INVENTUM ENGINEERING, PC

Interim Remedial Measures Work Plan
Brownfield Cleanup Program

Site No. C932169

3125 Highland Avenue Site

Niagara Falls, New York

October 18, 2023

441 CARLISLE DRIVE
SUITE C
HERNDON, VA 20170
WWW.INVENTUMENG.COM

Table of Contents

1 Introduction

This Interim Remedial Measures (IRM) Work Plan has been developed for the proposed 3125 Highland Avenue Brownfield Cleanup Program (BCP) Site located at 3219 and 3301 Highland Avenue, Niagara Falls, New York (Figure 1). This IRM Work Plan addresses three known issues on the proposed BCP Site:

1. Demolition of Unstable Structures;
2. Stabilization and Offsite Disposal of Debris Piles; and
3. Stabilization and Offsite Disposal of Soils Exhibiting the Characteristic of Toxicity.

The IRM Work Plan complements and will be implemented in support of the Remedial Investigation Work Plan (RIWP) submitted with the BCP Application. Descriptions of the proposed BCP Site can be found in the BCP Application and in detail in the RIWP (Inventum 2023).

1.1 Demolition

The demolition and dismantlement of structures on the BCP Site is necessary to provide access to conduct the required remedial investigations and anticipated remedial actions. The buildings to be removed are either unsuitable for occupancy, unstable, or too restrictive to allow the needed access to implement a complete RI. The structures being addressed by this IRM Work Plan are those that are required to be demolished under the BCP. Buildings that do not limit the ability to investigate the BCP Site will be addressed by future work plans. All demolition will be conducted in accordance with a demolition permit that will be obtained from the City of Niagara Falls.

Asbestos Containing Material (ACM) and universal waste removal will be addressed prior to the demolition of any structure. To avoid confusion associated with the various names given to the site buildings, structures are identified by number on Figure 3 of this work plan.

This work plan includes the buildings on the BCP Site that are unstable and that interfere with the implementation of the IRM Work Plan and the RIWP.

1.2 Soil Excavation, Stabilization, and Disposal

Soils and debris identified on Site with concentrations of lead above the characteristic toxicity threshold for hazardous waste (5 milligrams per liter [mg/l]) will be stabilized and disposed offsite. A bench scale test conducted during the Site Investigation (Inventum 2022) confirmed an admixture of 5-percent (by weight) Portland Cement is efficient at eliminating the hazardous characteristic of toxicity for lead. The locations to be addressed under the stabilization and disposal scope are shown on Figure 4. The size of the areas shown on Figure 4 are approximate, the actual extent will be determined by sampling as discussed in Section 3 of this Work Plan.

1.3 Site Materials Management

Site Materials Management protocols are included in this IRM Work Plan and include procedures to follow whenever ground intrusive site work is conducted during the demolition, remedial investigation, and site management during the BCP prior to issuance of a certificate of completion (COC). Section 3 of this IRM Work Plan includes:

- Requirements for excavation/grading activities, stockpiling and soil staging areas, waste characterization sampling, onsite reuse criteria, soil loading and transportation, and requirements for offsite disposal;

- Stabilization procedures to be utilized if additional soils exceeding the toxicity characteristic for lead are identified;
- Requirements for site cover and imported fill;
- Health and Safety for construction personnel, including requirements for Site and community air monitoring (Appendix A);
- Quality Assurance/Quality Control Plan (Appendix B);
- Community Air Monitoring Plan (Appendix C); and
- NYSDEC and NYSDOH notification and reporting requirements

1.4 Schedule

The work is to be scheduled as soon as the Brownfield Cleanup Agreement, Community Participation Plan, and Community Air monitoring Plan are approved. The schedules for the two IRM programs Demolition and Soil Excavation will be coordinated with the investigation activities in the RIWP.

2 Demolition

2.1 Mobilization and Site Controls

Mobilization for the demolition of each structure will include the following steps:

1. Surveys and Inspections:
    a. ACM Survey;
    b. Universal Waste survey, including equipment containing refrigerants;
    c. Lead-based Paint (LBP) Survey;
    d. Utility inspection including all electrical equipment;
    e. Pre-inspection building survey and photographs; and
    f. Materials Management Survey/Plan.
2. Permits and Approvals:
    a. A City of Niagara Falls Building Permit for demolition is required. The requirements of that permit are in addition to, and not superseded by, this work plan. The more stringent requirements of this Work Plan or the Building Permit apply. The permit application requires the following:
        i. Applicant must be a Registered Demolition Contractor in the City of Niagara Falls (OSC is a Registered Demolition Contractor). Contact Patrick Ciccarelli (Patrick.Ciccarelli@niagarafalls.ny.gov);
        ii. ACM Survey;
        iii. Abatement and a clearance letter for ACM;
        iv. Confirmation of a Universal Waste Sweep of the Structure;
        v. Building Dimensions (Height, Average Width, Average Length) and Estimated Volume;
        vi. Cost of Demolition; and
        vii. Utility Disconnection Plan (Plumbing must be isolated by a Licensed Plumber)
    b. Verify no threatened or endangered species are present in work zone, https://www.dec.ny.gov/animals/38801.html
    c. Approval for discharge of decontamination and dust control water from the City of Niagara Falls. This will be completed after data on the water quality is available.
    d. All disposal facilities shall be approved by GAE prior to approval of any waste profile.
3. Health and Safety Plan (HASP):
    a. Building/structure specific amendments to the Site HASP (Appendix A).
    b. OSHA Pre-demolition engineered survey (Appendix D) will be completed by Inventum and/or OSC on-site management. A copy of these surveys will always be available on-site.
    c. Structural inspection as appropriate.
4. Electrical Equipment:
    a. De-energizing electrical equipment.

b. Removing structures from electrical supply.
c. All electrical equipment containing, or potentially containing liquid dielectric fluids will be sampled and tested for Polychlorinated Biphenyls (PCBs) unless previous testing is available.
d. All fluids will be drained and properly recycled or disposed of appropriately prior to demolition.
e. No electrical equipment will be recycled until it is confirmed to contain acceptable levels of PCBs.

5. Final Building Sweep – A final building sweep will be conducted to remove remaining:

a. Containers of liquids or solids.
b. Lights and light ballasts.
c. Universal Wastes (batteries, mercury containing equipment, equipment with refrigerants, etc.).
d. Laboratory equipment containing residuals.
e. Process equipment containing fine particles that can be removed.
f. Dust control for process equipment containing fine particles that cannot be removed.

6. Work Zone Delineation:

a. Utilities and utility protection.
b. Fall radius.
c. Laydown Areas (Waste, recyclable materials, equipment).
d. Staff parking and break areas.

7. Community Air Monitoring Plan (Appendix C):

a. Monitoring Station Location(s).
b. Type and frequency of monitoring.

8. Stormwater and Dust Control Water Management

9. Sampling Analysis includes the testing of building materials and water associated with the Materials Management. The exact numbers and types of samples to be collected cannot be determined in advance. The pre-demolition survey will provide guidance on the types and numbers of samples. The sampling program for each building will be based on:

a. Number and type of sampling of building materials. For disposal characterization, or if clean, for beneficial reuse on the property.

b. Each class of like material to be shipped offsite for disposal in accordance with the requirements of the disposal facility(ies).

c. Sampling may be conducted before or after demolition.

d. The testing required by the City of Niagara Falls for the IDW Permit will be managed in accordance with the associated permit.

2.1.1 Dust Control

Dust control is a critical component of this work plan. The CAMP in Appendix C addresses the required air monitoring. Management of surface water and the dust control requirements for the structure demolition, include, but are not limited to the following:

1. ACM will be removed prior to demolition.
2. Universal Wastes shall be removed prior to demolition.
3. Dust control must be planned, and an appropriate water supply shall be identified as building interiors can be coated with dust and/or other particulates.
4. During demolition, brief, dust events are unavoidable, but will be controlled in accordance with the CAMP:
    a. Adjust site engineering controls if PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be adjusted or reemployed; and,
    b. After implementation of dust suppression techniques, if downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped, and a re-evaluation of activities initiated.
5. OSC shall conduct Job Safety Analyses and daily safety briefings to ensure that every employee works in the safest and cleanest environment possible.
6. Water will be used to limit fugitive dust beyond the work area. All OSC employees who notice or anticipate dust are required to communicate with their supervisor to implement mitigation measures.
7. OSC's Site Superintendent will take steps to control excessive amounts of dust and/or exposure using water, positioning ground personnel based on wind direction, and directing Operators to close their equipment cab.
8. Dust control water shall be contained, collected, and managed in accordance with the City of Niagara Falls IWD Permit.

OSC will maintain a water truck onsite to keep access roads wet to manage dust generated from site traffic. Dust shall be removed from roadways in conjunction with water application throughout the workday. No dust or soil associated with the BCP Site shall remain on Highland Avenue at the end of a daily shift. The water truck will be filled from an onsite source of potable water. Recycled dust control water shall not be used on public roadways.

The entrance and egress locations from the site will be regularly swept and sprayed with the water truck.

A water cannon will be used as necessary during demolition activities to apply a focused water mist to the structure(s) being dismantled. The water cannon will be positioned ahead of the lead demolition excavator and care will be taken not to blind the operator with misting water, creating a potential hazard. The water cannon will be fed from a hose and plumbed to the closest source of potable water. If no water source is accessible, a tank of potable water will be mobilized. Additionally, and as needed, laborers equipped with fire hoses and spray nozzles, will directly apply water to locations producing excessive dust and in areas used for concrete processing activities.

Potable or amended water may be used for dust control. Amended water is only required in the event a controlled demolition area is required in order to ensure proper control of ACM. Amended water will be contained, collected, treated, and discharged to the City of Niagara Falls. Potable water used for dust control of potentially impacted buildings will be contained to the extent practicable, filtered, and discharged to the City of Niagara Falls. All discharges to the City of Niagara Falls will be in accordance with an IDW Permit as approved by the City Pre-Treatment Supervisor.

All trucks from the site will go through a tire wash station. Wash water will be managed onsite through filters prior to discharge.

Trucks or containers carrying ACM or significant dust producing materials will be enclosed or properly covered once filled. The exterior surfaces and tires will be inspected before leaving the BCP Site.

