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WORK PLAN

For

REMEDIAL INVESTIGATION

CLAYTON STREET RESIDENCES
SITE # C915409
127 CLAYTON STREET
BUFFALO, NEW YORK 14202

Prepared For:
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1.0 INTRODUCTION

This Remedial Investigation workplan (RIWP) document presents details of work activities designed to support a Remedial Investigation (RI) at the Clayton Street Residents project (**SITE # C915409)**, located in Buffalo, Erie County, New York (see **Figure 1**). The Applicant, **ELMWOOD FOREST LLC**, acting as a Volunteer, has elected to pursue cleanup and redevelopment of the Site under the New York State Brownfield Cleanup Program (BCP), and has a fully executed Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC). The Site is planned for redevelopment as a residential facility, which includes a mixed-use 48-unit affordable housing complex.

The RI work will be completed by Niagara Engineering, D.P.C. (NE), on behalf of the Applicant. The work will be completed in accordance with NYSDEC DER-10 guidelines as summarized in this RIWP. A BCP project schedule is provided in **Appendix F**.

A previous Phase II Environmental Site assessments (ESA) identified site soils that have been impacted with metals and polycyclic aromatic hydrocarbons (PAH) related compounds. The purpose of the BCP RIWP is to address the following activities and requirements:

- Detail how environmental data will be obtained from the site under site specific quality assurance and quality control (QA/QC) for sampling, analyses, and data evaluation.
- Provide plans and approaches for health and safety and air monitoring for field activities.
- Summarize previous environmental assessments and investigations.
- Describe and illustrate the physical conditions of the site including surface waterbodies, ecological receptors, significant utility corridors.
- Tabulate and illustrate proposed sampling plan and results to include location, matrix, depth, analytes, methodologies, rationale, and QA/QC.
- Provide a schedule of activities and details of the proposed investigation team.
- Describe the areas of concern including impacted soils, fill material, groundwater, indoor air, and building conditions.
- Determine the necessity of a fish and wildlife impact analysis and, if required, gather data to evaluate impacts.
- Complete a qualitative exposure assessment for human health and fish/wildlife resources.
- Ensure (1) field work is sufficiently comprehensive to evaluate natural attenuation of groundwater, as applicable, and (2) all waste derived from the field work is managed in a manner that does not negatively impact human health and the environment.

1.1 BACKGROUND

The Clayton Street Residents project is located in a mixed commercial/residential neighborhood in the City of Buffalo, New York. The property is currently vacant and is bound by Clayton Street to the west, rail lines to the north, residential property to the south and a solar field to the east (see **Figure 2** – survey). The western side along Clayton Street is a long grass and weed covered field. The middle part of the property is tree covered, and the eastern portion is soil/fill covered where trees were recently removed in advance of completing the adjacent solar field. Clayton Street is a small side street bounded in a larger area by Military Road to the west, Hinman Street to the north, Elmwood Avenue to the east, and Hertel Avenue to the south. The area is a typical northeast urban-suburban setting with residential streets, commercial establishments, rail and mall/strip plaza complexes.

The Clayton Street Residents (i.e., the Property) is 1.77-acres and is composed of the 127 Clayton Street Property:

Address	Tax ID (SBL)	Acreage
127 Clayton Street	77.52-4-1.1	1.77

Historically, the property has been vacant with the exception of several rail lines. Fill material may have been placed on the property in the past as historic aerial photographs show considerable disturbance across the vacant area. The history and use of the subject property suggest there were potential contaminants of concern associated with fill material and past area rail use. The Phase II Environmental Site Assessment (ESA) completed at the property indicated that there are urban fill conditions existing to at least two - four (4) feet below ground surface (bgs) resulting in target compounds (metals and SVOCs, primarily polycyclic aromatic hydrocarbons (PAHs) above NYSDEC Industrial, Commercial and Restricted Residential SCOs.

1.2 PROJECT OBJECTIVES AND CONTEMPLATED RE-USE

For sites entering the BCP at the point of investigation, NYSDEC requires completion of a RI. The primary objectives of the RI are to:

- Collect additional media samples, under appropriate quality assurance/quality control criteria, to better delineate the nature and extent of contamination.
- Assess the groundwater flow direction and groundwater quality conditions at the Site.
- Determine if the concentrations of constituents of concern in site media pose potential unacceptable risks to human health and the environment.
- Provide the data needed to evaluate potential remedial measures and determine appropriate actions to address potential risks.

As part of the RI, sampling data will be used to evaluate whether remedial alternatives can meet the objectives. The intended uses of these data dictate the confidence levels. Two data confidence levels will be employed in the RI: screening level data and laboratory quality level data. In general, screening level confidence will apply to field measurements, including PID measurements, groundwater elevation measurements, and field analyses (i.e., pH, temperature, dissolved oxygen, specific conductivity, and turbidity). Laboratory quality level confidence will apply to samples sent to an offsite approved laboratory for chemical analysis. The applicability of these levels of data will be further specified in the Quality Assurance Project Plan (QAPP) in **Appendix B**. Sampling and analytical acceptance and performance criteria such as precision, accuracy, representativeness, comparability, completeness, and sensitivity, are defined in the QAPP.

1.2.1 RI Objectives

In general, an RI has the following objectives as described in NYCRR Part 375-1.8(e):

- Delineation of the extent of the contamination at and emanating from all media at the Site and the nature of that contamination.
- Characterization of the surface and subsurface of the Site, including topography, surface drainage, stratigraphy, depth to groundwater, and any aquifers that have been impacted or have the potential to be impacted.
- Identification of the sources of contamination, the migration pathways, and actual or potential receptors of contaminants.
- Evaluation of actual and potential threats to public health and the environment; and,
- Production of data of sufficient quality and quantity to support the necessity for, and the proposed extent of, remediation and to support the evaluation of proposed alternatives.

1.2.2 Specific Goals

Based on the data collected to date and history of the Property, RI activities have been developed that will allow for further assessment of fill material; depth of native soil; depth to groundwater; and assessment of groundwater. Specific goals for the RI are as follows:

- Perform additional soil borings/test trenches across the property to add to the existing data.
- Collect and analyze representative surface/subsurface soil samples to supplement samples collected in the Phase II ESA and better characterize fill soils and native soils to quantify and assess contamination.
- Install and sample groundwater monitoring wells to assess groundwater contamination and its sources (i.e., on or off-site) along with direction of groundwater flow; and,
- Fill in any data gaps resulting from previous assessments.

To the extent possible, RI field work will also include the identification of any significant structures, sensitive areas, or appurtenances that could have an impact on contaminant migration or future remedial action such as any existing storm/sanitary sewer lines or old rail lines.

1.2.3 Planned Re-Use

The project will include redevelopment of the Property with a residential apartment complex to include a two-story, 48-unit complex. The project is anticipated to start in September-October 2025 with a construction duration period of approximately 6 months. Remediation will occur in advance of and concurrently with the construction phase and will be completed in Spring-early summer 2026. The Certificate of Completion (COC) is expected to be awarded in the end of Fall of 2026.

The proposed development is a crucial affordable housing project that will be partially funded through the New York State Housing and Community Renewal (HCR) Participation Loan Program (PLP). The project entails the construction of 48 residential apartments, all of which are intended to provide affordable housing for underserved households in Buffalo. These households earn less than 80% of the area median income (AMI). The funding received from the PLP includes deed restrictions ensuring that rents remain at or below the levels established by HCR, reinforcing our commitment to maintaining affordability.

1.3 Project Organization and Responsibilities

The following personnel constitute the primary members of the project team:

Company	Role	Name	Contact Information
ELMWOOD FOREST LLC	Applicant contact	Anthony P. LoRusso/ co Akos Seres	(716) 583-0315
Niagara Engineering	Project Officer	Akos Seres	(716) 583-0315
Niagara Engineering	Principal Engineer	Norm Abraham, P.E	(716) 572-1140
Niagara Engineering	Project Manager	Peter J. Gorton	(716) 308-8220
Niagara Engineering	QA/QC	John Berry, P.E.	(801) 870-0285
Niagara Engineering	Health & Safety	Peter J. Gorton MPH; CHCM	(716) 308-8220
TBD	Laboratory	TBD	TBD
TBD	Drilling Services	TBD	TBD
TBD	Excavation Services	TBD	TBD
TBD	Waste Oil-Chemical Assessment	TBD	TBD
Environmental Data Usability (EDU) Or Vali-Data	DUSR	Mike Perry Or Jodi Zimmerman	(585) 991-9156 (716) 289-0926

2.0 SITE DESCRIPTION

2.1 General

The Clayton Street Residents project is located in the City of Buffalo, New York. Located in a mixed commercial/residential neighborhood, the Property is currently vacant and is bound by Clayton Street to the west, rail lines to the north, residential property to the south and vacant land and a solar field to the east. Clayton Street is a small side street bounded in a larger area by Military Road to the west, Hinman Street to the north, Elmwood Avenue to the east, and Hertel Avenue to the south. The area is a typical northeast urban-suburban setting with residential streets, commercial establishments, rail and mall/strip plaza complexes.

2.2 Site Topography and Drainage

The Property is generally flat and gently sloping south and west. On the western side along Clayton Street is a long grass and weed covered field. The middle part of the property is tree covered, and the eastern portion is soil/fill covered where trees were recently removed.

Surface and shallow groundwater flow most likely have been impacted over time by the various developments and fills as well as foundations, street beds, rail lines and utility lines. Surface water is directed to adjacent streets and low spots in the property. In general groundwater most likely flows towards the west and south towards the Niagara River.

2.3 Geology and Hydrogeology

2.3.1 Overburden

The United States Department of Agriculture (USDA) Natural Resources Conservation Service soil survey map of Erie County describes the general soil type at the Property as Urban Land (Ud). Soils associated with Urban Land are characterized as miscellaneous areas in which 80% or more of the soil surface is covered by asphalt, concrete, buildings, or other impervious structures.

The project area is situated within the Erie Lake Plain physiographic province, one of the two physiographic provinces of Erie County (the Allegheny Plateau is the other). The lake plain province is located along Lake Erie and its topography is typical of an abandoned lakebed with little significant relief except for narrow ravines carved by the area's streams. Although the project area is relatively flat, this topography is by no means natural. The current landscape is a result of nearly two centuries of alteration and development.

The Phase II ESA test trenches indicate that shallow subsurface conditions generally consisted of sandy clayey silt with some gravel fill with pieces of brick, cement, glass, clay pipe and cinder to about two (2) feet in depth in most locations. Fill depths were deeper in the eastern portion and less in the existing tree line and in the southwest area. Brown to reddish brown clay was observed below 2-3 feet in most locations.

2.3.2 Bedrock

The bedrock beneath the project area is Onondaga limestone, consisting of Middle Devonian age limestone and chert. It lies deeply buried beneath glacial deposits and no rock outcroppings are visible on the ground surface. This formation is notable for its chert nodules that were the primary prehistoric lithic resource used in western New York. Relatively flat, the bedrock underlying Erie County tilts to the southwest at approximately 50 ft (15 m) per mile.

The surficial geology of the Erie-Ontario Lowlands has developed from lacustrine deposits or till that may contain both limestone and shale. The Site overlies the Onondaga and Bois Blanc Limestone Formation of the Middle Devonian Series. The Onondaga Formation is comprised of Seneca, Morehouse (cherty), and Clarence Limestone members, Edgecliff cherty Limestone members, local coral bioherms, and sandy, thin, and discontinuous. The unit has an approximate thickness of 150 feet.

2.3.3 Hydrogeology

The Property is located within the Lake Erie-Niagara River major drainage basin, which is typified by little topographic relief that gently slopes westward towards the Niagara River, except in the immediate vicinity of major drainage ways. In the Erie-Niagara Basin, the major areas of groundwater are within coarser overburden deposits, limestone, and shale bedrock. The groundwater flow in the area of the Property is likely westerly towards the Niagara River, which is located west and flows to the north. Local groundwater flow is likely influenced by subsurface features, such as utilities, localized subgrade and nearby development conditions.

2.4 Climate

The City of Buffalo has a cold continental climate, with moisture from Lake Erie causing increased precipitation. Average annual precipitation is reportedly 40.5 inches and snowfall is 94 inches. The average temperature is 48 degrees Fahrenheit. The ground and lakes typically remain frozen from December to March. Winds are generally from the southwest (USClimateData.com).

2.5 Population and Land Use

The City of Buffalo, encompassing 40.38 square miles, has a population of 278,349 (2020 US Census Bureau). The Property is in Census Tract 1404, in an area of the City of Buffalo zoned D-C – Flex Commercial. The D-C zone addresses general commercial and mixed-use areas, which typically benefit from flexible form standards and are separate from, but within close proximity to, residential neighborhoods.

2.6 Utilities and Groundwater Use

The Property has access to all major public utilities, including potable water (Buffalo Water Authority), sanitary and storm sewers (Buffalo Sewer Authority), electric (National Grid), and natural gas (National Fuel Gas). Groundwater is not used in this area of Buffalo.

2.7 Contaminants and Areas of Concern

Based on the findings related to historic use of the Property and previous investigations, contaminants of concern (COCs) in the soils include: SVOCs (primarily PAHs) and metals. COCs in groundwater are as yet not defined. See **Figure 4** and **Tables 1 and 2** from the Phase II for previous soil/groundwater sampling locations and analytical exceedances. The full suite of soil and groundwater contaminants as identified in 6NYCRR Part 375 will be analyzed during the RI and compared to Part 375 Soil Cleanup Objectives (SCOs) and NYSDEC Division of Water TOGS for soils and groundwater respectively.

2.8 PAST ENVIRONMENTAL ASSESSMENTS/INVESTIGATIONS

Limited data from a past Phase II ESA was available to and reviewed by Niagara Engineering and was used to propose a new Phase II ESA. Niagara Engineering completed a subsurface soil assessment on July 12, 2024. The history and use of the subject Property suggested there were potential contaminants of concern associated with fill material and past area railroad use.

A total of fourteen (14) test trenches, designated Test Pits TP-1 through TP-14, were advanced at specific locations across the Property. A total of fourteen (14) grab subsurface soil samples were collected from mostly the 1-2-foot level from fill material. Ten (10) of those samples were submitted to the laboratory for analysis.

The trenches indicate that shallow subsurface conditions generally consisted of sandy clayey silt with some gravel fill with pieces of brick, cement, glass, clay pipe and cinder to about two (2) feet in most locations. Fill depths were deeper in the eastern portion and less in the existing tree line and in the southwest area. Brown to reddish brown clay was observed below 2-3 feet in most locations. Water was observed in Test Trench 1 (TP-1) at 3-4 feet. All trenches were completed to four (4) feet below ground surface.

The laboratory results indicated that there are urban fill conditions existing at the property to at least two (2) feet bgs resulting in target compounds (metals and SVOCs, primarily PAHs) above NYSDEC Industrial, Commercial and Restricted Residential SCOs.

3.0 REMEDIAL INVESTIGATION SCOPE OF WORK

3.1 Introduction

All investigation field work will be completed in accordance with the Health and Safety Plan (HASP) provided in **Appendix A**; the QA/QC procedures contained in **Appendix B;** and in accordance with standard procedures identified in the Field Sampling Plan provided in **Appendix C**. It is anticipated that the RI can be completed in a single phase and include the following:

- Soil investigation across the Site to supplement previous investigation findings (soil borings/trenches, sampling, and analyses);
- Groundwater investigation across the Site (well installation, sampling, and analyses);
- Hydraulic assessment of subsurface groundwater; and,
- Vapor intrusion investigation, if warranted, after the groundwater investigation results or based on field monitoring with real-time organic vapor monitoring.

A Citizen Participation Plan (see **Appendix D**) and a Community Air Monitoring Plan (CAMP) will also be implemented during RI field activities (see **Appendix E**)

3.2 Pre-Investigation Activities

3.2.1 Utility Clearance

Prior to any intrusive activities, Dig Safely New York (Call 811) will be contacted by the site contractor a minimum of three business days in advance of the work and informed of the intent to perform excavation work at the Property in the form of borings and excavations. If underground utilities are present on the property and are anticipated to interfere with intrusive activities, the Applicant and the NYSDEC will be contacted to discuss mitigating measures.

3.2.2 Interim Remedial Measures (IRM)

The primary objective of remediation is to reduce or eliminate receptor exposure to contaminants through the removal or stabilization of source contamination identified in media. IRMs are actions taken to mitigate exposures before the completion of the RI and remedial alternative selection. Examples of typical IRMs include the removal of source areas/hotspots/wastes, construction of collection or recovery systems, installation of engineered barriers and controls, and installation of vapor control systems.

If the need for implementing an IRM is determined during the RI, then the NYSDEC will be notified and the IRM defined as emergency or non-emergency. Emergency IRMs are addressed as a spill response and are time-critical that are not subject to DER-10 (i.e., other guidance applies, such as CERCLA, spill response guidance manual, etc.). Non-emergency IRMs such as drum removals, construction of fencing, and posting of warning signs can be performed at any time during the BCP, but in response to existing or potential exposures at the Site. These are best utilized when it is cost effective to complete the IRM prior to the remedial investigation and remedy selection process. In these cases, DER-10 will be followed and include corresponding documentation and oversight/approval by DEC.

The most significant advantage to using IRMs is the reduction in schedule of any impending remedial activities since they may be conducted concurrently with sampling to delineate the contamination and to confirm contaminant removal. The need for, and design of, an IRM will be developed as necessary following or during the implementation of the RI.

3.3 Soil/Fill Investigation

A soil/fill investigation will be completed across the Property to further assess the extent of, known historical contamination. The soil/fill investigation will include the collection of soil/fill samples from test pits, soil borings, and surface samples.

This soil assessment will allow the visual inspection and characterization of soil conditions on the Property with the objective of confirming the depth of fill material across the Property and to collect and analyze additional fill and native soil samples. Also, the extent of known contamination will be quantified and contamination sources identified, as data allows. The only complete soil assessment completed to date that is available to Niagara Engineering is the subsurface assessment in 2024 summarized in Section 2.8. Some limited data from a previous Phase II ESA is also available as documented in the BCP application. As such, the objective of the RI soil assessment will be to use the previous data and complete additional borings and test trenches in areas of concern identified in the previous assessments.

3.3.1 Surface Soil/Fill Assessment

Five (5) surface soil/fill samples spread across the Property will be collected (SS-1 through SS-5). The samples will be collected from 0 to 2 inches below the vegetative cover to allow for assessment of human exposure via incidental soil ingestion, inhalation of soil, or dermal contact with soil. The surface soil samples will be analyzed in accordance with the sampling and analysis plan **(see Table 3**). Specifically, as summarized on **Table 3**, all five surface soil samples will be analyzed for the full suite of Part 375 parameters to include analysis for semi- volatile organic compounds (SVOCs) and 375 List metals, PCBs, herbicides, pesticides, 1,4-dioxane, and per- and polyfluoroalkyl substances (PFAS). If elevated PID readings (i.e., sustained above 10 parts per million, (ppm)) are noted during field screening, laboratory analysis may be expanded to include additional VOCs samples in consultation with the NYSDEC. The soil/fill samples will be analyzed in accordance with USEPA SW 846 methodology with equivalent Category B deliverables to allow for independent third-party data usability assessment.

3.3.2 Subsurface Soil/Fill Assessment

Supplemental (from those completed during the Phase II ESAs) subsurface soil/fill exploratory locations will be advanced across the Property to further delineate the extent of known contamination, identify the presence of historic urban fill, and determine if other impacts requiring remediation are present at the Site, as further discussed below. An estimated 23 soil samples (plus QA/QC samples) will be collected for laboratory analyses as follows (refer to **Figure 3**):

- 17 subsurface fill samples will be collected from the fill to represent the total Site area and locations that indicate impacts; and,
- 6 "native" soil samples will be collected below the fill layer, spread across the aerial extent of the property.

Samples will be selected based upon (1) areas that appear to be impacted based upon visual, olfactory, or PID detections, (2) areas of natural soil at/just below the interface with fill material, and (3) known fill material that may or may not be impacted but believed to represent Site soils. Proposed soil samples to be collected are summarized in **Table 3** and **Appendix B** – Quality Assurance/Quality Control Plan. Note, as per DER-10 Section 3.11(b)3, if more than one type of historic fill material is encountered in any boring or test pit, one sample will be collected for each type of fill material encountered. This will apply if there is a distinct, separate fill layer. If, however, the fill is a jumbled mixture throughout the fill layer then one representative sample of the fill will be collected. More than one distinct fill layer may result in more samples collected per DER-10 then identified and that will be based on field observations.

The soil samples will be analyzed by a NYSDOH environmental laboratory accreditation program (ELAP) certified laboratory that produces NYSDEC Category B data package deliverables. Data Usability Summary Reports (DUSRs) will be prepared for all samples. **All 17 subsurface samples will be analyzed for the Part 375 Brownfields constituent list SVOCs and Metals** and six of the fill and three of native will be analyzed for 375 & CP-51 VOCs plus TICs, and Part 375 PCBs, Pesticides, 1,4-dioxane and PFAS. If field observations or PID screening indicates the potential for VOCs, PCBs or pesticides at additional locations then additional samples may require these parameters be analyzed.

All subsurface disturbance, boring or test trenches, will be performed at a minimum distance of 2.5 feet away from marked utilities to reduce the risk of damaging an underground utility line. All boreholes will be filled with indigenous soil or clean sand prior to leaving each location. Field equipment will be operated in accordance with standard practices and in a safe and efficient manner as to minimize any hydraulic system leaks or lubricant and fuel leaks (See **Appendix A** – HASP for details).

Additional field activities performed by the field geologist/technician include properly labeling, packaging, delivering samples to the laboratory; supervising field operations; and completing boring logs, which can be performed in the office after recording field notes. The geologist/technician will update the Project Manager at least daily on progress in the field and results of the subsurface investigation. No major changes in the subsurface investigations will occur unless approved by the Project Manager, who will also notify the Client and NYSDEC regarding project developments. A detailed description of the sampling methods is provided in the **Appendix C** – Field Sampling Plan.

3.3.2.1 Test Trench Assessment

As shown in **Figure 3**, a total of six (6) test trench locations (designated TT-1 through TT-6) are planned. Three (3) trenches will be excavated in the eastern section of the site; one (1) will be advanced inside the tree line in the center of the property and two (2) will be advanced on the western section near Clayton Street. The purpose will be to examine a wider area then the borings by advancing a trench over an elongated distance to establish how the subsurface conditions change over various parts of the property. As such the planned dimensions will be about 2-4 feet wide and about 6-10 feet long. This method allows for identification of different sedimentary changes over a longer distance and allows for a rapid examination of ground conditions across the horizontal and vertical horizons as the trench advances and faces are exposed allowing a large volume of ground to be inspected in situ.

The trenches will be advanced to groundwater or bedrock and no deeper than ten feet below ground surface (bgs) using a backhoe. At each test trench location, the following will be recorded:

- Thickness and characteristics of the cover/fill material.
- Depth to the water table, if encountered.
- Thickness and characteristics of the native soil.
- Depth to bedrock if found.
- Photoionization detector (PID) screening results; and,
- Samples collected at an estimated depth.

A detailed log of test trench records will be maintained, and photographs will be obtained. The native material below any fill is primarily red-brown silty clay with trace medium sand & fine gravel. Real time air and particulate monitoring will be conducted during intrusive activities using a PID and particulate monitor in accordance with the CAMP. All soil samples will be field screened for the presence of total volatile organics using a calibrated PID with a 10.6 eV lamp, as a procedure for ensuring the health and safety of personnel at the Site, and to identify potential impacts in soil samples for laboratory analysis. Upon reaching the completion depth of each location, field visual/olfactory and PID results will be reviewed, and sample intervals will be determined.

See Also Section 3.5 below.

3.3.2.2 Soil Boring Investigation

ten (10) to twelve (12) soil borings, identified as RIBH-1 through RIBH-12, will be advanced, in areas not previously assessed during the Phase II ESAs (refer to **Figures 2&3; note 11 locations are shown and if a twelfth is completed it will be based on field observations**) and outside of the test trench assessment described in 3.3.2.1. Soil borings will be advanced to an estimated depth of up to 12-16 fbgs or about 2-4 feet into native soil when encountered. Field borehole logs (including photographs) for each investigation location will be completed in accordance with the SAP (in **Appendix C**). Real time air and particulate monitoring will be conducted during intrusive activities using a PID and particulate monitor in accordance with the CAMP.

3.3.3 Soil/Fill Sample Collection and Analysis

Tables 3,4,5 and 6 summarizes the proposed RI sample collection and analytical program. The soil/fill samples will be collected to further delineate the horizontal and vertical extent of the known contamination and determine if other impacts requiring remediation are present at the Site.

Samples will be collected from fill and native soil as described in Section 3.3.1 and 3.3.2. The sample interval identified as the most impacted (i.e., greatest PID scan result and/or visual/olfactory evidence of impact) at investigation locations will be selected for laboratory analysis. In general, fill samples will be selected from the most visually impacted fill areas and native soils will be collected from just below the fill layer. If the impacts are ubiquitous from grade to final depth or no impacts were identified, and water is not encountered at a particular sample location, the sample interval will be selected based on the professional discretion of the field personnel and in consultation with the NYSDEC. If differentiable impacts or soil fill layers are noted during the investigation, additional samples will be collected such that representative samples from all fill/soil types are collected.

Additionally, up to three waste characterization soil/fill samples will be collected during the RI and analyzed for TCLP VOCs, TCLP SVOCs, TCLP metals, PCBs, ignitability, corrosivity, and reactivity to fulfill landfill analytical disposal requirements. The samples will be chosen to represent fill conditions across the Site, to include previously identified fill areas with elevated PAH/metal concentrations. Based on the results of the RI soil/fill samples and the waste characterization soil/fill samples, the landfill may allow the waste characterization parameter list to be reduced to the COPCs if the facility requires additional waste characterization samples based on the estimated disposal volume. The three samples will provide a jump start once remedial activities occur. It is anticipated however, based on the property size, that additional waste characterization samples will be collected during the remediation stage once the remedial plan is approved, and the most appropriate disposal facility is identified.

Pre-characterization of the soil/fill will allow for direct loading and off-site transportation at the time of the impacted soil/fill excavation and site remediation. Based on the results of the waste characterization sampling, impacted soil will be managed according to all federal, state, and local waste disposal regulations. The soil/fill samples will be analyzed in accordance with USEPA SW 846 methodology with equivalent Category B deliverables to allow for independent third-party data usability assessment.

3.4 Groundwater Investigation

It is unknown how deep groundwater is at this location. It may be relatively shallow or deep. One of the Phase II test trenches encountered groundwater at about 5-6 feet below ground surface (bgs). Overburden groundwater at the nearby Site southeast of the property was generally perched (contained) at depths around approximately 8-10 feet bgs. Groundwater at a nearby BCP site (308 Crowley Avenue Site -NYSDEC # C915390) southwest of the site was fairly deep. At that site a very thick clay aquitard exists at the site below the fill. On that site, a well was installed at the northwest side of the site to a total depth of 30 feet with a 20 -foot screen and no groundwater was encountered. Moist clay was not encountered until around 45 - 50 feet bgs during drilling at that site.

For the purposes of planning, four groundwater monitoring wells, identified as MW-1 through MW-4, will be advanced at the Property to assess groundwater depth/flow direction and collect groundwater samples. **Figure 3** shows the planned groundwater monitoring well locations. Monitoring well installation and groundwater sample collection details are discussed in the following sections. Drill cuttings and any other investigation derived waste (IDW) will be managed in accordance with DER-10 3.3(e). Specifically, drill cuttings from soil borings where wells will be installed will be placed in sealed New York State Department of Transportation (NYSDOT)-approved drums and labelled for subsequent characterization and disposal.

The four (4) overburden groundwater monitoring wells are proposed to be installed during the RI using a conventional truck mounted or track drill rig using hollow stem auger drilling techniques. However, depending on well depth use of a direct push drilling technique may be discussed with the DEC for relatively shallow depths. Each well will consist of a 2-inch inside diameter (ID), schedule 40 polyvinyl chloride (PVC) casing equipped with a 5-10-foot screen or less depending on well depth and solid PVC riser pipe extending to the surface. Screens will be positioned to straddle the groundwater surface and will be extended to the bottom of the boring to ensure assessment potential for contaminants associated with the Site. Filter pack will be placed around the screen to a minimum of 2 feet above the screen with a 1-foot bentonite/cement grout seal above the filter pack. Wells will be completed with either flush mounted or stick-up casings depending on well location – see also Section 3.4.1. For planning purposes, maximum well depth is anticipated to be between 10 and 20 feet bgs. However, if groundwater depth appears to be significantly deeper, the final completion of groundwater wells will be discussed with the DEC project manager.

Detailed boring and well construction logs will be provided for monitoring well installations and included in the RI report. Surface elevations of all wells will be surveyed in and groundwater elevations recorded to allow groundwater contours to be established during the RI.

The data obtained from the initial well installation, such as soil type and groundwater depth, will be used to guide the installation of the remaining wells. Installation, development, and sampling of the wells will also adhere to the requirements provided in the Sampling & Analysis Plan provided in **Appendix C**.

One groundwater sample will be collected from each of the four wells, and submitted to a New York State ELAP-certified laboratory and analyzed for the following 6 NYCRR 375 constituents and emerging contaminants:

- VOCs +TICs
- SVOCs
- Metals
- PCBs
- Pesticides
- 1,4-dioxane
- PFAS (PFOA/PFOS)

All sample analysis will be in accordance with ASP, Category B requirements. Groundwater samples collected for emerging contaminants (PFAS) will be conducted in accordance with the latest NYSDEC Sampling, Analysis, and Assessment Guidelines for PFAS. All detected sample concentrations will be included in a table and compared to NYSDEC Groundwater Standards (TOGS) and the latest PFAS standards. QA/QC requirements for all sample analysis are provided in **Appendix B** QA/QC Plan that summarizes the number of groundwater samples to be collected.

3.4.1. Monitoring Well Installation

Monitoring wells will be installed following the advancement of soil borings with a rotary or direct-push drill rig. All non-dedicated drilling tools and equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (e.g., Alconox).

Each well boring will be advanced to a target minimum depth of five feet below the first encountered groundwater or at top of bedrock; however, borings may be advanced to greater depths to define the site geology. Wells will be constructed with 2-inch diameter Schedule (SCH) 40 PVC with a minimum 5-foot flush joint SCH 40 PVC 0.010-inch machine-slotted well screen.

Each well screen and attached riser will be placed at the bottom of each borehole and a silica sand filter pack (size #0) will be installed from the base of the well to a maximum of two feet above the top of the screen. A bentonite chip seal will then be installed and allowed to hydrate sufficiently to mitigate the potential for downhole grout contamination. The newly installed monitoring wells will be completed with keyed-alike locks, a lockable J-plug, and a steel flush mounted road box or steel stick-up casing. Concrete will be placed in the boring around the protective casing and sloped away from the casing.

