg/m^3.
Cadmium	Soil	Suspected human carcinogen. Symptoms include pulmonary edema; difficulty breathing; cough; tightness in chest; substernal pain; headache; chills; nausea; vomiting; diarrhea; asnosmia.	PEL - 0.2 mg/m3; IDLH - 50 mg/m3; TLV - 0.01 mg/m3 (these limits are expressed for Cd dust)
Chromium	Soil	Hexavalent chromium compounds are confirmed human carcinogens. Symptoms include irritation to the respiratory system; nasal septum perforation; sensitization dermatitis (hexavalents). Irritation to the eyes; sensitization dermatitis (trivalents).	PEL - 0.5 mg/m3; IDLH - 250 mg/m3; TLV - mg/m3 (insoluable)
Lead	Soil	Confirmed animal carcinogen with unknown relevance to humans. Symptoms include weakness; tremor; irritation to eye; constipation; abdominal pain.	PEL - 0.05 mg/m3; IDLH - 100 mg/m3; TLV - 0.5 mg/m3
Mercury	Soil	Insufficient data from carcinogenic studies to classify substance as a potential carcinogen. Symptoms include irritation to eyes, skin; cough; chest pain; difficulty breathing; irritability; indecision; headache; fatigue; weakness; salivation.	PEL - 0.025 mg/m3 (acceptable ceiling concentration); IDLH - 2 mg/m3; TLV - 0.025 mg/m3 (elemental/inorganic)
Polychlorinated Biphenyl (PCBs)	Soil	Confirmed human carcinogen. Symptoms include dermal and ocular lesions, irregular menstrual cycles and a lowered immune response. Other symptoms included fatigue, headache, cough, and unusual skin sores	PEL - 1 mg/m3; IDLH - 5 mg/m3; TLV - 1 mg/m3

ACGIH TLV – American Conference of Governmental Industrial Hygienists Threshold Limit Value; Concentrations in ppm of mg/m3 based on an 8-hour TWA

OSHA PEL – Occupational Safety and Health Admiration Permissible Exposure Limits; Concentrations are shown in parts per million (ppm) or milligrams per cubic meter (mg/m3) based on an 8-hour time weighted average (TWA)

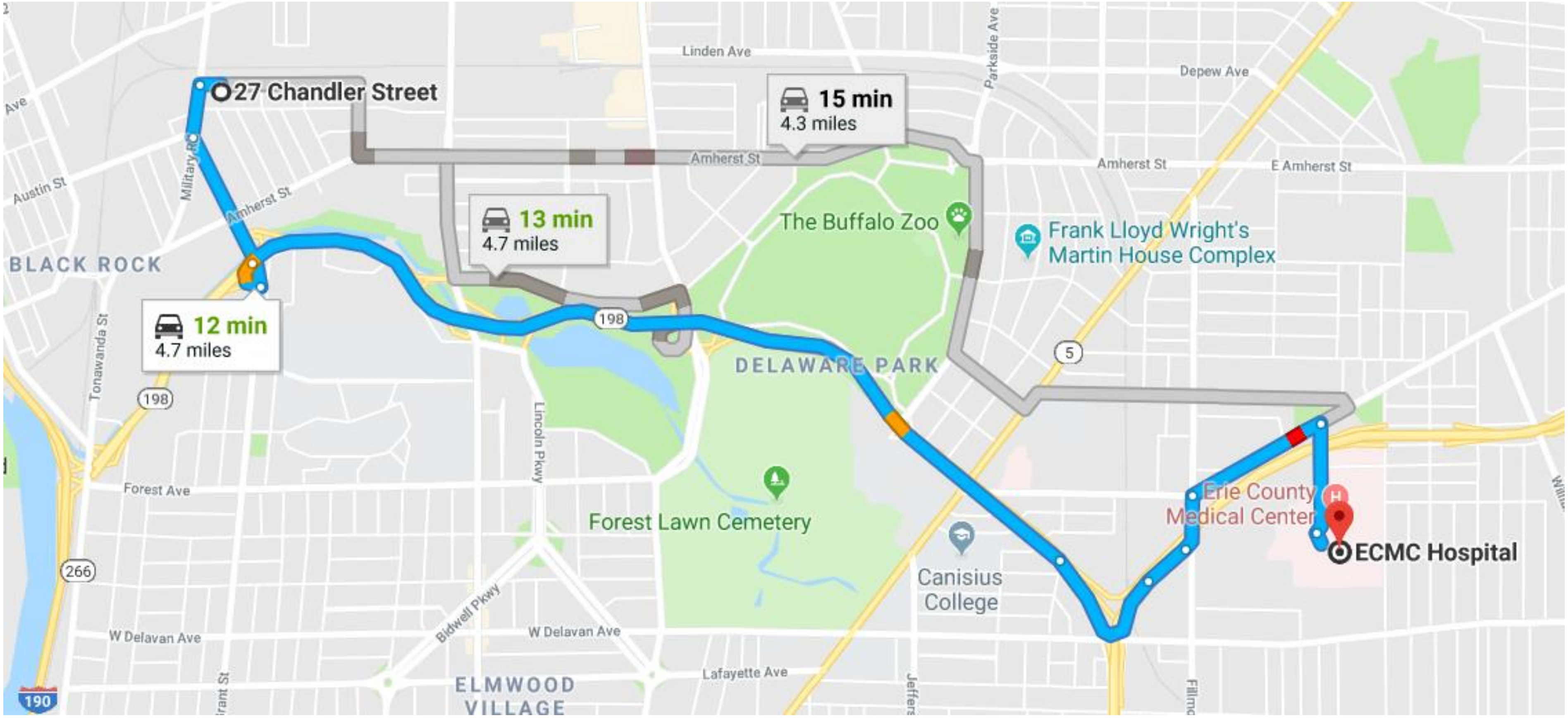
NIOSH IDLH – National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health; Concentrations in ppm or mg/m3