2.1.2 Process Piping

Process piping is prevalent in some areas of the site. Based on the former use, this piping may contain residuals that are corrosive (sulfuric acid). All process piping shall be inspected and addressed for each building in accordance with this work plan. If process piping contains residuals and is disposed as waste, the source, volume, and cost will be tracked under the BCP Waste Log (Table 2-1). Of note, the following must be carefully planned and managed during the demolition program:

1. Structures with Process Related Safety Concerns:
    a. Office/Laboratory/Maintenance Buildings (H, H-Addition, L and L-Addition) – ACM, LBP, laboratory impacted materials, lubricants and paints, air conditioners and other refrigerant containing equipment.
    b. Boiler House – ACM, combustion residuals, water treatment chemicals.
    c. Chip Storage – confined spaces, battery chip residuals (lead).
    d. Former Extruder Room (J-2) – sump, battery chip residuals (lead), LBP, compromised wooden framing, overhead piping.
2. Building with Structural and Safety Concerns:
    a. Maintenance and Storage Buildings (J-3, X, W, W-extension, and Q) – LBP, compromised wooden framing, overhead piping, maintenance lubricants and paints.
    b. Coal Silo – confined space, dust combustion hazards, compromised structure.
    c. Storage Silos (between J-2 and J-3, south of Q) - confined space, dust combustion hazards, compromised structures.
    d. Plastic Pellet Storage Silo – confined space and compromised structure, protection of adjacent capping system.

2.1.3 Utilities

There are active and abandoned utilities in the facility. Utilities supplying any structure in this work plan will be abandoned and properly decommissioned/isolated prior to commencing active demolition.

2.1.3.1 Electrical Equipment

The electrical service to all buildings will be isolated/air-gapped before structural demolition begins. Equipment capable of holding electrical energy will be discharged. The buildings will then be cleared of any remaining electrical equipment consisting of:

1. Transformers

2. Capacitors
3. Batteries
4. Light Bulbs
5. Light Ballasts
6. Automatic switches potentially containing mercury.

Liquid filled equipment that cannot be directly loaded for transport will be moved to a staging area prior to being shipped from the property. Universal Wastes will be properly sorted and packaged onsite for disposal and managed offsite for disposal.

2.1.3.2 Natural Gas

There was likely a natural gas supply pipe that fed the boiler house and potentially used to heat the structures. The supply to the lines shall be terminated and the lines shall be isolated and purged.

2.1.3.3 Water

Water (excluding the water required for dust control) must be managed when broken pipes release uncontrolled water flow that is not desirable or not in accordance with the City of Niagara Falls IDW Permit. Water supply to all portions of each building will be terminated outside the limits of construction by prior to being demolished.

Temporary taps and valves for use in dust control are acceptable in protected locations outside the limits of the building being actively demolished. Backflow preventors will be installed as required by the utility provider.

2.1.3.4 Sewer

Both sanitary and process sewers leading from each subject building shall be identified and plugged prior to demolition. Any sewer leading from the BCP Site shall be disconnected by a Licensed Plumber.

Ponding dust control water will be collected and treated prior to discharge in accordance with the City of Niagara Falls IWD Permit.

2.1.3.5 Storm Drainage

Surface water in the vicinity of the demolition will be managed in accordance with the requirements of the City of Niagara Falls. Decontamination and dust control water will be controlled to the extent practicable. Accumulations of water on and around the active demolition site will be managed as decontamination water and shall be collected, treated, and discharged to the City of Niagara Falls Sewer system in accordance with the IDW Permit. Sampling, Testing and Pre-approval will be completed before discharge. Results will be submitted in accordance with the City of Niagara Falls Permit.

2.1.4 Mechanical Equipment

There is old materials handling and other mechanical equipment located throughout the BCP Site in the vicinity of the buildings to be demolished. All equipment shall be inspected and any equipment capable of storing mechanical energy shall be deenergized. Any equipment meeting the definition of a confined space will be opened to eliminate any entrapment hazard before decontamination.

2.1.5 Hot Work

Torch cutting will be limited to structural steel components on the property in areas that are open to the atmosphere. When practicable, mechanical shearing shall be used in lieu of hot cutting.

Torch cutting of natural gas (yellow painted) lines is prohibited unless the line has been purged, frequently monitored with a LEL/O_2 meter, and visibly open at both ends to confirm the conditions are safe for torch cutting. Torch cutting of piping, tanks, process equipment or hoppers and conveyor systems covered with dust, battery chips, or inside closed buildings is prohibited without approval of the OSC site superintendent and in strict accordance with a Hot Work Permit (Appendix E).

2.2 Materials Management

The following materials management approach shall be implemented as the structures are demolished and equipment is decontaminated:

2.2.1 Segregation

To the extent practicable and safe, materials will be segregated in accordance with their material composition, including but not limited to:

1. Construction and Demolition (C&D) Debris
2. ACM debris
3. Grossly contaminated materials
4. Potentially mixed waste (ACM and potentially Characteristically Hazardous Materials)
5. Uncontaminated Brick and Concrete
6. Structural Steel
7. Non-ferrous metal
8. Pipe (process and utility shall be segregated)
9. Equipment and machinery

The management of each of these materials shall be as defined in subsections below. All materials transported offsite will be tracked by weight and disposal facility and presented in the Waste Log by source (Example - Table 1).

2.2.2 C&D Debris

C&D debris are those materials that are not suitable for use as fill, and which are not known to be impacted by ACM or the former operations at the 3125 Highland Avenue proposed BCP Site. These materials are anticipated to be wood (e.g., framing, lumber and railroad ties), plastic, fiberglass, and other non-durable materials. These materials will be separated, inspected and shipped offsite for disposal at a permitted C&D disposal facility.

All shipments of C&D will be tracked by transporter, disposal facility, and weight (see proposed Tracking Table 1). Any materials found to be impacted will be segregated and tracked in accordance with this Work Plan and the BCP Waste Log.

2.2.3 ACM Containing Debris

ACM removed during abatement activities and any debris containing ACM (pipe flanges, coatings, or building materials) will be managed in accordance with New York State Department of Labor (NYSDOL) requirements and in accordance with NYSDOL approval.

2.2.4 Grossly Contaminated Materials

In the context of building demolition, the characterization of grossly contaminated materials will include:

- Building materials covered with waste materials that cannot be physically removed;
- Building materials that are covered or saturated with petroleum or other liquid by-products;

- Building materials that produce a sheen; and
- Building materials that produce sufficient odor that could be detectable during transportation.

Grossly contaminated materials are not anticipated at the 3125 Highland Avenue Site. All grossly contaminated materials will be segregated, the volume quantified, described and sampled for disposal.

2.2.5 Potentially Mixed Waste

The materials produced during the demolition that have the potential to contain ACM and other wastes will be sampled for ACM. The materials produced during the demolition that have the potential to be contaminated with site related constituents (namely lead) will also be sampled. Materials to be transported offsite that are free of ACM will be tested for disposal characteristics (facility specific) and for the characteristics of hazardous waste.

If ACM is detected, and the materials do not meet the acceptance criteria of the ACM landfill, the materials will be shipped as "mixed" waste to a facility that is permitted to accept both ACM and chemically impacted materials. No mixed wastes are anticipated (See Table 6). If mixed wastes are identified, materials will be sampled prior to transportation and if characteristic hazardous waste is identified, the materials will be properly transported and disposed of. Those materials will be managed under this Work Plan and tracked on the Waste Tracking Log (to be submitted Monthly to the DEC). The DEC shall be notified no less than 5 days before any new waste stream is transported from the property.

2.2.6 Fill – Brick, CMU, and Concrete

Clean brick, concrete masonry unit (CMU), and concrete are defined as brick and concrete with no accumulations on the surface and are deemed uncontaminated:

Uncontaminated means not commingled with, and not containing:

(i) other waste;

(ii) petroleum and petroleum products, except those present solely as a result of normal use of vehicles on roadways or parking areas;

(iii) pesticides except those present solely as a result of the proper application in normal agricultural or horticultural practices; and

(iv) hazardous waste.

These uncontaminated materials are not subject to a BCP Agreement and will be prepared for backfill re-use purposes as approved by the City of Niagara Falls and the DEC. All staging and preparation activities shall be on or adjacent to the source of the materials.

Brick and concrete that are potentially contaminated will be transported offsite for disposal as C&D material. All shipments of C&D will be recorded in the Waste Tracking Log (submitted Monthly to the DEC). The DEC shall be notified no less than 5 days before any new waste stream is transported from the property.

2.2.7 Structural Steel

Uncontaminated steel (structural, equipment components, bins, hoppers, and clean tank materials) shall be segregated into manageable stockpiles in preparation for off-site recycling. Clean structural steel is defined as structural elements that recyclers will accept. Clean structural steel shall be stockpiled and inspected before it is prepared for recycling. All shipments of scrap will be recorded on the Waste Tracker Log.

2.2.8 Non-ferrous Metals

Non-ferrous metals recovered from the buildings shall be stockpiled separately for inspection. Following inspection and approval, the materials will be prepared for recycling. All shipments of scrap will be recorded on the Waste Tracker Log.

2.2.9 Pipe

Pipe can fall into several categories sorted by material (ex. ceramic, plastic, steel, iron) or use (ex. process piping and utility piping).

2.2.9.1 Piping as C&D

Plastic and ceramic piping will be treated as C&D materials as they typically were only used to convey water, sewage, or stormwater. This pipe will be stockpiled with C&D materials and after inspection will be disposed of as C&D.

2.2.9.2 Process Piping

Piping used for the boiler house, chip recycling, or process water treatment activities will be considered process piping. The pipes will be inspected prior to demolition. Following demolition, the pipes will be inspected and classified as BCP Waste Pipes (those that contain sediment or sludges from the former processes at the site) or Non-BCP Waste Pipes. Pipes classified as BCP Waste will be disposed at Modern or WM Chafee (depending on facility profile and approval) and Non-BCP Pipes will be recycled for thermal recovery of the metals, or in the case of water and steam piping, metal recovery or reuse.

2.2.9.3 Utility Piping

Utility piping (natural gas [marked as yellow piping], water, sewage, and steam) does not typically contain significant amounts of residual solid material. These pipes will be demolished during structural demolition operations and prepared for off-site recycling.

2.2.10 Equipment and Machinery

There is a significant amount of equipment and machinery within and around the buildings to be demolished. The equipment and machinery will be segregated as the demolition proceeds into the following categories:

a. Electrical Supply Equipment – Transformers, Capacitors, Switches.
b. Electric Motors
c. Pumps
d. Heat Exchangers and Boilers

Each category of equipment will be managed in accordance with the likely method of disposition (reuse, recycling, or disposal). The management of equipment will be documented and reported to the NYSDEC as:

- Reuse – Onsite or offsite. No less than 5 days' notice[1] will be provided for all equipment to be transported offsite for reuse;

[1] This does not include equipment owned by Tulip Molded Plastics that is transported to 3123 Highland Avenue.

- Recycling – Equipment to be recycled will either be prepared on site to separate the component materials or transported as a unit; and
- Disposal – Materials or components to be disposed of will be segregated. No less than 5 days' notice[2] will be provided for all equipment to be transported offsite for disposal at a permitted facility.

2.2.10.1 Electrical Equipment – Transformers, Capacitors, Switches, AC/DC Convertor

Electrical supply equipment will be deenergized and removed prior to demolition. The equipment will be segregated by; (1) known PCB containing equipment, (2) equipment known to contain less than 50 ppm PCBs, and (3) equipment to be tested. To the extent practicable, all liquid containing electrical supply equipment will be tested before it is moved. All liquid containing electrical supply equipment will be managed in accordance with the concentration of PCBs in the dielectric fluid.