3.4.2 Well Development

After installation, but not within 24 hours, newly installed monitoring wells will be developed in accordance with Niagara Engineering and NYSDEC protocols. Development of the monitoring wells will be accomplished with dedicated disposable polyethylene bailers via surge and purge methodology. Field parameters including pH, temperature, turbidity, dissolved oxygen (DO), oxidation-reduction potential (ORP) and specific conductance will be measured periodically (i.e., every well volume or as necessary) during development. Field measurements will continue until they become relatively stable. Stability will be defined as variation between measurements of approximately 10 percent or less with no overall upward or downward trend in the measurements. A minimum of three well volumes will be evacuated from each monitoring well during development activities. Should monitoring wells go dry during well development, Niagara Engineering will allow sufficient time for the well to recharge then continue to purge until three well volumes are evacuated. Purged groundwater will be containerized in NYSDOT-approved drums and labelled per monitoring well location pending laboratory analytical results. Based on the RI groundwater analytical results and field observations, it will be determined, in consultation with the NYSDEC, if the containerized development water is acceptable for surface discharge through carbon or requires subsequent on-site treatment and/or off-site disposal. Per DER-10 Section 3.3(e)5, all water/fluid resulting from well development and/or well purging will be containerized in properly labeled 55-gallon drums or an appropriate container and stored in a secure area on the project site. The containers will be securely staged, pending appropriate disposal in accordance with applicable DEC waste management regulations (e.g., 6 NYCRR Parts 360, 364 and the 370 series) or other provisions approved by DER.

3.4.3 Groundwater Sample Collection

Groundwater sampling will be initiated at least 24 hours after well development, with at least a week after development being preferred, to allow natural groundwater conditions to become reestablished. Prior to groundwater sample collection, static water levels will be measured and recorded from all on-site monitoring wells to facilitate the preparation of a Site-wide isopotential map. Following water level measurement, field personnel will purge and sample monitoring wells using a submersible pump with dedicated pump tubing following low-flow/minimal drawdown purge and sample collection procedures. In the event of pump failure or the saturated unit does not permit the proper implementation of low-flow sampling, a dedicated polyethylene bailer will be used to purge and sample the well. Prior to sample collection via low-flow methodology, groundwater will be evacuated from each well at a low-flow rate (typically less than 0.1 L/min) while maintaining a generally consistent water level. Field measurements for pH, temperature, turbidity, DO, ORP, specific conductance and water level, as well as visual and olfactory field observations will be periodically recorded and monitored for stabilization. Low-flow purging will be considered complete when field parameters stabilize and when turbidity measurements fall below 50 Nephelometric Turbidity Units (NTU) or become stable above 50 NTU regardless of volume purged. Purging via disposable bailer, if necessary, will be considered complete following the removal of three well volumes and field parameter stabilization or to dryness, whichever occurs first. In general, stability is defined as variation between field measurements of 10 percent or less and no overall upward or downward trend in the measurements. Upon stabilization of field parameters, groundwater samples will be collected and analyzed as discussed below.

Groundwater sampling methods will conform with protocol acceptable for the collection of the PFAS in accordance with the Department's Guidelines for Sampling and Analysis of PFAS (April 2023). Sampling personnel will wear nitrile gloves while handling empty sample containers, filling sample containers, sealing sample containers, and placement of samples into sample coolers. It is recommended that clean nitrile gloves be worn while handling sample containers, during the groundwater sampling, and sealing/placement of samples into the laboratory supplied cooler.

Sample collection methods will be in accordance with the **Appendix C** – Sampling & Analysis Plan.

3.4.4 Groundwater Sample Analysis

As summarized on **Table 3**, each groundwater sample from monitoring wells MW-1 through MW-4 will be sampled for Part 375 plus CP-51 VOCs and Part 375 SVOCs, metals, dissolved metals, PCBs, pesticides, herbicides, and emerging contaminants (PFAS and 1,4-dioxane). Groundwater samples will be collected and analyzed in accordance with USEPA SW 846 methodology with equivalent NYSDEC Category B deliverables to allow for independent third-party data usability assessment.

3.4.5 Groundwater Hydraulic Assessment

Hydraulic assessment includes the completion of hydraulic conductivity tests and the measurement of water levels in monitoring wells. Hydraulic conductivity testing will be performed on the newly installed monitoring wells using a variable head method. Variable head tests will be completed using a stainless steel or PVC slug to displace water within the well or by removing water from the well with a bailer or pump. The recovery of the initial water level is then measured with respect to time. Data obtained using this test procedures will be evaluated using procedures presented in "The Bouwer and Rice Slug Test - An Update", Bouwer, H., Groundwater Journal, Vol. 27, No. 3, May-June 1989, or similar method.

3.5 Soil Vapor Intrusion Assessment

At this time, a soil vapor assessment is not anticipated. Should the RI soil and groundwater sampling results indicate the potential for soil vapor entering a future structure, the need for soil vapor sampling beyond that interpreted from the groundwater sampling will be discussed with the DEC PM.

3.6 Quality Assurance/Quality Control (QA/QC) Sampling

In addition to the soil/fill, groundwater, waste and vapor samples described above, field-specific quality assurance/quality control (QA/QC) samples will be collected and analyzed to ensure the reliability of the generated data as described in the QAPP (**see Appendix B**) and to support the required third-party data usability assessment effort. Site-specific QA/QC samples will include matrix spikes, matrix spike duplicates (MS/MSDs), blind duplicates, and trip blanks (**see Table 3**).

3.7 Investigation-Derived Waste Management

Every attempt will be made to use dedicated sampling equipment during the RI; however, if non-dedicated equipment is required and/or used, the equipment will be decontaminated, at a minimum, with a non- phosphate detergent (i.e., Alconox®) and potable water mixture, rinsed with distilled water, and air-dried before each use in accordance with Niagara Engineering's field operating procedures (FOPs) presented in **Appendix C**. Decontaminated sampling equipment will be kept in a clean environment prior to sample collection. Heavy equipment, such as an excavator and drilling tools, will be decontaminated by the subcontractor, as necessary. To reduce investigative derived waste, Niagara Engineering proposes that heavy equipment decontamination is completed over the locations after sampling has been completed.

RI generated spoils (soil-fill) not exhibiting gross contamination (i.e., visible product, odor, sheen, etc.) will be returned to the location and approximate depth from which it was removed (soil/fill). RI generated monitoring well drilling spoils, groundwater, and decontamination rinse water will be containerized. RI and/or subsequent waste characterization analytical results of investigation-derived waste (IDW) material will be used to determine if spoils/water can be returned to the ground surface, utilized on-site, or require treatment and/or off-site disposal.

IDW materials exhibiting gross contamination will be placed in sealed NYS Department of Transportation (NYSDOT)-approved drums for subsequent characterization and disposal based on the RI results.

All generated IDW drums will be labelled alpha-numerically and include contents, origin, and date of generation using a paint stick marker on two sides and the top of each drum. Drums will be securely staged on-site pending analyses and remedial measures assessment. Field personnel will coordinate the on-site handling and temporary storage of IDW drums, including transportation, characterization sampling, and offsite disposal arrangements, as necessary.

Discarded personal protective equipment (PPE) (i.e., latex gloves, Tyvek, paper towels, etc.) and disposable sampling equipment (i.e., bailers or stainless-steel spoons) will be placed in sealed plastic garbage bags and disposed of as municipal solid waste.

3.8 Site Control – Survey and Mapping

A detailed site map showing sample points and relevant site features will be developed during the field investigation. In addition to traditional methods, Niagara Engineering will utilize advanced drone-based mapping and LiDAR technology to acquire high-resolution aerial imagery and precise topographic data of the site. These data sets will support the generation of 3D surface models, digital elevation models (DEMs), and orthomosaic imagery for accurate site characterization. Ground control points (GCPs) and mapping locations will be established and verified by a licensed surveying professional to ensure spatial accuracy relative to State planar grid coordinates.

A GNSS rover will be used to determine the locations of all soil borings, newly installed wells, and test pits. Monitoring well and subsurface soil investigation location elevations will be confirmed by Niagara Engineering's subcontracted surveyor. Drone-based mapping will supplement fieldwork by providing extensive coverage of site features, drainage patterns, and terrain with centimeter-level precision.

An isopotential map depicting the general direction of groundwater flow will be prepared using water level measurements tied to United States Geological Survey (USGS) vertical datum. The integration of LiDAR-derived elevation data and survey-grade GCPs will enhance the accuracy of the groundwater flow analysis by incorporating detailed surface contours and identifying subtle topographic features that may influence flow patterns.

3.9 Field Documentation and Reporting

RI field activities will be documented in a Field Activity Daily Log Book to provide a record of activities conducted at the Property. Entries will be signed and dated at the end of each day of fieldwork (or as produced) by the Field Team Leader. Field notes will include, at a minimum, the: date and time of all entries, names of personnel on-site, weather conditions (temperature, precipitation, etc.), location of activity, and description of activity. Sampling activities will be logged and photographed as necessary to document the activities at the Site. Progress photographs from a set location will be collected to document development activities and intrusive activities. Field personnel will, at a minimum, complete the following standard field forms as appropriate and necessary based on field activities:

- Chain of Custody Form (per selected laboratory)
- Equipment Calibration Log
- Field log book
- Field Borehole/Monitoring Well Log
- Groundwater Field Form
- Investigative-Derived Waste Container Log (if necessary)
- Photographic Log
- Real-Time Air Monitoring log or logbook notes
- Tailgate Safety Meeting Form
- Test Trench Excavation Log
- Problem Identification Report (as necessary)
- Corrective Measures Report (as necessary)

Daily field summary logs will be prepared and provided to the NYSDEC, including CAMP data during intrusive RI activities. Additionally, the Department will be notified within 24 hours of a remedial and/or CAMP event requiring corrective actions. CAMP monitoring exceedances will be reported separately from daily field summary logs and will be reported to the NYSDEC and NYSDOH project managers on the day of occurrence, along with corrective actions taken as a result of the exceedances. Appendix E includes the CAMP.

4.0 ADDITIONAL SUPPLEMENTAL FIELD INVESTIGATIONS

All the data generated during the RI will be evaluated to determine if additional investigation activities are needed beyond what is described herein. Additional assessment may include an additional subsurface boring or test trench and sample analysis limited to contaminants identified during the RI program.

5.0 QUALITATIVE EXPOSURE ASSESSMENT

Qualitative exposure assessments will be completed in accordance with DER-10 sections 3.3(c) 3 & 4. The assessments will include what impacts site contaminants and field activities may have, if any, on human health and fish and wildlife resources considering all media (ground/surface water, soil, soil vapor, ambient air and biota). Human health and ecological exposure impacts will be assessed as outlined in DER-10 Appendix 3B - Qualitative Human Health Exposure Assessment and Appendix 3C - Fish and Wildlife Resources Impact Analysis (FWRIA) Decision Key. The Appendix 3C Fish and Wildlife Resources Impact Analysis Decision Key is provided in **Appendix G**. No FWRIA is needed based on the completed decision key process. This determination is based on the following:

- The Site was a commercial/industrial property;
- There is no habitat of an endangered, threatened or special concern species present on site; and
- There are no ecological resources present on the site.

The qualitative human health exposure assessment will evaluate the five elements (DER-10 Appendix 3B) associated with exposure pathways and describe how each of these elements pertains to the Site. The exposure pathway elements that will be addressed include:

- A description of the contaminant source(s) including the location of the contaminant release to the environment (any waste disposal area or point of discharge) or if the original source is unknown, the contaminated environmental medium (soil, indoor or outdoor air, biota, water) at the point of exposure;
- An explanation of the contaminant release and transport mechanisms to the exposed population;
- Identification of all potential exposure point(s) where actual or potential human contact with a contaminated medium may occur;
- Description(s) of the route(s) of exposure (i.e., ingestion, inhalation, dermal absorption); and,
- A characterization of the receptor populations who may be exposed to contaminants at a point of exposure.

As called for in DER-10 for volunteers in the BCP, sufficient field information and sampling data will be provided to identify the presence of contamination, if any, that maybe leaving the Site to support qualitative off-site exposure assessments by others.

6.0 REPORTING AND SCHEDULE

Upon completion of the RI fieldwork, a comprehensive Remedial Investigation/Alternatives Analysis (RI/AA) Report will be prepared summarizing the tasks completed as described below.

Progress Reports

Summaries of the Remedial Investigation will be submitted to the Department as monthly progress reports as noted in Section XI of the Brownfield Cleanup Agreement (BCA).

Remedial Investigation Report

The RI section of the Remedial Investigation/Alternatives Analysis (RI/AA) Report will include the following information and documentation, consistent with the NYSDEC's DER-10.

- Introduction and background.
- A description of the site and the investigation areas.
- A description of the field procedures and methods used during the RI.
- The collection of geospatial data and presentation of investigation drawings detailing the investigation locations, potential areas of concern, presence of buildings, and subgrade utilities.
- A discussion of the nature and rationale for any significant variances from the scope of work described in this RI Work Plan.
- The data obtained during the RI and historical data considered by Niagara Engineering to be of usable quality including geochemical data, field measurements, etc.
- Comparative criteria that may be used to calculate cleanup levels during the AA process, such as NYSDEC SCOs and other pertinent regulatory standards or criteria.
- A discussion of contaminant fate and transport. This will provide a description of the hydrologic parameters of the Site, and an evaluation of the lateral and vertical movement of groundwater.
- Conclusions regarding the extent and character of environmental impact in the media being investigated.
- The conclusions of the qualitative exposure assessment for both human health and/or fish and wildlife resources (performed in accordance with DER-10 3.3(c)(4), including any recommendations for more detailed assessments, if applicable.
- Supporting materials for RI data. These will include boring logs, monitoring well construction diagrams, laboratory analytical reports, and similar information.
- Data generated for the Site will be reported to NYSDEC electronically via EQuIS software where it will be stored in NYSDEC's Environmental Information Management System (EIMS).

In addition, Niagara Engineering will require third-party data review by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results. The DUSR will follow NYSDEC format per the NYSDEC's September 1997 DUSR guidelines and May 2010 DER-10 guidance. The DUSR and any necessary qualifications to the data will be appended to the RI report. Niagara Engineering will provide submittals to the NYSDEC in accordance with EDD requirements.

Alternatives Analysis Reporting

An Alternatives Analysis (AA) Report is developed to provide a forum for evaluating and selecting a recommended remedial approach, in accordance with DER-10. Based on the findings of the RI, the AA portion of the report (1) evaluates remedial alternatives based upon the data obtained in the RI, and (2) initiates the 45-day public comment period for the generation of the remedial action work plan (RAWP) and final decision document produced by the NYSDEC.

A preliminary schedule is provided in **Appendix F**. It is anticipated that upon completion of the 30-day public comment period an RI report will be drafted. This report will also include the corresponding alternatives analysis report (AAR)

A Citizen Participation Plan (CPP) has been prepared for the Site in accordance with the NYSDEC template and the requirements outlined in NYSDEC's DER- 23 Citizen Participation Handbook for Remedial Programs, issued January 2010, as amended (See **Appendix D**). The CPP provides for issuance of fact sheets and public meetings at various stages in the investigation/remedial process. A fact sheet will be prepared by NYSDEC to announce the availability of the RIWP for review, followed by a 30-day comment period. A public meeting will be held, if requested, during the public comment period. An announcement will be issued in the Environmental Notice Bulletin.

The major components of the CPP are as follows:

- Names and addresses of the interested public as set forth on the Brownfield site contact list provided with the BCP application;
- Identification of major issues of public concern related to the site and that may be encountered during the remediation project;
- A description of citizens participation activities already performed and to be performed during remediation;
- Identification of document repositories for the project; and,
- A description and schedule of public participation activities that are either required by law or needed to address public concerns related to the Site.

Fact sheets documenting the goals and progress of the project will be prepared at key milestones during the project and distributed to those on the project mailing list. The distribution list is included in the CPP, which is provided in **Appendix D.**

7.0 INVESTIGATION SUPPORT DOCUMENTATION

A series of supporting documents are attached to this document and together complete the RIWP. These documents must be reviewed and followed by field personnel prior to field work. The attached documents include the Health and Safety Plan for site work (H&S Plan - **Appendix A**), the Quality Assurance Plan for all field data (QA/QC Plan - **Appendix B**), the Sampling and Analysis Plan for all field procedures (**SAP Appendix C**), the Citizen Participation Plan (**Appendix D**), and the Community Air Monitoring Plan (**Appendix E**). These are summarized further below.

7.1 Health & Safety Plan

Niagara Engineering has prepared a Site-Specific Health and Safety Plan (HASP) for use by our employees in accordance with 40CFR 300.150 of the NCP and 29 CFR 1910.120 (**Appendix A)**. The HASP includes an identification of the safety hazards specific to the site and the tasks and includes a contingency plan that addresses potential site-specific emergencies, and a CAMP that describes required particulate and vapor monitoring to protect the neighboring community during intrusive site investigation and remediation activities.

7.2 Quality Assurance Project Plan

A QAPP has been prepared in support of the RI activities (**See Appendix B)**. The QAPP dictates implementation of the investigation tasks delineated in this Work Plan. The QAPP will assure the accuracy and precision of data collection during the Site characterization and data. The QAPP has been prepared in accordance with USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations; the EPA Region II CERCLA Quality Assurance Manual, and NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010).

7.3 Sampling & Analysis Plan (SAP)

A SAP identifying methods for sample collection, decontamination, handling, and shipping is in **Appendix C**.

7.4 Citizen Participation Plan

The Citizen Participation Plan (**Appendix D**) explains how NYSDEC will coordinate and lead community relations throughout the course of the project. Niagara Engineering will support NYSDEC's community relations activities, as necessary. The CP Plan will follow NYSDEC's CP Plan template for BCP sites entering the BCP at the point of Site investigation per NYSDEC DER-23.

7.5 Community Air Monitoring Plan

Real-time community air monitoring will be performed during ground intrusive RI activities at the Site and is described in the Community Air Monitoring Plan (**see Appendix E**). Particulate and VOC monitoring will be performed along the upwind and downwind perimeters of the work area during subgrade excavation, grading, and soil/fill handling activities in accordance with this plan. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDEC's DER-10; specifically, NYSDOH's Generic Community Air Monitoring Plan and Fugitive Dust and Particulate Monitoring included in Appendix E. Any exceedances that occur will be reported to the NYSDEC and NYSDOH project managers on the date of occurrence.

8.0 REFERNCES

1. 6 NYCRR Part 375 Environmental Remediation Programs. December 2006.
2. New York State Department of Environmental Conservation. Division of Water Technical and Operation Guidance (TOGS). 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998.
3. New York State Department of Environmental Conservation. DER-23; Citizen Participation Handbook for Remedial Programs. January 2010.
4. New York State Department of Environmental Conservation. DER-10; Technical Guidance for Site Investigation and Remediation. May 2010.
5. New York State Department of Environmental Conservation. Sampling, Analysis, and Assessment of Per- And Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs. April 2023.
6. United States Department of Agriculture (USDA), Soil Conservation Service. Soil Survey of Erie County, New York. December 1986.
7. U.S. Environmental Protection Agency. Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA QA/R-5). October 1998.

8. U.S. Environmental Protection Agency, Region II. CERCLA Quality Assurance Manual, Revision I. October 1989.
9. Subsurface Phase II Environmental Site Assessment, 127 Clayton Street, Buffalo, Erie County, New York. Prepared for: APL Property Group. Prepared by Niagara Engineering/Niagara Development Group July 2024.
10. NYSDEC BCP Application – Clayton Street Residents- SITE # C915409. Submitted for ELMWOOD FOREST LLC – Rev October 2024
11. Brownfield Site Cleanup Agreement

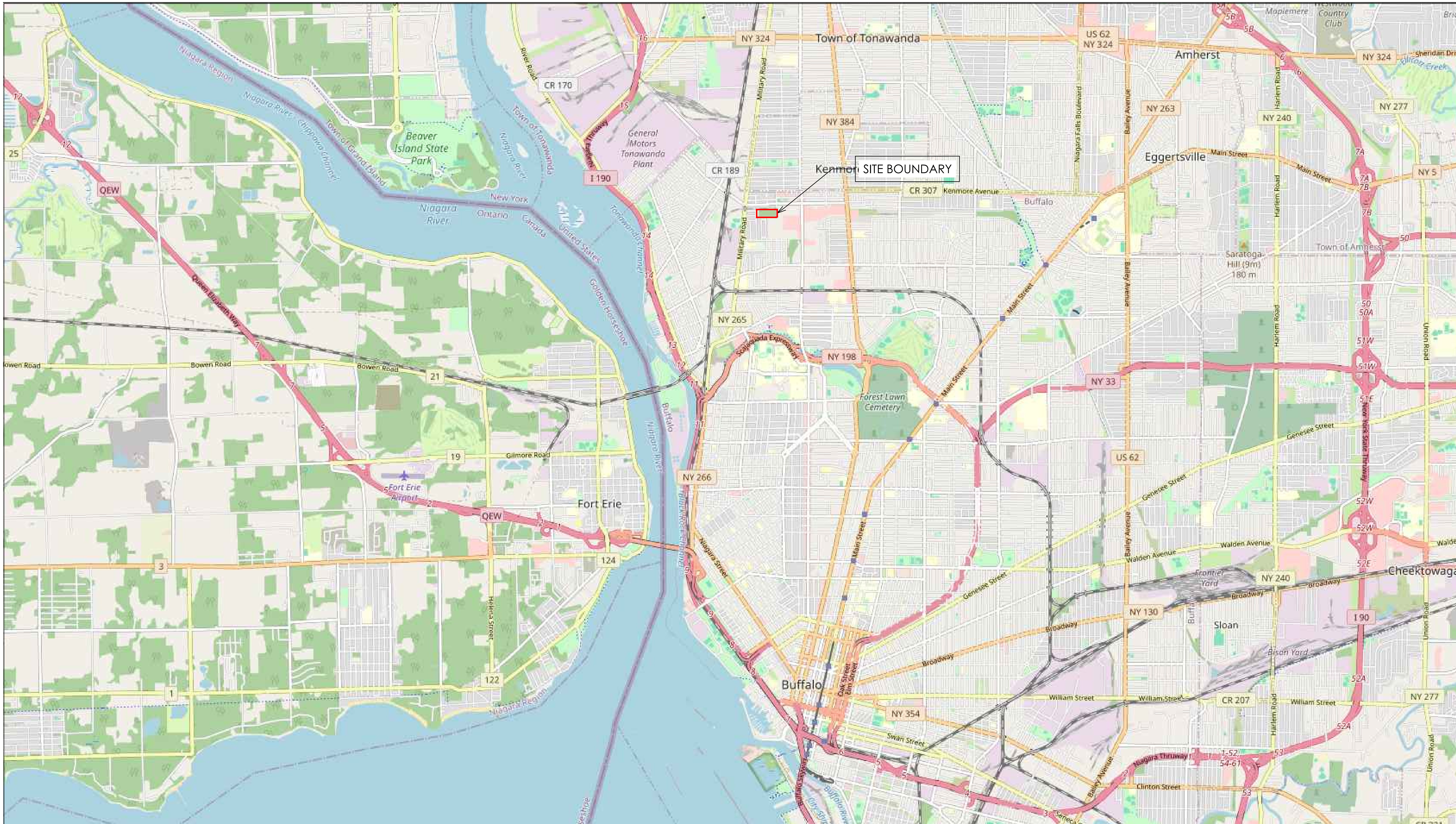
9.0 WORK PLAN CERTIFICATION

Norm Abraham, P.E. certifies that he is currently NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

____

Norm Abraham, P.E.

FIGURES



LEGEND

BCP Site Boundary

NOTES:

1) Basemap was adapted from Erie County GIS

N

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255 Great Arrow Ave # 102
Buffalo, NY 14207

Figure 1 - Property Location

Clayton Street Residences
127 Clayton Street
Buffalo, NY 14207

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10-16-2024

SCALE: NTS

SHEET 4 OF 11

LEGEND

BCP Site Boundary

NOTES:
1) Basemap was adapted from Google Maps

N

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255 Great Arrow Ave # 102
Buffalo, NY 14207

Figure 2- Boundary Survey

Clayton Street Residences
127 Clayton Street
Buffalo, NY 14207

Revisions	
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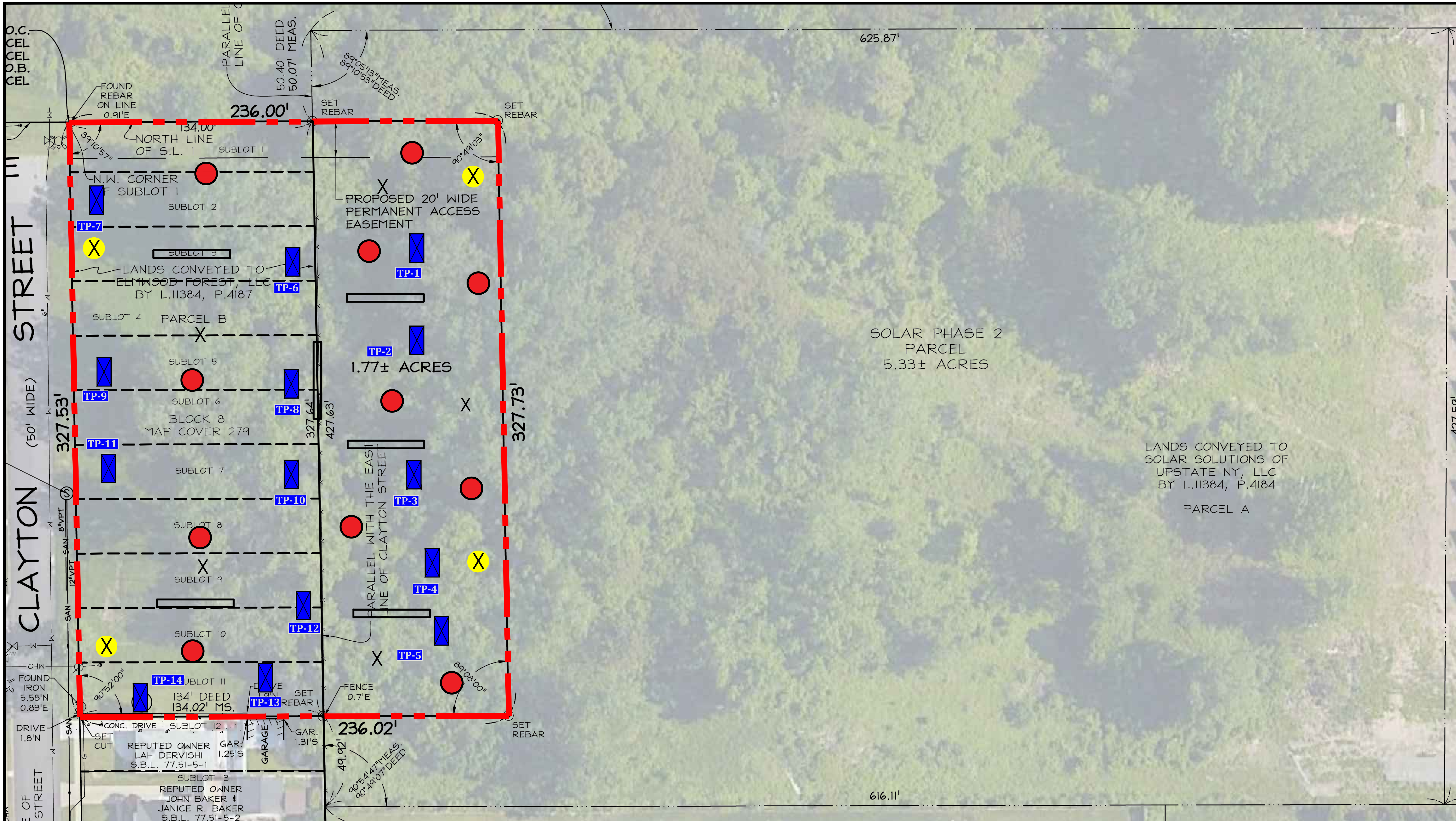

LEGEND

BCP Site Boundary	X RI SURFACE SOIL SAMPLES
TP-1 Phase II Test Trench	RI TEST TRENCHES
RI MONITORING WELL	
RI SOIL BORINGS	

NOTES:

1) Basemap was adapted from Google Maps

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255 Great Arrow Ave # 102
Buffalo, NY 14207

Figure 3 - Property Area Remedial Investigation (RI) Plan

Clayton Street Residences
127 Clayton Street
Buffalo, NY 14207

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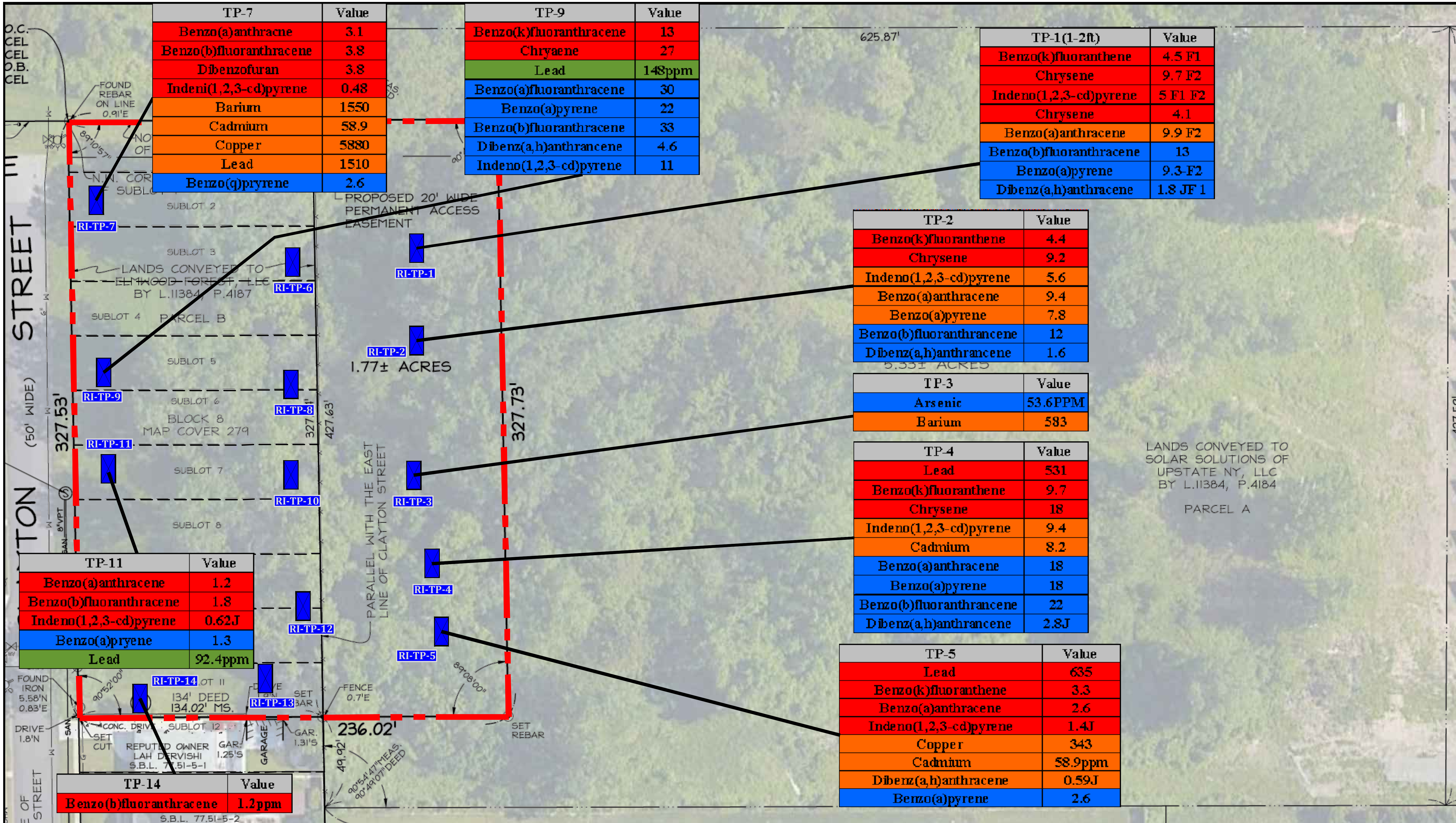