OSHA STEL - Short Term Exposure Limit

Table 2
Emergency Contacts

Agency	Contact	Phone Number
Buffalo Police	Emergency	911
Buffalo Fire/First Aid	Emergency	911
Ambulance	Emergency	911
Poison Control Center	Emergency	911
Hospital	Erie County Medical Center 462 Grider Street Buffalo, NY 14215	(716) 898-3000
NYSDOH	Charlotte Bethoney Empire State Plaza, Corning Tower Room 1787 Albany, NY 12237	(866) 881-2809
NYSDEC	Jaspal Walia 270 Michigan Ave. Buffalo, NY 14203	(716) 851-7220
NYSDEC	SPILL Hotline	(800) 457-7362
Wittman GeoSciences, PLLC	Michele Wittman, PG 3636 N. Buffalo Rd. Orchard Park, NY 14127	Cell: (716) 574-1513
Hazard Evaluations	Mark Hanna, CHMM 3636 N. Buffalo Rd. Orchard Park, NY 14127	Office: (716) 667-3130
Schenne & Associates	John Schenne,PE 391 Washington St. Suite 800, Buffalo, NY 14203	(716) 655-4991
27 & 37 Chandler Holdings, LLC (Owner)	Rocco Termini 391 Washington St. Buffalo, NY 14203	(716) 861-5385
Directions to Hospital - Head west on Chandler Street toward Military Road. Turn left onto Military Road. Turn left onto Grant. Turn right to merge onto NY-198E. Use the right 2 lanes to take the NY-33 E exit toward Airport. Keep right, follow signs for Fillmore Ave. Turn left onto Fillmore Ave. Turn right at the 1st cross street onto Kensington Ave. ECMC entrance is located on the right.		