2.2.10.2 Electric Motors

Electric motors will be prepared for offsite recycling by removing any accumulations of process residuals (if present) from the exterior surfaces. The motors will be transported offsite for reuse or recycling.

2.2.10.3 Pumps

Pumps fall into two general categories: utility (water and steam) and process. Process pumps will be decontaminated before recycling or disposal. Water and steam pumps will be staged for reuse, recycling, or disposal.

2.2.10.3.1 Water and Steam

Water and steam pumps will be segregated, inspected and shipped offsite for recycling. The inspection will be conducted to view the intake and discharge ends of the pump to ensure it had not been repurposed from a process.

2.2.10.3.2 Process Pumps (including Exhausters)

Process pumps will be managed with process piping unless they can be cleaned. If the pumps cannot be cleaned, the pumps will be disposed of with impacted process piping.

2.2.10.4 Heat Exchangers and Boilers

The shells and internal tubing are very different materials and can be managed separately. The tubing within the heat exchangers and boilers can be removed and inspected. These tubes will be managed in accordance with the protocol for process and utility piping.

The shells of the heat exchangers and boilers can typically be cleaned and recycled. Unless there is a heavy coating of process residuals that cannot be removed, the shells of all heat exchangers and boilers will be cleaned, prepped for recycling, inspected, and transported offsite.

[2] This does not include equipment owned by Tulip Molded Plastics that is transported to 3123 Highland Avenue.

2.2.10.5 Silos, Bins, and Tanks

The following shall be the minimum protocol for sampling unknown[3] contents of the silos, bins, and tanks, including any sampling of residuals on, or from floors, equipment pedestals, piping, or exterior components of the process equipment:

1. Inspect the exterior of the process equipment to be sampled. There are existing covered or open access points to all process equipment to be decommissioned under this IRM Work Plan. Avoid torch cutting the equipment to gain access for sampling. Access shall be through existing threaded or bolted connections (e.g., flange) or from pipe or drain connections. The connections shall be removed with non-sparking tools to allow inspection and sampling;
2. Inspect the ground surface around the process equipment to determine if there has been any previous or suspected historical leakage. Any identified historical leakage will be documented in the field book and reported to the NYSDEC within 24-hours;
3. Covers or pipes removed to allow sampling shall be replaced immediately after the sample has been collected;
4. Inspect the exterior of the process equipment and piping for signs of rupture, wear/holes, and bulging. If the process equipment or piping shows signs of structural weakness, contact Inventum personnel for inspection;
5. Use a photoionization detector (PID) to check the atmosphere around the outside of the component;
6. Measure the temperature of the vessel, sun side, shade side and at the proposed access point;
7. Establish a work zone to allow access to the process equipment;
8. Set up the CAMP air monitoring station no more than 50 feet downwind of the work zone. Refer to the CAMP (Appendix C) for action levels;
9. During sampling:
    a. No one or no part of anyone's body shall cross into the process equipment for sampling. Non-sparking tools shall be used to extract samples;
    b. Refer to HASP **(**Attachment A**)**, for the minimum respiratory protection required while sampling;
    c. Scan the vapors at the opening, just inside the interior of the component for VOCs. Refer to the HASP (Attachment A) for Action Levels;
    d. Scan the vapors at the opening for Lower Explosive (LEL) and oxygen (O_2). Refer to the HASP (Attachment A) for Action Levels; and
10. If the LEL/O_2 meter indicates a potentially explosive atmosphere, oxygen deficient, or oxygen rich atmosphere in the process equipment and the material is not reacting to the atmosphere, vent in accordance with the HASP (Attachment A). During venting, monitor the temperature of the process equipment. If the temperature monitoring shows an increase of temperature associated with exposure to the atmosphere, stop purging and inert the process equipment with nitrogen. If no temperature rise, vent until the LEL/O_2 reading indicates the vapor no longer contains a potentially explosive concentration. Wait 15 minutes and retest;
11. If the temperature monitoring shows a temperature rise of 10^0F above the ambient temperature due to exposure to the atmosphere, the process equipment shall be purged with nitrogen.

[3] Tulip Molded Plastics personnel are expected to be able to identify the majority of the contents, this protocol only apples to true unknown materials.

12. If possible, gauge the depth to contents of a process vessel with a non-sparking tape or non-metallic rod. Record depth to first material and the number of phases (liquid, sludge, and solid) present. The thickness of solid(s), thickness of liquid(s), color and physical descriptions shall be recorded in the field book. Sample crew shall be prepared to encounter more than one liquid and more than one solid layer,
13. Record (if applicable):
    a. Depth to each layer;
    b. Thickness of each layer;
    c. Apparent viscosity/density;
    d. Color;
    e. Other observations.
14. Process equipment field screening samples
    a. Solids Field Testing – Each different solid shall be sampled, and representative amounts (no less than 100 grams) shall be placed into a sealable (e.g., Ziploc™) bag and visually characterized.
    b. Liquids field sampling – Each different liquid shall be sampled, and representative amount (no less than 100 ml) shall be placed into clean laboratory provided glass container(s). record a field visual description and test aqueous materials for pH.
15. Laboratory Samples (Note: Laboratory samples shall not be collected from the field screening samples; they shall be a split collected BEFORE field screening samples are placed in the sealable bags and open container.)
    a. Solids - Collect samples from each unique solid material (from process equipment, decontamination containments, and quench tanks) for waste characterization for the full suite of DER-10 parameters except the per- and polyfluoroalkyl substances (PFAS) but including aliquots for Hazardous Characteristics and Toxicity Characteristic Leaching Procedure (TCLP). PFAS sampling is not required for disposal characterization.
    b. Quench Water – Place no less than one gallon of each solid phase in a 5-gallon container and cover the solids with no less than one-inch of potable water. Cover and label the container. Allow water and solids to come to equilibrium for no less than 72 hours. After 72-hours, collect samples for the IWD Permit parameters.
    c. Liquids – Collect samples from each unique liquid material within the process equipment for the full suite of DER-10 parameters (excluding Per-and Polyfluoroalkyl Substances [PFAS]) and Hazardous Waste Characteristic parameters.
    d. Soils – If there is evidence of a release to soils, samples collected below the containment or foundation from each unique soil or other solid material will be for the full suite of DER-10 parameters (including PFAS). If there is evidence of a historical release, one sample from each location will be sampled and analyzed for Hazardous Waste Characteristic parameters. Note: Any evidence of a historical release shall be documented in the field book, photographed, and be included in the IRM construction completion report (CCR).
    e. Sample analysis to determine the appropriate disposal alternative shall include:
        i. TCL VOCs and SVOCs'
        ii. Metals,
        iii. Pesticides and herbicides,
        iv. Cyanide,
        v. Ammonia,
        vi. Toxicity Characteristic Leaching Procedure (TCLP) VOCs, SVOCs, and Metals,

vii. PCBs,
viii. Flash Point,
ix. Paint Filter Test,
x. pH,
xi. Reactivity, Cyanide, and
xii. Reactivity, Sulfide.

2.3 Disposal

It is expected that multiple types of waste streams will be produced as described above:

- C&D
- ACM Materials
- Mixed Waste (ACM and process residuals)
- Non-hazardous Waste
- Characteristic Hazardous Waste

All waste materials will be sampled, waste profiles will be developed, and the wastes will be transported to the appropriate permitted landfill. All materials transported for disposal will be tracked on the Waste Log.

3 Soil Excavation, Stabilization, and Disposal

The elimination of potential exposures to isolated areas of soils with concentrations of lead that exhibit the characteristic of toxicity will be achieved by excavations, stabilization, and offsite disposal. These are those isolated "hot spot" areas (Figure 4) that were identified as part of the site investigations (Inventum 2022) conducted prior to submittal of the BCP Application and are not intended to be a final remedy.

The size of the areas shown on Figure 4 are approximate, the actual extent will be determined by sampling as discussed in Section 3.2 of this work Plan.

A preliminary bench scale test was conducted during the Site Investigation (Inventum 2022) and confirmed an admixture of 5-percent (by weight) Portland Cement eliminated the characteristic of toxicity for lead in the samples tested.

3.1 Mobilization and Site Controls

Mobilization for the proposed excavations will include the following steps:

1. Surveys and Inspections:
    a. Utility notification and inspection including UDig NY (https://udigny.org/ or 811) and private utility locator;
    b. Pre-inspection building survey and photographs; and
    c. Materials Management Plan.
2. Permits and Approvals:
    a. A City of Niagara Falls Building Permit for demolition may be required for pavement removal. The requirements of that permit are in addition to, and not superseded by, this work plan. The more stringent requirements of this Work Plan or the Building Permit apply. The permit application requires the following:
        i. Applicant must be a Registered Demolition Contractor in the City of Niagara Falls (OSC is a Registered Demolition Contractor). Contact Patrick Ciccarelli (Ptrick.Ciccarelli@niagarafalls.ny.gov);
        ii. Cost of Demolition; and
        iii. Utility Disconnection Plan (Plumbing must be isolated by a Licensed Plumber)
    b. Verify no threatened or endangered species are present in work zone, https://www.dec.ny.gov/animals/38801.html
    c. Approval for discharge of excavation dewatering and dust control water from the City of Niagara Falls. This will be completed after data on the water quality is available.
    d. All disposal facilities shall be approved by GAE prior to approval of any waste profile.
3. Health and Safety Plan (HASP):
    a. HASP (Appendix A) includes excavation and stabilization specific amendments to the Site HASP.
4. Electrical Equipment:

a. De-energizing electrical utilities within and above excavation areas.
b. Removing electrical supply crossing the excavation.

5. Work Zone Delineation:

a. Utilities and utility protection.
b. Laydown Areas (Waste stabilization, recyclable materials, equipment).
c. Traffic controls (Tire cleaning, staging, tarping [if needed]).
d. Staff parking and break areas.

6. Community Air Monitoring Plan (CAMP), Appendix C:

a. Monitoring Station Location(s).
b. Type and frequency of monitoring.

7. Stormwater and Dust Control Water Management

3.1.1 Dust Control

Dust control is a critical component of the excavation and stabilization activities in this work plan. The CAMP in Appendix C addresses the required air monitoring. Management of surface water and the dust control requirements for the structure demolition, include, but are not limited to the following:

1. During pavement demolition, brief, dust events are unavoidable, but will be controlled in accordance with the CAMP:
   a. Adjust engineering controls if PM-10 particulate level is 100 mcg/m^3 greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be adjusted or reemployed; and
   b. After implementation of dust suppression techniques, if downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped, and a re-evaluation of activities initiated.
2. OSC shall conduct Job Safety Analyses and daily safety briefing to ensure that every employee works in the safest and cleanest environment possible.
3. Water will be used to limit fugitive dust beyond the work area. All OSC employees who notice or anticipate dust are required to communicate with their supervisor to implement mitigation measures.
4. OSC's Site Superintendent will take steps to control excessive amounts of dust and/or exposure using water, positioning ground personnel based on wind direction, and directing Operators to close their equipment cab.
5. Dust control water shall be contained, collected, and managed in accordance with the City of Niagara Falls IWD Permit.