TP-7	Value
Benzo(a)anthracne	3.1
Benzo(b)fluoranthracene	3.8
Dibenzofuran	3.8
Indeni(1,2,3-cd)pyrene	0.48
Barium	1550
Cadmium	58.9
Copper	5880
Lead	1510
Benzo(q)pryrene	2.6

TP-9	Value
Benzo(k)fluoranthracene	13
Chryaene	27
Lead	148ppm
Benzo(a)fluoranthracene	30
Benzo(a)pyrene	22
Benzo(b)fluoranthracene	33
Dibenz(a,h)anthracene	4.6
Indeno(1,2,3-cd)pyrene	11

TP-1(1-2ft)	Value
Benzo(k)fluoranthene	4.5 F1
Chrysene	9.7 F2
Indeno(1,2,3-cd)pyrene	5 F1 F2
Chrysene	4.1
Benzo(a)anthracene	9.9 F2
Benzo(b)fluoranthracene	13
Benzo(a)pyrene	9.3-F2
Dibenz(a,h)anthracene	1.8 JF 1

TP-2	Value
Benzo(k)fluoranthene	4.4
Chrysene	9.2
Indeno(1,2,3-cd)pyrene	5.6
Benzo(a)anthracene	9.4
Benzo(a)pyrene	7.8
Benzo(b)fluoranthrancene	12
Dibenz(a,h)anthracene	1.6

TP-3	Value
Arsenic	53.6PPM
Barium	583

TP-4	Value
Lead	531
Benzo(k)fluoranthene	9.7
Chrysene	18
Indeno(1,2,3-cd)pyrene	9.4
Cadmium	8.2
Benzo(a)anthracene	18
Benzo(a)pyrene	18
Benzo(b)fluoranthrancene	22
Dibenz(a,h)anthracene	2.8J

TP-11	Value
Benzo(a)anthracene	1.2
Benzo(b)fluoranthracene	1.8
Indeno(1,2,3-cd)pyrene	0.62J
Benzo(a)pryene	1.3
Lead	92.4ppm

TP-5	Value
Lead	635
Benzo(k)fluoranthene	3.3
Benzo(a)anthracene	2.6
Indeno(1,2,3-cd)pyrene	1.4J
Copper	343
Cadmium	58.9ppm
Dibenz(a,h)anthracene	0.59J
Benzo(a)pyrene	2.6

TP-14	Value
Benzo(b)fluoranthracene	1.2ppm

LEGEND

BCP Site Boundary

RI-TP-1 RI Test Trench

Value exceeds NYSDEC Restricted Residential SCOs

Value exceeds NYSDEC Commercial SCOs

Value exceeds NYSDEC Industrial SCOs

Value exceeds NYSDEC UNRESTRICTED SCO

NOTES:

1) Basemap was adapted from Google Maps

SOURCE: Phase II ESA July 2024

N

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255 Great Arrow Ave # 102
Buffalo, NY 14207

Figure 4 - Property Area w/ Soil Sample Exceedances

Clayton Street Residences
127 Clayton Street
Buffalo, NY 14207

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TABLES

127 Clayton Street
Buffalo New York
Subsurface Soil Assessment - 7-12-2024

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	Phase II Report - Sample Identification, Sample Depth in feet below ground surface (bgs), and Sample Date										NYSDEC Soil Cleanup Objectives (SCOs)				
	TP--1 2-3	TP-2 1-2ft	TP-3 1-2ft	TP-4 1-2ft	TP-5 1-2ft	TP-7 1-2ft	TP-9 1-2ft	TP-11 1-2ft	TP-13 2-3ft	TP-14 1-2ft	Unrestricted	Residential	Restricted Residential	Commerical	Industrial
	7/12/2024														
METALS/INORGANICS															
Arsenic	7.10	5.80	53.60	9.20	12.70	8.60	4.90	4.80	6.10	14.70	13	16	16	16	16
Barium	231.00	368 F1	583.00	490.00	277.00	1550.00	128.00	128.00	174.00	141.00	350	350	400	400	10,000
Beryllium	1.40	3.10	1.40	2.20	1.10	0.50	0.66	0.75	0.91	1.20	7.2	14	72	590	2,700
Cadmium	2.20	2.30	3.80	12.20	12.50	58.90	1.20	0.94	0.73	2.00	2.5	2.5	4.3	9.3	60
Chromium	24.40	14.60	19.60	95.90	176.00	106.00	21.80	21.50	19.10	31.90	30	36	180	1,500	6,800
Copper	70.10	76.20	242.00	229.00	343.00	5880.00	58.60	66.90	62.00	107.00	50	270	270	270	10,000
Lead	122.00	164.00	74.70	531.00	635.00	1510.00	148.00	92.40	171.00	148.00	63	400	400	1,000	3,900
Manganese	735.00	1390 F1	324.00	1070.00	583.00	679.00	367.00	397.00	343.00	263.00	1,600	2,000	2,000	10,000	10,000
Mercury	0.091	0.097	0.44	0.18	0.26	0.56	0.07	0.08	0.14	0.15	0.18	0.81	0.81	2.8	5.7
Nickel	20.40	13.00	53.20	47.00	58.30	63.50	25.60	24.40	24.20	37.20	30	140	310	310	10,000
Selenium	1.6 J	2.2 J F1	3.6 J	2.7 J	1.3 J	7.00	2.0 J	ND	ND	2.2 J	3.9	36	1,500	1,500	6,800
Silver	0.50 J	0.65 J	0.54 J	1.30	0.67 J	2.00	0.34 J	ND	ND	0.33 J	2	36	1,500	1,500	6,800
Zinc	248.00	212 F1	572.00	754.00	718.00	3520.00	229.00	185.00	201.00	465.00	109	2,200	10,000	10,000	10,000
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)															
Acenaphthene	2.2 J F1	0.9 J	0.1	3.4 J	0.36 J	ND	1.9 J	ND	ND	0.062 J	20	100	100	500	1,000
Acenaphthylene	0.39 J	0.17 J	ND	ND	ND	0.49 J	1.7 J	0.17 J	0.07 J	0.14 J	100	100	100	500	1,000
Anthracene	4.8 F1 F2	2.20	0.230 J	8.00	0.88 J	0.85 J	10.00	0.33 J	0.073 J	0.22 J	100	100	100	500	1,000
Benzo(a)anthracene	9.9 F2	5.00	0.6	18.00	2.60	3.10	30.00	1.20	0.33	0.86	1	1	1	5.6	11
Benzo(a)pyrene	9.3 F2	4.40	0.66	18.00	2.60	2.60	22.00	1.30	0.33	0.83	1	1	1	1	1.1
Benzo(b)fluoranthene	13.00	6.10	0.74	22.00	3.30	3.80	33.00	1.80	0.46	1.20	1	1	1	5.6	11
Benzo(g,h,i)perylene	5.7 F1 F2	2.40	0.4	10.00	1.6 J	1.30	10.00	0.63 J	0.17 J	0.36	100	100	100	500	1,000
Benzo(k)fluoranthene	4.5 F1	2.30	0.44	9.70	1.4 J	1.40	13.00	0.82 J	0.22	0.51	0.8	1	3.9	56	110
Chrysene	9.7 F2	5.00	0.66	18.00	2.80	3.00	27.00	1.40	0.39	0.94	1	1	3.9	56	110
Dibenz(a,h)anthracene	1.8 J F1	0.80	0.10 J	2.8 J	0.59 J	0.48 J	4.60	0.24	0.061 J	0.15 J	0.33	0.33	0.33	0.56	1.1
Dibenzofuran	1.2 J F1 F2	0.58	0.06 J	1.7 J	0.3 J	0.15 J	2.0 J	ND	ND	0.046 J	7	14	59	350	1,000
Fluoranthene	25.0 F2	12.00	1.5	44.00	5.70	7.90	65.00	3.60	0.89	2.20	100	100	100	500	1,000
Fluorene	2.1 J F1 F2	0.96	0.096 J	3.00	0.44 J	0.39 J	4.60	0.18 J	0.043 J	0.12 J	30	100	100	500	1,000
Indeno(1,2,3-cd)pyrene	5 F1 F2	2.20	0.35	9.40	1.4 J	1.30	11.00	0.62 J	0.17 J	0.38	0.5	0.5	0.5	5.6	11
Naphthalene	0.48	0.20	0.11 J	ND	0.33 J	ND	ND	ND	ND	0.036 J	12	100	100	500	1,000
Phenanthrene	21 F2	10.00	1.1	33.00	4.20	4.70	39.00	2.10	0.51	1.30	100	100	100	500	1,000
Pyrene	19.00	8.60	1.2	35.00	4.40	5.20	42.00	2.30	0.63	1.60	100	100	100	500	1,000

ND Analyte not detected
- Not Applicable or sample not tested for this analyte
J Estimated Concentration
B Anaalyte detected in method blank
K Result is reported as Benzo(b)fluoranthene
E Results exceeded calibration range
F1 MS and or MSD recovery exceeds control limits
T Result is Tentatively Identifies Compound and an estimated value

13.0 Analyte detected
Reported concentration greater than or equal to the NYSDEC Unrestricted SCO
Reported concentration greater than or equal to the NYSDEC Residential SCO
Reported concentration greater than or equal to the NYSDEC Restricted Residential SCO
Reported concentration greater than or equal to the NYSDEC Commercial SCO
Reported concentration greater than or equal to the NYSDEC Industrial SCO

TABLE 3
CLAYTON STREET RESIDENCES - SITE # C915409
SUMMARY OF REMEDIAL INVESTIGATION SAMPLING AND ANALYTICAL PROGRAM

Location/Sample Type	Number of Proposed Locations/ Samples	Matrix	Parameters							
			375 plus CP-51 VOCs (TO-15 for air/vapor)	375 SVOCs	375 Metals	PCBs	Herbicides	Pesticides	PFAS Sample Analysis	Waste Characterization Samples
Surface Soil Samples										
Surface Soil (0-2")	5	Soil	-	5	5	5	5	5	5	-
Blind Duplicate[3]	1	Soil	-	1	1	1	1	1	1	-
MS/MSD[3]	1	Soil	-	1	1	1	1	1	1	
Surface Soil Sample Totals			**0**	**7**	**7**	**7**	**7**	**7**	**7**	**0**
Subsurface Soil Samples										
Test Pit Fill Material	6/6	Soil	2	6	6	2	2	2	2	-
Boring Fill Material	12/11	Soil	4	11	11	4	4	4	4	-
Test Pit Native	6/2	Soil	1	2	2	2	2	2	2	-
Boring Native	12/4	Soil	2	1	1	1	1	1	1	-
Blind Duplicate[3]	1	Soil	1	1	1	1	1	1	1	-
MS/MSD[3]	1	Soil	1	1	1	1	1	1	1	-
Subsurface Soil Sample Totals			**11**	**22**	**22**	**11**	**11**	**11**	**11**	**0**
Groundwater Samples										
Monitoring Wells	4	GW	4	4	4	4	4	4	4	-
Blind Duplicate[3]	-	GW	1	1	1	1	1	1	1	-
MS/MSD[3]	-	GW	1	1	1	1	1	1	1	-
Trip Blank	-	Water	1	-	-	-	-	-	-	-
Equipment Blank[5]	-	Water	-	-	-	-	-	-	1	-
Field Blank[6]	-	Water	-	-	-	-	-	-	1	
Groundwater Sample Totals			**7**	**6**	**6**	**6**	**6**	**6**	**8**	
UST Assessment										
Test Pit/Well Boring	0	Soil	0	-	-	-	-	-	-	0
UST Assessment Sample Totals			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Soil Vapor Intrusion Sampling (Method TO-15*)										
Sub-slab Vapor	0	Vapor	0							
Above Slab Vapor		Vapor	0							
Outdoor		Ambient	0							
Soil Vapor Intrusion Sample Totals			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Waste Characterization Samples										
Subsurface Soil	3	Soil	-	-	-	-	-	-	-	3
Waste Characterization Samples Totals			**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
Sample Totals			**18**	**35**	**35**	**24**	**24**	**24**	**26**	**3**

Notes: 1) Analysis will be performed via USEPA SW-846 methodology with equivalent Category B Deliverable – see Tables 4 & 5
2) Tentatively identified compounds (TICs) and 1,4 Dioxane (soil via USEPA Method 8270 and Groundwater via USEPA Method 8270 SIM will also be reported
3) Blind duplicate and MS/MSD samples will be collected at a frequency of 1 per 20 samples/media collected
4) Trip blanks will be submitted to the laboratory each day aqueous volatile organic samples are collected
5) one equipment blank will be submitted to the laboratory for the 4 monitoring wells sampled
6) Field blanks will be submitted each day groundwater samples are collected
7) Waste characterization samples are likely to include the following parameters: TCLP VOCs, TCLP SVOCs, TCLP Metals, PCBs, Ignitability, corrosivity, and reactivity or based on disposal landfill requirements. **Acronyms VOCs – volatile organic compounds; SVOCs semi-volatile organic compounds; PFAS – Per- and polyfluoroalkyl substances**

TABLE 4
CLAYTON STREET RESIDENCES - Site No.: C915409
SAMPLE CONTAINER, VOLUME, PRESERVATION & HOLDING TIME REQUIREMENTS

Matrix	Parameter/Analyte	Method	Container[2]	Volume[2]	Preservation	Holding Time
Soil	Part 375 & CP-51 VOCs	8260B	EnCore/WMG	5 gm/4 oz	Cool 2-4 C, Zero Headspace	48Hrs/14 days
	375 SVOCs	8270C	WMG	16 oz	Cool 2-4 C	14 days extrac../40 days
	375 Metals	6010/7470/7471	WMG	4 oz	Cool 2-4 C	6 months
	Mercury	7471	WMG	4 oz	Cool 2-4 C	28 days
	Pesticides	8081	WMG	8 oz	Cool 2-4 C	14 days extrac../40 days
	Herbicides	8151	WMG	8 oz	Cool 2-4 C	14 days extrac../40 days
	PCBs	8082	WMG	4 oz	Cool 2-4 C	14 days extrac../40 days
	PFAS[1]	Modified 537	HDPE/Polypropylene	4-8 oz	Cool 2-4 C	14 days extrac../40 days
Groundwater	Part 375 & CP-51 VOCs	8260B	Glass vial	40 ml vials	HCL(pH<2) No Headspace	14 days
	PFAS[1]	1633	HDPE/Polypropylene	2-500 mL	Cool 2-4 C	14 days
	1,4 Dioxane	8270 SIM	8270 SIM	2-500 mL	Cool 2-4 C	7 days extrac./40days
	375 SVOCs	8270C	Amber glass	1000 mL	Cool 2-4 C	7 days extrac./40days
	375 Metals	6010	plastic	600 mL	HNO_3 (pH<2), Cool 2-4 C	6 months
	Mercury	7470	plastic	250 mL	HNO_3 (pH<2), Cool 2-4 C	28 days
	Pesticides	8081B	Amber glass	1000 mL	Cool 2-4 C	14 days extrac./40 days
	Herbicides	8151A	Amber glass	1000 mL	Cool 2-4 C	14 days extrac./40 days
	PCBs	8082	Amber glass	1000 mL	Cool 2-4 C	7 days extrac./40days

References – Test Methods for Evaluating Soild Wastes, USEPA SW-846, Update III, 1991

Notes

1 – See Table 6

2 – Volumes may change based on laboratory specific requirements. Laboratory will supply containers per Laboratory analyte and method requirements

Acronyms:

VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
TCL = Target Compound List
TAL = Target Analyte List
WMG = Wide Mouth Glass
PFAS = Per- and Polyfluoroalkyl Substances

TABLE 5

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

TABLE 6
Part 375 ANALYTE LIST

Part 375 Metals (ICP)
EPA 6010C

Analyte
Arsenic
Barium
Beryllium
Cadmium
Chromium
Copper
Lead
Manganese
Nickel
Selenium
Silver
Zinc
Mercury EPA 7471B
Cyanide, Total EPA 9014

PCBs **EPA 7471B**
PCB-1016
PCB-1221
PCB-1232
PCB-1242
PCB-1248

Chlorinated Pesticides
EPA 8081B/ Herbicides EPA 8151

4,4-DDD
4,4-DDE
4,4-DDT
Aldrin
alpha-BHC
beta-BHC
cis-Chlordane
delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Endrin Ketone
gamma-BHC (Lindane)
Heptachlor
Heptachlor Epoxide
Methoxychlor
Toxaphene
trans-Chlordane
2,4,5-TP Acid (Silvex)

Semi-Volatile Organics (Acid/Base Neutrals)
EPA 8270D

1,1-Biphenyl
1,2,4,5-Tetrachlorobenzene
1,2,4-Trichlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2,2-Oxybis (1-chloropropane)
2,3,4,6-Tetrachlorophenol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnapthalene
2-Methylphenol
2-Nitroaniline
2-Nitrophenol
3&4-Methylphenol
3,3'-Dichlorobenzidine
3-Nitroaniline
4,6-Dinitro-2-methylphenol
4-Bromophenyl phenyl
4-Chloro-3-methylphenol
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Nitroaniline
4-Nitrophenol
Acenaphthene
Acenaphthylene
Acetophenone
Anthracene
Atrazine
Benzaldehyde
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Bis (2-chloroethoxy) methane
Bis (2-chloroethyl) ether
Bis (2-ethylhexyl) phthalate
Butylbenzylphthalate
Caprolactam
Carbazole
Chrysene
Dibenz (a,h) anthracene
Dibenzofuran
Diethyl phthalate
Dimethyl phthalate
Di-n-butyl phthalate
Di-n-octylphthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3-cd) pyrene
Isophorone
Naphthalene
Nitrobenzene
N-Nitroso-di-n-propylamine
N-Nitrosodiphenylamine
Pentachlorophenol
Phenanthrene
Phenol
Pyrene

Volatile Organics
EPA 8260C

1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,2-Dibromo-3-Chloropropane
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3,5-Trimethylbenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,4-dioxane
2-Butanone
2-Hexanone
4-Methyl-2-pentanone
Acetone
Benzene
Bromochloromethane
Bromodichloromethane

TABLE 2 (Continued)

Volatile Organics (Continued)

Bromomethane
Carbon disulfide
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethene
cis-1,3-Dichloropropene
Cyclohexane
Dibromochloromethane
Dichlorodifluoromethane
Ethylbenzene
Freon 113
Isopropylbenzene
m,p-Xylene
Methyl acetate
Methyl tert-butyl Ether
Methylcyclohexane
Methylene chloride
Naphthalene
n-Butylbenzene
n-Propylbenzene
o-Xylene
p-Isopropyltoluene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethene
Toluene
trans-1,2-Dichloroethene
trans-1,3-Dichloropropene
Trichloroethene
Trichlorofluoromethane
Vinyl chloride

Volatiles-Air - TO-15

Acetone
Benzene
Carbon disulfide
Chloromethane
Dichlorodifluoromethane
Ethanol
Ethylbenzene
Ethyl Acetate
4-Ethyltoluene
Heptane
Hexane
Isopropyl Alcohol
Methylene chloride
Methyl ethyl ketone
Propylene
1,1,1-Trichloroethane
1,2,4-Trimethylbenzene
1,3,5-Trimethylbenzene
2,2,4-Trimethylpentane
Tertiary Butyl Alcohol
Tetrachloroethylene
Toluene
Trichloroethylene
Trichlorofluoromethane
m,p-Xylene
o-Xylene
Xylenes (total)
Acetone
Benzene
Carbon disulfide
Chloromethane
Dichlorodifluoromethane
Ethanol
Ethylbenzene
Ethyl Acetate
4-Ethyltoluene
Heptane
Hexane
Isopropyl Alcohol
Methylene
Methyl ethyl ketone
Propylene
1,1,1-Trichloroethane

APPENDICES

Appendix A - Health and Safety Plan

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APPENDIX A

HEALTH & SAFETY PLAN

For

REMEDIAL INVESTIGATION

CLAYTON STREET RESIDENCES
SITE # C915409
127 CLAYTON STREET
BUFFALO, NEW YORK 14202

Prepared For:
ELMWOOD FOREST LLC
366 Elmwood Avenue
Buffalo, New York 14222

Prepared By:

Niagara Engineering, DPC
255 Great Arrow Ave, Suite 102
Buffalo, New York 14207

September 2025

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1.0 INTRODUCTION

The **Health & Safety Plan (HASP)** portion of this site-specific Remedial Investigation workplan (RIWP) document presents safety aspects of work activities designed to support a Remedial Investigation (RI) at the Clayton Street Residents project (**SITE # C915409)**, located in Buffalo, Erie County, New York. The Applicant, **ELMWOOD FOREST LLC** , acting as a Volunteer, has elected to pursue cleanup and redevelopment of the Site under the New York State Brownfield Cleanup Program (BCP), and has a fully executed Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC), Index No. C915405-07-24, dated August 23, 2024. The Site is planned for redevelopment as a residential facility, which includes affordable housing. The purpose of the project is the construction of a mixed-use two-story, 48-unit complex.

The following health and safety procedures apply to Niagara Engineering BCP project personnel. Subcontractors, performing activities at the site are required to either develop their own Health and Safety Plans (HASPs) meeting these requirements at a minimum or adopt this plan.

1.1 GENERAL

In accordance with OSHA requirements contained in 29 CFR 1910.120, this HASP describes the specific health and safety practices and procedures to be employed by Niagara Engineering, D.P.C. employees during Remedial Investigation (RI) activities at the Clayton Street Residents project site. This HASP presents procedures for Niagara Engineering employees who will be involved with RI field activities; it does not cover the activities of other contractors, subcontractors, or other individuals on the Site unless they adopt the plan. However, Niagara Engineering accepts no responsibility for the health and safety of contractor, subcontractor, or other personnel. The purpose of this HASP is to establish personnel protection standards and mandatory safety practices and procedures for each task specific effort. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise during the field efforts.

This HASP presents information on known Site health and safety hazards using available historical information, and identifies the equipment, materials, and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during field activities to provide real-time data for on-going assessment of potential hazards.

1.2 BACKGROUND

The site background is covered in more detail in the body of the RIWP document. The Clayton Street Residents project is located in the City of Buffalo, New York. Located in a mixed commercial/residential neighborhood, the property is currently vacant and is bound by Clayton Street to the west, rail lines to the north, residential property to the south and a solar field to the east.

The Clayton Street Residents (i.e., the Property) is 1.77-acres and is composed of the 127 Clayton Street Property. The property has been vacant with the exception of some rail lines. The property may have been filled in the past as historic aerial photographs show considerable disturbance across the vacant area. The history and use of the subject property suggest there were potential contaminants of concern associated with fill material and past area rail use. Potential contaminants include metals and polycyclic aromatic hydrocarbons (PAHs),. The Phase II Environmental Site Assessment (ESA) completed at the property indicated that there are urban fill conditions existing at the properties to at least two - four (4) feet below ground surface (bgs) resulting in target compounds (metals and SVOCs, primarily PAHs) above NYSDEC Industrial, Commercial and Restricted Residential SCOs.

1.3 SITE IMPACTS OF HEALTH & SAFETY INTEREST

Based on the previous investigations, environmental impacts of concern in soil and, potentially groundwater, at the Site include:

- **Polycyclic Aromatic Hydrocarbons (PAHs) –** PAHs present at elevated concentration may include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, (dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.
- **Inorganic Compound –** The inorganic COPCs potentially present at elevated concentrations are arsenic, barium, cadmium, and lead.

1.4 RI TASKS & ACTIVITIES

The work addressed by this HASP includes remedial investigation (RI) activities such as assessment of subsurface conditions related to soil, and groundwater and oversight activities related to remediation. Field work will be conducted that can include soil borings, monitoring well installation, groundwater and soil sampling. Niagara Engineering personnel will be on-site to observe and perform RI activities. The field activities to be completed as part of the RI are described below.

Remedial Investigation Activities

1. **Surface & Subsurface Soil Sampling:** Niagara Engineering will advance test pits/borings and collect surface and subsurface soil samples for the purpose of determining the nature and extent of potential environmental impacts in the subsurface soil/fill.
2. **Monitoring Well Installation/Development and Sampling:** Niagara Engineering will observe the installation of groundwater monitoring wells, develop the wells, and collect groundwater samples for the purpose of determining the impacts to groundwater and vapor.

2.0 ORGANIZATIONAL STRUCTURE- KEY RI PERSONNEL

This section of the HASP describes the lines of authority, responsibility, and communication as they pertain to health and safety functions at the Site. The purpose of this section is to identify the personnel who impact the development and implementation of the HASP and to describe their roles and responsibilities. This section also identifies other contractors and subcontractors involved in work operations and establishes the lines of communication among them for health and safety matters. The organizational structure described in this section is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at this Site.

2.1 ROLES AND RESPONSIBILITIES

All Niagara Engineering personnel on the Site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this Site are detailed in the following paragraphs.

Key Personnel for This HASP are:

Corporate Health & Safety – Peter J. Gorton
Project Manager: Peter J. Gorton
Engineers & Geologists: Attiq Rahman, Jim Richert, John Boyd
QA/QC: John Berry, P.E.

2.1.1 Corporate Health and Safety Director

The Niagara Engineering Corporate Health and Safety Director is Mr. Peter J. Gorton. The Corporate Health and Safety Director responsible for developing and implementing the Health and Safety program and policies for Niagara Engineering, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates Niagara Engineering's Health and Safety training and medical monitoring programs and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for this Site is Peter J. Gorton. The Project Manager has the responsibility and authority to direct all Niagara Engineering work operations at the Site. The Project Manager coordinates safety and health functions with the Site Safety and Health Officer and bears ultimate responsibility for proper implementation of this HASP. They may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the Site work plan.
- Providing Niagara Engineering workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the Site Safety and Health Officer (SSHO).
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liaison with Site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The SSHO for this Site will be selected for each site task. The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the Site during all work operations and has the authority to halt Site work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Monitoring work practices to determine if potential hazards are present, such as heat/cold stress, safety rules near heavy equipment, etc.

- Managing the safety and health functions for Niagara Engineering personnel on the Site.
- Serving as the point of contact for safety and health matters.
- Determining changes to work efforts or equipment to ensure the safety of personnel.
- Ensuring that Niagara Engineering field personnel working on the Site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.
- Performing or overseeing Site monitoring as required by the HASP
- Assisting in the preparation and review of the HASP.
- Maintaining site-specific safety and health records as described in this HASP and documenting incident and reporting to Project Manager within 48 hours of occurrence if established safety rules and practices are violated
- Coordinating with the Project Manager, Site Workers, and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers – Niagara Engineering

Site workers are responsible for: complying with this HASP, using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other Site personnel include subcontractors who will have health and safety responsibilities are responsible for following their health and safety HASP or adopting and following this plan - equally stringent or more stringent than Niagara Engineering's HASP. Niagara Engineering assumes no responsibility for the health and safety of anyone outside its direct employment. Each Contractor's HASP shall cover all non-Niagara Engineering Site personnel. Each Contractor shall assign a SSHO who will coordinate with Niagara Engineering's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

In addition to Niagara Engineering and Contractor personnel, other individuals who may have responsibilities in the work zone include subcontractors and governmental agencies performing Site inspection work (i.e., the New York State Department of Environmental Conservation). The Contractor shall be responsible for ensuring that these individuals have received OSHA-required training (29 CFR 1910.120(e)), including initial, refresher and site-specific training, and shall be responsible for the safety and health of these individuals while they are on-site.

3.0 HAZARD EVALUATION

Previous environmental assessments and investigations found impacted environmental media and contaminants of concern at the site. Potential contaminants include metals, polycyclic aromatic hydrocarbons (PAHs), petroleum related compounds, and possibly solvents. These included metals such as arsenic, barium, cadmium, and lead and various semi-volatile organic compounds (SVOCs) - PAH compounds. As per the analytical data in the previous assessments presented, soils are expected to be slightly impacted by PAHs and metals and are non-hazardous. The potential risk to workers is dermal contact, ingestion and inhalation.

Due to the presence of these contaminants at the Site, the possibility exists that workers will be exposed to during field activities. The principal points of exposure would be through direct contact with and incidental ingestion of soil, and through the inhalation of contaminated particles or vapors. Other points of exposure may include direct contact with groundwater. In addition, safety concerns exist associated with the use heavy equipment. Physical and biological hazards also exist including heat/cold stress, tripping and falling hazards and insect bites and stings.

3.1 CHEMICAL HAZARDS

Table 1 lists exposure limits for airborne concentrations of the chemicals of concern identified in this HASP. Brief descriptions of the toxicology and related health and safety guidance and criteria are provided below.

3.1.1 Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a group of chemicals that are formed during incomplete burning of organic matter such as wood, coal, gas, garbage, or other organic substances and are widely distributed in the environment and particularly in older urban environments where coal, gas, and petroleum were burned for heat and other energy uses. PAH compounds are common constituents of fill material found in urban environments, and are typically associated with both fill material, coal tar, and asphalt-based materials or ash. Along with metals they are frequently constituents in fill around rail lines and yards or in fill containing building materials such as roofing materials and asphalt.

Seven of the PAHs are classified by USEPA as probable human carcinogens (USEPA Class B2). These are: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, (dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The primary route of exposure to PAHs is through incidental ingestion and inhalation of contaminated particulates or through repeated skin exposure. PAHs are characterized by an organic odor and exist as oily liquids in pure form. Acute exposure symptoms may include acne-type blemishes in areas of the skin exposed to sunlight.

3.1.2 Metals

Several specific metals were identified in samples however, fill often contains a mixture of metals that vary across a site. The main metals identified on this site are:

Arsenic (CAS #7440-38-2) - is a naturally occurring element. Inhalation is a more important exposure route than ingestion. Acute exposure symptoms include nausea, vomiting, diarrhea and pain in the stomach. Prolonged contact is corrosive to the skin and mucus membranes. Arsenic is considered a Group A human carcinogen by the USEPA. Exposure via inhalation is associated with an increased risk of lung cancer. Exposure via the oral route is associated with an increased risk of skin cancer.

Barium (CAS #7440-39-3) - is a silvery-white metal that can be found in the environment, where it exists naturally. It is a flammable solid, dangerous when wet, and highly toxic by ingestion. Target organs include the central nervous system and kidneys. This material is considered hazardous by the OSHA Hazard Communication Standard (29CFR 1910.1200).