Figures

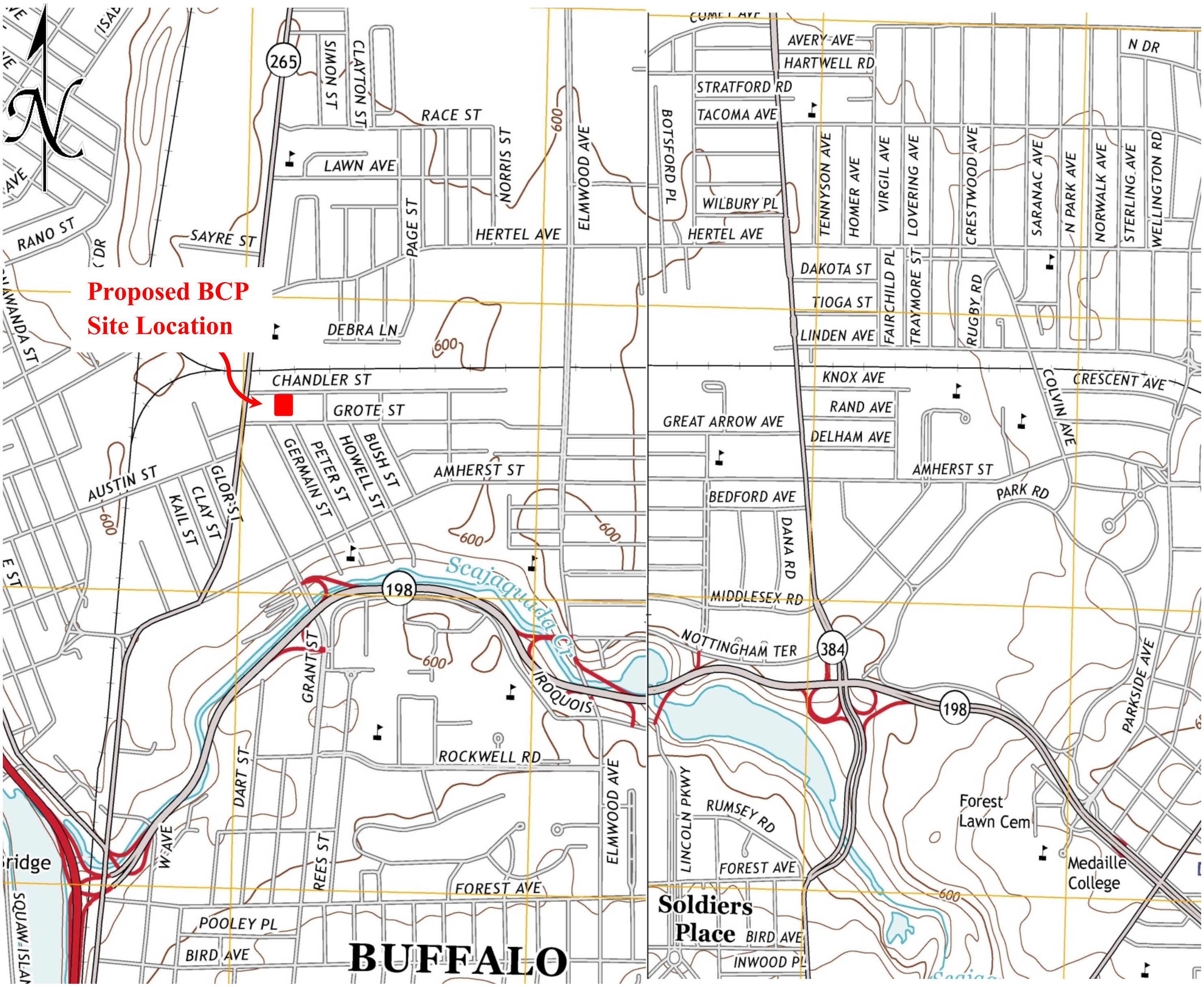


Directions: Head west on Chandler Street toward Military Road. Turn left onto Military Road. Turn left onto Grant. Turn right to merge onto NY-198E. Use the right 2 lanes to take the NY-33 E exit toward Airport. Keep right, follow signs for Fillmore Ave. Turn left onto Fillmore Ave. Turn right at the 1st cross street onto Kensington Ave. ECMC entrance is located on the right.

HAZARD EVALUATIONS, INC.
Phase I/II Audits – Site Investigations – Facility Inspections

HOSPITAL DIRECTIONS
27 & 37 CHANDLER STREET
BUFFALO, NEW YORK

DRAWN BY: GB	SCALE: NOT TO SCALE	PROJECT: e1608
CHECKED BY: MW	DATE: 11/18	FIGURE NO: 2



THIS DRAWING IS FOR ILLUSTRATIVE AND INFORMATIONAL PURPOSES ONLY
AND WAS ADAPTED FROM USGS, BUFFALO NE & NW, NEW YORK 2013 QUADRANGLE.

HAZARD EVALUATIONS, INC.
Phase I/II Audits – Site Investigations – Facility Inspections

SITE LOCATION
27 & 37 CHANDLER
BUFFALO, NEW YORK

CHANDLER INCUBATOR
BUFFALO, NEW YORK

DRAWN BY: MMW	SCALE: NOT TO SCALE	PROJECT: e1646
CHECKED BY: MMW	DATE: 11/18	FIGURE NO: 1

Attachment A

Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

BROWNFIELD CLEANUP PROGRAM
For
27 Chandler Street, LLC and 37 Chandler Street, LLC
Chandler Incubator, 27 & 37 Chandler Street, Buffalo, New York 14207
BCP # C915336

Prepared For:
27 Chandler Street, LLC and 37 Chandler Street, LLC
391 Washington Street, Buffalo, New York 14203
HEI Project No: e1646

Prepared By:

Hazard Evaluations, Inc.
3636 North Buffalo Road
Orchard Park, New York 14127
(716) 667-3130

Wittman GeoSciences, PLLC
3636 North Buffalo Road
Orchard Park, New York 14127
716-574-1513

November 6, 2018

HAZARD EVALUATIONS

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1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been developed for the Remedial Investigation/Interim Remedial Measures/Alternatives Analysis Report (RI/IRM/AAR) Work Plan to be completed by Hazard Evaluations, Inc. (HEI) and Wittman GeoSciences, PLLC (WGS) for Chandler Incubator located at 27 & 37 Chandler Street, Buffalo, Erie County, New York, on behalf of 27 Chandler Holdings, LLC and 37 Chandler Holdings, LLC (Applicant) as part of the Brownfield Cleanup Program (BCP).

The CAMP requires real-time monitoring of volatile organic compounds (VOCs) and particulates (dust) at downwind perimeter of each designated work area. The CAMP will be implemented during the excavation and removal of soils from the courtyard and vacant lot areas of the subject site. This CAMP will be completed in general accordance with NYSDEC DER-10 Appendix 1A, as included in Attachment A. A figure showing proposed monitoring points is included as Figure 1.