OSC will maintain a water truck onsite to keep access roads wet to manage dust generated from site traffic. Dust shall be removed from roadways, in conjunction with water application throughout the work day. No dust or soil associated with the BCP Site shall remain on Highland Avenue at the end of a daily shift. The water truck will be filled from an onsite source of potable water. Recycled dust control water shall not be used on public roadways.

The entrance and egress locations from the site will be regularly swept and sprayed with the water truck.

Only potable water will be used for dust control.

All trucks from the site will go through a tire wash station before leaving the BCP Site boundary. Wash water will be managed onsite through filters prior to discharge.

3.2 Soil Excavation and Stabilization

Soil excavations will be completed in the two isolated "hot spot" areas of the site where GAE's investigations conducted prior to the BCP application produced samples that exhibited the characteristic of toxicity for lead (Figure 4). The protocols for each area will be as defined below.

3.2.1 Former Chip Unloading Area

The excavation in the former chip unloading area is initially planned for a 35-foot by 35-foot area immediately west of the former chip storage area (Figure 4).

- The pavement will be removed from the limits of the excavation. The removed pavement will be stockpiled outside the proposed excavation to allow inspection and sampling (if needed). Pavement that if free of soil or staining does not require sampling and will be disposed as C&D debris. If there are accumulations of soils on the surfaces of the debris that cannot be sufficiently removed in bulk, it shall be sampled to ensure it meets the landfill acceptance criteria.
- The area will be divided into 6 approximately 200 square foot grid areas. Test trenches will be excavated to 4 feet bgs in each grid. A sample will be collected from the upper 1 foot and between 3 and 4 feet BGS from each grid.
- Following receipt of the laboratory data, a final excavation plan will be discussed with the NYSDEC PM.
- The upper 4 feet of each grid that produces a sample that exhibits the characteristic of toxicity will be stabilized in-situ with 5% Portland Cement (approximately 3 tons per grid). If needed, moisture will be added to activate the reagent and allow for uniform mixing and provide dust control.
- Two samples of the stabilized material will be collected after the stabilized matrix has been mixed and allowed to hydrate for no less than 24 hours.
- If a stabilized grid produces samples that still exhibit the characteristics of toxicity, an additional one ton of Portland cement will be blended into the soil in the grid and the sampling and analysis will be repeated.
- Following receipt of data below the characteristic, the upper four feet of stabilized soil from those grids that had previously produced samples exhibiting the characteristic of toxicity will be excavated and transported offsite for disposal as solid non-hazardous waste.
- Following stabilization and excavation of soils in the grid, grab samples of the excavation bottom and sidewalls will be collected prior to backfill and analyzed for TAL Metals and TCLP-lead. One sample will be collected from each sidewall and one sample per 200 square feet of excavation will be collected and analyzed.

- If required and site features allow, the excavation limits will be extended horizontally and/or vertically if any TCLP result(s) for the grab samples exceed the toxicity characteristic threshold.

3.2.2 South Side of Warehouse

An excavation will be conducted in the vicinity of SB-007, immediately south of the former plastic production/current warehouse (Building Q-1, Figure 4), to further delineate the extent of soils with TCLP-lead concentrations above the characteristic of toxicity threshold. The initial excavation will be from the building wall to the edge of pavement and five feet east and west of the SB-007 location.

- The upper 3 feet of the area will be stabilized in-situ with 5% Portland Cement (approximately 0.5 ton). If needed, moisture will be added to activate the reagent and allow for uniform mixing and provide dust control.
- Two samples of the stabilized material will be collected after the stabilized matrix has been mixed and allowed to hydrate for no less than 24-hours.
- If either sample exhibits the characteristics of toxicity, an additional 200 pounds of Portland cement will be blended into the soil and the sampling and analysis will be repeated.
- Following receipt of data below the characteristic, the upper three feet of stabilized soil from those grids that had previously produced samples exhibiting the characteristic of toxicity will be excavated and transported offsite for disposal as a non-hazardous solid waste.
- Grab samples of the excavation bottom and sidewalls will be collected prior to backfill and analyzed for TAL Metals and TCLP-lead. One sample will be collected from each sidewall and one sample from the base of the excavation will be collected and analyzed for total and TCLP-lead.
- If required and site features allow, the excavation limits will be extended horizontally and/or vertically if any TCLP result(s) exceed the toxicity characteristic threshold. If the sidewall sample against the building exhibits the characteristic of toxicity, the location will be surveyed and recorded for evaluation in the Alternatives Analysis.

The excavations will be backfilled with imported fill approved by the NYSDEC for commercial use. Inventum will submit a Request to Import Fill to the NYSDEC for approval prior to bringing any material onsite. The final cover system will be determined based on the specification of the planned redevelopment.

3.3 Debris Piles

The stabilization and offsite disposal of material in the two debris piles on the north side of the property will be conducted in conjunction with the soil stabilization. The source of the materials in the piles is unknown. The removal of the two debris piles will be completed by:

- Surface drains/inlets around the mixing area will be identified and protected from any runoff.
- Large pieces of concrete and other debris in the stockpiles will be removed prior to mixing. Loose soil will be removed from the concrete and large debris. Concrete will be separated from other debris and categorized for disposal as C&D.
- If feasible, the remaining finer grained materials stockpiles will be consolidated within the footprint of each pile. After removal of the large debris, the quantity of remaining material will be estimated, by

weight. A unit weight of 135 pounds per cubic foot will be used for the initial stabilization addition rate estimate.

- The materials will be stockpiled in piles of 100 tons (1,500 cubic feet) or less to facilitate mixing.
- The Portland cement (5% by weight) will be mixed in place with the bucket of an excavator. Sufficient moisture will be added, if necessary, to activate the reagent and allow for uniform mixing and provide dust control.
- Stabilized piles will be covered while curing (minimum 24-hours) to prevent runoff.
- Composite samples from each pile will be collected following stabilization and analyzed for TAL Metals and TCLP Metals to confirm successful application prior to shipping off-site as non-hazardous solid waste.
- Additional samples may be collected and analyzed as required by the disposal facility.
- Following removal of the stockpiles, five samples of the surface soil (surface to 6-inches BGS) will be collected and analyzed for TAL and TCLP lead. If any samples exhibits the characteristic of toxicity, the area around the sample will be subject to further investigation.

4 Communications and Reporting

4.1 Contact Information/Responsible Parties

Facility Operator
Ganson Alternative Energy, LLC 140 Lee Street Buffalo, NY 14210 Contact: Lawrence Pirrone Telephone: 716.4184204 E-Mail: lpirrone@oscinc.com
Facility Owner
Ganson Alternative Energy, LLC 140 Lee Street Buffalo, NY 14210 Contact: Jon M. Williams Telephone: 716.856.3333
SWPPP and CAMP Contact
Inventum Engineering, P.C. 441 Carlisle Drive; Suite C Herndon, VA 20170 Contact: John P. Black, P.E. Telephone: 571.752.6559 (office) / 571.217.6761(cell) E-Mail: john.black@inventumeng.com

4.2 Contact Information/Inspections and Notifications

Preliminary contact information for regulatory agencies are provided in the sections below. The contact information will be updated with the appropriate agency personnel when finalized.

4.2.1 Inspections

Prior to shipping any new waste streams and any impacted (non-C&D) materials from the site, the New York State Department of Environmental Conservation shall be notified:

Division of Environmental Remediation
New York State Department of Environmental Conservation
700 Delaware Avenue
Buffalo, NY 14209
P: (716) 851-7220 | F: (716) 851-7226

4.2.2 CAMP Reporting

Public Health Specialist, Bureau of Environmental Exposure Investigation (BEEI)
New York State Department of Health
Center for Environmental Health
Corning Tower, Rm 1787
Albany, NY 12237

4.2.3 Spills

In the event of a spill:

1. The person discovering the spill shall report to the OSC onsite superintendent and the Inventum project manager immediately:
    a. OSC Superintendent - TBD
    b. Inventum Engineering - John Black: 571.217.6761
2. Project Manager shall inspect the area as soon as the flow is abated and call the NYS Spill Hotline (1-800-457-7362) within 2 hours of incident identification;
3. In the event of a potential or actual release from the property through a sanitary sewer, the following shall be called:
    a. NYSDEC PM – TBD
    b. Niagara Falls Water Board – Wastewater Treatment Plant – 716.283.9770
4. In the event of a potential or actual release from the property beyond the property line, the following shall be called in the order given after calling the NYS Spill Hotline (1-800-457-7362):
    a. National Response Center: 800.424.8802
    b. U.S. Coast Guard: 716.846.4168
    c. USEPA: 732.548.8730
    d. NYSDEC (Region 9): 716.851.7220

4.3 Reporting

A series of reports will be provided during and following the IRMs.

4.3.1 Demolition

A final demolition inspection will be documented to confirm all items in the pre-demolition form (Appendix D) have been addressed and a Construction Completion Report (CCR) will be prepared in accordance with DER-10. Attached to the CCR shall be copies of all permits and approvals, a shipping summary table of any materials shipped from the property, a summary table of where fill has been placed on the property, and a photographic log of the demolition progress. The supplemental demolition information will also be included in the BCP Site Final Engineering Report (FER).

4.3.2 Stabilization Program – Soil and Debris Piles

During the soil and debris pile stabilization program, there will be a series of interim memoranda to allow sharing of the data and proposed stages of stabilization and mixing:

- Pre-treatment Sample Data Reports – All premixing data will be provided to the NYSDEC and NYSDOH with a proposed volume to be treated.
- Stabilization Testing – All test data collected to verify treatment will be submitted to the NYSDEC and NYSDOH. The memorandum will include recommendations for additional stabilization, if needed.

- Post-excavation Sampling – The results of the sidewall and base sampling will be provided prior to backfill placement.
- Import Approval Form – An import approval form shall be submitted for the backfill to be used to fill the excavation voids.

5 Schedules

The schedules for the IRMs and the RI are interdependent, but for the purposes of this IRM Work Plan, the following are known.

5.1 Demolition Program

The schedule for the demolition program is dependent on the approval of the BCP Application, execution of a BCP Agreement, permitting, and weather. Permitting and access will be defined by the ACM survey and subsequent abatement. An ACM clearance letter is required for the issuance of each building permit. Wind weather and temperatures affect the demolition of the buildings. The schedule is to have the unstable buildings demolished in 2024. The proposed sequence[4] is as follows:

- ACM and Universal Waste Surveys
- ACM Abatement as defined by the survey
- Building Sweep of containers and universal wastes
- Utility Disconnection/Isolation
- Erosion and access controls
- Initiate CAMP monitoring
- Demolition and materials segregation
- Materials characterization sampling
- Notification of proposed disposition of materials
- Materials management (placement or offsite transportation)
- Restoration.