Cadmium (CAS #7440-43-9) - is a natural silver-white blue tinged lustrous metallic solid and usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide). All soils and rocks, including coal and mineral fertilizers, contain some cadmium. Most cadmium used in the United States is extracted during the production of other metals like zinc, lead, and copper. Cadmium does not corrode easily and has many uses, including batteries, pigments, metal coatings, and plastics. Cadmium can cause severe acute or chronic toxicity in humans. Most cases of cadmium toxicity are due to chronic exposure. Chronic, low-level cadmium exposure can affect a variety of organs, with the kidneys and bones being the principal targets. Acute cadmium toxicity is less common. Depending upon the route of exposure, acute cadmium toxicity primarily affects the lungs and gastrointestinal tract.

Lead (CAS #7439-92-1) - can affect almost every organ and system in our bodies but especially sensitive is the central nervous system. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect memory. Lead may cause anemia.

3.1.3 Petroleum Compounds

To date petroleum impacts have not been identified with the property. Based on site history there is a possibility. The main issues of concern at sites where petroleum impacts are a concern are associated with diesel and gasoline releases either associated with USTs or other spills. There is no history of USTs on this property. Diesel fuel like gasoline is a specific fractional distillate of petroleum fuel oil. They are mixture of volatile, flammable liquid hydrocarbons derived from petroleum and used as fuel for internal-combustion engines. Gasoline synonyms are motor fuel, motor spirits, natural gasoline, petrol. Gasoline is a complex mixture of volatile hydrocarbons (paraffins, cycloparaffins, and aromatics).

Diesel Fuel and Gasoline routes of exposure are skin contact, eye contact, inhalation, and ingestion. Compounds are harmful if comes in contact with or is absorbed throughout the skin. Contact may cause skin and eyes irritation. Prolonged or repeated exposure may cause liver or blood forming organ damage. May cause skin irritation or dermatitis. Acute exposure results in central nervous system effects and chemical pneumonitis if aspirated into the lungs. Chronic exposure to benzene is a confirmed carcinogen. Long term exposure caused kidney and liver cancer in rats/mice.

Other petroleum compounds of concern that may be contained in small quantities in containers or leaked to soil are grease, oil and hydraulic fluids. These represent similar routes of exposure and hazards as described above for petroleum.

With respect to the anticipated RI activities possible routes of exposure to the above-mentioned contaminants are presented, use of proper protective equipment monitoring and action levels are described below.

3.2 PHYSICAL HAZARDS

RI field activities at the site may present the following main physical hazards:

- The potential for physical injury during heavy construction equipment use, such as backhoes, excavators, and drilling equipment.
- The potential for heat/cold stress to employees during the summer/winter months (see Section 10.0).
- The potential for slip and fall injuries due to rough, uneven terrain and/or open excavations.

In general, the potential physical hazards are:

- Noise
- Heat Stress
- Cold Stress
- Slips, trips, and falls
- Exposure to moving machinery during drilling and excavation activities
- Physical eye hazards
- Lacerations and skin punctures
- Back strain from lifting equipment
- Electrical storms and high winds
- Contact with overhead or underground utilities

Field personnel shall become familiar with the general terrain and potential physical hazards that is associated with the risk of slips, trips, and falls. Special care shall be taken when working near demolition and excavation operations and material stockpiles. Workers will observe all pedestrian and vehicle rules and regulations. Extra caution will be observed while working near roadways and while driving in reverse to ensure safety.

Field personnel shall wear hearing protection such as earmuffs or ear plugs around heavy equipment or other operations that potentially create noise above 85 decibels. The Occupational Health & Safety Administration (OSHA) requires employers to implement a hearing conservation program when noise exposure is at or above 85 decibels averaged over 8 working hours, or an 8-hour time-weighted average (TWA). Hearing conservation programs strive to prevent initial occupational hearing loss, preserve and protect remaining hearing, and equip workers with the knowledge and hearing protection devices necessary to safeguard themselves. A field rule of thumb is that any noise producing equipment that produces noise level conditions such as difficulty hearing while speaking to one another at a normal tone within three feet will warrant hearing protection if it's not already employed.

Heat stress work modification may be necessary during ambient temperatures of greater than 85 degrees Fahrenheit [°F]) while wearing normal clothing or exceeding 70°F while wearing PPE. Because heat stress is one of the most common and potentially serious illnesses at work sites, regular monitoring and preventive measures will be utilized such as additional rest periods, supplemental fluids, restricted consumption of drinks containing caffeine, use of cooling vests, or modification of work practices. Most of the work to be conducted during the RI operations is expected to consist of light manual labor and visual observation. Given the nature of the work and probable temperatures, heat stress hazards are not anticipated.

If work is to be conducted during winter conditions, cold stress may be a concern. Wet clothes combined with cold temperatures can lead to hypothermia. If air temperature is less than 40°F and a worker perspires, the worker should change to dry clothes. The following summary of the signs and symptoms of cold stress are provided as a guide for field personnel.

1. Incipient frostbite is a mild form of cold stress characterized by sudden blanching or whitening of the skin.
2. Chilblain is an inflammation of the hands and feet caused by exposure to cold moisture. It is characterized by a recurrent localized itching, swelling, and painful inflammation of the fingers, toes, or ears. Such a sequence produces severe spasms, accompanied by pain.
3. Second-degree frostbite is manifested by skin with a white, waxy appearance and the skin is firm to the touch. Individuals with this condition are generally not aware of its seriousness because the underlying nerves are frozen and unable to transmit signals to warn the body. Immediate first aid and medical treatment are required.
4. Third-degree frostbite will appear as blue blotchy skin. The tissue is cold, pale, and solid. Immediate medical attention is required.
5. Hypothermia develops when body temperature falls below a critical level. In extreme cases, cardiac failure and death may occur. Immediate medical attention is warranted when the following symptoms are observed:

    - Involuntary shivering
    - Irrational behavior
    - Slurred speech
    - Sluggishness

There are a variety of potential health and safety hazards associated with excavations. In particular the following concerns should be dealt with caution

- Excavation of or near surface encumbrances, such as structures, fencing, stored materials that may cause physical hazards during heavy equipment operations
- Below- and above-ground utilities, such as water and sewer lines, gas lines, telephone lines, and optical cable lines, etc must be carefully observed and checked even after identified
- Excavation near overhead power lines and other utilities shall be avoided
- Vehicle and heavy equipment traffic near excavations
- Falling loads from lifting or digging equipment
- Water accumulation within excavations
- Hazardous atmospheres, such as oxygen deficiency, flammable gases, and toxic gases
- Falling into or driving equipment into unprotected or unmarked excavations; and,
- Cave-in of loose rocks and soil at the excavation face.

All heavy equipment will be equipped with a fire extinguisher. OSHA requirements for trenching and excavations are contained in 29 Code of Federal Regulations (CFR), Subpart P, 1926:650 through 1926.652.

Basic minimum excavation requirements include:

- Personnel entry into excavations should be minimized whenever possible and no entry will occur in pits greater than 4 feet below ground surface (bgs). Sloping, shoring or equivalent means should be utilized.

- Surface encumbrances such as structures, fencing, piping, stored material etc. that may interfere with safe excavations should be avoided, removed or adequately supported prior to the start of excavations. Support systems should be inspected daily.
- Underground utility locations should be checked and determined, and permits should be obtained prior to initiating excavations. Local utility companies will be contacted at least two days in advance, advised of proposed work, and requested to locate underground installations. When excavations approach the estimated location of utilities, the exact location should be determined by careful probing or hand digging and when it is uncovered, proper supports should be provided.
- A minimum safe distance of 15 feet should be maintained when working around overhead high-voltage lines or the line should be de-energized following appropriate lock-out and tag- out procedures by qualified utility personnel.
- Personnel working around heavy equipment, or who may be exposed to public vehicular traffic should wear high visibility clothes, especially at night.
- Heavy equipment or other vehicles operating next to or approaching the edge of an excavation will require that the operator have a clear view of the edge of the excavation, or that warning systems such as barricades, hand or mechanical signals, or stop logs be used. If possible, the surface grade should slope away from the excavation.
- Personnel should be safely located in and around the trench/excavation face and should not work underneath loads handled by lifting or digging equipment.
- Hazardous atmospheres, such as oxygen deficiency (atmospheres containing less than 19.5% oxygen), flammable gases (airborne concentrations greater than 20% of the lower explosive limit), and toxic gases (airborne concentrations above the OSHA Permissible Exposure Limit or other exposure limits) may occur in excavations. Monitoring should be conducted for hazardous atmospheres prior to entry and at regular intervals. Ventilation or respiratory protection may be provided to prevent personnel exposures to oxygen deficient or toxic atmospheres. Periodic retesting (at least each shift) of the excavation will be conducted to verify that the atmosphere is acceptable. A log or field book records should be maintained.
- Personnel should not work in excavations that have accumulated water or where water is accumulating unless adequate precautions have been taken. These precautions can include shield systems, water removal systems, or safety harnesses and lifelines. Groundwater entering the excavation should be properly directed away and down gradient from the excavation.
- Safety harnesses and lifelines should be worn by personnel entering excavations that qualify as confined spaces.
- Excavations near structures should include support systems such as shoring, bracing, or underpinning to maintain the stability of adjoining buildings, walls, sidewalks, or other structures endangered by the excavation operations.
- Loose rock, soil, and spoils should be piled at least two and preferably 5 feet or more from the edge of the excavation. Barriers or other effective retaining devices may be used to prevent spoils or other materials from falling into the excavation.
- Walkways or bridges with standard guardrails that meet OSHA specifications will be provided where employees, the public, or equipment are required to cross over excavations.
- Adequate barrier physical protection should be provided, and excavations should be barricaded or covered when not in use or left unattended. Excavations should be backfilled as soon as possible when completed.

- Safety personnel should conduct inspections prior to the start of work and as needed throughout the work shift and after occurrence that increases the hazard of collapse (i.e., heavy rain, vibration from heavy equipment, freezing and thawing, etc.).
- Personnel working in excavations should be protected from cave-ins by sloping or benching of excavation walls, a shoring system or some other equivalent means in accordance with OSHA regulations. Soil type is important in the determination of the angle of repose for sloping and benching, and the design of shoring systems.

3.3 BIOLOGICAL HAZARDS

Biological hazards can result from encounters with mammals, insects, snakes, spiders, ticks, plants, parasites, and pathogens. Mammals can bite or scratch when cornered or surprised. The bite or scratch can result in local infection with systemic pathogens or parasites. Insect and spider bites can result in severe allergic reactions in sensitive individuals. Exposure to poison ivy, poison oak or poison sumac results in skin rash. Ticks are a vector for several serious diseases. Dead animals, organic wastes, and contaminated soil and water can harbor parasites and pathogens. These hazards are reduced if work is conducted during late fall and winter months. The following are highlighted because they represent more likely concerns for the site-specific tasks and location:

Sensitization by the victim to the venom from repeated stings can result in anaphylactic reactions. If a stinger remains in the skin, it should be removed by teasing or scraping, rather than pulling. An ice cube placed over the sting will reduce pain. An analgesic corticosteroid lotion is often useful. People with known hypersensitivity to such stings should consult with their doctor about carrying a kit containing an antihistamine and aqueous epinephrine in a pre-filled syringe when in endemic areas. Nests and hives for bees, wasps, hornets and yellow jackets often occur in the ground, trees and brush. Before any nests or hives are disturbed, an alternate sampling location should be selected. If the sample location cannot be relocated, site personnel who may have allergic reactions shall not work in these areas.

The incidence of Lyme disease is correlated to outdoor workers in areas where the disease is widespread and heightened risk of **encountering ticks** infected with B. burgdorferi, which varies from state to state, within states, and even within counties. Preventing tick bites is of utmost importance in preventing Lyme disease and other tickborne illnesses. Tick bite prevention strategies include avoidance or clearing of tick-infested habitats and use of personal protective measures (e.g., repellents and protective clothing). Tick checks should be done regularly, and ticks should be removed promptly. If a worker in a high-risk area develops flu-like symptoms (fever, chills, muscle aches, joint pains, neck stiffness, headache) or a bulls-eye rash, they should seek medical attention even if there is no recall of a tick bite. Workers who have experienced a tick bite should remove the tick and seek medical attention if signs and symptoms of tick-borne diseases occur.

Storms - When lightning is within 10 miles of the work site, all personnel should evacuate to a safe area.

Sun - When working in the sun, personnel should apply appropriate sun screening lotions (30 sunscreen or above), and/or wear long sleeve clothing and hats.

4.0 TRAINING

Training involves the following:

- All personnel must read, understand and sign that they are knowledgeable on this site-specific health and safety plan
- The Project Manager and Site Safety Officer should review site specific safety procedures and site-specific safety and hazard recognition, including chemical, physical and biological hazards.
- Site workers should minimally have received a 10-hour OSHA construction Safety course
- Personnel who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors/managers responsible for the Site shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor.
- Site Training - Site workers are given a copy of the HASP and provided with a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The Site briefing shall be provided by the SSHO prior to initiating field activities and shall include: Names of personnel and alternates responsible for Site safety and health. Safety, health, and other hazards present on the Site. The site layout including work zones and places of refuge. The emergency communications system and emergency evacuation procedures. Work practices by which the employee can minimize risks from hazards.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to Niagara Engineering employees only if engaged in Hazardous Waste Site work. Brownfield sites are not deemed hazardous waste sites unless specifically identified.

For work on hazardous waste sites medical monitoring will occur as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment, annual and employment termination physicals for all Niagara Engineering employees involved in hazardous waste site field operations. Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, or developed signs or symptoms of over-exposure to hazardous substances or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data. In conformance with OSHA regulations, Niagara Engineering will maintain and preserve medical records for a period of 30 years following termination of employment. Employees are provided with a copy of the physician's post-exam report and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

All Niagara Engineering employees shall conform to the following safe work practices during all on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Respiratory protective equipment and clothing must be worn by all personnel entering the Site if required by the HASP or as modified by the Site safety officer. Excessive facial hair (i.e., beards, long mustaches, or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.
- Medicine and alcohol can synergize the effects of exposure to toxic chemicals. Alcoholic beverages and illegal drug intake are strictly forbidden during the workday.
- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan.
- On-site personnel shall use the “buddy” system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective Site operations.
- All employees have the obligation to immediately report and if possible, correct unsafe work conditions.
- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion into full-face respirators will be provided for Niagara Engineering employees, as requested, and required.

Safety around heavy Equipment (e.g., backhoes, bulldozers, excavators, drill rigs etc.) are as follows:

- Subsurface work will not be initiated without first clearing underground utility services.
- Heavy equipment should not be operated within 15-20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage.
- The Site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.
- Hard hats, safety boots and safety glasses should be always worn in the vicinity of heavy equipment. Hearing protection is also recommended.
- The work Site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the Site.
- Proper lighting must be provided when working at night.
- Construction activities should be discontinued during an electrical storm or severe weather conditions.
- The presence of combustible gases should be checked before igniting any open flame.
- Personnel shall stand upwind of any construction operation when not immediately involved in sampling/logging/observing activities.

- **Personnel will not approach the edge of an unsecured trench/excavation closer than two feet.**

7.0 PERSONAL PROTECTIVE EQUIPMENT

Work at this brownfield site will consist of construction site personnel protective equipment (PPE) attire with some upgrades regarding gloves.

7.1 EQUIPMENT SELECTION

PPE will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the Site, the task-specific conditions and duration, and the hazards and potential hazards identified at the Site.

For hazardous Waste Site work, equipment designed to protect the body against contact with known or suspected chemical hazards are grouped into four categories according to the degree of protection afforded. These categories designated A through D consistent with United States Environmental Protection Agency (USEPA) Level of Protection designation, are:

- Level A: Should be selected when the highest level of respiratory, skin and eye protection is needed. This typically involves a fully encapsulated chemically resistant suit and self-contained breathing apparatus. This level will not be worn by Niagara Engineering personnel unless the proper training, medical monitoring and supervision is provided. This level of personnel protective clothing is not envisioned for Niagara Engineering projects and certainly not for this site.

  Level A/B ensembles include similar respiratory protection; however, Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by comparing the concentrations of identified substances in the air with skin toxicity data and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing. Level A/B typically includes the following PPE: Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA); Chemical-resistant clothing. For Level A, clothing consists of totally encapsulating chemical resistant suit. Level B incorporates hooded one-or two-piece chemical splash suit; Inner and outer chemical resistant gloves; Chemical-resistant safety boots/shoes; and Hardhat.

- Level B: Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B (or Level A) is also necessary for oxygen-deficient atmospheres. This level will not be worn by Niagara Engineering personnel unless the proper training, medical monitoring and supervision is provided. This level of personnel protective clothing is not envisioned for Niagara Engineering projects and certainly not for this site. See above for clothing/respiratory requirements

- Level C: Level C personnel protective clothing is worn when levels of contamination are above action levels described in the site safety plan. Level C can only be worn/selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only. This level may be worn by Niagara Engineering personnel on infrequent occurrences and only after the proper training, medical monitoring and supervision is provided. This level of personnel protective clothing is envisioned for Niagara Engineering on very rare occasions.

  Level C protection is distinguished from Level B by use of an air-purifying device (cartridge mask) and not a self-contained breathing apparatus . The device (when required) must be a properly fitted air-purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded. Typical PPE for Level C conditions includes: Full-face or half-faced piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO; Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit); Inner and outer chemical-resistant gloves; Chemical-resistant safety boots/shoes; and Hardhat. It is particularly important that the air be monitored thoroughly when personnel are wearing air- purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

- Level D: Should not be worn on any Site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection. Level D + may include a higher level of skin protection like a Tyvek suit and addition glove requirements. This is typically the highest level of personnel protective clothing envisioned at this site and most Niagara Engineering work projects. As indicated, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances above action levels, and where the atmosphere contains at least 19.5% oxygen. Recommended PPE for Level D includes: construction work cloths; safety boots/shoes; safety glasses or chemical splash goggles; hardhat; and optional gloves, tyveck; face shield.

8.0 EXPOSURE MONITORING

8.1 GENERAL

Based on the findings of the Phase II ESA and historical information on the property, the possibility exists that organic vapors and/or particulates may be released to the air during intrusive remedial investigation and construction activities. The main concerns will be dust containing low levels of PAHs and metals and possibly but as yet unknown volatile levels of organic petroleum compounds. Ambient breathing zone concentrations may at times exceed the permissible exposure limits (PELs) established by OSHA for the individual compounds (see Table 1), in which case administrative, engineering and/or PPE will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 On-Site Work Zone Monitoring

Niagara Engineering personnel will conduct routine on-site, real-time air monitoring during all intrusive construction phases such as excavation, backfilling, drilling, etc. The work area will be monitored at regular intervals using a PID for organic vapors. If dusty conditions exist then a real time dust monitor will be also used. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by Niagara Engineering personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change. Monitoring instruments will be calibrated in accordance with manufacturer's instructions before use.

8.1.2 Perimeter Community Air Monitoring

As part of the Community Air Monitoring Program (CAMP), monitoring at the downwind portion of the Site perimeter will be conducted. This will provide a real-time method for determination of vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work. Ground intrusive activities are defined in the Generic Community Air Monitoring Plan and attached to the RIWP. Ground intrusive activities include soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the collection of groundwater samples from existing wells. Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for non- intrusive activities. Periodic monitoring consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring while bailing a well, and taking a reading prior to leaving a sampling location. This may be upgraded to continuous if the sampling location is in close proximity to individuals not involved in the Site activity (i.e., on a curb of a busy street). The action levels below will be used during periodic monitoring.

8.1.3 Monitoring Action Levels

<u>On-Site Work Zone Action Levels</u>

The PID, or other appropriate instrument(s), will be used by Niagara Engineering personnel to monitor organic vapor concentrations as specified in this HASP. Combustible gas will be monitored with the “combustible gas” option on the combustible gas meter or other appropriate instrument(s) during certain activities as warranted. In addition, fugitive dust/particulate concentrations will be monitored only if dusty conditions exist in the immediate work zone. Otherwise these will be monitored at the perimeter during major soil intrusion using a real-time particulate monitor as specified in this plan. Sustained readings obtained in the breathing zone may be interpreted (with regard to other Site conditions) as follows for Niagara Engineering personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to 3 ppm above background on the PID) - Continue operations under Level D.

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings from >3 ppm to 5 ppm above background on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) – Stop work to assess conditions and utilize administrative, engineering or PPE controls which may include level C respiratory protection.
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of >5 ppm to 50 ppm above background on the PID- halt operation and discuss administrative, engineering controls to lower levels prior to resuming work activities.
- atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities and during handling of Site soil/fill at the site perimeter. If dusty conditions persist at the job site and administrative or engineering controls do not reduce levels then a hand-held particulate monitor will be used. Action levels based on the instrument readings shall be as follows:

- Less than 50 mg/m3 - Continue field operations.
- 50-150 mg/m3 - Don dust/particulate mask or equivalent
- Greater than 150 mg/m3 - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (wetting of excavated soils or tools at discretion of Site Health and Safety Officer).

Monitoring results will be recorded and documented on the appropriate Project Field Forms and/or the log book. All instruments will be calibrated before use daily and the procedure will be documented on the appropriate Project Field Forms.

Community Air Monitoring Action Levels

In addition to the work zone action levels, the following criteria shall also be adhered to for the protection of downwind receptors consistent with NYSDOH requirements (CAMP). **Appendix 1A NYSDOH Generic Community Air Monitoring Plan and Appendix 1 B Fugitive Dust and Particulate Monitoring from DER-10 are provided in Appendix B of the RIWP and will be followed by all field workers.**

- **ORGANIC VAPOR PERIMETER MONITORING**

  1) If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the sustained organic vapor decreases below 5 ppm over background, work activities can resume with continued monitoring.

  2) If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone are greater than 5 ppm over background but less than 25 ppm for the 15-minute average, activities can resume provided that: the organic vapor level 200

feet downwind of the working site or half the distance to the nearest off-site residential or commercial structure, whichever is less, but in no case less than 20 feet, is below 5 ppm over background; and more frequent intervals of monitoring, as directed by the Site Health and Safety Officer, are conducted.

3) If the sustained organic vapor level is above 25 ppm at the perimeter of the exclusion zone for the 15-minute average, the Site Health and Safety Officer must be notified, and work activities shut down. The Site Health and Safety Officer will determine when re-entry of the exclusion zone is possible and will implement downwind air monitoring to ensure vapor emissions do not impact the nearest off-site residential or commercial structure at levels exceeding those specified in the Organic Vapor Contingency Monitoring Plan below.

All readings will be recorded and will be available for New York State Department of Environmental Conservation (DEC) and Department of Health (DOH) personnel to review.

- **MAJOR VAPOR EMISSION RESPONSE PLAN:**

  If efforts to abate the emission source are unsuccessful and if sustained organic vapor levels approach or exceed 5 ppm above background within the 20-foot zone for more than 30 minutes or are sustained at levels greater than 10 ppm above background for longer than one minute, then the Major Vapor Emission Response Plan will automatically be placed into effect after discussion with the site safety and project manager as follows:

  1) All site work will be halted
  2) All Emergency Response Contacts listed in this Health and Safety Plan and the Emergency Response Plan will be advised.
  3) The local police authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation.
  4)Frequent air monitoring will be conducted at 30-minute intervals within the 20-foot zone. If two sustained successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer.

The following personnel are to be notified in the listed sequence if a Major Vapor Emission Plan is activated:

Site Health and Safety Officer will contact Police – 911
Site Health and Safety Officer will contact the State Emergency Response Hotline – 800 – 457-7362

Additional emergency numbers are listed in the Emergency Response Plan included as Attachment A.

- **EXPLOSIVE VAPORS:**

  1) Sustained atmospheric concentrations of greater than 10% LEL in the work area - Initiate combustible gas monitoring at the downwind portion of the Site perimeter.
  2) Sustained atmospheric concentrations of greater than 10% LEL at the downwind Site perimeter – Halt work and contact local Fire Department.

- **AIRBORNE PARTICULATE COMMUNITY AIR MONITORING**

  Real time air monitoring will be conducted whenever site soil is disturbed during sampling, excavation, grading, etc. A real time personal aerosol monitor (i.e., TSI SidePak AM5 10 Personal Aerosol monitor or equivalent) will be used. This monitor is a laser photometer that measures data as both real-time aerosol mass-concentration and 8-hour time weighted average (TWA). The monitor will be used to measure real-time concentrations in milligrams per meter cubed (mg/m^3). Action levels are:

  - 15 mg/m^3 total dust
  - 5 mg/m^3 respirable fraction for nuisance dusts

  Dust suppression techniques should be employed prior to exceeding the action levels. However, if these levels are exceeded, then work will be halted, and additional dust suppression techniques employed until safe levels are reached.

  Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review.

  Readings will be interpreted as follows:

1) If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m3) greater than the background (upwind perimeter) reading 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 provided that the downwind PM-10 particulate levels do not exceed 150 ug/m3 above the upwind level and that visible dust is not migrating from the work area.
2) If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 ug/m3 above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m3 of the upwind level and in preventing visible dust migration.

9.0. WORK ZONES AND SITE CONTROL

Work zones around the areas designated for construction activities will be established daily and communicated to all employees and other Site users by the SSHO. It shall be each Contractor's Site Safety and Health Officer's responsibility to ensure that all Site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include Work zone, Support Zone, Perimeter Zone and Administrative Zone. Note, work zones at a hazardous waste operation will be established to include "hot" zones and decontamination zones. Since this site is not a hazardous waste site operation, these do not apply.

9.1 WORK ZONES

The zones are further explained as follows:

- Work Zone – This is the area or areas where active RI tasks are being performed. This area may contain impacted environmental media, and this media may be exposed, excavated, or handled. Although not necessary, flagging tape may be used to delineate the zone. All personnel entering the work zone must wear the prescribed level of personal protective equipment and use the appropriate monitoring equipment.
- Support Zone – this area contains any additional supplies, personnel or equipment not actively needed in the work zone.
- Perimeter Zone – area around the site that is considered the border between the active work area and the general public. Often at BCP sites this area is the perimeter fencing used to keep the general public from the construction/remedial zone. This is the area where perimeter air monitoring (CAMP) is usually conducted.
- Administration Zone - The part of the site that is considered non-impacted or "clean." Site trailers and communication may be set in this area on a construction site.

The task-specific work zone boundaries are established by the Site manager in consultation with the SSHO. Locations will be site and job specific. Access, as in the case of all construction sites, of non-essential personnel to the work zones will be strictly controlled by the SSHO/site manager. Only personnel who are essential to the completion of the task will be allowed access to these areas and only if they are wearing the prescribed level of protection. Entrance of all personnel must be approved by the SSHO. Visitors and site workers will be identified in the daily field log book

9.2 DECONTAMINATION

No formal decontamination of personnel is envisioned at this BCP site. Equipment decontamination may be required for heavy equipment and sampling equipment.

Decontamination of heavy equipment typically includes manually removing heavy soil contamination and may be followed by steam cleaning. On this site, if steam cleaning is employed, the equipment will be cleaned over the the completed area prior to moving to the next.

Niagara Engineering personnel will conduct decontamination of all tools used for sample collection purposes, as necessary and appropriate. In most cases dedicated or disposable equipment will be used.

Decontamination of bailers, split-spoons, spatula knives, and other tools used for environmental sampling and examination shall be as follows:

- Disassemble the equipment, as necessary
- Water wash to remove all visible foreign matter.
- Wash with detergent.
- Rinse all parts with distilled-deionized water.
- Allow to air dry.

10.0 EMERGENCY CONTACTS, RESPONSE/SPILL RESPONSE

10.1 EMERGENCY INFORMATION/CONTACTS

In the event of an emergency, the field personnel or the health and safety manager will employ emergency procedures. A copy of emergency information will be kept in the field and will be reviewed during the initial site briefing. Copies of emergency telephone numbers and directions to the nearest hospital will be prominently posted in the field.

<u>Medical Treatment and First Aid</u>

A first aid kit adequate for anticipated emergencies will be maintained in the field. If any injury should require advanced medical assistance, emergency personnel will be notified, and the victim will be transported to the hospital. The Contractor will establish his own first aid station and details will be provided in his HASP.

In the event of an injury or illness, work will cease until the field safety and oversight inspector has examined the cause of the incident and taken appropriate corrective action. Any injury or illness, regardless of extent, is to be reported to the project manager and health and safety officer.

<u>Emergency Contacts</u>

Emergency telephone numbers will be posted in the field and are listed below:

Ambulance, Fire, Police – 911

Kenmore Mercy Hospital – (716) 447-6111 -SEE ATTACHED ROUTE/MAP TO HOSPITAL

Poison Control Center - 800-222-1222

NYSDEC Spills Hotline - 800-457-7362

Peter J. Gorton, Niagara Engineering PM & SAFETY - 716-308-8220

NYSDEC PM - 716 851-7220

NYSDOH PM - 518-402-7877

10.2 EMERGENCY ALERTING & EVACUATION

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of each contractor's Site Health and Safety Officer to ensure all personnel entering the site understand an adequate method of internal communication. Unless all personnel are informed, the following signals shall be used.

Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site excavation.

Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately. Closed Fist – halt operation (ie, backhoe)

If evacuation notice is given, Site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures are followed to the extent practical without compromising the safety and health of site personnel. The evacuation routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by rehearsals and inputs from emergency response organizations. Wind direction indicators are located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the emergency response coordinator at the time the evacuation alarm sounds. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the construction Site Health and Safety Officer to review evacuation routes and procedures as necessary and to inform all workers of any changes.
Personnel leaving the site will gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly site. If any worker cannot be accounted for, notification is given to the SSHO (Lori Riker, P.E.) so that appropriate action can be initiated. Contractors and subcontractors on this Site have coordinated their emergency response plans to ensure that these plans are compatible, and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

Verbal communications between workers or use of a vehicle horn repeatedly at intervals of three short beeps shall be used to signal all on-site personnel to immediately evacuate the area and report to the vehicle parking area.

10.3 EMERGENCY STANDARD OPERATING PROCEDURES

The following standard operating procedures are to be implemented by on-site personnel in the event of an emergency. The health and safety manager and Contractor's field manager shall manage response actions.

- Upon notification of injury to personnel, the designated emergency signal shall be sounded. All personnel are to terminate their work activities and assemble in a safe location. The emergency facility listed above shall be notified. If the injury is minor, but requires medical attention, the Contractor's field manager or the health and safety manager shall accompany the victim to the hospital and help in describing the circumstances of the accident to the attending physician.
- Upon notification of an equipment failure or accident, the Contractor's field manager or the health and safety manager shall determine the effect of the failure or accident on site operations. If the failure or accident affects the safety of personnel or prevents completion of the scheduled operations, all personnel are to leave the area until the situation is evaluated, and appropriate actions taken.
- Upon notification of a natural disaster, such as tornado, high winds, flood, thunderstorm or earthquake, on-site work activities are to be terminated and all personnel are to evacuate the area.

A first-aid kit shall be readily accessible, fully supplied, and maintained at specified locations used for on-site operations.

10.4 BLOOD BORN PATHOGENS & UNIVERSAL PRECAUTIONS

Universal precautions shall be followed on-site that consist of treating all human blood and certain body fluids as being infected with Human Immune Deficiency Virus (HIV), Hepatitis B virus (HBV), or other blood borne pathogens. Clothing and first-aid materials visibly contaminated with blood or other body fluids will be collected and placed into a biohazard bag. Individuals providing first aid or cleanup of blood- or body-fluid contaminated items should wear latex gloves. If providing CPR, a one-way valve CPR device should be used. Biohazard bags, latex gloves, and CPR devices will be included in the site first-aid kits.