2.0 VOLATILE ORGANIC COMPOUND AIR MONITORING

VOCs will be monitored at the downwind perimeter of the work are on a continuous basis and periodically during non-intrusive activities. VOC monitoring will be done using an organic vapor meter (OVM) equipped with a photoionization detector (PID) to provide real-time recordable air monitoring data.

VOCs will also be monitored and recorded at the downwind perimeter of the immediate work area(s). Upwind concentrations will be measured at the beginning of each day before activities begin and periodically throughout the day to establish background conditions. The downwind VOC monitoring device will also be checked periodically throughout the day to assess emissions and the need for corrective action. VOC monitoring action levels as per *DER-10 Technical Guidance for Site Investigations and Remediation* is as follows:

- 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.

- If the organic vapor level at the perimeter of the work area 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 take 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 than that 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.

3.0 PARTICULATE AIR MONITORING

The remediation crew will make all efforts to suppress dust and particulate matter during the handling of contaminated soil. Fugitive dust and particulate monitoring will be completed in accordance with DER-10 Appendix 1B, as included in Attachment B. The following techniques have been shown to be effective for the controlling 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/or
(g) Reducing the excavation size and/or number of excavations.

Care will be taken not to use excess water, which can result in unacceptably wet site conditions. Use of atomizing sprays will prevent overly wet conditions, conserve water and provide an effective means of suppressing fugitive dust.

Weather conditions will be evaluated during remedial work. When extreme wind conditions make dust control ineffective, as a last resort, remedial actions may need to be suspended.

Dust and particulate monitoring will be conducted near approximate upwind and downwind perimeters of the work area, when possible. If visual evidence of dust is apparent in other locations, monitoring equipment will be placed where necessary. Dust monitoring may be suspended during period of precipitation and snow cover.

Particulate air monitoring will be done with a DataRAM-4 (or similar), which will be capable of reading particles less than 10 micrometers in size (PM-10) and equipped with an audible alarm feature which will indicate exceedances. Dust monitoring devices will be recorded periodically throughout the day to assess emissions and the need for corrective actions. Particulate monitoring action levels as per *DER-10 Technical Guidance for Site Investigations and Remediation* is as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (µg/m^3) greater than background 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 (µg/m^3) above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 (µg/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.

4.0 DOCUMENTATION

All 15-minute readings will be recorded and be available for or State (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

5.0 WIND DIRECTION

Prevailing wind direction will be recorded at the beginning of each work day by visual observations of an on-site windsock. As wind direction may change throughout the work day, direction will be reestablished if a significant change in direction is observed. The wind direction results will be utilized to determine the placement of the monitoring equipment.

Figures

BCP Boundary Limits

<u>KEY</u>

▲ Down-wind site perimeter monitoring location

☆ Up-wind site perimeter monitoring location

HAZARD EVALUATIONS, INC.
Phase I/II Audits – Site Investigations – Facility Inspections

Potential Air Monitoring Device Locations
27 & 37 CHANDLER STREET
BUFFALO, NEW YORK

Chandler Incubator
BUFFALO, NEW YORK

DRAWN BY: MMW	SCALE: NOT TO SCALE	PROJECT: e1646
CHECKED BY: MMW	DATE: 11/18	FIGURE NO: 1

Attachment A

NYSDEC DER-10 Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic 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.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

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. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

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.

VOC Monitoring, Response Levels, and Actions

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. 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/m^3 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.

December 2009

Attachment B

NYSDEC DER-10 Appendix 1B
Fugitive Dust and Particulate Monitoring

Appendix 1B
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);
(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 PM10 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. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

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.

Appendix 1C
DEC Permits Subject to Exemption

In accordance with section 1.10, exemptions from the following permit programs may be granted to the person responsible for conducting the remedial programs undertaken pursuant to section 1.2:

Air - Title 5 permits
Air - State permits
Air - Registrations
Ballast Discharge
Chemical Control
Coastal Erosion Hazard Areas
Construction of Hazardous Waste Management Facilities
Construction of Solid Waste Management Facilities
Dams
Excavation and Fill in Navigatable Waters (Article 15)
Flood Hazard Area Development
Freshwater Wetland
Hazardous Waste
Long Island Wells
Mined Land Reclamation
Navigation Law - Docks
Navigation Law - Floating Objects
Navigation Law - Marinas
Non-Industrial Waste Transport
Operation of Solid Waste Management Facilities
Operation of Hazardous Waste Management Facilities
State Pollution Discharge Elimination Systems (SPDES)
Stream Disturbance
Tidal Wetlands
Water Quality Certification
Water Supply
Wild, Scenic and Recreational Rivers

APPENDIX D

COMMUNITY PARTICIPATION PLAN

NEW YORK
STATE OF
OPPORTUNITY™
Department of
Environmental
Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
Chandler Incubator
27 & 37 Chandler, Buffalo, New York

November 7, 2018

BCP # C915336
27 & 37 Chandler Street
Buffalo
Erie County, New York

Contents

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **27 Chandler Holdings, LLC and 37 Chandler Holdings, LLC (“Applicant”)**
Site Name: **Chandler Incubator (“Site”)**
Site Address: **27 & 37 Chandler, Buffalo, NY 14207**
Site County: **Erie County**
Site Number: **C915336**

1. What is New York’s Brownfield Cleanup Program?

New York’s Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as “brownfields” so that they can be reused and developed. These uses include recreation, housing, and business.