5.2 Soil Excavation and Disposal

The schedule for the soil excavation and disposal program is dependent on the approval of the BCP Application, execution of a BCP Agreement, permitting, weather, and completion of the demolition. The soil excavation and disposal cannot be completed concurrently with the demolition. Although the debris piles could be sorted at the same time or before allowing the C&D to be disposed with the demolition debris, the work in the former chip handling area should be completed after the demolition.

The proposed sequence assumes the excavations and debris piles are treated simultaneously, is as follows:

- Utility Clearance and Disconnection;
- Pavement Removal Former Chip Handling Area;
- Large Debris Removal from Piles;
- Sampling and Analysis:
    - Former Chip Handling Area
    - SB-007 Area
    - Finer-grained Residual from Debris Piles
- Data Summary Memorandum;
- Stabilization

[4] The sequence is dependent on equipment logistics and weather. Some alteration of the schedule may be necessary. Some listed buildings are not covered by the BCP IRM Work Plan but were added to provide detail on the schedule.

    - Former Chip Handling Area
    - SB-007 Area
    - Finer-grained Residual from Debris Piles
- Sampling and Analysis:
    - Former Chip Handling Area
    - SB-007 Area
    - Finer-grained Residual from Debris Piles
- Data Summary Memorandum;
- Waste Profiles and Approvals;
- Excavation and Offsite Disposal;
- Sidewall and Base Sampling
    - Former Chip Handling Area
    - SB-007 Area
    - Debris Pile Areas
- Import Request Form
- CCR

6 References

AECOM. September 2010. Draft Phase I Environmental Site Assessment. Tulip Corporation Site. 3125 Highland Avenue, Niagara Falls, NY

AECOM. October 2011. Phase II Environmental Site Assessment. 3125 Highland Avenue Property. Niagara Falls, New York.

AECOM. November 2013. Remediation Documentation Report (Incomplete Copy). Remediation Documentation Report. Tulip corporation. 3125 Highland Avenue, Niagara Falls, New York.

AMEC. December 2014. Tract I Site, Final Engineering Report. NYSDEC Site Number. C932157. Niagara County, New York

AMEC Foster Wheeler. March 2018. Final Engineering Report. Tract II Site. 3001 Highland Avenue. Niagara Falls, Niagara County, New York. Site No. 932136

Inventum Engineering 2022, Site Investigation Report, Tulip Molded Plastics Corporation Site #932169, 3125 Highland Avenue, Niagara Falls, New York, April 12.

Inventum Engineering 2023. Remedial Investigation Work Plan. 3125 Highland Avenue. Site #932169. October.

NYSDEC. May 2010. DER-10, Technical Guidance for Site Investigation and Remediation. Issued on May 3, 2010

Figures

PROPOSED 3125 HIGHLAND AVENUE BCP SITE NO. 932169

BRAUN HORTICULTURE INC.

JAMES N. GANT

JAMES N. GANT

INDUSTRIAL PROPERTIES LLC

GANSON ALTERNATIVE ENERGY, LLC

NIAGARA MOHAWK POWER CORPORATION

TRACT II - SITE NO. C932136

TRACT I - SITE NO. C932157

N

D

1" = 40'

80' 40' 0' 80'

DRAWING BY	R. BIRX
CHECKED	T. WALDROP
APPROVED	J. BLACK

PROPERTY OF INVENTUM ENGINEERING

IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. IT IS NOT TO BE REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN THOSE FOR WHOM IT WAS PREPARED NOR ARE ITS CONTENTS TO BE DISCLOSED TO SUBCONTRACTORS AND SUPPLIERS WITHOUT THE WRITTEN CONSENT OF INVENTUM ENGINEERING.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER. IT IS A VIOLATION OF STATE LAW FOR ANY PERSONS, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT IN ANY WAY.

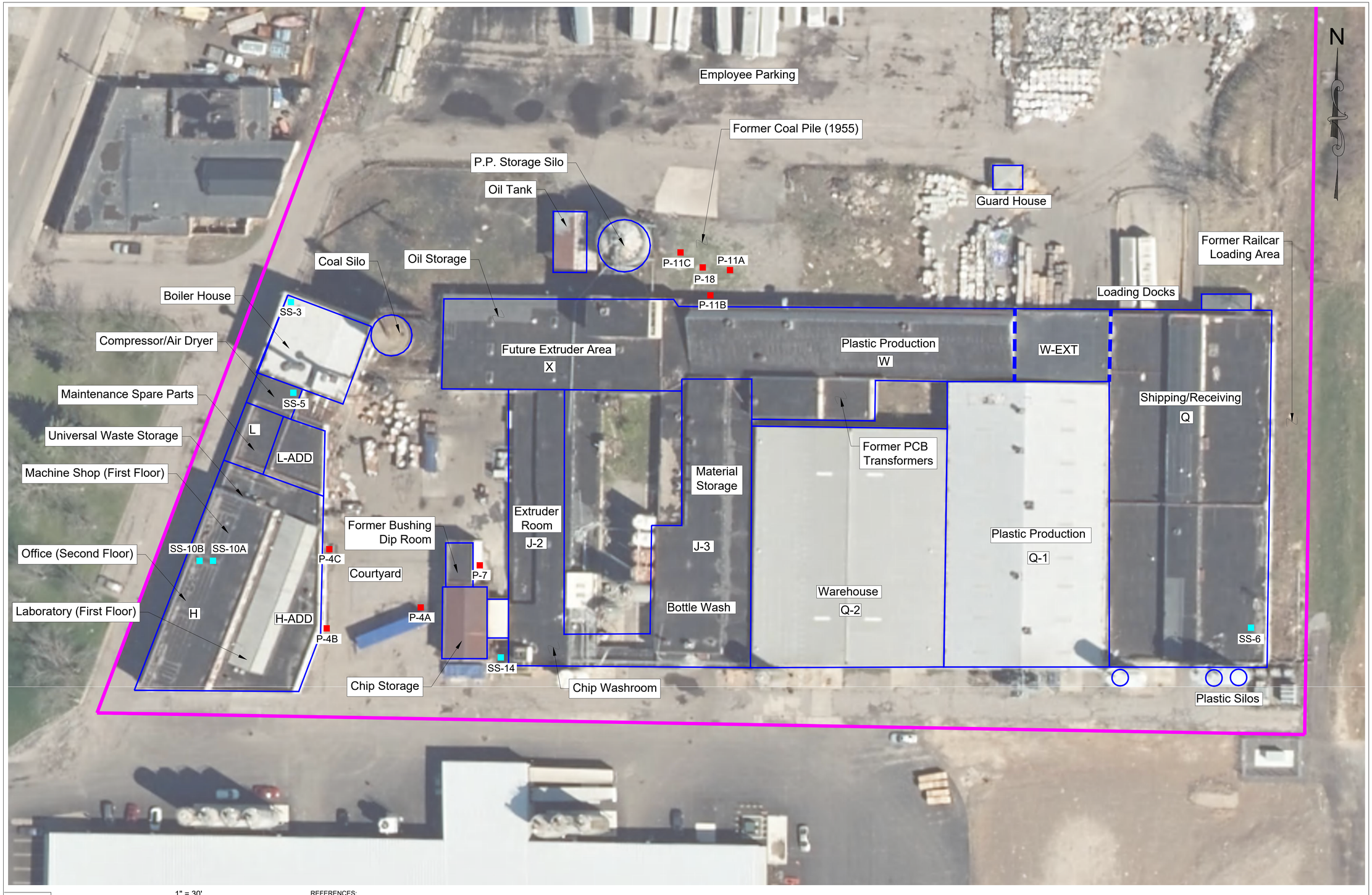
Ganson Alternative Energy LLC
3125 Highland Avenue
Niagara Falls, NY
Site No. 932169

3125 HIGHLAND AVENUE
PROPOSED BCP SITE

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

FIGURE 1

IRM WORKPLAN



D

1" = 30'

60' 30' 0' 60'

REFERENCES:
1. BUILDING KEY - PRESTOLITE DIVISION OF ELTRA CORP, PLOT PLAN PRESTOLITE 11/24/1982
2. HISTORICAL SAMPLE LOCATIONS FROM OCTOBER 2011 PHASE II ENVIRONMENTAL SITE ASSESSMENT CONDUCTED BY AECOM TECHNICAL SERVICES, INC. ON BEHALF OF TULIP CORPORATION

DRAWING BY	R. BIRX
CHECKED	T. WALDROP
APPROVED	J. BLACK

PROPERTY OF INVENTUM ENGINEERING

IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. IT IS NOT TO BE REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN THOSE FOR WHOM IT WAS PREPARED, NOR IS IT TO BE LOANED TO SUBCONTRACTORS AND SUPPLIERS WITHOUT THE WRITTEN CONSENT OF INVENTUM ENGINEERING.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER. IT IS A VIOLATION OF STATE LAW FOR ANY PERSONS, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT IN ANY WAY.

Ganson Alternative Energy LLC
3125 Highland Avenue
Niagara Falls, NY
Site No. 932169

HISTORICAL BUILDING PLAN

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

FIGURE 3

IRM WORKPLAN

Soil Boring Location (Scoping Investigations)

Monitoring Well

Material Estimate Ranges	DEBRIS PILE 1	DEBRIS PILE 2
Volume	2,500 - 3,500 cubic feet	3,000 - 4,000 cubic feet
Stabilization Required	128 to 179 tons	153 to 204 tons
Portland Cement Required	7 to 9 tons	8 to 10.5 tons

Debris Pile Area 1

Debris Pile Area 2

Demolition of Boiler House to Investigate lead in soils

Demolition of Former Chip Processing Areas to investigate the extent of lead

Demolition of Former Extruder, Plastic Production and Shipping/Receiving Buildings

Estimated area of impact with TCLP - Lead > 5 mg/L ~4,500 cubic feet

Estimated area of impact with TCLP - Lead > 5 mg/L ~300 cubic feet

Demolition of Laboratory to allow assessment of VOC impact

SB-001, SB-002, SB-003, SB-004, SB-005, SB-010, SB-011, SB-012, SB-013, SB-014, SB-015, SB-016, SB-017, SB-018, SB-019, SB-006, SB-007, SB-008, SB-009

MW-1, MW-2, MW-4, MW-5

DEBRIS-1, DEBRIS-2, DEBRIS-3

T1-EA1-CS34 LEAD = 1,250 PPM

T1-EA1-CS18 LEAD = 7,050 PPM

T1-EA1-CS23 LEAD = 2,150 PPM

T2-NG-SW6 LEAD = ,030 PPM

T2-NG-SW5 LEAD = 19,40 PPM

L, L-ADD, H, H-ADD, X, W, W-EXT, Q, J-2, J-3, Q-1, Q-2

D

1" = 40'

80' 40' 0' 80'

DRAWING BY	R. BIRX
CHECKED	T. WALDROP
APPROVED	J. BLACK

PROPERTY OF INVENTUM ENGINEERING

IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. IT IS NOT TO BE REPRODUCED, COPIED OR USED IN ANY MANNER WHATSOEVER NOR ARE ANY OF THE INFORMATION SHOWN HEREON TO BE REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN THOSE FOR WHOM IT WAS PREPARED, NOR DISCLOSED TO UNAUTHORIZED SUBCONTRACTORS AND SUPPLIERS WITHOUT THE WRITTEN CONSENT OF INVENTUM ENGINEERING.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER. IT IS A VIOLATION OF STATE LAW FOR ANY PERSONS, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT IN ANY WAY.