Work areas visibly contaminated with blood or body fluids shall be cleaned using a 1:10 dilution of household bleach. If equipment becomes contaminated with blood or body fluids, and can not be sufficiently cleaned, the equipment shall be placed in a plastic bag and sealed. Any personnel servicing the equipment shall be made aware of the contamination, so that proper precautions can be taken.

10.5 POTENTIAL SPILLS AND AVAILABLE CONTROLS

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this Site. For this evaluation, hazardous materials posing a significant spill potential are:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Extremely Hazardous Substances as identified in 40 CFR Part 355, Appendix A, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Oil/petroleum products that include a “harmful quantity” of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum- based heat source, energy source, or engine lubricant/maintenance fluid.
- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a site having stationary tank(s) and intra-facility piping, fixtures, and related equipment with an aggregate storage volume of 1,100 gallons or greater.

For this site and the RI activities, based on Site history and decommissioning records, a hazardous material spill and/or a petroleum product spill is not likely to occur during RI efforts.

10.6 INITIAL SPILL NOTIFICATION, EVALUATION & RESPONSE

No spills have been identified for this property. In general, any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries.

10.6.1 Notification

Following the initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the Site owner and NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies (e.g., USEPA) are to be contacted regarding the release, and will follow up with written reports as required by the applicable regulations.

10.6.2 Spill Response

The Project Manager should be notified immediately. The proper response sequence includes stopping/controlling the source, containing the spread, initiating remedial actions. Typically a spill response contractor is contacted to respond.

For all spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be roped, ribboned, or otherwise blocked off to prevent unauthorized access.
- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

10.6.3 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared. The report will identify the root cause of the spill, type and amount of material released, date/time of release, response actions, agencies notified and/or involved in cleanup, and procedures to be implemented to avoid repeat incidents.

11.0 REFERENCES

1) New York State Department of Environmental Conservation*. DER-10; Technical Guidance for Site Investigation and Remediation*. May 2010.
2) NIOSH/OSAHA Guidance for Construction and Hazardous Waste Sites

bing maps

A 127 Clayton St, Buffalo, NY 14207

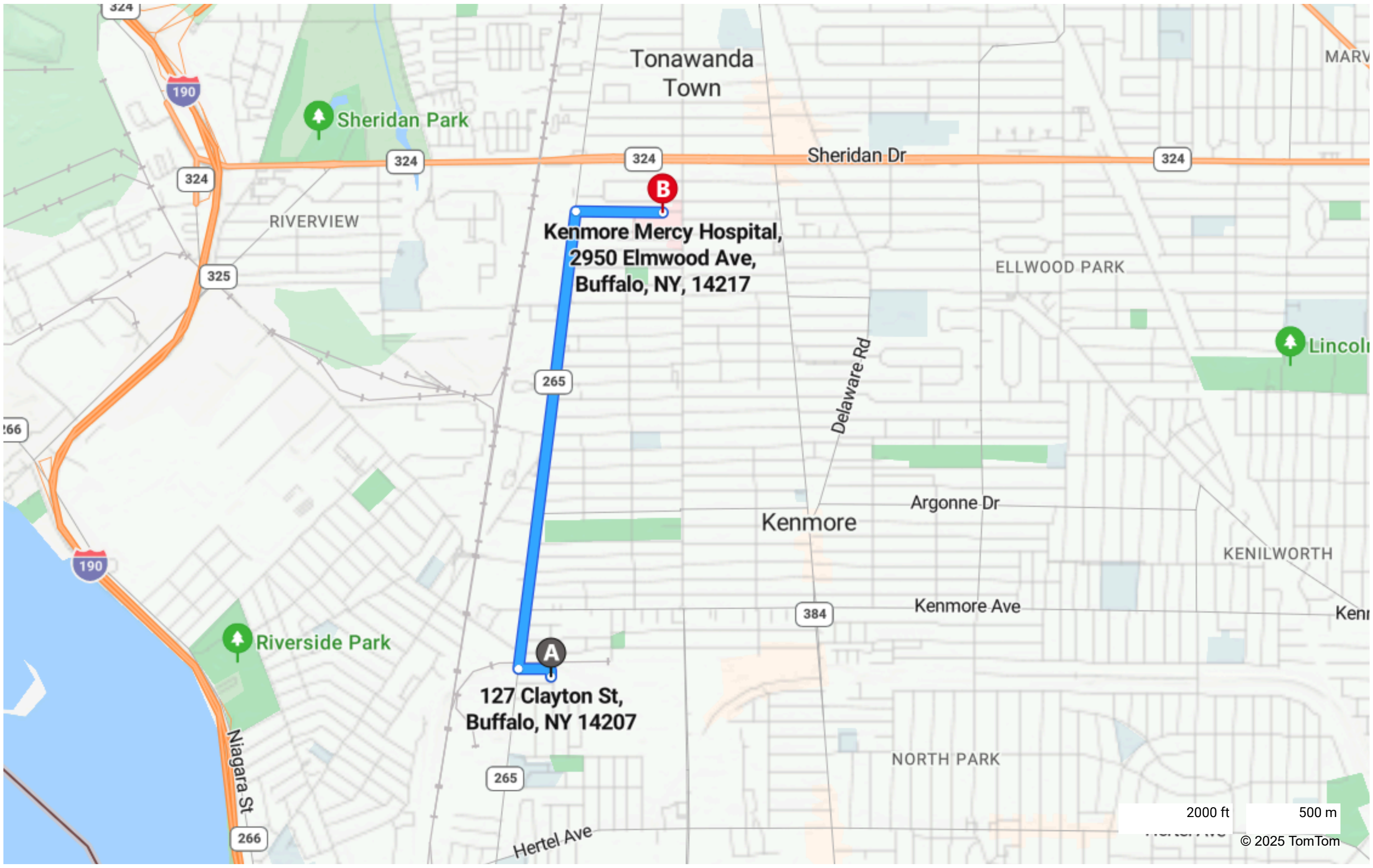
B Kenmore Mercy Hospital, 2950 Elmwood Ave, Buffalo, NY, 14217

5 min , **2.0 miles**
Light traffic
Via NY-265

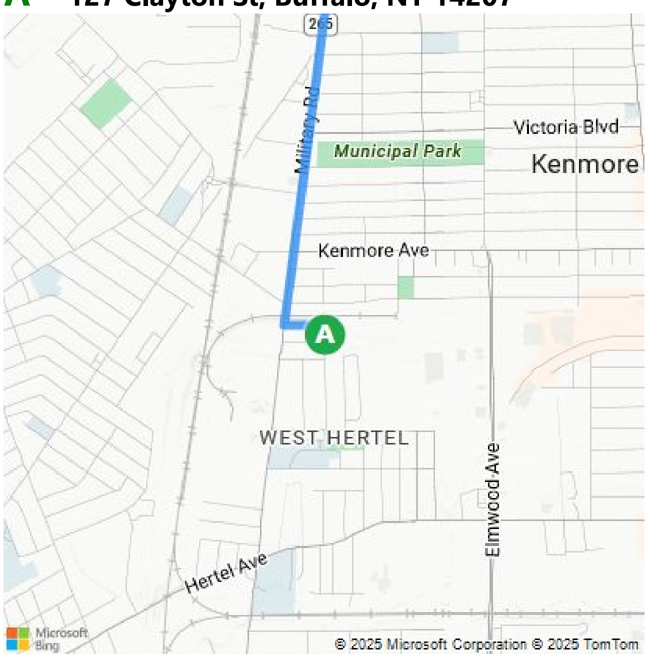
A 127 Clayton St, Buffalo, NY 14207

↑	1.	Leave from **Clayton St**	0.1 mi
↱	2.	Turn right onto **Military Rd/NY-265**	1.6 mi
↱	3.	Turn right	0.3 mi
	4.	You have arrived. Your destination is on the right	

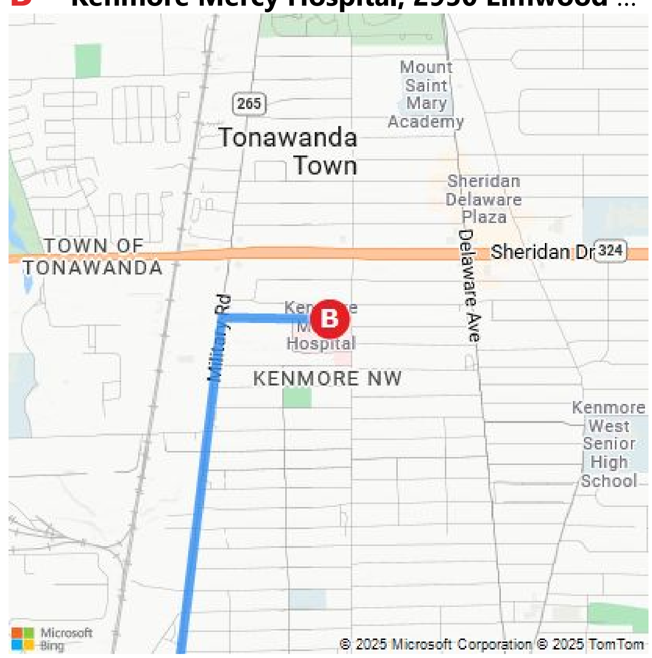
B Kenmore Mercy Hospital, 2950 Elmwood Ave, Buffalo, NY, 14217



A 127 Clayton St, Buffalo, NY 14207



B Kenmore Mercy Hospital, 2950 Elmwood ...



Appendix B - Quality Assurance/Quality Control Plan

Niagara Engineering
255 Great Arrow Ave.
Suite 102
Buffalo, NY 14207

Ph: (716) 447-9698

APPENDIX B

QUALITY ASSURANCE/QUALITY CONTOL PLAN

For

REMEDIAL INVESTIGATION

CLAYTON STREET RESIDENCES
SITE # C915409
127 CLAYTON STREET
BUFFALO, NEW YORK 14202

Prepared For:
ELMWOOD FOREST LLC
366 Elmwood Avenue
Buffalo, New York 14222

Prepared By:

Niagara Engineering, DPC
255 Great Arrow Ave, Suite 102
Buffalo, New York 142o7

September 2025

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1.0 INTRODUCTION

This Quality Assurance/Quality Control (QA/QC) Plan provides an overview of QA/QC procedures required for the project. It also provides methods for laboratory testing of environmental samples obtained from the Site, which helps to ensure the quality of the data produced. The RIWP of which this QA/QC plan is an appendix provides the nuts and bolts of the planned scope of the RI work including the environmental media to be sampled, the number of samples, and the organizational structure. The details of the procedures and quality control/quality assurance is provided in this appendix. The organizational structure presented in the RIWP identifies the names of key project personnel. The project manager is responsible for verifying that QA procedures are followed in the field so that quality, representative samples are collected. The Project Manager is in contact with the analytical laboratory to monitor laboratory activities so that holding times and other QA/QC requirements are met. The anticipated quantity of field samples collected, and corresponding analytical parameters/methods are provided in tables in the RIWP and also in this QA/QC Plan.

2.0 SCOPE OF THE QA/QC

This QA/QC plan has been prepared to provide quality assurance (QA) and quality control (QC) guidelines to be implemented during the RI activities. This document may be modified for subsequent phases of investigative work, as necessary.

The QA/QC plan together with the RIWP and other appendixes provides:

- A means to communicate to the persons executing the various activities exactly what is to be done, by whom, and when.
- A culmination to the planning process that ensures that the program includes provisions for obtaining quality data (e.g., suitable methods of field operations).
- A historical record that documents the investigation in terms of the methods used, and the planned calibration standards and frequencies, and auditing.
- A document that can be used by the Project Managers and QA/QC Officer to assess if the activities planned are being implemented and their importance for accomplishing the goal of quality data.
- A plan to document and track project data and results.
- Detailed descriptions of the data documentation materials and procedures, project files, and tabular and graphical reports.

The plan is primarily concerned with the QA/QC aspects of the procedures involved in the collection, preservation, packaging, and transportation of samples; field testing; record keeping; data management; chain-of-custody procedures; laboratory analyses; and other necessary matters to assure that the investigation activities, once complete, will yield data whose integrity can be defended.

Quality Assurance – QA

QA refers to the conduct of planned and systematic actions necessary to perform satisfactorily task-specific activities and to provide information and data confidence as a result of such activities. The QA for task specific activities includes the development of procedures, auditing, monitoring, and surveillance of the performance.

Quality Control – QC

QC refers to the activity performed to determine if the work activities conform to the requirements. This includes activities such as inspections of the work activities in the field (e.g., verification that the items and materials installed conform to applicable codes and design specifications). QA is an overview monitoring of the performance of QC activities through audits rather than first time inspections

3.0 QA/QC PLAN ORGANIZATION AND RESPONSIBILITY

The principal organizations involved in verifying achievement of data collection goals for this project include: the NYSDEC, NYSDOH, **ELMWOOD FOREST LLC** (Volunteer), Niagara Engineering (Volunteer's Engineering Consultant), the drilling subcontractor(s), the independent environmental laboratory, and the independent third-party data validator. The roles, responsibilities, and required qualifications of these organizations are discussed in the following subsections. Ultimately, the field geologist/technician coordinates all personnel involved with field sampling, verifies that all sampling is conducted per the sampling and analysis plan, and communicates regularly with the Project Manager. The ultimate responsibility for maintaining quality throughout the project rests with the Project Manager, including field and laboratory QA/QC.

3.1 Volunteer

ELMWOOD FOREST LLC ("Volunteer") will be responsible for complying with the QA requirements as specified herein and for monitoring and controlling the quality of the Brownfield cleanup construction either directly or through Niagara Engineering DPC (designated environmental engineer) and/or legal counsel. The Volunteer and Niagara Engineering will also have the authority to select Remedial Action Contractor(s) to assist them in fulfilling these responsibilities. The designated Project Manager is responsible for implementing the project and has the authority to commit the resources necessary to meet project objectives and requirements.

3.2 Niagara Engineering - Environmental Engineering Consultant

Niagara Engineering, D.P.C., is the primary engineering and scientific consultant on this BCP project and is responsible for the implementation of the RI Work Plan, including, but not limited to, field operations, laboratory testing, data management, data analysis, and reporting. Any one member of Niagara Engineering's staff may fill more than one of the identified project positions (e.g., field team leader and site safety and health officer). The various quality assurances, field, laboratory, and management responsibilities of key project personnel are defined below.

- BCP Project Engineers: Norm Abraham, PE and Attiq Rahman, P.E. will oversee all engineering aspects of the project and will be the final signature.
- BCP Project Manager (PM): Peter J. Gorton, MPH, CHCM. The PM has the responsibility for ensuring conformance with the BCP program requirements. The PM along with the PE will report directly to **ELMWOOD FOREST LLC** personnel and the NYSDEC/NYSDOH Project Coordinators and is responsible for project oversight. The PM will: 1) Define project

objectives and develop a detailed work plan schedule. 2) Acquire and apply technical and corporate resources as needed to assure performance within budget and schedule constraints. 3) Review the work performed on the project to assure its quality, responsiveness, and timeliness. 3) Certify deliverables before their submission to NYSDEC. 4) ensuring that the project meets the Work Plan objectives. 5) Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product. 6) Ultimately be responsible for the preparation and quality of interim and final reports. 7) Represent the project team at meetings.

- Field Team Leader: TBD - The Field Team Leader (FTL) will likely change depending on individual tasks (i.e. test trenches, borings, well installation…). The FTL has the responsibility for implementation of specific project tasks identified at the Site and is responsible for the supervision of project field personnel, subconsultants, and subcontractors. The FTL reports directly to the Project Manager.
- Site Safety - for this project, the FTL will also serve as the Site Safety and Health Officer (SSHO). As such, they are responsible for implementing the procedures and required components of the Site Health and Safety Plan (HASP), determining levels of protection needed during field tasks, controlling site entry/exit, briefing the field team and subcontractors on site-specific health and safety issues, and all other responsibilities as identified in the HASP.
- Quality Assurance (QA) Officer – John Berry, P.E.. The QA Officer will have direct access to corporate executive staff as necessary, to resolve any QA dispute, and is responsible for auditing the implementation of the QA/QC program in conformance with the demands of specific investigations and Niagara Engineering policies, and NYSDEC requirements. The QA Officer has sufficient authority to stop work on the investigation as deemed necessary in the event of serious QA issues.
- Field Staff responsibilities - Niagara Engineering field staff for this project are drawn from a pool of qualified resources. The Project Manager will use staff to gather and analyze data, and to prepare various task reports and support materials. The designated technical team members are experienced professionals who possess the degree of specialization and technical competence required to perform the required work effectively and efficiently.

4.0 ANALYTICAL PROCEDURES

Samples collected during field sampling activities will be analyzed by a NYSDOH approved laboratory. All samples analyzed for VOCs and/or SVOCs will report TICs as specified in DER-10 Section 2.1(a)1.i. Sampling for emerging contaminants will be conducted in accordance with the NYSDEC Guidance Sampling, Analysis, and Assessment of Per-And Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs – April 2023. As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL) or Part 375 Remedial Programs compound list, PFAS analysis should also be performed. Field sampling for PFAS performed should follow the appropriate procedures outlined for soils, sediments, or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F). QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c).

Methods are provided in **Table 4.** The analytical laboratory proposed for use for the analysis of samples will be a certified NYSDOH ELAP laboratory. The QA Manager of the laboratory will be responsible for performing project-specific audits and for overseeing the quality control data generated.

5.0 DATA QUALITY OBJECTIVES

5.1 Background

Data quality objectives (DQOs) are qualitative and quantitative statements, which specify the quality of data required supporting the investigation for the site. DQOs focus on the identification of the end use of the data to be collected. The project DQOs are achieved utilizing the definitive data category as outlined in *Guidance for the Data Quality Objectives Process,* EPA QA/G-4 (September 1994). All sample analyses will provide definitive data, which are generated using rigorous analytical methods such as reference methods approved by the United States Environmental Protection Agency (USEPA). The purpose of this investigation is to determine the nature and extent of contamination at the site.

Within the context of the purpose stated above, the project DQOs for data collected during this investigation are:

- To assess the nature and extent of contamination in soil, groundwater, and soil vapor
- To maintain the highest possible scientific/professional standards for each procedure
- To develop sufficient data to assess whether the levels of contaminates identified in the media sampled exceed regulatory guidelines

5.2 QA Objectives for Chemical Data Measurement

Sample analytical methodology for the media sampled and data deliverables are required to adhere to the requirements in NYSDEC Analytical Services Protocol. Laboratories are instructed to complete Sample Preparation and Analysis Summary forms and submit with the data packages. The laboratory is instructed that matrix interferences must be fixed to the extent practicable. To achieve the definitive data category described above, the data quality indicators of precision, accuracy, representativeness, comparability, and completeness are measured during analysis.

5.2.1 Precision

Precision examines the distribution of the reported values about their mean. The distribution of reported values refers to how different the individual reported values are from the average reported value. Precision may be affected by the natural variation of the matrix or contamination within that matrix and by errors made in field or laboratory handling procedures. Precision is evaluated using analyses of a laboratory matrix spike/matrix spike duplicate (for organics) and matrix duplicates (for inorganics), which indicate analytical precision through the reproducibility of the analytical results. Relative Percent Difference (RPD) is used to evaluate precision and it must meet the method requirements.

Precision is evaluated using analyses of a field duplicate or a laboratory MS/MSD that indicate analytical precision through the reproducibility of the analytical results.

RPD is used to evaluate precision by the following formula:

$$RPD = \frac{(X_1 - X_2)}{[(X_1 + X_2)/2]} \times 100\%$$

where:

X_1 = Measured value of sample or matrix spike
X_2 = Measured value of duplicate or matrix spike duplicate

Precision will be determined using MS/MSD (for organics) and matrix duplicates (for inorganics) analyses.

5.2.2 Accuracy

Accuracy measures the analytical bias in a measurement system. Sources of error are the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques. These data help to assess the potential concentration contribution from various outside sources. The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical methods on samples of the same matrix. The percent recovery criterion is used to estimate accuracy based on recovery in the matrix spike/matrix spike duplicate and matrix spike blank samples. The spike and spike duplicate, which will give an indication of matrix effects that may be affecting target compounds is also a good gauge of method efficiency.

Accuracy is calculated as follows:

$$Accuracy\ (\%R) = \frac{(X_s - X_u)}{K} \times 100\%$$

where:

X_s - Measured value of the spike sample
X_u - Measured value of the unspiked sample
K - Known amount of spike in the sample

5.2.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represent the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter, which is most concerned with the proper design of the sampling program or sub-sampling of a given sample. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the investigative objectives. The sampling procedures described in the Field Sampling Plan (Appendix C in the RIWP) have been selected with the goal of obtaining representative samples for the media of concern.

5.2.4 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. A DQO for this program is to produce data with the greatest possible degree of comparability. This goal is achieved through using standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units. Complete field documentation will support the assessment of comparability. Comparability is limited by the other parameters (e.g., precision, accuracy, representativeness, completeness, comparability), because only when precision and accuracy are known can data sets be compared with confidence. For data sets to be comparable, it is imperative that contract-required methods and procedures be explicitly followed.

5.2.5 Completeness

Completeness is defined as a measure of the amount of valid data obtainable from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is important that appropriate QA procedures be maintained to verify that valid data are obtained to meet project needs. For the data generated, a goal of 90% is required for completeness (or usability) of the analytical data. If this goal is not met, then project personnel will determine whether the deviations might cause the data to be rejected.

Completeness is calculated on a per matrix basis for the project and is calculated as follows:

$$Completeness\ (\%C) = \frac{(X_v - X_n)}{N} \times 100\%$$

where:

X_v - Number of valid measurements

X_n - Number of invalid measurements

N - Number of valid measurements expected to be obtained

6.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall objectives and criteria for assuring quality for this effort are discussed below. This QA/QC plan addresses how the acquisition and handling of samples, and the review and reporting of data will be documented. The objectives of this QA/QC Plan are to address the following:

- The procedures to be used to collect, preserve, package, and transport groundwater samples.
- Field data collection.
- Record keeping.
- Data management.
- Chain-of-custody procedures.
- Precision, accuracy, completeness, representativeness, decision rules, comparability, and level of quality control effort conformance for sample analysis and data management by the Project selected Approved Laboratory under EPA analytical methods.

6.1 QC Sample Parameters

Field blank, method blank, trip blank, field duplicate, laboratory duplicate, laboratory control, reference materials (SRM) and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs. QC samples are as follows:

- Field and trip blanks consisting of distilled water will be submitted to the analytical laboratories to provide the means to assess the quality of the data resulting from the field-sampling program. Field (equipment) blank samples are analyzed to check for procedural chemical constituents at the site that may cause sample contamination. Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample laboratory shipment and storage and transportation.
- Method blank samples are generated within the laboratory and used to assess contamination resulting from laboratory procedures.
- Duplicate samples are analyzed to check for sampling and analytical reproducibility.
- MS/MSD and MS/Duplicate samples provide information about the effect of the sample matrix on the digestion and measurement methodology.

6.2 QC Sample Amount

The number of QC samples are collected as follows:

- one field (blind) duplicate and one field blank (when non-dedicated equipment is used) for every 20 or fewer investigative samples of a given matrix. One trip blank consisting of distilled, deionized water will be included along with each sample delivery group of aqueous VOC samples.
- Depending on site-specific circumstances, one (1) MS/MSD or MS/Duplicate should be collected for every 20 or fewer investigative samples to be analyzed for organic and inorganic chemicals of a given matrix.

7.0 SAMPLING AND ANALYSIS PLAN QA/QC

Sampling locations are discussed and identified in the Remedial Investigation Work Plan (RIWP). Procedures addressing field and laboratory sample chain-of-custody and holding times details are presented in this plan and the Field Sampling Plan. The laboratory must meet the method required detection limits which are referenced within the methods.

The Sampling and Analysis Plan (SAP) is a separate appendix in the RIWP **(Appendix C)**. It provides procedures to be used in completing the field sampling. Summary tables are attached to this QA/QC plan (and also in the RIWP). The attached **Sample Summary Table (Table 3)** summarizes the number and types of environmental and QA/QC samples to be collected. The attached **Sample Parameter Table (Table 4)** summarizes sample parameter lists, holding times and sample container requirements. The sampling program and related site activities are discussed below. Methods and protocol to be used to collect environmental samples (i.e., soil, groundwater, and sub-slab vapor) for this investigation are described in the Niagara Engineering Field Operating Procedures (FOPs) in Appendix C.

7.1 Custody Procedures

Sample custody is controlled and maintained through the chain-of-custody procedures. Chain-of-custody (COC) is how the possession and handling of samples will be tracked from the source (field) to their final disposition, the laboratory. A sample is in a person's custody if it is in the person's possession, or it is in the person's view after being in his or her possession or it was in that person's possession and that person has locked it in a vehicle or room. Sample containers come cleaned and preserved from the laboratory before shipment to the Site. Sample custody is defined by this document as when it is in someone's actual possession, in someone's view after being in his or her physical possession, locked, sealed, or secured in a manner that prevents unsuspected tampering.

7.1.1 Sample Storage

Samples are stored in secure limited-access areas. Walk-in coolers or refrigerators are maintained at 4°C±2°C, or as required by the applicable regulatory program. The temperatures of all refrigerated storage areas are monitored and recorded at a minimum of once per day. Deviations of temperature from the applicable range require corrective action, including moving samples to another storage location if necessary.

7.1.2 Sample Tracking

Samples are maintained in the appropriate coolers prior to and during submission to the laboratory under chain of custody. People handling the samples must sign the original COC relinquishing custody of the samples.

8.0 CALIBRATION PROCEDURES AND FREQUENCY

This section describes the calibration procedures and the frequency at which these procedures will be performed for both field and laboratory instruments.

Field Instrument Calibration

Quantitative field data to be obtained during groundwater sampling include pH, turbidity, specific conductance, temperature, and depth to groundwater and during soil sampling screening for presence of volatile organic compounds using a field PID. Quantitative water level measurements will be obtained with an electronic sounder or steel tape, which require no calibration. Standard procedures describe the field instruments used to monitor for these parameters and the calibration methods, standards, and frequency requirements for each instrument. Calibration results will be recorded on the appropriate field forms and in the Project Field Book.

Laboratory Calibration

All laboratory calibration will follow standard laboratory protocol as specified in laboratory QA/QC guidelines. The project will utilize NYSDOH/NYSDEC approved laboratories with approved standard procedures.

9.0 CORRECTIVE ACTIONS

Laboratory corrective actions shall be implemented to resolve problems and restore proper functioning to the analytical system when errors, deficiencies, or out-of-control situations exist at the laboratory. Full documentation of the corrective action procedure needed to resolve the problem shall be filed in the project records, and the information summarized in the case narrative. A discussion of the corrective actions to be taken is presented in the following sections.

9.1 Incoming Samples

Problems noted during sample receipt shall be documented by the laboratory. The Project Manager shall be contacted immediately for problem resolution. All corrective actions shall be documented thoroughly.

9.2 Sample Holding Times

If any sample extraction or analyses exceed method holding time requirements, the Project Manager shall be notified immediately for problem resolution. All corrective actions shall be documented thoroughly.

9.3 Instrument Calibration

Sample analysis shall not be allowed until all initial calibrations meet the appropriate requirements. All laboratory instrumentation must be calibrated in accordance with method requirements. If any initial/continuing calibration standards exceed method QC limits, recalibration must be performed and, if necessary, reanalysis of all samples affected back to the previous acceptable calibration check.

9.4 Reporting Limits

The laboratory must meet the method required detection limits listed in NYSDEC ASP, 10/95 criteria. If difficulties arise in achieving these limits due to a sample matrix, the laboratory must notify PEI project personnel for problem resolution. To achieve those detection limits, the laboratory must utilize all appropriate cleanup procedures to retain the project required detection limits. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory must document all initial analyses and secondary dilution results. Secondary dilution will be permitted only to bring target analytes within the linear range of calibration. If samples are analyzed at a secondary dilution with no target analytes detected, the Project Manager will be immediately notified so that appropriate corrective actions can be initiated.

9.5 Method QC

All QC method-specified QC samples shall meet the method requirements referenced in the analytical methods. Failure of method-required QC will result in the review and possible qualification of all affected data. If the laboratory cannot find any errors, the affected sample(s) shall be reanalyzed or re-extracted/redigested, then reanalyzed within method-required holding times to verify the presence or absence of matrix effects. If matrix effect is confirmed, the corresponding data shall be flagged accordingly using the flagging symbols and criteria. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed or re-extracted/redigested, then reanalyzed at no cost. Project Manager shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

9.6 Calculation Errors

All analytical results must be reviewed systematically for accuracy prior to submittal. If upon data review calculation or reporting errors exist, the laboratory will be required to reissue the analytical data report with the corrective actions appropriately documented in the case narrative.

10.0 DATA REDUCTION, VALIDATION, AND USABILITY

10.1 Data Reduction

Laboratory analytical data are first generated in raw form at the instrument. These data may be either in a graphic or printed tabular format. Specific data generation procedures and calculations are found in each of the referenced methods. Analytical results must be reported consistently. Identification of all analytes must be accomplished with an authentic standard of the analyte traceable to NIST or USEPA sources. Individuals experienced with an analysis and knowledgeable of requirements will perform data reduction.

10.2 Data Validation

Data validation is a systematic procedure of reviewing a body of data against a set of established criteria to provide a specified level of assurance of validity prior to its intended use. All analytical results from soil and groundwater samples will have ASP Category B deliverables and DUSRs. The data validation will be in accordance with DER-10 Section 2.2 with ASP - Category B data deliverables provided by the laboratory and a DUSR provided for validation. Where possible, discrepancies will be resolved by the project manager.

- Technical holding times will be in accordance with NYSDEC ASP, 7/2005 edition.
- Organic calibration and QC criteria will be in accordance with NYSDEC ASP, 7/2005 edition. Data will be qualified if it does not meet NYSDEC ASP, 7/2005 criteria.

Note that analytical results from the PCB Survey will also complete DUSRs and be submitted to EQuIS, in accordance with the Quality Assurance/Quality Control Plan (QA/QC Plan). All EDDs will be submitted to EQuIS and a copy will be sent to the NYSDEC PM.

10.3 Data Usability

Appendix C of the RIWP includes field procedures for collecting and preserving groundwater and soil samples. **RI soil/fill samples for VOC analysis will collected in laboratory 4 oz glass containers supplied for VOCs or will be collected using EnCore® samplers per recent NYSDOH requirements for VOC analytical method certification. The NYSDEC PM will determine which sample method will be used for this project.**

Data usability evaluation procedures shall be performed for both field and laboratory operations. Procedures Used to Evaluate Field Data Usability for this project will be facilitated by adherence to the SAP (see Appendix C). The performance of all field activities, calibration checks on all field instruments at the beginning of each day of use, manual checks of field calculations, checking for transcription errors and review of field logbooks is the responsibility of the Field Team Leader.