A *brownfield* is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
http://www.dec.ny.gov/chemical/8450.html.

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at

the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html .

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/ implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the site had not yet been made.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at
http://www.dec.ny.gov/regulations/2590.html

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

The contamination at the site is primarily due to the presence of fill material varying in depth from approximately 3 to 5.5 feet below ground surface. The primary contaminants of concern in the fill/soil include semi-volatile organic compounds (SVOCs) including benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene; metals including copper and lead. The presence of these contaminants does not present a significant risk at this time to the surrounding properties. The soil and groundwater conditions will be further investigated as part of this BCP project. There is a potential for worker exposure through fugitive dust emissions during investigation and remediation activities. Such exposure will be alleviated through dust control measures and a community air monitoring plan.

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

The site is addressed as 166 Chandler Street in the City of Buffalo, Erie County, New York and consists of one parcel totaling approximately 0.48 acres of land. The site is bound to the south by Chandler Street, to the west by vacant building and lot, and to the north by railroad line and to the east by a vacant lot used for storage. The property is located within an urban area, utilized for industrial, commercial, and residential purposes. The 166 Chandler parcel is improved with one 43,000 square foot four-story building located on the eastern portion of the site. Historic industrial fill and rubble resulting from the demolition of old buildings, as well as piles of soil/debris are located within the western parking area.

History of Site Use, Investigation, and Cleanup

The 27 Chandler site was constructed in 1902 by Charles Berricks & Sons, a brick manufacturing company. By 1916 the property was inhabited by the Jewett Refrigerator Co. Buffalo Davenport, a furniture manufacturing facility, occupied the property from at least 1930 to 1960. Since that time, various companies occupied the building including Temp-Trol Windows, Inc., Gotta Rest Mattress Co. Inc. (manufacturer), Masters Pattern Co. (industrial patterns), Warren Refining & Chemical Co. (manufacturer), Byam CP Co (paper milk container manufacturers), Acme Steel (warehouse), Atlas Steel Casting Co. (warehouse), Cople Refrigeration & Heating (service repair), Liable Colling & Heating, Inc. as well as other commercial occupants including lawyers office, leather merchandise sales, janitorial supplies sales, and office supplies sales. Most recently, the building was used for warehousing and storage, as well as used furniture sales until 2017.

The 37 Chandler site was constructed in 1902 by the Double Truss Cornice Brake Company. The site was vacant by 1930 and remained vacant until 1935 when Viner & Sons (organ builders) occupied the building, remaining at the site until the early 1940s. Acme Steel and Malleable Iron Works and Buffalo Brake Beam Co. (railroad equipment manufacturing) occupied the property from the mid-1940s into the 1980s. The property was vacant for a few years then occupied by Corr Distributors in the mid-1980s until the mid-2000s. Commercial occupants since that time included Horsefeathers Architectural Antiques and Kennel Club (dog training, grooming, and boarding). The site has been vacant since 2017.

Prior remedial measures have not been completed at the site. Hazard Evaluations Inc. completed a limited Phase II investigation for Signature Development at the property in December 2017. The work included completion of 12 soil borings and collection of soil and groundwater samples.

The primary contaminants of concern include historical industrial fill which contains petroleum type compounds and heavy metals. The fill was present to depths ranging from 3 to 5.5 feet below grade. The fill material appeared to be typical industrial fill, typically comprised of sand intermixed with concrete, broken brick, gravel, and asphalt pieces. Currently there are no known health concerns or issues related to the identified contamination.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and has been accepted into New York's Brownfield Cleanup Program as a volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for restricted residential purposes.

To achieve this goal, the Applicant will conduct investigation and cleanup activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant will conduct an investigation of the site officially called a "remedial investigation" (RI). This investigation will be performed with NYSDEC oversight. The Applicant must develop a remedial investigation work plan which is subject to public comment.

The site investigation has several goals:

1) define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) identify the source(s) of the contamination;
3) assess the impact of the contamination on public health and the environment; and
4) provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

The Applicant submits a draft "Remedial Investigation Work Plan" to NYSDEC for review and approval. NYSDEC makes the draft plan available to the public review during a 30-day public comment period.

When the investigation is complete, the Applicant will prepare and submit a report that summarizes the results. This report also will recommend whether cleanup action is needed to address site-related contamination. The investigation report is subject to review and approval by NYSDEC.