Ganson Alternative Energy LLC
3125 Highland Avenue
Niagara Falls, NY
Site No. 932169

SOIL EXCAVATION, STABILIZATION, AND DISPOSAL IRM

INVENTUM ENGINEERING
441 CARLISLE DRIVE
SUITE C
HERNDON, VIRGINIA 20170
(703) 722-6049
www.InventumEng.com

FIGURE 4

IRM WORKPLAN

Appendix A – Health and Safety Plans

Inventum Engineering
Site-Specific Health and Safety Plan (HASP)

(Required for all Type 2 and 3 projects.)

1. General Information

Client Name: 3125 Highland Avenue, Inc.

Project #:

Project Name: 3125 Highland Avenue BCP Site Remedial Investigations and Interim Remedial Measures

Project Manager: John Black, PE

Street Address:

3219 and 3301 Highland Avenue

Niagara Falls, New York

Prepared By: Peter Zaffram Date: February 9, 2023

Approved By: John Black, P.E. Date:

Proposed Date(s) of Work: TBD

Proposed Scope of Work:

Inventum Engineering, P.C. (Inventum) will be the owner's representative and engineer for the site management, site investigation(s), remedial investigation(s), and Interim Remedial Measures (IRMs) through the New York State Brownfield Cleanup Program (BCP) for 3125 Highland Avenue, Inc. located on the 3125 Highland Avenue proposed BCP Site (Site). The general scope of work is provided below, and tasks will be updated with additional details/specifications as the project progresses through the BCP.

Task 1 - Site Management and Oversight

Inventum will conduct site visits, general management, and general contractor and subcontractor oversight related to the Site's entry into the BCP. This task includes site visits related to performance of Site maintenance, relocation of equipment and products, and housekeeping, but specifically excludes Inventum personnel directly performing any intrusive site work or oversight of contractors/subcontractors performing intrusive site work. Direct intrusive site work and/or intrusive site work oversight is covered under the tasks listed below.

Task 2 – Surficial Soil Sampling

Surficial (approximately 0 to 1 foot below ground surface [bgs]) soil samples will be collected from various locations of the BCP Site to establish current conditions. Shallow borings will be installed using a hand-auger, shovel, or trowel and the material will be recovered for lithological characterization and field screening with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. Samples may be collected for various constituents including Metals, Semi-Volatile Organic Compounds (SVOCs), Volatile Organic

Compounds (VOCs), Polychlorinated Biphenyls (PCBs), 1,4-Dioxane, and Per- and Polyfluoroalkyl Substances (PFAS).

Task 3 – Subsurface Soil Sampling

Subsurface (> 1 feet bgs) soils samples will be collected from various locations of the BCP Site to establish current conditions. Depending on the depth of sample, subsurface borings may be installed using a hand-auger, shovel, trowel, light or heavy excavating equipment, direct-push equipment, or rotary drilling equipment. Material will be recovered for lithological characterization and field screening with a PID equipped with a 10.6 eV lamp. All observations and measurements will be logged in the field notebook. Samples may be collected for various constituents including Metals, SVOCs, VOCs, PCBs, 1,4-Dioxane, and PFAS.

Task 4 – Permit Compliance Water and Wastewater Sampling

Water samples will be collected periodically in accordance with a City of Niagara Falls Sewer Discharge Permit.

Compliance samples in accordance with requirements of the Sewer Discharge Permit will be collected in accordance with the project specific requirements of the permit.

Task 5 – Monitoring Well Installation

New monitoring wells may be installed as part of the BCP investigation(s) and remedial activities. The borings for the wells will be advanced to depth using hollow-stem augers for the collection of soil samples for lithological characterization. Unconsolidated material samples will be collected for observation and screening with a photo-ionization detector (PID) equipped with a 10.6 eV lamp in a continuous interval over the total depth of the boring with a split barrel sampler driven through the augers. All lithological observations, field measurements, and well construction details will be logged in the field notebook. Surface and subsurface soil samples may be collected in accordance with Tasks 2 and 3.

The new wells will be completed with a 2-inch Schedule 40 polyvinyl chloride (PVC) well casing and 5-feet of 0.010-inch slotted screen. A sand filter pack will be placed from the bottom of the screened interval to a minimum of 1 foot above the top of the screen. A 2-foot bentonite seal will be placed on top the filter pack and the remaining annular space will be completed with a cement grout (Portland Type I cement with 3 – 5% bentonite). The wells may either be completed flush-to-grade within a traffic rated box or within a steel bollard enclosure that protrudes a minimum of 2-feet above ground surface.

All newly installed wells will be developed prior to sampling and any existing monitoring wells may be redeveloped prior to sampling. The water levels in the monitoring wells will be manually measured using an oil/water interface probe prior to redevelopment and the depth to water, depth and thickness of any Light Non-Aqueous Phase Liquid (LNAPL), and the total depth of the well will be measured and logged in the field notebook. The wells will be redeveloped by removing three well volumes, purging the wells until dry, or purging and surging the wells using a submersible pump.

Field parameters (temperature, pH, conductivity, ORP, turbidity) will be measured and logged in the field notebook at least three (3) times during the development process (beginning, middle, and end) using a hand-held water quality monitor. All development water will be containerized and stored in appropriately labeled drums or totes and disposed offsite in accordance with applicable local, state, and federal regulations.

Task 6 – Groundwater Monitoring and Sampling

Inspections will be conducted prior to sampling and will include visual observations of the well head, seal, and cover. Measurements of the depth to liquid (if LNAPL is present), depth to water, and the overall total depth of the well will be collected using an oil/water interface probe and recorded in the field notebook for comparison to construction dimensions and previous records.

Monitoring wells will be sampled using a peristaltic pump following low-flow sampling procedures. Field parameters (temperature, pH, conductivity, ORP, turbidity) will be measured and logged in the field notebook at periodic intervals using a hand-held water quality monitor. All purge water will be containerized and stored in appropriately labeled drums or totes and disposed offsite in accordance with applicable local, state, and federal regulations.

Samples may be collected for various constituents including Metals, SVOCs, VOCs, PCBs, 1,4-Dioxane, and PFAS.

Task 7 – Demolition Monitoring

Inspections and air monitoring will be conducted throughout the process of demolition of buildings, process equipment and pavement. Inspections will include; observing and documenting the collection and proper management of containers and liquid filled equipment; proper placement of erosion and sediment controls, dust control, tire washing and inlet control, and materials management.

Monitoring will include compliance monitoring defined by the Community Air Monitoring Plan (CAMP), photographs to document progress, and documentation of progress and generation of material for offsite disposal.

Samples may be collected from liquids and solid debris for various constituents including Metals, SVOCs, VOCs, and PCBs.

Task 8 – Soil Excavation and Stabilization

There are soils and piles of debris known to contain materials that exhibit the characteristics of hazardous waste for lead. Onsite activities will include sampling materials for offsite analysis, documenting the activities associated with stabilization of the soils, documentation of the excavation of the soils, and monitoring the placement of fill.

Monitoring will include compliance monitoring defined by the Community Air Monitoring Plan (CAMP), photographs to document progress, and documentation of progress and generation of material for offsite disposal.

Samples will be collected from soil and solid debris for various constituents including Metals, SVOCs, VOCs, and PCBs.

Inventum Engineering
Site-Specific Health and Safety Plan (HASP)

(Required for all Type 2 and 3 projects.)

Inventum Role(s) On Site:

- ☐ Inventum Staff Will Not Be On Site (HASP and Risk Analysis is for subcontractor information only)
- ☐ Resident Project Representative (*e.g.,* "Observe and Document")
- ☐ Construction Manager (*e.g.,* CM, Managing/General Contractor)
- ☒ Representative for Client (*e.g.,* "Agent for Owner")
- ☒ General On-site Consulting/Engineering Services
- ☒ Other

☒ Soil Sampling	☒ Solid Waste Sampling	☒ Liquid Waste Sampling
☒ Groundwater Sampling	☒ Surface Water Sampling	☒ Wastewater Sampling
☒ Sediment Sampling	☐ Surveying	☐ Confined Space Entry

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Major Project Tasks	Inventum Task	Subcontractor Task	Minimum PPE Level Required see HASP for details (suggested levels for Subcontractor work)
1. Site Management and Oversight	☒	☐	☐ N/A ☒ D ☐ C ☐ B ☐ A
2. Surficial Soil Sampling	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
3. Subsurface Soil Sampling	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
4. Permit Compliance Water and Wastewater Sampling	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
5. Monitoring Well Installation	☒	☒	☐ N/A ☒ D ☐ C ☐ B ☐ A
6.			