Procedures Used to Evaluate Laboratory Data Usability will be performed by the third-party data validator using the most current methods and quality control criteria (DER-10). The data review guidance will be used only to the extent that it is applicable to the SW-846 methods; SW-846 methodologies will be followed primarily and given preference over CLP when differences occur. Also, results of blanks, surrogate spikes, MS/MSDs, and laboratory control samples will be reviewed/evaluated by the data validator. All sample analytical data for each sample matrix shall be evaluated. The third-party data validation expert will also evaluate the overall completeness of the data package. Completeness checks will be administered on all data to determine whether deliverables specified in this QAPP are present. The reviewer will determine whether all required items are present and request copies of missing deliverables.

11.0 REFERENCES

Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Quality Assurance Manual, Final Copy, Revision I, October 1989.

National Enforcement Investigations Center of USEPA Office of Enforcement. *NEIC Policies and Procedures.* Washington: USEPA.

New York State Department of Environmental Conservation (NYSDEC) 2005. *Analytical Services Protocol*, (ASP) 7/2005 Edition. Albany: NYSDEC. NYSDEC "DER-10 Technical Guidance for Site Investigation and Remediation (DER-10)," dated May 3, 2010, Appendix 2B

Appendix C - Sampling & Analysis Plan

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SAMPLING and ANALYSIS PLAN

For

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See Also Attached Figures & Tables

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) provides procedures for the field activities for this project as presented in the RIWP which include soil, groundwater, and vapor sampling as well as waste and UST assessment. The following presents a summary of the field procedures which are covered in more detail in the attached Niagara Engineering Standard Operating Procedures (SOPs) attached to this plan or at the end of the RIWP. The field procedures presented in this plan should be followed by all field personnel, as adherence will ensure the quality and usability of the data collected. The SAP should be used collectively with and comply with the following documents:

- The RIWP
- The Health and Safety Plan
- The Quality Control/Quality Assurance Plan

2.0 PFAS/PFOS SAMPLING

Sampling for emerging contaminants will be conducted in accordance with the NYSDEC Guidance Sampling, Analysis, and Assessment of Per-And Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs – April 2023 as updated. As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Part 375 Compound List, PFAS analysis should also be performed. Field sampling for PFAS should follow the appropriate procedures outlined for soils and other solids, non-potable groundwater, surface water, public or private water supply wells, and fish tissue. QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c).

As detailed in the guidance document, EPA Method 1633 (or as updated by DEC) is the procedure to use for environmental samples. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. . The analytical laboratory proposed for use for the analysis of samples will be a certified NYSDOH ELAP laboratory.

All field equipment requiring calibration will be calibrated per, and at the frequency, recommended by the equipment manufacturer.

3.0 SOIL SAMPLING

Soil samples are obtained as outlined in the RIWP, considering the following general protocol:

1. Inspect newly created test pit or boring core stratigraphy once obtained in/from the subsurface.
2. Sample soil, and record depth and any physical characteristics (e.g., contamination, odor, discoloration, debris, etc.) in the logbook.
3. Quickly place the calibrated PID into the exposed soil and record the instrument readings in the logbook.

4. Samples should be collected at locations and frequency per the Work Plan and QA/QC Plan.
5. Decontaminate sampling implements after use and between sample locations. In most cases, dedicated sampling equipment is utilized thereby eliminating equipment decontamination. If dedicated equipment is not used, “dry” decontamination will be applied and “wet” as necessary.
6. Label each sample container with the appropriate sample identification and place samples in a cooler (cooled to 4 degrees C.) for shipment to the laboratory.
7. Initiate chain-of-custody procedures.

2.1 Test Pit Procedures

Test pit/trench sampling is a standard method of soil sampling to obtain representative samples for identification as well as to serve as a means of obtaining a significant information about the subsurface. The following steps describe the procedures for test pit operations - see also the attached SOP for test trenching.

2.1.1 Field Preparation

1. Verify underground utilities have been found.
2. Review scope of work, safety procedures and communication signals with site personnel.
3. Pre-clean the sampling equipment prior to use, as necessary.
4. Mark and review trench locations. Specific locations are determined in the field and are selected based on areas of visible or potential surface contamination or debris, pre-determined locations representing specific Site areas, and field obstructions.

2.1.2 Excavation and Sample Collection

1. Position backhoe/equipment into appropriate area considering direction of excavation, obstructions, safety concerns, etc.
2. Commence excavation with the backhoe upwind of the excavation, as possible.
3. Ensure continuous air monitoring has been activated.
4. Screen soil regularly for VOCs as excavation progresses and soil is stockpiled.
5. As directed by field technician for each test trench, topsoil, or cover soil (if any) is excavated and placed on poly/plastic sheeting.
6. Soil/material below the topsoil is excavated to the depth as directed by field technician and placed on poly/plastic sheeting separate from the topsoil/cover soil.
7. Segregate ‘clean’ material from impacted material, as possible, using visual observations and PID screening.
8. Record geologic log as trenches are excavated visually inspecting subsurface material for discoloration or staining and documenting pit/trench with photos. The following information will be recorded for each test pit log:
   - Depth, length, and width of the excavation.
   - Description of each lithological unit including depth and thickness of distinct soil, fill, or rock layers.
   - Description of any man-made impacts or apparent contamination.
   - Depth to groundwater and bedrock, if encountered.
9. Collect soil samples using dedicated stainless-steel spoons or directly into the sample

container directly from the bucket of the backhoe at ground surface. No personnel shall enter the excavation to collect samples unless provisions in the HASP have been addressed for entering an excavation.

10. Place each soil sample directly into appropriate sample bottles/jars.
11. Clearly label the sample bottles and jars.
12. Place each jar in an ice-filled cooler.
13. Ship samples to the laboratory as soon as possible, but no later than 24 hours after collection.
14. Document the types and numbers of samples collected on Chain-of-Custody.
15. Record time and date of sample collection and a description of the sample and any associated air monitoring measurements in the field logbook.
16. After sampling, backfill and compact (e.g., bucket and equipment tracks/wheels) the excavated material from each trench or pit prior to moving to next location.
17. Backfill with indigenous soil in the order in which the material was removed with the topsoil/cover soil placed last to cover the trench, placing impacted material at bottom of pit/trench and covering with 'clean' material.
18. Decontaminate sampling and excavation equipment between sampling locations (i.e., if not dedicated) and at completion over top of excavation area using dry methods initially and steam cleaning, as needed.

2.2 Geoprobe Procedures

Geoprobe direct push sampling is a standard method of soil sampling to obtain representative soil samples from the subsurface. Field preparation, sample collection, and data logging activities for Geoprobe sampling are identical to that of test pitting/trenching listed above. The following procedures detail activities, as directed by the field technician, for the execution of Macro Core drilling operations:

1. Startup drill rig/geoprobe and raise mast.
2. Use star bit with rig in rotary setting to penetrate pavement (if applicable).
3. Excavate a hole large enough to set a road box before you advance the borehole (if applicable based on plan to install a permanent groundwater well).
4. Unthread the shoe from the bottom of the sample tube and inset a sample liner and rethread the shoe on the bottom of the sample tube.
5. Thread the drive cap on the top of the sample tube.
6. Align the sample tube so it is plumb in both directions to ensure a straight borehole is drilled.
7. Drive the top of the sample tube into ground surface to a depth of 4-feet for the first 4-foot sample.
8. Unthread the drive cap from the top of the sample tube and thread the pull cap in its place.
9. Pull the sample tube from the ground using caution to not pinch your hand between the drill rods, pull cap, or rig.
10. Unthread the cutting shoe and pull the sample liner from the bottom of the sample tube. Use pliers to reach in the sample tube and grab the liner, if needed.
11. Cut the sample liner lengthwise in two places and present the sample on a table or plastic sheeting (or similar) to ensure all sample material is contained. Quickly screen the soil for volatile organic vapors using a PID. Describe the soil and collect any necessary samples into appropriate containers and label the containers.
12. Insert a new liner and thread on the cutting shoe and repeat steps from #4 to #11 with the addition of a 4-foot long drill rod onto the top of the sample tube to advance a second 4-

foot interval.
13. Proceed with this procedure until the desired depth or refusal is reached.
14. Upon completion of probing, decontaminate all equipment in contact with the soil/fill in a decontamination area using Alconox and water.
15. Backfill borings with indigenous soil in the order in which the material was removed with the topsoil/sand/cover soil placed last to cover the hole. Soil samples that exhibit detectable vapors or exhibit grossly other contaminated characteristics shall not be placed back into the borehole but shall be containerized for proper disposal.

Reference: American Society for Testing Material (ASTM), 1992, ASTM D1586-84, Standard Method for Penetration Test and Split Barrel Sampling of Soils.

2.3 Hollow-Stem Auger Drilling and Sampling Procedures

Drilling with Hollow Stem Augers (HSAs) is a standard method for collecting undisturbed soil samples at depths that can exceed 100 feet below ground surface (bgs). This drilling and sampling method uses auger flights with a hollow center that can be used for sample collection during the drilling program. For environmental soil investigations, augers are typically 5-feet in length with a 4 1/4-inch hollow center section.

While drilling with HSAs, a plug is placed at the base of the auger string to prevent soil from entering the augers. When the sampling depth is reached, the center plug is removed and replaced with a 2-foot-long split-spoon soil sampler. A 140-pound hammer, mounted on the drill rig, is then used to drive the soil sampler and connect drill rods 2 feet into the undisturbed soil at the base of the augers. Removal of the soil sampler from the augers allows description and sampling of the collected soil. To sample the next lower 2-foot soil sample, the center plug is again placed at the base of the auger string and drilling and then sampling is continued. Continuous soil samples can be collected using HSAs to any drillable depths.

Field procedures.

1. HSAs, drill rods and the drilling rig will be thoroughly decontaminated prior to initial borehole installation, and between each borehole, at the centralized decontamination area. All decontamination liquids and solids will be collected and placed in DOT approved 55-gallon drums.
2. The drill rig will be inspected for oil leaks and any other leaks prior to starting drilling operations.
3. Lower the center plug to the bottom of the augers. Advance the boring by rotating and advancing the HSAs to the desired depth. The boring will be advanced incrementally to permit continuous or intermittent subsurface soil sampling, as required.
4. Remove the center plug from the HSAs and lower the 2-foot-long split-spoon sampler to the base of the augers. Use the rigs 140 hammer to drive the split-spoon sampler 2-feet into the undisturbed soil. Record the number of hammer blows (blow counts) for each 6-inches of sampler penetration.
5. Remove the split-spoon sampler from the borehole, open the split-spoon and quickly scan the soil for VOCs with a PID or FID. Describe the soil, collect the project required samples, place in the proper containers, label the containers and place on ice.
6. Continue the above drilling and sampling steps until the final desired depth is reached.
7. If a monitoring well will not be constructed in the borehole, backfill the borehole with either uncontaminated soil cuttings or grout, as specified by the project work plan.

Reference: American Society for Testing Material (ASTM), ASTM D5784, Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water Quality Monitoring Devices

3.0 GROUNDWATER SAMPLING

3.1 Well Installation Procedures

The following procedure outlines a NYSDEC-approved method of constructing groundwater wells within unconsolidated material to monitor groundwater elevation and acquiring groundwater samples for laboratory testing. The well screen is 4” Schedule 40 pipe with 0.010 slot size. The following is a step-by-step method for the open-hole method of installing a groundwater well once a boring or augured hole has been drilled to a desired depth within the subsurface:

1. Thread a cap on the bottom section of well screen. If more than one section of well screen is required, thread the last section.
2. Lower the screen into the borehole with the riser section ready.
3. Add the riser sections to the screen. Do not drop the screen in the borehole.
4. Add riser sections as required until the bottom screen section touches the bottom of the borehole.
5. If completing the well with a road box, mark the riser two inches below the lid of the road box and then cut the riser.
6. Place a slip cap over the top of the rise section.
7. Place sand in the space between the borehole and the PVC screen and riser to the required depth. Place the sand in very slowly so it does not bridge in the well bore.
8. Place bentonite and cement above the sand-pack.
9. Grout in the road box with concrete mix.

3.2 Well Development Procedures

At least 24 hours after completion of drilling and installation, well development is completed through pumping or bailing until the discharged water is relatively sediment free and the indicator parameters (e.g., pH, temperature, specific conductivity, etc.) have reached steady-state. Development removes sediment and can improve the hydraulic properties of the sand pack. The effectiveness of this process is monitored to minimize the volume of discharged waters to obtain sediment-free samples. As approved by the regulatory agency, well development water can be discharged onto the ground surface downgradient of the well. Otherwise, this water must be containerized and sampled prior to discharge or disposal.

1. Select an appropriate well development method based upon water depth, well productivity, and sediment content of the water. Well development options include: (a) bailing; (b) manual pumping; and (c) submersible pumps. These options utilized with surging of the well screen using an appropriately sized surge block.
2. Decontaminate, as needed, and assemble equipment in the monitoring well based upon the method selected. Care should be taken not to introduce contaminants into the equipment or well during installation.

3. Proceed with development by repeated removal of water from the well until the discharged water is relatively sediment-free (i.e., < 50 NTUs). Volume of water removed, pH, temperature and conductivity measurements are recorded on the Well Development/Purging Logs.

3.3 Well Purging Procedures

To collect representative samples, groundwater wells must be adequately purged prior to sampling. Purging will require removing three to five volumes of standing water in rapidly recharging wells and at least one volume from wells with slow recharge rate. In addition to the required well volumes, water quality parameters (pH, temperature, specific conductivity and turbidity) should have stabilized prior to sampling. Sampling should commence as soon as adequate recharge has occurred. Although not required, it is recommended that purging and sampling occur at least 24 hours after development.

1. Remove well cover ensuring no foreign material enters the well.
2. Monitor the interior of the riser pipe for organic vapors using a PID. If reading of greater than 5 ppm is recorded, the well will be vented until levels are below 5 ppm before pumping is started.
3. Measure the water level below top of casing using an electronic water level indicator.
4. Determine the volume of water within the well by knowing the total depth of the well.
5. Wash the end of the probe with soap and rinse with deionized water between wells.
6. Calibrate field instruments for measuring water quality parameters (e.g., pH, specific conductance, turbidity, etc.)
7. In all wells, a peristaltic pump will be used to purge the required water volume (i.e., until stabilization of pH, temperature specific conductivity and turbidity). If depths to water exceed about 25 feet below ground, bailers and/or submersible pumps may be used.
8. Utilize dedicated, new polyethylene bailers and tubing for sampling. If sampling for emerging contaminants such a PFAS, HDPE bailers and tubing must be used.
9. Purge until the required volume is removed. If the well purges to dryness and recharges within 15 minutes, purging can continue as it recharges. If the well purges to dryness and recharge is greater than 15 minutes, purging is terminated and sampling can occur as soon as the well recharges.
10. Calculate well volumes and record measurements for pH, temperature, turbidity, and conductivity during the purging along with physical observations.

3.4 Well Sampling Procedures

1. Perform well sampling within 24 hours of purging if well has recovered sufficiently to sample. If sufficient volume for analytical testing cannot be obtained from a well or if recharge exceeds 24 hours, then DEC should be consulted on analytical priorities and validity of the sample.
2. Collect sample using appropriate containers.
3. Label sample bottles using a waterproof permanent marker per procedures outlined below.
4. Use verifiably clean sample bottles (containing required preservatives) and place samples on ice in coolers for transport to the analytical laboratory, who will certify bottles are analyte-free.
5. Initiate chain-of-custody.
6. Record well sampling data field notebook and on the Well Development/Purging Log.

4.0 SAMPLE DOCUMENTATION

Each soil and groundwater sample is logged in a bound field notebook by the technician, engineer, scientist or geologist. Field notes should include, but are not limited to the following:

- descriptions of subsurface material encountered during sampling,
- sample numbers and types of samples recovered, and
- date and time of sampling event.

Field personnel also completes a daily drilling or sampling record and chains-of-custody for all samples collected that are being transported to the laboratory. Once sampling program is complete, the geologist or technician transfers field notes/logs onto standard forms (e.g., boring logs, sampling logs, daily reports, etc.) to be included with the formal investigation report.

5.0 SAMPLING CONTAINER SELECTION

The selection of sample containers is based on the media being sampled and the required analysis. Container selection should be completed in advance of mobilizing into the field with close communications with the laboratory.

6.0 SAMPLE LABELING

The following procedure helps to prevent misidentification of samples and to clarify the location and purpose of environmental samples collected during the investigation:

1. Fix a non-removable (when wet) label to each container.
2. Wrap each sample bottle within 2-inch cellophane tape.
3. Write the following information with permanent marker on each label:
    A. Site name
    B. Sample identification
    C. Project number
    D. Date/time
    E. Sampler's initials
    F. Sample preservation
    G. Analysis required

Please note, do not use a sharpe when using containers for PFAS sampling. Each sample is assigned a unique identification alpha-numeric code, such as RR-ss1 or WS-TP1 (2-3’), where the abbreviations represent RR – River Road (site), surface sample 1 and Waste Site, test pit 1, obtained at 2-3’ bgs. Other common abbreviations include the following:

- BH = Geoprobe Borehole
- SW = Surface Water
- SED = Sediment
- SB = Soil Boring
- MSB = Matrix Spike Blank
- NSS = Near Surface Soil (1' - 2' depth)
- EB = Equipment Rinse Blank
- HW = Hydrant Water (Decon/Drilling Water)

- GW = Groundwater
- TB = Trip Blank
- RB = Rinse Blank
- MS/MSD = Matrix Spike/Matrix Spike Duplicate

7.0 SAMPLE SHIPPING

Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for (1) presenting analytical results in a legal or regulatory forum (e.g., evidence in litigation or administrative hearings), (2) minimizing loss or misidentification of samples, and (3) ensuring that unauthorized persons do not tamper with collected samples.

The following chain-of-custody guidelines should be utilized during sample collection as outlined in and prepared by the National Enforcement Investigations Center (NEIC) Policies and Procedures of the USEPA Office of Enforcement:

1) Complete chain-of-custody record with all relevant information.
2) Send original chain with the samples in a sealed, waterproof bag taped inside the sample cooler.
3) Place adequate inert cushioning material (e.g., corrugated plastic, polypropylene foam wrap, etc.) in bottom of cooler.
4) Place bottles in cooler so they do not touch (use cushioning material for dividers).
5) Place VOA vials in sealed/waterproof bags in the center of the cooler.
6) Pack cooler with ice in sealed/waterproof plastic bags.
7) Pack cooler with cushioning material.
8) Place any additional paperwork in sealed bag with original chain.
9) Tape cooler drain shut.
10) Wrap cooler with packing tape at two locations to secure lid. Do not cover labels.
11) Place lab address on top of cooler.
12) Ship samples via overnight carrier the same day that they are collected.
13) Label cooler with "This side up" on all sides and "Fragile" on at least two sides.
14) Fix custody seals on front right and left of cooler and cover with packaging tape.

8.0 SOIL VAPOR INTRUSION SAMPLING

Soil vapor intrusion (SVI) investigation consist of sampling contaminant vapors that may exist beneath the building slabs, inside the buildings, and outside the buildings. Sample collection includes the following procedures per New York State Department of Health *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*.

8.1 Sub-Slab Air Sampling Procedures

Note, unless experienced, it is good to practice these procedures and watch training videos prior to entering the field. See also the SOP on vapor sampling attached to the RIWP.

8.1.1 Sampling Locations

Select the sub-slab sample collection points by observing the condition of the building floor slab for apparent penetrations such as concrete floor cracks, floor drains, or sump holes. The floor conditions will be noted, and potential locations of subsurface probes will be selected. The locations will ideally be away from the foundation walls, apparent penetrations, and buried pipes.

8.1.2 Sampling Probes

Drill a 5/8-inch diameter hole approximately one inch deep into the concrete floor using a 5/8-inch diameter drill bit and a hammer drill. Extend the hole through the remaining thickness of the slab and about three inches below the base of the slab using a ½-inch diameter drill bit.

Remove the concrete cuttings using the ½-inch drill bit in an up-down motion. Clean out the shallow 5/8-inch drilled hole using a round steel wire brush. Carefully clean the surface of the concrete adjacent to the 5/8-inch hole using a flat wire brush to remove any residual concrete dust from the floor's surface. Dabbing the surface with clay can also remove the dust. These steps will allow the clay seal (see below) to better adhere to the concrete surface.

Insert one end of a 1.5-foot length of ¼-inch diameter (OD) Teflon or HDPE tubing through the center hole of a 5/8-inch diameter rubber stopper. About two inches of the tubing should extend beyond and below the narrow end of the stopper. Insert the tubing into the 5/8-inch diameter borehole so that the bottom of the stopper rests on top of the 1/2-inch diameter drilled hole. Pack the annulus of the 5/8-inch diameter hole with Sculpy modeling clay and extend the clay about 1.5-inches above the floor adhering tightly to the tubing. The clay should be in a volcano-like shape with a wide base adhering to the concrete floor and narrowing at the upper end of contact with the tubing. This shape allows the tubing to move without disturbing the contact of the clay with the floor and the tubing. The clay should cover and adhere to a minimum of one-half inch of the concrete surface beyond the borehole.

8.1.3 Helium Tracer Gas Testing

Place a 1-quart (or similar size) container over the sample probe after threading the sample tube through a hole in the top of the bucket. Seal the tube to the bucket with clay. The bucket should also have another hole drilled in the top for the injection of helium, and a hole in the side near the floor for the measurement of helium gas concentrations.

Connect a helium (99.999% pure) cylinder tubing to the top port of bucket enclosure and seal with clay or other sealing material. Insert a helium detector probe in the bottom port of the bucket. Release enough helium to displace any ambient air in the bucket until the concentration of helium reaches a minimum of 90%. Maintain this minimum concentration by testing with a helium detector. The Helium cylinder should be open during the purge time to cause a slight positive pressure within the enclosure.

Connect the sample tubing to a GilAir vacuum pump or equivalent using 3/8-inch O.D. silicone tubing. Connect a 1-liter Tedlar bag to the outlet of the pump using silicone tubing and collect a 1-liter sample. Purging flow rates must not exceed 0.2 liters per minute (L/min). Analyze the Tedlar bag for helium using a helium detector and record the results on the Summa Canister Data Sheet. A concentration of helium 10% or greater indicates a poor seal of the sample probe and it must be reinstalled and retested. After purging, remove the bucket enclosure from over the sample probe.

8.1.4 Sample Collection

Assign sample identification to the Summa canister sample identification tag and record on chain of custody (COC), and the Summa Canister Data Sheet. Also record the Summa canister and flow controller (regulator) serial numbers on the COC and Summa Canister Data Sheet. Attach a pre-calibrated/certified 8-hour or 24-hour flow controller, and particulate filter to the Summa canister. Attach the sample tube to the Summa canister using a ¼-inch Swagelok nut with appropriate ferrules, to the end of the flow controller/particulate filter assembly. The sampling period will be 8 hours for most commercial facilities and 24 hours for mixed use residential/commercial.

Open canister valve to initiate sample collection and record sample start time, date, and initial canister vacuum on the canister identification tag and on the Summa Canister Data Sheet. If the canister does not show sufficient vacuum (generally less than 25“Hg), do not use. Take a digital photograph of canister setup and surrounding area. Include in the photograph a dry erase board or similar display which presents sample ID, location, and date.

After 8 or 24 hours, record sample end time and canister pressure on the Summa Canister Data Sheet, and close valve. Disconnect the Teflon tubing and remove flow controller/particulate filter assembly from canister. Seal canister with laboratory supplied brass plug. Ship the samples, with COCs, overnight, to the selected laboratory for standard TO-15 analysis.

8.2 Indoor/Outdoor Air Sampling Procedures

Place the indoor air Summa canister/flow controller inlet at breathing height in the approximate center of the space being sampled, or, for the outdoor air sample, elevated on a table or other object in a location upwind of the building being sampled. The breathing height is defined as four to six feet above the floor or ground. As an option, a length of Teflon tubing can be attached to the Summa canister/flow controller inlet and raised to breathing zone height.

Record the canister and flow controller serial numbers on the canister identification tag, COC and the Summa Canister Data Sheet. Assign sample identification to the canister identification tag, and record on the COC and the Summa Canister Data Sheet. Remove brass plug from canister fitting and save.

Attach a pre-calibrated/certified 8 or 24-hour flow controller and particulate filter to the Summa canister. For the outside air sample, also connect the laboratory supplied “candy cane” fitting to the flow controller. Open canister valve to initiate sample collection and record start time, date, and gauge vacuum reading on the canister identification tag and on the Summa Canister Data Sheet. Take a photograph of canister setup and surrounding area.

After 8 or 24 hours, record the gauge vacuum reading, close the Summa canister valve completely and record the end time on the Summa Canister Data Sheet. There should still be a slight vacuum in the Summa canister. If no vacuum remains in the canister, or the canister does not show a significant net loss in vacuum after sampling, the sample should be re-collected using a new Summa canister and flow controller. Disconnect any tubing and candy cane fittings from the

Summa canister and remove the flow controller. Replace the brass plug on the canister. Ship canister, with COCs, overnight, to the selected laboratory

8.3 Quality Control

The number of Quality Control samples (duplicates) to be taken during sub-slab sampling may be found in the QA/QC Plan. The duplicate sample rate is usually 10 percent. Field duplicates for sub-slab, indoor air and outdoor air samples will be collected by attaching the T-fitting supplied by the laboratory to two Summa canisters with attached regulators. For sub-slab samples, the inlet of the T-fitting will then be attached to the sub-slab sample tubing using a Swagelok fitting. For indoor and outdoor air samples, any tubing used to raise the sampling height will also be attached to the inlet of the T fitting. For sampling, both Summa canister valves are opened and closed simultaneously.

8.4 Sample Labeling

Each sub-slab sample should have the following information at a minimum placed on the laboratory supplied sample label:

- Site name
- Sample identification – see below
- Date/time
- Sampler's initials
- Analysis required – TO-15

The serial number of the canister and regulator used during sampling is also noted on the Summa canister identification tag and on the COC. Each sub-slab, indoor air and outdoor air sample will be assigned a unique alpha-numeric code. An example of this code and a description of its components are presented below. Field duplicate samples will be assigned a unique identification alphanumeric code that specifies the date of collection, the letters FD (for field duplicate) and an ascending number that records the number of duplicate samples collected that day. For example, the first field duplicate collected on February 22, 2023 would be assigned the sample number in the format YYYYMMDD-FD-1 = 20230222-FD-1.

Subsequent duplicates collected on the same day will be assigned FD-2, FD-3 etc. Field sampling crew will record the duplicate sample information on the Summa Canister Data Sheets and in the field book.

8.5 Field Documentation

Field notebooks are used during all on-site work. A dedicated field notebook is maintained by the field technician overseeing the site activities. Sub-slab sampling procedures should be photo-documented. The field sampling team will maintain sampling records that include the following data:

- Sample Identification
- Date and time of sample collection
- Identity of samplers
- Sampling methods and devices
- Purge volumes (soil vapor)
- Volume of soil vapor sample extracted

- The Summa canister vacuum before and after samples collected
- Chain of Custody and shipping information

The proper completion of the following forms/logs is considered correct procedure for documentation during the indoor air-sampling program:

1. Field Logbook - weather-proof hand-bound field book
2. Summa Canister Data Sheet
3. Chain of Custody Form

8.6 Sample Shipping

Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for presentation of sample analytical chemistry results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with collected samples.

The following chain-of-custody guidelines should be utilized during sample collection as outlined in and prepared by the National Enforcement Investigations Center (NEIC) Policies and Procedures of the USEPA Office of Enforcement:

- Complete the chain-of-custody (COC) record with all relevant information.
- Ship original COC with the samples in a sealed waterproof plastic bag and place inside the box containing a Summa canister.
- Retain a copy of the COC for field records.
- Ship Summa canisters in the same boxes the laboratory used for shipping.
- Place the lab address on top of sample box/cooler.
- Fix numbered custody seals across box lid flaps and cooler lid.
- Cover seals with wide, clear tape.
- Ship samples via overnight carrier within three days of sample collection if possible.

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FIELD OPERATING PROCEDURE

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FIELD OPERATING PROCEDURE

COMPLETION/CLOSURE OF BOREHOLES

FIELD OPERATING PROCEDURE
COMPLETION/CLOSURE OF BOREHOLES

PURPOSE AND OBJECTIVE

The purpose of this procedure is to identify the standard procedure for completing/closing standard field borings used for environmental assessments and investigations. The objective is to provide standard procedures for use by field personnel.

BACKGROUND

Typically, soil borings advanced for environmental assessment purposes are completed two standard methods including geoprobe methods using direct push technology or standard drilling methods using a conventional drill rig and hollow stem augers. Soil borings that are not completed as monitoring wells will be closed by filling the holes in either of two methods:

- Using the removed soil and placing it back into the boring in the order of removal
- With a cement/bentonite grout (typically preferred for deep borings (great than 20 feet below ground surface) or when conventional hollow-stem augers are used or when specifically called for in site-specific procedures

When closure using cement/bentonite, field staff will calculate the borehole volume and compare it to the final installed volume of grout to evaluate whether bridging or loss to the formation has occurred. These calculations and the actual volume placed will be noted on the Boring Log.

PROCEDURE FOR CEMENT/BENTONITE CLOSURE

- Determine most suitable seal materials. Grout specifications generally have mixture ratios as follows:
  Grout Slurry Composition (% Weight)
  1.5 to 3.0% - Bentonite (Quick Gel)
  40 to 60 % - Cement (Portland Type I)
  40 to 60 % - Potable Water

- Calculate the volume of the borehole base on the bit or auger head diameter plus 10% and determine the volume of grout to be emplaced. Generally, the total mixed volume is the borehole volume plus 20%.

- Identify the equipment to be used for the preparation and mixing of the grout. Ensure the volume of the tanks to be used for mixing has been measured adequately. Document these volumes on the Well Abandonment/Decommissioning Log.

- Identify the source of the water to be used for the grout and determine its suitability for use. In particular, water with high sulfate, or chloride levels or heated water should not be used. These types of waters can cause operational difficulties or modify the set-up for the grout.

- Identify the equipment to be used for emplacing the grout. Ensure that the pump to be used has adequate pressure to enable complete return to surface.

- Identify the volumes to be pumped at each stage or in total if only one stage is to be used.

- Prepare the borehole abandonment plan and discuss the plan and activities with the drilling contractor prior to beginning any mixing activities.

- Begin mixing the grout to be emplaced.

- Record the type and amount of materials used during the mixing operation. Ensure the ratios are within specifications tolerance.

- Begin pumping the grout through the return line bypass system to confirm all pump and surface fittings are secure.

- Initiate downhole pumping from the bottom of the borehole. Record the times and volumes emplaced on the Well Abandonment/Decommissioning Log.

- Document the return circulation of grout. This may be facilitated by using a colored dye or other tagging method if a mudded borehole condition exists prior to grout injection.

- Identify what procedures will be used for grouting in the upper 3 feet. When casing exists in the borehole, decisions are required as to the timing for removal and final disposition of the casing. Generally, it will not be removed prior to grouting because of the potential for difficult access and loss of circulation in the upper soil or rock layers. Accordingly, when cement return is achieved at surface, the casing is commonly removed and the borehole is topped off with grout or soils. If casing removal is not possible or not desired, the casing left in place should be cut off at a depth of 5 feet or greater below ground surface. If casing is not present during grouting, the grout level in the borehole is topped off after the rods or tremie pipe is removed.

- Clear and clean the surface near the borehole.