NYSDEC will use the information in the investigation report to determine if the site poses a significant threat to public health or the environment. If the site is a "significant threat," it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at

the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a “Certificate of Completion” (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a “Remedial Work Plan”. The Remedial Work Plan describes the Applicant’s proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a final engineering report that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the final engineering report. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan.

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include: caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed.

Appendix A -
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

Mr. Jaspal Walia
Project Manager
NYSDEC 9
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, NY 14203-2915
716-851-7220
Email: Jaspal.walia@dec.ny.gov

Jennifer Dougherty, Esq.
(correspondence only)
NYSDEC
Office of General Counsel
270 Michigan Ave
Buffalo, NY 14203-2915
716-851-7220
Email: Jennifer.dougherty@dec.ny.gov

New York State Department of Health (NYSDOH):

Charlotte Bethoney (elec copy only)
New York State Department of Health
Bureau of Environmental Exposure
Investigation
Empire State Plaza
Corning Tower Room 1787
Albany, NY 1223T
Charlotte.bethoney@health.ny.gov

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents:

Buffalo and Erie County Library
North Park Library
975 Hertel Avenue
Buffalo, NY 14216
716-875-3748
Hours: Mon, Sat: 10:00am – 6:00pm;
Wed, Fri - 12:00pm – 8:00 pm

NYSDEC 9
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, NY 14203-2399
Attn: Jaspal Walia
716-851-7220
Hours: Mon-Fri 8:30am - 4:45pm