2. Contingency Planning

LOCAL EMERGENCY RESOURCES:	
Ambulance: 911	Emergency Room:
Police: 911	Fire Department: 911
NYSDEC Contact:	Poison Control Center: 1-800-222-1222 ☐ Specify:
Other (client services offered, etc.):	

SITE RESOURCES:			
Drinking Water Supply	☐ Inventum	☐ Subcontractor	☒ Client
Wash Water Supply	☐ Inventum	☐ Subcontractor	☒ Client
Telephone – Land Line		☐ Subcontractor	☒ Client
Telephone - Cellular	☒ Inventum	☐ Subcontractor	
First Aid Kit	☒ Inventum	☒ Subcontractor	
Fire Extinguisher	☐ Inventum	☒ Subcontractor	☒ Client
Emergency Shower N/A	☐ Inventum	☐ Subcontractor	☐ Client
Eye Wash	☐ Inventum	☐ Subcontractor	☒ Client
Other: Confined space retrieval device N/A	☐ Inventum	☐ Subcontractor	☐ Client

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

EMERGENCY/SAFETY CONTACTS:	
Inventum Technical Contacts	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048)
Inventum Project Manager (PM): John Black	571.217.6761
Inventum Office Safety Coordinator (OSC)	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048)
Inventum Field Contact:	John Black (571.217.6761); Todd Waldrop (571.217.3627); James Edwards (571.232.5048); Roxanne Birx (585.734.5255); Peter Zaffram (716.553.5129)
Contractor Contact (To Vary – Main Remedial Contractor provided):	Ontario Specialty Contracting; 716.856.3333
Client Contact:	Jon Williams: 716.856.3333; John Yensan (716.856.3333)

Emergency Route:

Hospitals or clinics identified for emergency medical care should be contacted, to verify that emergency care is provided at that location. Verify the exact location of the medical facility during this call. See directions and map of route to _____ Hospital on the following page:

Hospital: Other: NA

Map to Hospital

Directions to Hospital:

Emergency Procedures:

If an emergency develops at the site, the first responder should take the following course of action:

- Notify the proper emergency services for assistance.
- Notify other personnel at the site.
- As soon as possible, contact the Inventum Project Manager to inform them of the incident.
- Complete the Inventum Incident Report Form (see Appendices) within 24 hours of the incident and client notifications, as required.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Investigation of Near Miss Incident and Initial Report of Incident/Exposure:

Inventum employees are required to report any incident, near miss, or injury, as soon as possible, by contacting the following:

☒ Inventum Managing Partner ☒ Notify supervisor ☒ Notify project manager

☐ Notify Site Manager () ☐ Complete client report: as required

(name):

(phone number):

Emergency Equipment Required On Site:

☒ First Aid Kit

☐ Emergency Eye Wash

☐ Emergency Shower

☐ Fire Extinguisher

☐ Spill Control Media

☐ Tripod/Hoist/Harness for non-entry confined space rescue

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

3. Site Classification

	Identification of Potential Hazards	YES	NO	SITE TYPE(1)
1.	Is the work a Phase I ESA (i.e., supervised plant walk-through, etc.)?	☒	☐	1
2.	Is the work being performed solely by a subcontractor (i.e., INVENTUM not on site)?	☐	☒	1
3.	Is the work just a supervised inspection for process evaluation, other inspections, meetings, records review, or a tour?	☒	☐	1
4.[1]	Is the work completely absent any chemical, physical, biological, or radiological hazards which would require a site-specific health and safety plan?	☐	☒	1
5.	Does the work include any mandatory client H&S requirements?	☒	☐	1, 2, or 3
6.	Does the project include on-site work other than office type areas?	☒	☐	2 or 3
7.	Does the proposed work scope involve any of the following:			
	Known and controlled chemical or biological hazards	☒	☐	2
	Unprotected work at elevation (fall protection required)	☐	☒	2
	Invasive activities (*i.e.,* Phase II ESA, UST Removal, sampling, etc.)	☒	☐	2 or 3
	Exposure to ionizing radiation (i.e., using nuclear gauges, etc.)	☐	☒	2 or 3
	Open excavations/trenches (Competent Person may be required on site)	☒	☐	2 or 3
	Confined space entry (permit may be required)	☐	☒	2 or 3
	The use of scaffolding (qualified inspections are required)	☐	☒	2 or 3
	Heavy equipment	☒	☐	2 or 3
	Facility maintenance (O&M, piping, electrical, lockout/tagout, etc.)	☐	☒	2 or 3
	Underground utilities may be encountered	☒	☐	2 or 3
	Overhead utilities may be encountered	☒	☐	2 or 3
	Stack testing	☐	☒	2 or 3
	Geotechnical drilling	☒	☐	2 or 3
	Demolition Activities with known or suspected contamination	☒	☐	2 or 3
	Unknown or uncontrolled chemical or biological hazards	☐	☒	3
	Known and uncontrolled chemical or biological hazards	☒	☐	3
	Waste sampling	☒	☐	3
	Construction activities with known or suspected contamination	☒	☐	3
	Remedial activities (RCRA, CERCLA, EnviroBlend®, Oxigent, etc.)	☒	☐	3
8.	Is the work regulated by 29 CFR 1910.120 (OSHA) or 30 CFR (MSHA)?	☒	☐	3
9.	Is the work regulated by NPL, CERCLA, RCRA, TSD, or SARA?	☒	☐	3

(1) Denotes typical site level (based on activities).

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Site Type Designation:

☐ Type 1 Known and controlled hazards associated with consulting/engineering services.

☐ Type 2 Known and controlled hazards, but with invasive, hazardous activities and/or civil/mechanical construction related services, or sampling.

☒ Type 3 Unknown and/or uncontrolled hazards associated with corrective action clean-up, and/or remediation of hazardous substances.

4. Site Characterization

Client Requirement(s)[1]:	☒ None	☐ Site Orientation	☐ H&S Orientation
	☐ Permits or Other Requirements (specify and attach, if available):		
Site Information:	☒ Map/Diagram (attach)	☐ Map/Diagram Unavailable	
	☐ Inactive Site	☒ Active Site (specify below)	
General Environmental Concerns:	☒ Contaminated Water	☒ Wastewater	☒ Dust
	☒ Contaminated Soil	☒ Solid Waste	☒ Noise
	☒ Contaminated Air	☒ Waterways	☐ Other:
Site Security/Access Control:	☐ None	☒ On Site	
	☐ Other (explain):		
Amenities Available for Work:	☐ None	☒ Waste Storage	☒ Restrooms
	☒ Tools/Equipment Storage	☒ Office/Trailer Space	☒ Supplies Storage
Utilities Available For Work:	☐ None	☒ As Listed: Water, electric	
Medical Services Available:	☐ None On Site	☒ As Listed: First aid	
Facility Alarms/Signals:	☒ None	☐ As Listed:	
Traffic/Parking/Railway Issues:	☐ None	☒ As Listed (On-Site/Off-Site): On-site parking	
☐ Permits Required (specify)[2]:	☐ Confined Space Entry	☐ Local:	☐ State:
	☐ Federal:	☐ Other:	☒ N/A
☒ Utility Locate Service(s):	☒ On Site	☐ Client	☒ Other: Former Site employees contracted to client for daily site management
	☐ Off Site	☐	☒ One Call
		☐	☐ N/A

[1] If relying on the client for any specific hazard identification and control, implemented control and effectiveness should be documented prior to beginning any work activities. This is recommended for all field projects.

[2] Permit examples: Utilities (electrical, water, gas, etc.); Excavations; Explosives; Cranes; Burning; Fuel storage; Traffic control; Hoists; Cutting; Welding; Demolition; Confined space; Restricted access areas; etc.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

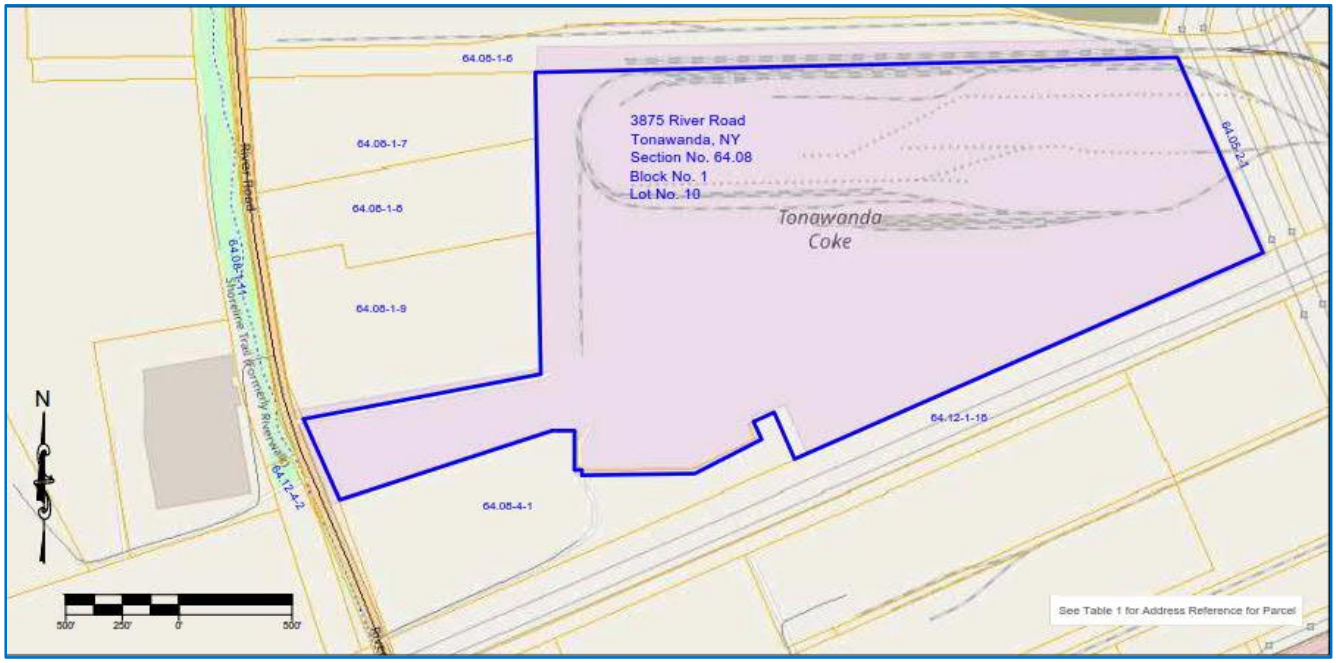
Detailed Physical Description of Site/Facility: ☒ Map/Diagram Attached

The Site is located at 3875 River Road, Town of Tonawanda, Erie County, New York. The portion of the Site in the BCP program encompasses approximately 86.5 acres of land although Riverview Innovation Technology Campus, Inc (client) will control additional acreage outside the BCP program within the federal/state superfund programs. The Site is located approximately 0.25 miles west of I-90 on the east side of River Road. The surrounding properties are primarily industrial or vacant.

The former coke production facility is located in the northern center portion of the property which includes coke ovens, coke by-product plant, storage tanks, and railway line spurs. The southern portion of the property is mainly open with multiple former raw material coal and coke piles located throughout the area. The facility is no longer in operation; however, activities on site include surficial mining of remaining coal/coke storage areas and water management from secondary containment areas.

Historically, manufacturing processes used at the plant have included: by products coking, light oil distillation, ammonia recovery, and ethene, toluene, and xylene extraction. Historical investigations that were performed at the site have identified some conditions that previously required remediation.