- The uppermost five feet of the borehole at the land surface should be filled with material physically similar to the natural soils. The surface of the borehole should be restored to the condition of the area surrounding the borehole. For example, concrete or asphalt will be patched with concrete or asphalt of the same type and thickness, grassed areas will be seeded, and topsoil will be used in other areas. All solid waste materials generated during the decommissioning process must be disposed of properly.

- A follow-up check at each site should be made within one week to 10 days of completion. It should be noted that on occasion, the grout and/or surface material may settle over several days. If settling occurs, additional material physically similar to surrounding materials (i.e., asphalt, concrete, or soil) must be used to match the existing grade.

- Document borehole and/or well/piezometer decommissioning activities should be done in the field log book. If a well is decommissioned (different procedure) a Well

Abandonment/Decommissioning Log should be used.

REFERENCES

ASTM D 5299: Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities.

NYSDEC, July 1988, Drilling and Monitoring Well Installation Guidance Manual.

NYSDEC, November 2009, CP-43: Groundwater Monitoring Well Decommissioning Policy.

Driscoll, F.G., 1987, Groundwater and Wells, Johnson Division, St. Paul, Minnesota, 1089 p.

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FIELD OPERATING PROCEDURE

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FIELD OPERATING PROCEDURE

Trenching and Excavation Health & Safety

FIELD OPERATING PROCEDURE
Trenching and Excavation Health & Safety

PURPOSE AND OBJECTIVE

The purpose of this procedure is to identify the standard procedure for Trenching and Excavations used for environmental assessments and investigations. The objective is to provide standard procedures for use by field personnel. **This is one of the more acute safety hazards to construction and field environmental personnel.**

REGULATORY AUTHORITY

Excavations will be performed in accordance with OSHA 29 CFR, subpart P, 1926:650-1926.652 and USACOE EM 385-1-1 section 25 requirements as they apply to project activities.

GENERAL

At all times the need for personnel to enter excavations will be minimized. Inspections or sample removal will be done from above the excavation, whenever possible. Personnel will only enter excavations after the requirements of this plan have been met. Personnel protective equipment including hard hat, safety glasses and steel-toe work boots may be required.

SURFACE ENCUMBRANCES

Surface encumbrances such as structures, fencing, piping, stored material etc. which may interfere with safe excavations will be avoided, removed or adequately supported prior to the start of excavations. Support systems will be inspected daily.

UNDERGROUND UTILITIES

Underground utility locations will be checked and determined and permits as necessary will be in place prior to initiating excavations. Local utility companies will be contacted at least two days in advance, advised of proposed work, and requested to locate underground installations. When excavations approach the estimated location of utilities, the exact location will be determined by careful probing or hand digging and when it is uncovered, proper supports will be provided.

OVERHEAD OBSTACLES

A minimum safe distance of 20 feet will be maintained when working around overhead high-voltage lines or the line will be de-energized following appropriate lock-out and tag-out procedures by qualified utility personnel.

ENTRY/EXIT ROUTES

Excavations five feet or more deep will require an adequate means of exit, such as a ladder, ramp, or steps and located so as to require no more than 25 feet of lateral travel. Under no circumstances will personnel be raised.

VEHICLE CONTROL/SAFETY

Personnel working around heavy equipment, or who may be exposed to public vehicular traffic will wear a traffic warning vest consisting of at least 400 square inches of red or orange material. At night, at least 400 square inches of florescent or other reflective material will be worn.
For excavation work on or adjacent to highways or streets, signs, signals, and barricades tat conform to the requirements of the current American National Standards Institute (ANSI) D6.1, Manual on Uniform Traffic Control Devices for Streets and Highways will be used to protect work areas. Signs, signals, and barricades will be adequately lighted at night. Flagmen will be provided when signs, signals and barricades do not provide adequate protection. Flagmen will use signals and procedures contained in the current issue of ANSI D6.1. At night, flagmen will be clearly illuminated so as to be easily seen by approaching traffic. For mobile equipment operating next to or approaching the edge of an excavation, the operator will have a clear view of the edge of the excavation, or a warning system such as barricades, hand or mechanical signals, or stop logs will be used. If possible, the surface grade will slope away from the excavation.

Personnel will be safely located in and around the trench and will not be permitted to work underneath loads handled by lifting or digging equipment. Personnel are required to standaway from vehicles being loaded and unloaded. Operators can remain in the cabs of vehicles being loaded or unloaded provided the vehicles are equipped to provide adequate protection to the operator.

HAZARDOUS ATMOSPHERES

Hazardous atmospheres, such as oxygen deficiency (atmospheres containing less than 19.5% oxygen), flammable gases or vapors (airborne concentrations greater than 20% of the lower explosive limit), and toxic gases or vapors (airborne concentrations above the OSHA Permissible Exposure Limit or other exposure limits)may occur in excavations, especially around landfills and hazardous waste sites. In locations where oxygen deficiency or hazardous gaseous conditions are possible, the air in the excavation will be tested before personnel are permitted to enter an excavation deeper than 4 feet. When flammable gases are present, adequate ventilation will be provided and sources of ignition will be eliminated. Ventilation or respiratory protection will be provided to prevent personnel exposures to oxygen deficient or toxic atmospheres. Periodic retesting (at least each shift) of the excavation will be conducted to verify that the atmosphere is acceptable. A log or field book records will be maintained of all test results.

WATER ACCUMULATION HAZARDS

Personnel will not work in excavations that have accumulated water or where water is accumulating unless adequate precautions have been taken. These precautions can include special support or shield systems, water removal systems such as pumps, or safety harnesses and lifelines. Water removal systems will be operated and monitored by experienced personnel. Diversion ditches or dikes will be used to prevent surface water from entering the excavation and to provide adequate drainage of the area around the excavation. Adequate precautions, as described above, will be taken for excavating subject to heavy rains.

STABILITY OF ADJACENT STRUCTURES

Support systems such as shoring, bracing, or underpinning will be provided to maintain the stability of adjoining buildings, walls, or other structures endangered by the excavation operations. Excavations below a foundation or retaining wall that could be reasonably expected to pose a hazard to personnel will not be permitted unless:

- a support system is provided
- The excavation is in stable rock; or
- A Registered Professional Engineer has determined that the structure will not be effected by the excavation activity or that the excavation work will pose a hazard to employees. The Professional Engineer is required to demonstrate how the above determination was made on the basis of appropriate calculations.

Sidewalks will not be undermined unless shored to protect from possible collapse.

PROTECTION FROM LOOSE ROCK, MATERIALS OR SPOILS

In excavations and trenches that personnel may be required to enter, loose rock, excavated or other material, and spoils will be effectively stored and retained at least two feet or more from the edge of the excavation. As an alternative to the clearance prescribed above, barriers or other effective retaining devices may be used in order to prevent spoils or other materials from falling into the excavation. Walkways, runways, and sidewalks will be kept clear of excavated material from other obstructions. Scaling operations may be used to remove loose material and will be performed only by experienced crews under the direct supervision of a competent supervisor. The scalers will be provided with scaler's lifelines, safety belts, boatswain chair, and other safety equipment necessary for their protection.

FALL PROTECTION

Walkways or bridges with standard guardrails that meet OSHA specifications will be provided where employees, the public, or equipment are required to cross over excavations. Adequate barrier physical protection will be provided at all remotely located excavations. All excavations will be barricaded or covered.

EMERGENCY RESCUE

In the event of a cave-in, the Emergency Rescue Squad will be immediately notified. The caller should provide his name, location, nature of the accident (an excavation collapse), the dimensions of the excavation, and number of people trapped in the excavation. Personnel are not to enter a collapsed trench to attempt rescue. This may cause a further collapse of the trench. Under no circumstance is heavy equipment to be used to attempt rescue of personnel in a collapsed excavation; injury or decapitation could be the result. All heavy equipment and traffic in the area is to be shut down and stopped to reduce vibration. Pumps should be started if water ensues.

INSPECTION PROGRAM

Safety personnel will conduct daily inspections of the excavation, the adjacent areas, and protective systems. Inspections will be conducted prior to the start of work and as needed throughout the work shift. Inspections will also be made after every rainstorm or other occurrence that increases the hazard of collapse (i.e., vibration from heavy equipment, freezing and thawing, etc.). The excavation inspection will include a check for the following:

- Evidence if situations that could result in possible cave-in (i.e. soil crumbling or sloughing, water saturated soils, freezing and thawing, unusual vibrations such as fromheavy equipment, heavy rains, surface run off entering trench, etc.);
- Indications of failure of protective systems;
- Hazardous atmosphere (oxygen deficiency, flammable and toxic gases and vapors);
- Condition and support of exposed underground installations;
- Adequate means of egress;
- Signs, signals, and barricades for work area protection;
- Precautionary measures to control water accumulation;
- Stability and support of adjacent structures; and
- Adequate protection from loose rock and soil.

PROTECTIVE SYSTEMS

Personnel working in excavations will be protected from cave-ins by sloping and/or benching of excavation walls, a shoring system or some other equivalent means except when:

- The excavation is made entirely in stable rock; or
- Excavations are less than five feet deep and safety personnel have determined that there is no indication of potential cave-in. Depending on site and soil conditions protective measures may be taken for the excavations less than five feet in depth.

The most important factor influencing the choice of protective systems is the soil type classification. Once the soil type has been classified, selection of the protective system, the determination of the angle of repose for sloping and benching, and the design of shoring systems will be made. Decisions will be based on careful evaluation of pertinent factors such as depth of cut; possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed structures equipment, overlying material, or stored material; and vibration from equipment, blasting traffic or other sources.

Soil Classification

Appendix A of the OSHA Excavation Standard describes a method to classify soils into four types:

- Stable Rock - Solid mineral matter that can be excavated with vertical sides.
- Type A - cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) or greater. Examples include: clay; silty clay; sandy clay; clayey loam; and cemented soils such as caliche and hardpan. No soil is considered to be Type A if it is fissured, subject to vibration, previously disturbed, or part of a sloped, layered system.
- Type B - cohesive soils with an unconfined compressive strength of greater than 0.5 tsf

but less than 1.5 tsf. Examples include: angular gravel similar to crushed rock; silt; silty loam; and sandy loam; Type B soils also include : previously disturbed soils that are not type C; Type A soils that are fissured or subject to vibration; and dry rock that is not stable.

- Type C - cohesive soils with an unconfined compressive strength of 0.5 tsf or less. Examples include: gravel; sand; loamy sand; submerged soil or soil from which water is seeping; submerged rock that is not stable.

The engineer, geologist, or safety personnel will conduct at least one visual and at least one manual test
as described in the OSHA excavation standard in order to classify soils. Visual tests include looking
for : particle size and soil cohesiveness (clumping); cracking in the excavation sides which suggests fissured material; underground installations and previously disturbed soils; layered soil systems that slope toward the excavation; evidence of surface water and water seeping from the sides of the excavation; and sources of vibration that may affect the excavation stability. Manual tests include: plascticity; dry strength; thumb penetration; drying test; and strength tests using a pocket penetrometer or hand-operated shearvane.

Sloping and Benching

One of the following options for sloping and benching systems described in section 1926.652(b) of the OSHA Excavation Standard will be used in excavations of .5 foot or deeper or at the discretion of the safety personnel:

- The walls of excavation will be sloped at an angle not steeper than 0ne-and one-half horizontal to one vertical. Sloping configurations will follow the slopes shown for Type C soils in Appendix B of the OSHA Excavation Standard.
- Maximum allowable slopes and sloping and benching configurations will be determined according to soil type as described in Appendices A and B of the OSHA Excavation Standard.
- Use of other written tabulated data and designs, such as tables and charts, to design sloping and benching systems. A copy of the tabulated data must be approved by a registered Professional Engineer. A copy of the tabulated data must be kept at the job site. Personnel are not allowed to work on the faces of sloped or benched excavations above other workers unless the workers at the lower levels are protected from falling material or equipment. Similar protection will be provided for personnel working in excavations below other workers.

Support Systems, Shield Systems, and Other Protective Devices

One of the following options described in OSHA (1926.652 (c)) will be followed.

- Timber shoring, designed according to the conditions and requirements of Appendix C of the OSHA Excavation Standard or aluminum hydraulic shoring designed according to manufacturers tabulated data or Appendix D of the OSHA Excavation Standard. In order to use the information in Appendices C or D, the soil type must first be determined using the classification system in Appendix A. For each soil type the size and spacing of the cross braces, uprights, and walls that comprise the shoring system are then selected based on the depth and width of the trench.
- Use of the manufacturer's written tabulated to design support systems, shielded systems,

and other protective devices. Any deviation from this tabulated data must be approved by the manufacturer. A copy of the tabulated data as well as any approvals to deviate from the tabulated data must be kept at the job site.

- Use of other written tabulated data to design support systems, shield systems, and other protective devices. The tabulated data must be approved by a Registered Professional Engineer. A copy of the tabulated data must be kept at the job site.
- Use of a written support system, shield system, and other protective device design that has been approved by a Registered Professional Engineer. A copy of the written design must be kept at the job site.

Installation and Removal of Support

Cross braces or trench jacks, uprights, and walls will be secured together to prevent sliding, falling or kickouts. Additional precautions byway of shoring and bracing will be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery, or any other source. If it is necessary to place or operate power shovels, derricks, trucks, materials, or other heavy objects on a level above or near any excavation, the side of the excavation will be sheet piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads. Backfilling and removal of trench progress together from the bottom of the trench. Jacks or braces will be released slowly and , in unstable soil, ropes will be used to pull out the jacks or braces from above after employees have cleared the trench.

Shield Systems

Portable trench boxes or sliding trench shields may be used for protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they will be designed, constructed and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench. Shields will be installed so as to restrict lateral or other hazardous movement. Personnel are not allowed inside shields when shields are being moved.

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FIELD OPERATING PROCEDURE

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FIELD OPERATING PROCEDURE

GROUNDWATER SAMPLING

FIELD OPERATING PROCEDURE
GROUNDWATER SAMPLING

PURPOSE AND OBJECTIVE

The purpose of this procedure is to identify the standard procedure for sampling groundwater performed during environmental assessments and investigations. The objective is to provide standard procedures for use by field personnel. The following are standard procedures. However, procedures will be specific to the project objectives. Typically, approved professional drilling contractors follow these standard procedures and they should be reviewed with the Niagara Engineering field personnel and drilling personnel prior to completing groundwater wells for sampling.

GROUNDWATER SAMPLING

Well Installation Procedures

The following procedure outlines a NYSDEC-approved method of constructing groundwater wells within unconsolidated material to monitor groundwater elevation and acquiring groundwater samples for laboratory testing. These should be reviewed with the drilling contractor prior to installation. The well screen is 4" Schedule 40 pipe with 0.010 slot size. The following is a step-by-step method for the open-hole method of installing a groundwater well once a boring or augured hole has been drilled to a desired depth within the subsurface:

- Thread a cap on the bottom section of well screen. If more than one section of well screen is required, thread the last section.
- Lower the screen into the borehole with the riser section ready.
- Add the riser sections to the screen. Do not drop the screen in the borehole.
- Add riser sections as required until the bottom screen section touches the bottom of the borehole.
- If completing the well with a road box, mark the riser two inches below the lid of the road box and then cut the riser.
- Place a slip cap over the top of the rise section.
- Place sand in the space between the borehole and the PVC screen and riser to the required depth. Place the sand in very slowly so it does not bridge in the well bore.
- Place bentonite and cement above the sand-pack.
- Grout in the road box with concrete mix.

Well Development Procedures

At least 24 hours after completion of drilling and installation, well development is completed through pumping or bailing until the discharged water is relatively sediment free and the indicator parameters (e.g., pH, temperature, specific conductivity, etc.) have reached steady-state. Development removes sediment and can improve the hydraulic properties of the sand pack. The effectiveness of this process is monitored to minimize the volume of discharged waters to obtain sediment-free samples. As approved by the regulatory agency, well development water can be discharged onto the ground surface downgradient of the well. Otherwise, this water must be containerized and sampled prior to discharge or disposal.

Select an appropriate well development method based upon water depth, well productivity, and sediment content of the water. Well development options include: (a) bailing; (b) manual pumping; and (c) submersible pumps. These options utilized with surging of the well screen using an appropriately sized surge block.

Decontaminate, as needed, and assemble equipment in the monitoring well based upon the method selected. Care should be taken not to introduce contaminants into the equipment or well during installation.

Proceed with development by repeated removal of water from the well until the discharged water is relatively sediment-free (i.e., < 50 NTUs). Volume of water removed, pH, temperature and conductivity measurements are recorded on the Well Development/Purging Logs.

Well Purging Procedures

To collect representative samples, groundwater wells must be adequately purged prior to sampling. Purging will require removing three to five volumes of standing water in rapidly recharging wells and at least one volume from wells with slow recharge rate. In addition to the required well volumes, water quality parameters (pH, temperature, specific conductivity and turbidity) should have stabilized prior to sampling. Sampling should commence as soon as adequate recharge has occurred. Although not required, it is recommended that purging and sampling occur at least 24 hours after development. Procedures as follows:

- Remove well cover ensuring no foreign material enters the well.
- Monitor the interior of the riser pipe for organic vapors using a PID. If reading of greater than 5 ppm is recorded, the well will be vented until levels are below 5 ppm before pumping is started.
- Measure the water level below top of casing using an electronic water level indicator.
- Determine the volume of water within the well by knowing the total depth of the well.
- Wash the end of the probe with soap and rinse with deionized water between wells.
- Calibrate field instruments for measuring water quality parameters (e.g., pH, specific conductance, turbidity, etc.)
- In all wells, a peristaltic pump will be used to purge the required water volume (i.e., until stabilization of pH, temperature specific conductivity and turbidity). If depths to water exceed about 25 feet below ground, bailers and/or submersible pumps may be used.
- Utilize dedicated, new polyethylene bailers and tubing for sampling. If sampling for emerging contaminants such a PFAS, HDPE bailers and tubing must be used.
- Purge until the required volume is removed. If the well purges to dryness and recharges within 15 minutes, purging can continue as it recharges. If the well purges to dryness and recharge is greater than 15 minutes, purging is terminated and sampling can occur as soon as the well recharges.
- Calculate well volumes and record measurements for pH, temperature, turbidity, and conductivity during the purging along with physical observations.

Well Sampling Procedures

Sampling procedures include:

- Perform well sampling within 24 hours of purging if well has recovered sufficiently to sample. If sufficient volume for analytical testing cannot be obtained from a well or if recharge exceeds 24 hours, then DEC should be consulted on analytical priorities and validity of the sample.
- Collect sample using appropriate containers.
- Label sample bottles using a waterproof permanent marker per procedures outlined below.

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FIELD OPERATING PROCEDURE

Niagara Engineering

FIELD OPERATING PROCEDURE

Heat Stress Management Program and Procedures

FIELD OPERATING PROCEDURE
HEAT STRESS MONITORING

PURPOSE AND OBJECTIVE

The purpose of this procedure is to identify the standard procedure for heat stress monitoring used for environmental assessments and investigations. The objective is to provide standard procedures for use by field personnel. **This is one of the more acute safety hazards to construction and field environmental personnel.**

BACKGROUND

Niagara Engineering employees engage in a variety of activities with potential exposure to excessive ambient temperatures and humidity, with the overall result being a potential for heat stress. This procedure establishes the Niagara Engineering Heat Stress Management Program. It establishes responsibilities and basic requirements for personnel who may be required to work in situations where the ambient temperature exceeds 70 degrees Fahrenheit while wearing protective equipment (e.g., hazardous waste site investigations) or when the ambient temperature exceeds 85 degrees Fahrenheit while wearing normal clothing. Because heart stress is one of the most common and potentially serious illnesses at job sites and particularly hazardous waste sites, regular monitoring and other preventive measures are warranted.

There are no regulations addressing heat stress. However, it should be noted that OSHA does recognize heat as a potentially serious health hazard and can fine employers under the general duty clause of the Occupational Safety Health Act if heat-related illness is occurring or likely to occur.

PROGRAM ADMINISTRATION AND RESPONSIBILITIES

The Heat Stress Management Program is administered by Niagara Engineer's Managers and Health and Safety personnel. These Individuals:

- Oversee the implementation of the Heat Stress Management Program;
- Periodically audit and evaluate program implementation;
- Evaluate this procedure on an ongoing basis to see that it reflects current practice and regulations;
- Assist field crews in their implementation of this procedure.

Project Managers (PM) and Safety Personnel are responsible for:

- Implementing this Procedure in all field operations
- Providing guidance to staff regarding heat stress management as described in the Procedure; and
- Providing feedback to management regarding program effectiveness.

Staff Members are responsible for:

- Complying with this Procedure as it applies to their activities; and
- Providing feed back to their supervisor regarding program effectiveness.

HEAT STRESS HAZARDS AND RISK FACTORS

Heat Stress is defined as the total net load on the body with contributions from both exposure to external sources, such as sunshine and hot surfaces, and from internal metabolic heat production. A person's exposure to the increased ambient temperatures and humidity produces physiological responses referred to as heat stress which are characterized by an increase in the: a) core or deep body temperature. b) heart rate, c) blood flow to the skin, and d) water and salt loss due to sweating. Conditions of excessive heat stress may occur either when the physical work is too heavy, or the environment is too hot in relation to the work being performed. If work is performed under hot environmental conditions, the workload effort must be reviewed and the heat exposure limit maintained at or below the levels to protect the worker from the risk of acute heat illness.

In general, there are four types of physiological disorders associated with heat stress. They include:

- Heat Rash - a skin reaction occurring as a result of obstructed sweat glands, often associated with impermeable clothing.
- Heat Cramps – painful muscle spasms of extremities and abdomen, resulting from inadequate balance of electrolytes which are lost from sweating.
- Heat Exhaustion - a mild form of heat stroke due to depletion of body fluids and electrolytes. Blood vessels dilate despite decreased volume of blood. Symptoms include weakness, dizziness, nausea, rapid pulse, and a small increase in body temperature.
- Heatstroke - a potentially fatal disorder resulting from failure of the body=s thermoregulatory system. The classical description of heatstroke includes (1) a major disruption of central nervous function (unconsciousness of convulsions), (2) a lack of sweating (3) hot, dry, red or mottled skin, and (4) a core temperature in excess of 41oC (105.8o F). Heatstroke is a serious medical condition which calls for emergency medical action.

Seven factors play significant roles in the development of or predisposition to, heat stress disorders. These factors include:

- Acclimatization - Heat acclimatization leads to increased and quicker sweating, cooler skin due to an increase in evaporative cooling and a lower, more stable core body temperature. Maximal sweating rates in unacclimatized persons are lower, but salt concentrations in their perspiration are higher, requiring a higher rate of salt replacement.
- Age - Older individuals are generally more susceptible to heat stress than younger individuals. However, older healthy workers are able to perform well in hot jobs if permitted to proceed at a self-regulated pace.
- Gender - The average woman has a lower aerobic capacity than a similar-sized man. Nevertheless, when working at similar proportions of their maximum aerobic capacity, women perform similarly or only slightly less well than men.
- Body Fat - The lower level of physical fitness, decreased maximum work capacity and decreased cardiovascular capacity frequently associated with obesity predispose

individuals to heat disorders.

- Water and Electrolyte Balance - Sustained, effective work performance in heat requires a drinking, continued sweating will draw on water reserves from both tissues and body cells leading to dehydration.
- Use of Alcohol and Medication -Notwithstanding the potential hazards from impaired coordination and judgment, the ingestion of alcohol before or during work in the heat should not be permitted because it reduces heat tolerance and increases the risk of heat illness, Many drugs, including diuretics and antihypertensives, can interfere with the body's thermoregulation.
- Physical Fitness - Physical conditioning enhances heat tolerance by increasing the functional capacity of the cardiovascular system, and reduces the time required to develop heat acclimatization by about 50% over those not physically fit.

The factors listed above are to be taken into account by all project personnel when planning or executing a project subject to heat stress conditions. The factors should be taken into consideration for:

- the development of the project schedule;
- the ordering of supplies/equipment;
- the support facilities to be made available at the site;
- the execution of work tasks; and
- the after work hours activities.

The following is a summary of signs and symptoms of heat stress:

Heat Rash may result from continuous exposure to heat or humid air .

Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: Muscle Spasms and Pain in the hands, feet and abdomen.

Heat Exhaustion occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: Pale, cool and moist skin, Heavy sweating, Dizziness, fainting and nausea

Heat stroke is the most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate actionmust be taken to cool the body before serious injury or death occurs. Competent medical help must be obtained. Signs and symptoms are: Red, hot and unusually dry skin, Lack of or reduced perspiration, Dizziness and confusion, and Strong, rapid pulse and coma.

HEAT AND STRESS PREVENTION

Preventive measures should be taken to prevent personnel from experiencing heat stress illness. Prevention of heat stress is also important because if an individual has experienced a heat illness incident, he has an increased likelihood of future occurrences. Preventive measures include: favorable work scheduling, acclimatization of workers to hot environments, drinking sufficient quantities of fluids, providing cool, sheltered work and rest areas, and utilizing cooling devices as appropriate of feasible. Heat stress monitoring/work rest regimens are discussed below.

Work Schedules and Activity

If possible, work should be scheduled during the coolest part of the day. Early morning and evening work can be considerably more effective than working midday when the additional time for breaks and heat stress monitoring are taken into account. Employees should also be encouraged to maintain a certain level of activity during the work shift. Prolonged standing in hot environments can lead to heat illness because the blood pools in the lower extremities. Workers should periodically walk about to encourage blood circulation from the feet and legs.

Acclimatization of Workers

A properly designed and applied heat acclimatization program will dramatically increase the ability of workers to work at a hot job and will decrease the risk of heat-related illnesses and unsafe acts. Heat acclimatization can usually be induced in 5 to 7 days of exposure to the hot job. For workers who have had previous experience with the job, the acclimatization regimen should be exposure for 50% on day 1, 60% on day 2, 80% on day 3 and 100% on day 4. For workers new to job the schedule should be 20% on day 1 with a 20% increase in each additional day. Acclimatization can be induced by sustained elevations of the skin and core body temperatures above levels for the same work in cool environments for an hour or more per day. Acclimatization needs periodic reinforcement such as occurs daily during the work week. Persons may show some loss of acclimatization on the first day of the new shift after being idle for two days or over a weekend. After vacations of two weeks or longer he loss of acclimatization is substantial, several days at work will be needed before heat tolerance is fully restored.

Drinking Sufficient Quantities of Fluids

Under hot conditions where sweat production may reach 6 to 8 liters per day, voluntary replacement of the water lost is usually incomplete. The normal thirst mechanism is not sensitive enough to urge us to drink enough water to prevent dehydration. Individuals are seldom aware of the exact amount of seat they produce of how much water is needed to replace that lost in sweat; 1 liter/hour is not an uncommon rate of water loss. Every effort should be made to encourage individuals to drink water, low-sodium noncarbonated beverages or electrolyte replacement fluids (e.g., Gatorade). Lightly salted water (1 gram/liter of water (0.1%) or one level teaspoon per 15 quarts of water), should be provided to unacclimated workers. The salt should be dissolved completely, and the water kept cool. Salt tablets as dietary supplements are not generally recommended. Workers should drink at least 500 ml (one pint) of water before beginning work. The fluid should be maintained at temperatures of 10o to 15o (50 to 59o F). If possible, small quantities of fluids should be consumed at frequent intervals (e.g., 150 to 250 milliliters (ml), or at least a quarter pint, every 20 minutes) rather than the intake of 750 ml (3 cups) or more once per hour. Individuals vary, but water intake should total 4 to 8 liters (quarts) per day. When heat stress is considered a potential problem, a minimum of 1 liter/hour/person of water are to be maintained onsite. Individual paper or plastic cups will be provided in order to prevent the spread of communicable disease.

Alcohol and diuretics such as caffeine (contained in coffee, tea and soft drinks) can increase dehydration. Therefore employees with potential exposure to heat stress should be discouraged from the consumption of these types of fluids during and after working hours.

Cool, sheltered Work and Rest Areas

Exposure to direct sunlight significantly increases the overall thermal loading of the body, thereby increasing an individuals susceptibility to heat stress illnesses. Whenever possible work should be conducted under suspended tarps, in shady areas or in other sheltered areas in order to reduce thermal loading caused by the sun. Cool sheltered areas should be provided also for rest breaks. A rest area should be situated so that part of it is in the contamination reduction area so that workers can take breaks without being required to undertake a full decontamination procedure. Canopies or tarps and open air tents, are types of cool shelters which can provide shaded rest areas.

Cooling Devices

Auxiliary cooling devices can be successfully used to provide body cooling, especially to workers wearing protective garments at hazardous waste sites. Vortex coolers utilize high velocity air which is directed inside the protective clothing. Vortex coolers have been used successfully in some operations. Cooling vests utilizing blue ice type packs can provide some cooling to the torso, but add weight for the wearer and can inhibit body movements. Newer, more sophisticated tube and refrigerant systems woven into undergarments are also available. However, some of these systems ,,may not be effective in situations where the work involves considerable motion, since bending and lifting can crimp the tubes, impending the flow of refrigerant.

Heat Stress Monitoring

Several heat stress monitoring systems have been devised to help manage heat stress in hot work environments. Panamerican performs heat stress monitoring when: 1) employees are wearing normal work clothing in ambient temperatures exceeding 85 degrees F and 2) employees wearing chemical protective clothing (including paper coveralls) working in ambient temperatures exceeding 70 degrees F. The temperature differential is related to the reduced ability of a person to maintain a core temperature of 98.6 degrees F when wearing chemical protective clothing.

It should be noted by personnel that there are no fast and true methods of heat stress monitoring; likewise there are no regulations concerning heat stress monitoring. Individual susceptibility to heat stress is highly variable. Some individuals are highly susceptible to any increase in their internal body temperature while other individuals can work very well with internal body temperatures of 102.2 degrees F or higher.

The heat stress monitoring systems should be used by Site Safety Officers as guidelines and not necessarily as hard, fast rules. Individuals working in elevated temperatures should be queried on a regular basis regarding their perceived state of heat stress. If the calculated heat stress index value indicates that work can continue but a person states that they believe they are experiencing heat stress, the work effect should be discontinued, and a rest break taken. Likewise, if the calculated heat stress index value indicates that a rest break should be taken but the workers believe they can work longer, they should be permitted to work longer providing that their heart rates do not exceed 110 beats per minute. If the individual’s heart rate rates exceed 110 beats per minute a rest break will be taken. In all cases, individual workers should not be permitted or expected to perform excessive work which could result in heat stress. If a SSO has any concerns that an individual may be pushing himself/herself past the breaking point work/rest regimens will be followed.

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FIELD OPERATING PROCEDURE

Niagara Engineering

FIELD OPERATING PROCEDURE

Documentation Requirements for Drilling and Well Installation & Well Installation

FIELD OPERATING PROCEDURE REQUIREMENTS FOR DRILLING AND WELL INSTALLATIONS

PURPOSE AND OBJECTIVE

The purpose of these requirements is to document the procedures used for drilling and installing wells in order to ensure the quality of the data obtained from these operations. Niagara Engineering field technical personnel will be responsible for developing and maintaining documentation for quality control of field operations. At least one field professional will monitor each major operation (e.g. one person per drilling rig) to document and record field procedures for quality control. These procedures provide a description of the format and information for this documentation.