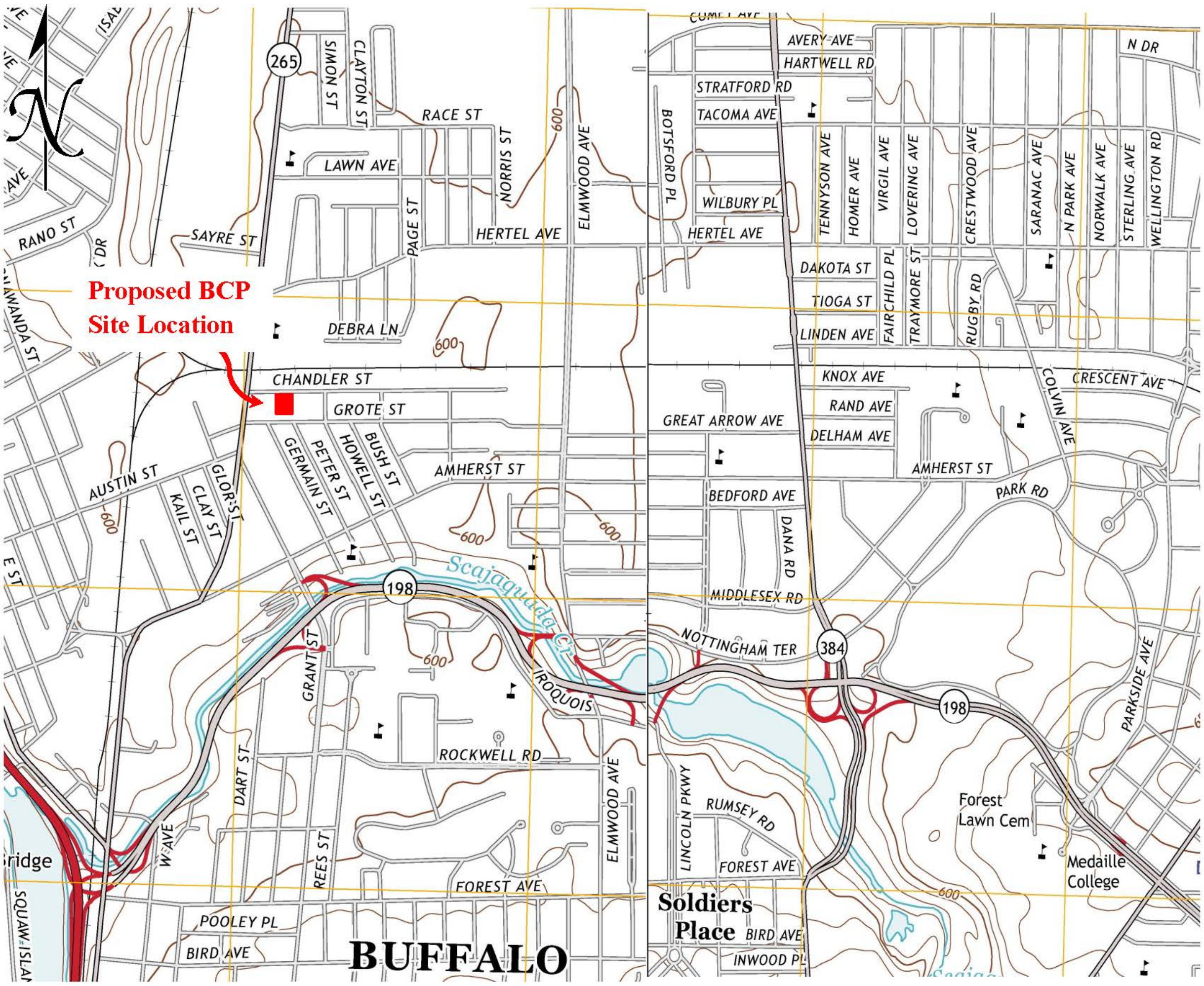
Appendix B - Site Contact List

Contact List		
Federal Representative		
U.S. Representative Brian Higgins 27th District Local Office 640 Park Place Niagara Falls, NY 14301 716-282-1274	US Senator Hon. Charles E. Schumer 130 South Elmwood Ave. #660 Buffalo, NY 14202 716-846-4111	US Senator Hon. Kristen Gillibrand 726 Exchange St., Suite 511 Buffalo, NY 14201 716-854-9725
New York Representative		
New York State Senator Chris Jacobs 65 Court Street Mahoney State Office Building Rm. 213 Phone: 716-854-8705	New York State Assemblyman Sean Ryan District Office 936 Delaware Avenue Buffalo, NY 14209 716-885-9630 Fax: 716-885-9636	
Erie County Representative		
Erie County Executive Mark Poloncarz 95 Franklin Street 16th Floor Buffalo, New York 14202 (716) 858-8500	Erie County Clerk Michael P. Kearns 92 Franklin Street Buffalo, New York 14202 (716) 858-8865	Commissioner of Environment and Planning Thomas R. Hersey, Jr. Edward A. Rath County Office Building 95 Franklin Street,10th Floor Buffalo, New York 14202 (716) 858-8390
City of Buffalo Representative		
Office of the Mayor Mayor Byron W. Brown 201 City Hall Buffalo, New York 14202 (716) 852-3300	North District Councilman Joseph Golombek, Jr. 1502 City Hall Buffalo, NY 14202 (716)851-5116	Division of Environment Samantha Long 920 City Hall Buffalo, New York 14202 (716) 851-6587
Office of Strategic Planning Brendan Mehaffy, Executive Director 201 City Hall Buffalo, New York 14202 (716) 851-2872	Planning Board Nadine Marrero Director of Planning 901 City Hall Buffalo, New York 14202 (716) 851-5029	

Adjacent Property Owners		
21 Chandler Street JCSF LLC 2430 W 3rd Street Los Angeles, CA 90054	Occupant 21 Chandler Street Buffalo, NY 14207	41 Chandler Street Chandler Place LLC 50 Orton Place Buffalo, NY 14201
Occupant 41 Chandler Street Buffalo, NY 14207	124 Chandler Street Norris Holding, Inc. PO Box 863 Buffalo, NY 14240	130 Chandler Street Chandler Field LLC 50 Orton Place Buffalo, NY 14201
19 Grote Street Laide Awolaja 28 Ealing Close Chatham, England ME5 8YJ	Occupant 19 Grote Street Buffalo, NY 14207	26 Grote Street Mohammed Shafie 125 Ladner Avenue Buffalo, NY 14220
Occupant 26 Grote Street Buffalo, NY 14207	31 Grote Street Kimberly Williams 26 Donaldson Road Buffalo, NY 14208	Occupant 31 Grote Street Buffalo, NY 14207
33 and 39 Grote Street Nicholas Lewczyk 421 North Creek Drive Depew, NY 14043	Occupant 33 Grote Street Buffalo, NY 14207	Occupant 39 Grote Street Buffalo, NY 14207
41 Grote Street Jesus Alvarez 41 Grote Street Buffalo, NY 14207	45 Grote Street Phillip Mazur 45 Grote Street Buffalo, NY 14207	50 Grote Street Joseph & Louise Domagala 184 Haverford Lane Amherst, NY 14221
Occupant 50 Grote Street Buffalo, NY 14207	James Parker 51 Grote Street Buffalo, NY 14207	
Local News Media		
Buffalo News One News Plaza PO Box 100 Buffalo, NY 14240 716-849-4444	WGRZ-TV Channel 2 259 Delaware Avenue Buffalo, NY 14202 716-849-2222	WIVB-TV Channel 4 2077 Elmwood Avenue Buffalo, NY 14202 716-874-4410
WKBW-ABC Channel 7 7 Broadcast Plaza Buffalo, NY 14202 716-845-6100	WUTV-FOX (Channel 29) 699 Hertel Avenue, Suite 100 Buffalo, New York 14207	