Procedure

Personnel assigned by the Niagara Engineer Project Manager will maintain a Project Field Book for all site activities. These Field Books will be started upon initiation of any site activities to document the field investigation process. The Field Books will meet the following criteria:

Permanently bound, with nominal 8.5-inch by 11-inch gridded pages. Water resistant paper. Pages must be pre-numbered or numbered in the field, front and back. Notations in the field book will be in black or blue ink that will not smudge when wet. Information that may be recorded in the Field Book includes:

- Time and date of all entries.
- Name and location of project site and project job number.
- Listing of key project, client and agency personnel and telephone numbers.
- Date and time of daily arrivals and departures, name of person keeping the log, names and affiliation of persons on site, purpose of visit (if applicable), weather conditions, outline of project activities to be completed.
- Details of any variations to the procedures/protocols (i.e., as presented in the Work Plan or Field Operating Procedures) and the basis for the change.
- Field-generated data relating to implementation of the field program, including sample locations, sample descriptions, field measurements, instrument calibration, etc.
- Record of all photographs taken in the field, including date, time, photographer, site location and orientation, sequential number of photograph, and roll number.

Upon completion of the site activities, all Field Books will be photocopied and both the original and photocopied versions placed in the project files. In addition, all field notes except those presented on specific field forms will be neatly transcribed into Field Activity Daily Log (FADL) forms. Field Borehole Log and Field Borehole/Monitoring Well Installation Log forms are required. One form will be completed for every boring by Niagara Engineering field person overseeing the drilling. At a minimum, these forms will include:

- Project name, location, and number.
- Boring number.

- Rig type and drilling method.
- Drilling dates.
- Sampling method.
- Sample descriptions, to meet the requirements of the Unified Soil Classification System (USCS) for soils and the Unified Rock Classification System (URCS) for rock.
- Results of photoionization evaluations (scan and/or headspace determinations).
- Blow counts for sampler penetration (Standard Penetration Test, N-Value), if obtained.
- Drilling rate, rig chatter, and other drilling-related information, as necessary.

All depths recorded on Boring/Monitoring Well Installation Log forms will be expressed in increments tenths of feet, and not in inches. One form will be completed for every boring by the Niagara Engineering field person overseeing the well installation. At a minimum, these forms will include: Project name, location, and number; Well number; Installation dates; Dimensions and depths of the various well components illustrated in the Well Completion Detail. These include the screened interval, bottom caps or plugs, centralizers, and the tops and bottoms of the various annular materials, drilling rate, rig chatter, and other drilling related information.

All depths recorded on Field Borehole/Monitoring Well Installation Logs will be expressed in tenths of feet, and not in inches. An example of this form is attached to this Field Operating Procedure. This form should be used to summarize all drilling activities. One form should be completed for each rig for each day. These forms will include summaries of: Footage drilled, broken down by diameter (e.g. 200 feet of 6-inch diameter hole, 50 feet of 10-inch diameter hole). Footage of well and screen installed, broken down by diameter. Quantities of materials used, including sand, cement, bentonite, centralizers, protective casings, traffic covers, etc. recorded by well or boring location. Active time (hours), and activity (drilling, decontamination, development, well installation, surface completions, etc.). Down-time (hours) and reason. Mobilizations and other events. Other quantities that will be the basis for drilling invoices. The form should be signed daily by both the Niagara Engineering field supervisor and the drillers representative, and provided to the Field Team Leader.

Other Project Field Forms

Well purging/well development forms, test pit logs, environmental sampling field data sheets, water level monitoring forms, and well testing (slug test or pumping test) forms. Refer to specific guidelines for form descriptions.

Well Installation Procedures

The following procedure outlines a NYSDEC-approved method of constructing groundwater wells within unconsolidated material to monitor groundwater elevation and acquiring groundwater samples for laboratory testing. The well screen is 4” Schedule 40 pipe with 0.010 slot size. The following is a step-by-step method for the open-hole method of installing a groundwater well once a boring or augured hole has been drilled to a desired depth within the subsurface:

1. Thread a cap on the bottom section of well screen. If more than one section of well screen is required, thread the last section.
2. Lower the screen into the borehole with the riser section ready.
3. Add the riser sections to the screen. Do not drop the screen in the borehole.
4. Add riser sections as required until the bottom screen section touches the bottom of the

borehole.

5. If completing the well with a road box, mark the riser two inches below the lid of the road box and then cut the riser.
6. Place a slip cap over the top of the rise section.
7. Place sand in the space between the borehole and the PVC screen and riser to the required depth. Place the sand in very slowly so it does not bridge in the well bore.
8. Place bentonite and cement above the sand-pack.
9. Grout in the road box with concrete mix.

Well Development Procedures

At least 24 hours after completion of drilling and installation, well development is completed through pumping or bailing until the discharged water is relatively sediment free and the indicator parameters (e.g., pH, temperature, specific conductivity, etc.) have reached steady-state. Development removes sediment and can improve the hydraulic properties of the sand pack. The effectiveness of this process is monitored to minimize the volume of discharged waters to obtain sediment-free samples. As approved by the regulatory agency, well development water can be discharged onto the ground surface downgradient of the well. Otherwise, this water must be containerized and sampled prior to discharge or disposal.

1. Select an appropriate well development method based upon water depth, well productivity, and sediment content of the water. Well development options include: (a) bailing; (b) manual pumping; and (c) submersible pumps. These options utilized with surging of the well screen using an appropriately sized surge block.
2. Decontaminate, as needed, and assemble equipment in the monitoring well based upon the method selected. Care should be taken not to introduce contaminants into the equipment or well during installation.

3. Proceed with development by repeated removal of water from the well until the discharged water is relatively sediment-free (i.e., < 50 NTUs). Volume of water removed, pH, temperature and conductivity measurements are recorded on the Well Development/Purging Logs.

Well Purging Procedures

To collect representative samples, groundwater wells must be adequately purged prior to sampling. Purging will require removing three to five volumes of standing water in rapidly recharging wells and at least one volume from wells with slow recharge rate. In addition to the required well volumes, water quality parameters (pH, temperature, specific conductivity and turbidity) should have stabilized prior to sampling. Sampling should commence as soon as adequate recharge has occurred. Although not required, it is recommended that purging and sampling occur at least 24 hours after development.

1. Remove well cover ensuring no foreign material enters the well.
2. Monitor the interior of the riser pipe for organic vapors using a PID. If reading of greater than 5 ppm is recorded, the well will be vented until levels are below 5 ppm before pumping is started.
3. Measure the water level below top of casing using an electronic water level indicator.
4. Determine the volume of water within the well by knowing the total depth of the well.
5. Wash the end of the probe with soap and rinse with deionized water between wells.

6. Calibrate field instruments for measuring water quality parameters (e.g., pH, specific conductance, turbidity, etc.)
7. In all wells, a peristaltic pump will be used to purge the required water volume (i.e., until stabilization of pH, temperature specific conductivity and turbidity). If depths to water exceed about 25 feet below ground, bailers and/or submersible pumps may be used.
8. Utilize dedicated, new polyethylene bailers and tubing for sampling. If sampling for emerging contaminants such a PFAS, HDPE bailers and tubing must be used.
9. Purge until the required volume is removed. If the well purges to dryness and recharges within 15 minutes, purging can continue as it recharges. If the well purges to dryness and recharge is greater than 15 minutes, purging is terminated and sampling can occur as soon as the well recharges.
10. Calculate well volumes and record measurements for pH, temperature, turbidity, and conductivity during the purging along with physical observations.

Well Sampling Procedures

1. Perform well sampling within 24 hours of purging if well has recovered sufficiently to sample. If sufficient volume for analytical testing cannot be obtained from a well or if recharge exceeds 24 hours, then DEC should be consulted on analytical priorities and validity of the sample.
2. Collect sample using appropriate containers.
3. Label sample bottles using a waterproof permanent marker per procedures outlined below.
4. Use verifiably clean sample bottles (containing required preservatives) and place samples on ice in coolers for transport to the analytical laboratory, who will certify bottles are analyte-free.
5. Initiate chain-of-custody.
6. Record well sampling data field notebook and on the Well Development/Purging Log.

Attachments

Field Activity Daily Log; Field Borehole Log; Field Borehole/Monitoring Well Installation Log; Stick-up Well/Piezometer Completion Detail, Flush-mount Well/Piezometer Completion Detail; Daily Drilling Report (sample)

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FIELD OPERATING PROCEDURE

Niagara Engineering

FIELD OPERATING PROCEDURE

SAMPLE DOCUMENTATION, CONTAINER SELECTION, LABELING, & SHIPPING

FIELD OPERATING PROCEDURE
SAMPLE DOCUMENTATION, CONTAINER SELECTION, LABELING, & SHIPPING

PURPOSE AND OBJECTIVE

The purpose of these requirements is to document the procedures used for sample documentation, Container selection, labeling and shipping. These procedures provide a description of the format and information for this documentation.

SAMPLE DOCUMENTATION

Each soil, groundwater and other samples are logged in a bound field notebook by the technician or geologist. Field notes should include, but are not limited to the following:

- descriptions of subsurface material encountered during sampling,
- sample numbers and types of samples recovered, and
- date and time of sampling event.

The technician or geologist also completes a daily drilling or sampling record and chains-of-custody for all samples collected that are being transported to the laboratory. Once sampling program is complete, the geologist or technician transfers field notes/logs onto standard forms (e.g., boring logs, sampling logs, daily reports, etc.) to be included with the formal investigation report.

SAMPLING CONTAINER SELECTION

The selection of sample containers is based on the media being sampled and the required analysis. Container selection should be completed in advance of mobilizing into the field with close communications with the laboratory. For RIWPs, sample containers and documentation are defined represented in RIWP tables.

SAMPLE LABELING

The following procedure helps to prevent misidentification of samples and to clarify the location and purpose of environmental samples collected during the investigation:

- Fix a non-removable (when wet) label to each container.
- Wrap each sample bottle within 2-inch cellophane tape.
- Write the following information with permanent marker on each label:
    - A. Site name
    - B. Sample identification
    - C. Project number
    - D. Date/time
    - E. Sampler's initials
    - F. Sample preservation
    - G. Analysis required

Each sample is assigned a unique identification alpha-numeric code, such as RR-ss1 or WS-TP1 (2-3'), where the abbreviations represent RR – River Road (site), surface sample 1 and Waste Site, test pit 1, obtained at 2-3' bgs. Other common abbreviations include the following:

- BH = Geoprobe Borehole
- SW = Surface Water
- SED = Sediment
- SB = Soil Boring
- MSB = Matrix Spike Blank
- NSS = Near Surface Soil (1' - 2' depth)
- EB = Equipment Rinse Blank
- HW = Hydrant Water (Decon/Drilling Water)
- GW = Groundwater
- TB = Trip Blank
- RB = Rinse Blank
- MS/MSD =Matrix Spike/Matrix Spike Duplicate

SAMPLE SHIPPING

Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for (1) presenting analytical results in a legal or regulatory forum (e.g., evidence in litigation or administrative hearings), (2) minimizing loss or misidentification of samples, and (3) ensuring that unauthorized persons do not tamper with collected samples.

The following chain-of-custody guidelines should be utilized during sample collection as outlined in and prepared by the National Enforcement Investigations Center (NEIC) Policies and Procedures of the USEPA Office of Enforcement:

- Complete chain-of-custody record with all relevant information.
- Send original chain with the samples in a sealed, waterproof bag taped inside the sample cooler.
- Place adequate inert cushioning material (e.g., corrugated plastic, polypropylene foam wrap, etc.) in bottom of cooler.
- Place bottles in cooler so they do not touch (use cushioning material for dividers).
- Place VOA vials in sealed/waterproof bags in the center of the cooler.
- Pack cooler with ice in sealed/waterproof plastic bags.
- Pack cooler with cushioning material.
- Place any additional paperwork in sealed bag with original chain.
- Tape cooler drain shut.
- Wrap cooler with packing tape at two locations to secure lid. Do not cover labels.
- Place lab address on top of cooler.
- Ship samples via overnight carrier the same day that they are collected.
- Label cooler with "This side up" on all sides and "Fragile" on at least two sides.
- Fix custody seals on front right and left of cooler and cover with packaging tape.

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FIELD
OPERATING
PROCEDURE

Niagara Engineering

FIELD OPERATING PROCEDURE

TEST TRENCHING, GEOPROBE & HOLLOW STEM AUGER OPERATIONS & SOIL SAMPLING

FIELD OPERATING PROCEDURE
SOIL SAMPLING

PURPOSE AND OBJECTIVE

The purpose of this procedure is to identify the standard procedure for sampling fill and soil performed during environmental assessments and investigations. The objective is to provide standard procedures for use by field personnel. Sampling soil sampling will include surface materials, fill materials and native soils and are typically completed using heavy equipment such as backhoes during test trenching and geoprobe and conventional drill rigs for completing soil borings and during well installations.

STANDARD PROCEDURES

GENERAL SOIL SAMPLING

Soil samples are obtained as outlined in the investigation work plans and typically follow the following general protocol:

- Complete visual observations, field screening and soil descriptions during test trenching or boring core stratigraphy as each proceeds.
- Sample soil, and record depth and any physical characteristics (e.g., contamination, odor, discoloration, debris, etc.) in the logbook.
- Quickly place the calibrated PID into the exposed soil and record the instrument readings in the logbook.
- Samples should be collected at locations and frequency per the Work Plan and QA/QC Plan.

Decontaminate sampling implements after use and between sample locations. In most cases, dedicated sampling equipment is utilized thereby eliminating the need for equipment decontamination. If dedicated equipment is not used, “dry” decontamination will be applied and “wet” as necessary.

Each sample container should be labeled with the appropriate sample identification and place samples in a cooler (cooled to 2-4 degrees C.) for shipment to the laboratory. Please note, while it is common to label sample lids using a “sharpe” pen during the field sampling, this should not be done on/around containers for PFAS sampling.

TEST PIT PROCEDURES

Test trench/pit sampling is a standard method of soil sampling to obtain representative samples for identification as well as to serve as a means of obtaining a significant amount of information about the subsurface. The following steps describe the standard Niagara Engineering procedures for test pit operations.

Field Preparation

- Verify underground utilities have been found.

- Review scope of work, safety procedures and communication signals with site personnel.
- Pre-clean the sampling equipment prior to use, as necessary or use pre-cleaned dedicated equipment.
- Mark and review trench locations. The work plan may have pre-selected location but specific locations are determined in the field and are selected based on areas of visible or potential surface contamination or debris, pre-determined locations representing specific site areas, and field obstructions.

Excavation and Sample Collection

- Always check for underground and overhead utilities before positioning the backhoe at every location. It is good procedure to pre-walk the planned work areas with the operator prior to starting work.
- Position backhoe/equipment into appropriate area considering direction of excavation, obstructions, safety concerns, etc.
- Commence excavation with the backhoe upwind of the excavation, as possible.
- Ensure continuous air monitoring has been activated.
- Screen soil regularly for VOCs as excavation progresses and soil is stockpiled.
- As directed by field technician for each test trench, topsoil, or cover soil (if any) is excavated and placed on on the ground or on poly/plastic sheeting if planned or if petroleum/chemical contaminated soil is encountered.
- Soil/material below the topsoil is excavated to the depth as directed by field technician and placed on poly/plastic sheeting separate from the topsoil/cover soil.
- Segregate ‘clean’ material from impacted material, as possible, using visual observations and PID screening.
- Record geologic log as trenches are excavated visually inspecting subsurface material for discoloration or staining and documenting pit/trench with photos. The following information will be recorded for each test pit log:
    - Depth, length, and width of the excavation.
    - Description of each lithological unit including depth and thickness of distinct soil, fill, or rock layers.
    -Description of any man-made impacts or apparent contamination.
    - Depth to groundwater and bedrock, if encountered.
- Collect soil samples using dedicated stainless-steel spoons, wooden devices or directly into soil jars directly from the bucket of the backhoe at ground surface. No personnel shall enter the excavation to collect samples unless provisions in the HASP have been addressed for entering an excavation.
- Place each soil sample directly into appropriate sample bottles/jars.
- Clearly label the sample bottles and jars.
- Place each jar in an ice-filled cooler.
- Ship samples to the laboratory as soon as possible, but no later than 24 hours after collection.
- Document the types and numbers of samples collected on Chain-of-Custody.
- Record time and date of sample collection and a description of the sample and any associated air monitoring measurements in the field logbook.
- After sampling, backfill and compact (e.g., bucket and equipment tracks/wheels) the excavated material from each trench or pit prior to moving to next location.
- Backfill with indigenous soil in the order in which the material was removed with the topsoil/cover soil placed last to cover the trench, placing impacted material at bottom of

pit/trench and covering with ‘clean’ material.

- Decontaminate sampling and excavation equipment between sampling locations (i.e., if not dedicated) and at completion over top of excavation area using dry methods initially and steam cleaning, as needed.

GEOPROBE PROCEDURES

Geoprobe direct push sampling is a standard method of soil sampling to obtain representative samples from the subsurface. Field preparation, sample collection, and data logging activities for Geoprobe sampling are identical to that of test pitting/trenching listed above. The following procedures detail activities, as directed by the field technician, for the execution of Macro Core drilling operations:

- Overhead and underground utilities should be checked prior to starting operations.
- Startup drill rig and raise mast.
- Use star bit with rig in rotary setting to penetrate pavement (if applicable).
- Excavate a hole large enough to set a road box before you advance the borehole (if applicable).
- Unthread the shoe from the bottom of the sample tube and inset a sample liner and rethread the shoe on the bottom of the sample tube.
- Thread the drive cap on the top of the sample tube.
- Align the sample tube so it is plumb in both directions to ensure a straight borehole is drilled.
- Drive the top of the sample tube into ground surface to a depth of 4-feet for the first 4-foot sample.
- Unthread the drive cap from the top of the sample tube and thread the pull cap in its place.
- Pull the sample tube from the ground using caution to not pinch your hand between the drill rods, pull cap, or rig.
- Unthread the cutting shoe and pull the sample liner from the bottom of the sample tube. Use pliers to reach in the sample tube and grab the liner, if needed.
- Cut the sample liner lengthwise in two places and present the sample on a table or plastic sheeting (or similar) to ensure all sample material is contained. Quickly screen the soil for volatile organic vapors using a PID. Describe the soil and collect any necessary samples into appropriate containers and label the containers.
- Insert a new liner and thread on the cutting shoe and repeat steps from #4 to #11 with the addition of a 4-foot long drill rod onto the top of the sample tube to advance a second 4-foot interval.
- Proceed with this procedure until the desired depth or refusal is reached.
- Upon completion of probing, decontaminate all equipment in contact with the soil/fill in a decontamination area using Alconox and water.
- Backfill borings with indigenous soil in the order in which the material was removed with the topsoil/sand/cover soil placed last to cover the hole. Soil samples that exhibit detectable vapors or exhibit grossly other contaminated characteristics shall not be placed back into the borehole but shall be containerized for proper disposal.

<u>Reference</u>: American Society for Testing Material (ASTM), 1992, ASTM D1586-84, Standard Method for Penetration Test and Split Barrel Sampling of Soils.

HOLLOW-STEM AUGER DRILLING AND SAMPLING PROCEDURES

Drilling with Hollow Stem Augers (HSAs) is a standard method for collecting undisturbed soil samples at depths that can exceed 100 feet below ground surface (bgs). This drilling and sampling method uses auger flights with a hollow center that can be used for sample collection during the drilling program. For environmental soil investigations, augers are typically 5-feet in length with a 4 1/4-inch hollow center section.

While drilling with HSAs, a plug is placed at the base of the auger string to prevent soil from entering the augers. When the sampling depth is reached, the center plug is removed and replaced with a 2-foot-long split-spoon soil sampler. A hammer, mounted on the drill rig, is then used to drive the soil sampler and connect drill rods 2-3 feet into the undisturbed soil at the base of the augers. Removal of the soil sampler from the augers allows description and sampling of the collected soil. To sample the next lower 2-foot soil sample, the center plug is again placed at the base of the auger string and drilling and then sampling is continued. Continuous soil samples can be collected using HSAs to any drillable depths.

Field Procedures

- HSAs, drill rods and the drilling rig will be thoroughly decontaminated prior to initial borehole installation, and between each borehole, at the centralized decontamination area. All decontamination liquids and solids will be collected and placed in DOT approved 55-gallon drums.
- The drill rig will be inspected for oil leaks and any other leaks prior to starting drilling operations.
- Lower the center plug to the bottom of the augers. Advance the boring by rotating and advancing the HSAs to the desired depth. The boring will be advanced incrementally to permit continuous or intermittent subsurface soil sampling, as required.
- Remove the center plug from the HSAs and lower the 2-foot-long split-spoon sampler to the base of the augers. Use the rigs 140 hammer to drive the split-spoon sampler 2-feet into the undisturbed soil. Record the number of hammer blows (blow counts) for each 6-inches of sampler penetration.
- Remove the split-spoon sampler from the borehole, open the split-spoon and quickly scan the soil for VOCs with a PID or FID. Describe the soil, collect the project required samples, place in the proper containers, label the containers and place on ice.
- Continue the above drilling and sampling steps until the final desired depth is reached.
- If a monitoring well will not be constructed in the borehole, backfill the borehole with either uncontaminated soil cuttings or grout, as specified by the project work plan.

<u>Reference</u>: American Society for Testing Material (ASTM), ASTM D5784, Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water Quality Monitoring Devices

Appendix D - Citizen Participation Plan

This appendix Has been Submitted to NYSDEC as a Separate PDF

Appendix E – Community Air Monitoring Plan

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APPENDIX E

COMMUNITY MONITORING PLAN

For

REMEDIAL INVESTIGATION

CLAYTON STREET RESIDENCES
SITE # C915409
127 CLAYTON STREET
BUFFALO, NEW YORK 14202

Prepared For:
ELMWOOD FOREST LLC
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Prepared By:

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September 2025

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1.0 INTRODUCTION

The Community Monitoring Plan typically involves perimeter air monitoring at the project site during active investigation and remedial activities. Real-time community air monitoring will be performed during ground intrusive RI and remedial activities at the Site. A Community Air Monitoring Program (CAMP) is also part of the HASP (see Appendix A). Particulate and VOC monitoring will be performed along the upwind and downwind perimeters of the work area during subgrade excavation, grading, and soil/fill handling activities in accordance with this plan. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDEC's DER-10; specifically, NYSDOH's Generic Community Air Monitoring Plan and Fugitive Dust and Particulate Monitoring (attached). Any exceedances that occur will be reported to the NYSDEC and NYSDOH project managers on the date of occurrence.

A NYSDOH generic CAMP copied from NYSDEC DER-10 is presented in Attachment 1 that will be followed and adhered to for work activities that could release potential contaminants from an impacted area. A program for suppressing fugitive dust and particulate matter monitoring will also be conducted in accordance with NYSDEC DER-10 titled Appendix 1B Fugitive Dust and Particulate Monitoring, which is also provided in Attachment 1. The fugitive dust suppression and particulate monitoring program will be employed at the site during building demolition, site investigations/remediation and other intrusive activities which warrant its use.

Both the CAMP and the fugitive dust and particulate monitoring program will be administered by Niagara Engineering. Monitoring results of the CAMP will be reported to the New York State Department of Health daily for review as typically NYSDEC and NYSDOH are provided CAMP data on a daily basis when collected. When sample excursions occur, the reasons will be identified and measures to address the excursions will be employed.

2.0 OFF-SITE COMMUNITY AIR MONITORING

In addition to on-site monitoring within the work zone(s), monitoring at the downwind portion of the Site perimeter will be conducted. This will provide a real-time method for determination of vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work. Ground intrusive activities are defined in the Generic Community Air Monitoring Plan (attached). Ground intrusive activities include soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the collection of groundwater samples from existing wells.

Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for nonintrusive activities. Periodic monitoring consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring while bailing a well, and taking a reading prior to leaving a sampling location. This may be upgraded to continuous if the sampling location is in close proximity to individuals not involved in the Site activity (i.e., on a curb of a busy street). The action levels below will be used during periodic monitoring.

3.0 COMMUNITY AIR MONITORING ACTION LEVELS

The criteria below shall be adhered to for the protection of downwind receptors consistent with NYSDOH requirements:

3.1 ORGANIC VAPOR PERIMETER MONITORING

The following action levels apply:

- If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the sustained organic vapor decreases below 5 ppm over background, work activities can resume with continued monitoring.

- If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone are greater than 5 ppm over background but less than 25 ppm for the 15-minute average, activities can resume provided that: the organic vapor level 200 feet downwind of the working site or half the distance to the nearest off-site residential or commercial structure, whichever is less, but in no case less than 20 feet, is below 5 ppm over background; and more frequent intervals of monitoring, as directed by the Site Health and Safety Officer, are conducted.
- If the sustained organic vapor level is above 25 ppm at the perimeter of the exclusion zone for the 15-minute average, the Site Health and Safety Officer must be notified, and work activities shut down. The Site Health and Safety Officer will determine when re-entry of the exclusion zone is possible and will implement downwind air monitoring to ensure vapor emissions do not impact the nearest off-site residential or commercial structure at levels exceeding those specified in the Organic Vapor Contingency Monitoring Plan below.

All readings will be recorded and will be available for NYSDEC and NYSDOH personnel to review.

3.2 AIRBORNE PARTICULATE COMMUNITY AIR MONITORING

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review.

Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m3) greater than the background (upwind perimeter) reading 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 provided that the downwind PM-

10 particulate levels do not exceed 150 ug/m3 above the upwind level and that visible dust is not migrating from the work area.

- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 ug/m3 above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m3 of the upwind level and in preventing visible dust migration.

3.3 EXPLOSIVE VAPORS

If sustained atmospheric concentrations of greater than 10% LEL are identified in the work area - combustible gas monitoring should be initiated at the downwind portion of the Site perimeter.
If sustained atmospheric concentrations of greater than 10% LEL are measured at the downwind Site perimeter then work should be halted work and contact made to the local Fire Department.

3.4 MAJOR VAPOR EMISSION RESPONSE PLAN

If major vapor emissions are occurring at the site and affecting offsite, the following activities will be undertaken:

- All Emergency Response Contacts will be advised.
- The local emergency authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation including:

  - Police and Fire 911
  - State Emergency Response Hotline (800) 457-7362

Appendix F – Project Schedule

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APPENDIX F

SCHEDULE

CLAYTON STREET RESIDENCES
SITE # C915409
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September 2025

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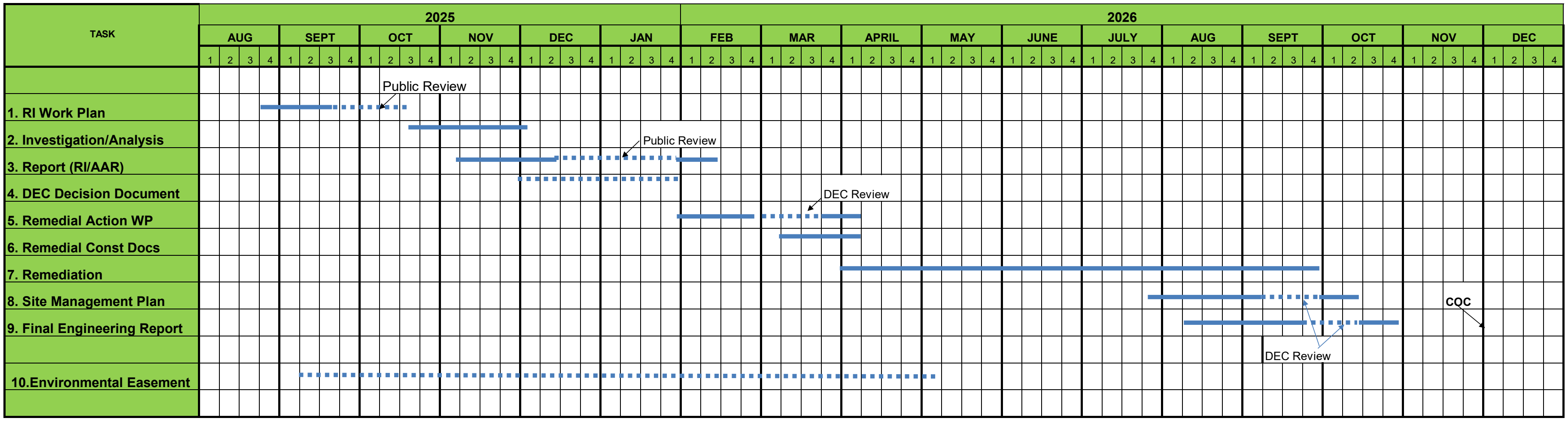
1.0 INTRODUCTION & PURPOSE

Attached is the preliminary schedule for this BCP project. The purpose to to provide workers and decision makers a key to planned key BCP activities and dates. This schedule will be updated as the project unwinds and dates change.

FIGURE

BCP PROJECT SCHEDULE July 2025

Clayton Street Residences- BCP SITE # C915409 - 127 Clayton Street, Buffalo, NY



Appendix G – DER-10 Appendix 3C Decision Key

Appendix 3C **Fish and Wildlife Resources Impact Analysis Decision Key**	If YES Go to:	If NO Go to:
1. Is the site or area of concern a discharge or spill event?	13	2
2. Is the site or area of concern a point source of contamination to the groundwater which will be prevented from discharging to surface water? Soil contamination is not widespread, or if widespread, is confined under buildings and paved areas.	13	3
3. Is the site and all adjacent property a developed area with buildings, paved surfaces and little or no vegetation?	4	9
4. Does the site contain habitat of an endangered, threatened or special concern species?	Section 3.10.1	5
5. Has the contamination gone off-site?	6	14
6. Is there any discharge or erosion of contamination to surface water or the potential for discharge or erosion of contamination?	7	14
7. Are the site contaminants PCBs, pesticides or other persistent, bioaccumulable substances?	Section 3.10.1	8
8. Does contamination exist at concentrations that could exceed ecological impact SCGs or be toxic to aquatic life if discharged to surface water?	Section 3.10.1	14
9. Does the site or any adjacent or downgradient property contain any of the following resources? i. Any endangered, threatened or special concern species or rare plants or their habitat ii. Any DEC designated significant habitats or rare NYS Ecological Communities iii. Tidal or freshwater wetlands iv. Stream, creek or river v. Pond, lake, lagoon vi. Drainage ditch or channel vii. Other surface water feature viii. Other marine or freshwater habitat ix. Forest x. Grassland or grassy field xi. Parkland or woodland xii. Shrubby area xiii. Urban wildlife habitat xiv. Other terrestrial habitat	11	10
10. Is the lack of resources due to the contamination?	3.10.1	14
11. Is the contamination a localized source which has not migrated and will not migrate from the source to impact any on-site or off-site resources?	14	12
12. Does the site have widespread surface soil contamination that is not confined under and around buildings or paved areas?	Section 3.10.1	12
13. Does the contamination at the site or area of concern have the potential to migrate to, erode into or otherwise impact any on-site or off-site habitat of endangered, threatened or special concern species or other fish and wildlife resource? (See #9 for list of potential resources. Contact DEC for information regarding endangered species.)	Section 3.10.1	14
14. No Fish and Wildlife Resources Impact Analysis needed.		X