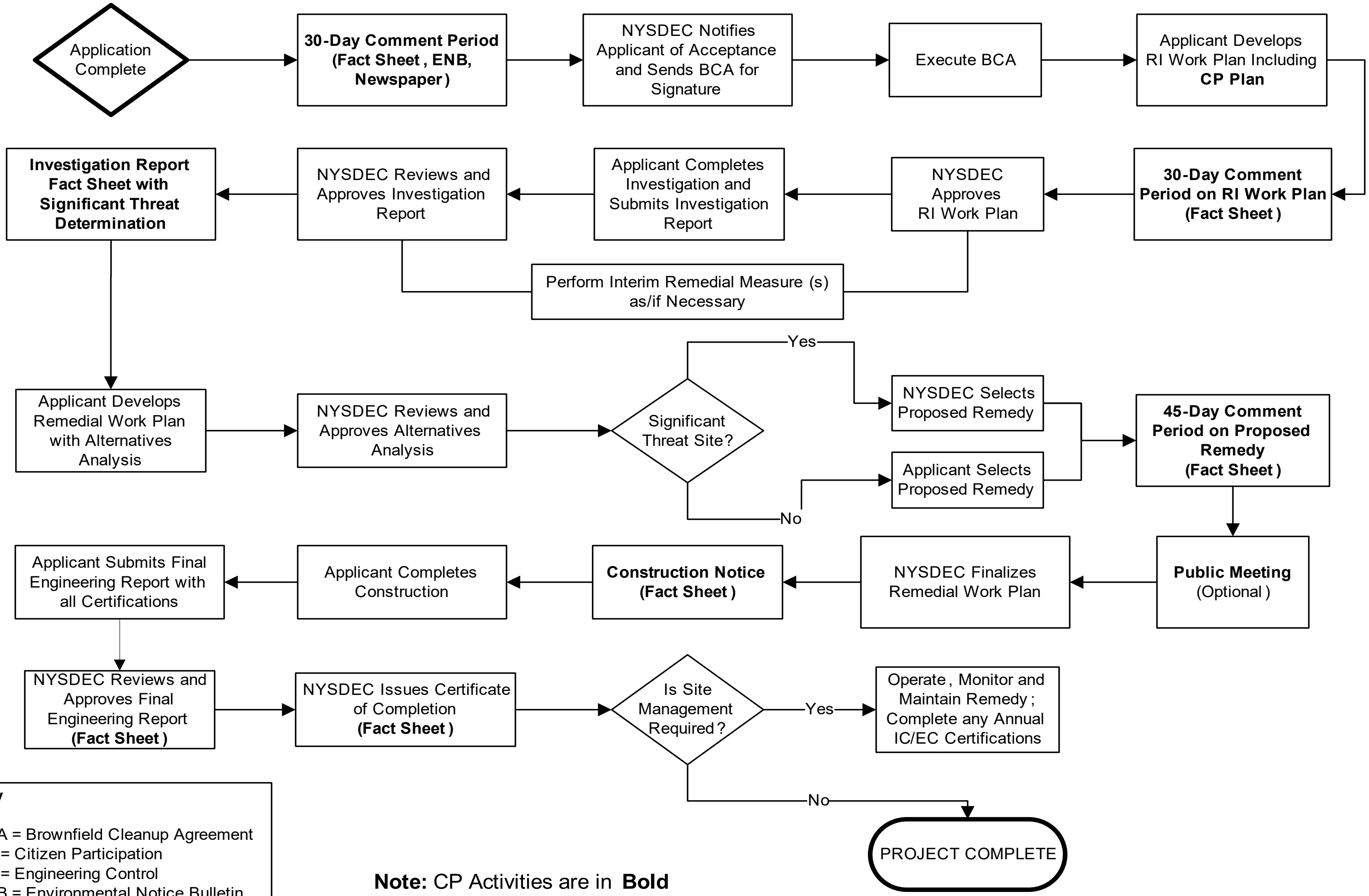
Public Water Supplier		
Buffalo Water Authority 281 Exchange Street Buffalo, New York 14202		
Persons who have requested to be on the list		
None requested		
Administrator of School and Daycare Facilities near the Property		
Elmwood Village Charter School 655 Hertel Avenue Buffalo, NY 14207 Ms. Kathy Jamil - Principal	West Hertel Academy 489 Hertel Avenue Buffalo, NY 14207 Cecelie Owens - Principal	Our Lady of Black Rock School 16 Peter Street Buffalo, NY 14207 Mrs. Martha Eadie - Principal
Local Document Repositories		
North Park Library 975 Hertel Avenue Buffalo, NY 14216 716-875-3748 Paul Guminski – Branch Manager	NYSDEC Region 9 Office 270 Michigan Avenue Buffalo, NY 14203 716-851-7220	

Appendix C - Site Location Map



Proposed BCP Site Location

Appendix D– Brownfield Cleanup Program Process



Key

BCA = Brownfield Cleanup Agreement
CP = Citizen Participation
EC = Engineering Control
ENB = Environmental Notice Bulletin
IC = Institutional Control
RI = Remedial Investigation

Note: CP Activities are in **Bold**