Figure 1; Site Location



Site Activities/Current Operations: ☐ None ☒ As Specified

Other Concurrent Site Activities, Work, and/or Other Adjacent Hazards or Concerns:

☐ None

As Specified:

☐ Schools ☐ Daycare ☐ Hospital ☐ Airport

☐ Residential ☒ Offices ☐ Shopping ☐ Active parking lot in work space

5. Hazard Evaluation

Complete (1) Substance Name (be specific)	Specific Applicable OSHA Standard (if any)	Physical State (2) (S, L, G, Aq, Vap, F, P)	Max. (3) Conc. Level Per Physical State	General (4) Control Measures (Eng., Admin., PPE)
Coal Tar	0.2 mg/m3	S	Coal Tar Product	Eng., PPE
Benzo(a)pyrene	0.2 mg/m3	S	4,100 ug/kg	Eng., PPE
Benzo(b)fluoranthene	N/A	S	4,600 ug/kg	Eng., PPE
Benzo(a)anthracene	N/A	S	20,000 ug/kg	Eng., PPE
Chrysene	0.2 mg/m3	S	21,000 ug/kg	Eng., PPE
Dibenz(a,h)anthracene	N/A	S	1,700 ug/kg	Eng., PPE
Indeno(1,2,3-cd)pyrene	N/A	S	15,000 ug/kg	Eng., PPE
Cyanide	N/A	L	2.75 mg/L	Eng., PPE
1,4-Dichlorobenzene	75 ppm	L	29 ug/L	Eng., PPE
Benzene	1 ppm	L	85 ug/L	Eng., PPE
Chlorobenzene	75 ppm	L	22 ug/L	Eng., PPE
Xylenes	100 ppm	L	36 ug/L	Eng., PPE
Toluene	200 ppm	L	59 ug/L	Eng., PPE
Iron	N/A	L	160 mg/L	Eng., PPE
Manganese	N/A	L	11.2 mg/L	Eng., PPE
Phenolics	5 ppm	L	0.61 mg/L	Eng., PPE
1,1,1-Trichloroethane	350 ppm	L	12.2 ug/L	Eng., PPE
Methylene chloride	25 ppm	L	52 ug/L	Eng., PPE
Selenium	0.2 mg/m3	L	0.0116 mg/L	Eng., PPE
Nickel	N/A	L	0.153 mg/L	Eng., PPE
Cadmium	0.005 mg/m3	L	0.19 mg/L	Eng., PPE
Chromium Total	1 mg/m3	L	0.086 mg/L	Eng., PPE
Lead	0.050 mg/m3	L	0.025 mg/L	Eng., PPE

(1) Use OSHA regulated name, not elemental forms. If available, attach SDS. Identify any sample preservative or O&M chemicals or subcontractor chemicals in this table also.
(2) S = Solids, L = Liquid, G = Gas, Aq = Aqueous, Vap = Vapor, F = Fume, P = Airborne Particulate.
(3) If available, attach laboratory results or summary tables.
(4) See the following sections for detailed control measures: personal protection equipment (PPE), Air Monitoring (Admin), or Site Control (Admin and Eng.).
(6) IP = Ionization Potential, VP = Vapor Pressure, LEL = Lower Explosive Limit, UEL = Upper Explosive Limit, N/A = Not Applicable, N.D. = Not Determined
(7) IDLH = Immediately Dangerous to Life and Health. NEVER enter IDLH conditions on site without proper respiratory protection.
(8) C = Ceiling Value, ST = Short-Term Exposure Limit, TWA = Time-Weighted Average, None Est. = None Established
(9) R = Respirable Limit, T = Total Limit
(10) Warning Properties: Good (G), Poor (P), None (N)

5. Hazard Evaluation (continued)

Site-Specific Physical Hazards

HAZARD	SPECIFIC CONTROL MEASURE
Slip/Trip/Fall Injury	— Use roads or trails whenever possible. — Occasionally reassess route to avoid dangerous terrain. — Maintain good housekeeping and keep work area clear of loose materials and equipment. — Use portable steps to mount and dismount sampling vehicle.
Ingestion of or contact with impacted soil	— Wear safety glasses. — Wear nitrile and appropriate cut-/puncture-resistant gloves (see Glove Selection Guideline) when performing tasks. — Wash hands and arms thoroughly when daily work is completed. — No eating, drinking, or smoking while conducting monitoring or sampling activities.
Pinched fingers or toes	— Where appropriate cut-/puncture-resistant gloves (see Glove Selection Guideline) when the potential for hand injury exists. — Where steel-toed safety shoes with steel shanks while on site.
Strained muscles	— Use proper lifting posture, techniques, and equipment when handling heavy objects. — Use two people for loads >40 lbs. or awkward items. — Take rests as needed during and between carries.
Cutting activities	
Flying debris/eye injuries	— Wear ANSI-approved safety glasses when the potential for flying debris and eye injuries exists.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Aboveground Storage Tanks (AST)	Be aware of any aboveground storage tanks and the type of material being stored in them. Be aware of the potential of spills, fires, explosions, etc., while working near the tanks. Stay clear of tanks whenever possible, and be aware of any equipment operators near the tank(s).
☒	Animals (dogs, etc.)	Be aware of any animals on site or adjacent to the site. Appropriate care should be taken if any feral (wild) animals are encountered.
☐	Blasting/Explosives	INVENTUM personnel shall not handle any explosive devices or materials. INVENTUM personnel should understand the blasting procedures being used by the subcontractor, and all of the associated health & safety precautions. The subcontractor shall handle, store, and use the explosives in accordance with 29 CFR 1926.900, Subpart H and U.
☐	Boat or Barge	A boat or barge should be used that is adequately stable for the type of activity conducted. The boat or barge should have all of the appropriate and current licensing and registrations required by the applicable regulatory agencies. All applicable laws and regulations will be followed when launching the boat or barge, and when navigating to and from the work site. Personal floatation devices should always be worn while navigating the boat or barge. The boat must be equipped with the following approved United States Coast Guard (USCG) safety equipment: — A Type 1, 2, or 3 personal flotation device (PFD) for every person aboard (should be worn while navigating) The following equipment is recommended: — A Type 4 throwable PFD — Audible distress signal device (air horn, whistle) — Fire extinguisher (if engine-propelled) — Auxiliary propulsion (spare paddles, trolling motor) — Bow and stern lines — Anchor and anchor line — First aid kit — Visual distress signal device(s) (flares, dyes) — Additional PFDs Be familiar with local weather and tidal characteristics. Do not conduct sampling from a boat/barge when threatening weather is imminent, or poor visibility exists. Sampling from a boat is prohibited in water containing substances likely to cause injury upon short-term or prolonged contact. Sampling from a boat is prohibited when the temperature of the water is high or low enough to cause injury upon short-term or prolonged exposure. Avoid sampling from a boat when unsafe water turbulence (waves) exists. Avoid standing in a boat. Always use the buddy system when sampling from a boat or barge; one person should be on shore with visual contact of the barge and should be able to summon emergency assistance if needed. Be familiar with local weather and tidal characteristics. Work on a boat or barge will not be performed when threatening or severe weather is impending or present.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Briars or Thistles	Be aware of any briars or thistles on site. Wear appropriate clothing and gloves. Avoid contact with briars or thistles whenever possible.
☒	Business Traffic	Be aware of traffic patterns associated with local businesses near the work site. Allow traffic to enter and exit the businesses in such a manner to avoid creating traffic hazards, back-ups, delays, or potential accident situations.
☐	Cement Dust	Stay clear of mixing operations and avoid contact with or breathing of the dust.
☐	Chain Saws	Stay clear of any chain saw operations. Subcontractor is responsible for the safe use of chain saws on site.
☐	Cleaning Agents	Use caution when applying cleaning agent to equipment. Use gloves, safety glasses, splash shields, and protective clothing as needed.
☒	Client Activities	Be aware of client activities at or adjacent to the site. Work activities should be coordinated with other site activities to avoid conflicts. Contact EDP offices prior to starting work.
☒	Cold Stress	Work schedules may be modified when temperatures are below 20° F as measured by the wind chill factor. Take frequent breaks to warm up. Drink plenty of fluids. Wear appropriate clothing, and monitor for cold stress symptoms (frostbite, hypothermia, etc.).
☒	Compressed Air or Gas Cylinders	Compressed air or gas cylinders should be clearly marked, and they should be stored, transported, and secured in an approved manner.
☒	Compressed Air/Gas or Pressurized Liquids Hoses, Lines & Fittings	Compressed air or gas, or pressurized liquid lines or hoses should be inspected at least daily, or in the event a leak develops, or if a line or hose is run over or crimped.
☐	Concrete/Masonry/ Foundations	No construction loads shall be placed on a concrete structure or portion of a concrete structure unless a person who is qualified in structural design has determined that the structure or portion of the structure is capable of supporting the loads. All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement. No employee shall be permitted to work under concrete buckets while buckets are being elevated or lowered into position. To the extent practical, elevated concrete buckets shall be routed so that no employee, or the fewest number of employees, are exposed to the hazards associated with falling concrete buckets. A limited access zone shall be established whenever a masonry wall is being constructed. All masonry walls over eight feet in height shall be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing shall remain in place until permanent supporting elements of the structure are in place.
☐	Confined Spaces (tanks, vaults, vessels, trenches, manholes, some excavations, etc.)	The scope of this project does entail entry into confined spaces. Confined spaces will not be entered unless a confined space entry permit has been completed, signed, and approved, and all participating personnel are trained in confined space entry procedures, including safety, and rescue procedures. All potential hazards of confined space may not be addressed by this hazard assessment, and health and safety plan.
☒	Cutting Tools	Stay clear of contractors' cutting tools, especially saws and torches. Be aware that cutting operations could create other hazards, such as falling objects, or shifting materials, etc. Safety glasses should be worn while using cutting tools. Spark-proof tools should be used when working in areas of potential explosive or flammable conditions. Fixed-open blade knives are prohibited.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Demolition Activities	Stay clear of walls, ceilings, roofs, etc., as they are being demolished.
☒	Demolition Debris	Demolition material should only be handled by appropriate equipment because of sharp points, edges, etc. Demolition material may also pose a trip hazard, fall, or puncture hazard, so avoid walking or climbing on debris piles, etc.
☒	Drums	If drums are used on-site, they should be clearly labeled with the name of the contents and the appropriate label. Drums should only be handled with the appropriate equipment. Drums discovered during excavations, etc., shall not be opened or moved until appropriate identification can be performed. At a minimum, Level B protection is required for sampling any unlabeled drums discovered during remediation procedures.
☒	Dust/Particulates (Particulates Not Otherwise Regulated) (PNOR) (OSHA PEL = 15 mg./m^3, total) (OSHA PEL = 5 mg./m^3, respirable)	For general dust, work should be performed up-wind if possible. If conditions warrant it, monitoring should be done with a PM-10. Monitoring should occur at least 3 times per day, and every time re-entering the site. Readings should be taken downwind from the work area or inside the equipment as indicated by the conditions on site. If the OSHA PEL is exceeded, or is likely to be exceeded, engineering or administrative controls should be used, or a dust respirator must be worn. For hazardous dusts, a detailed air monitoring plan and a respiratory protection plan should be developed for the site activities.
☐	Elevated Work	For any construction work activities elevated 6 feet or more, or other non-construction activities elevated 4 feet or more, fall protection must be provided. Caution should be taken on catwalks and ladders because of potential slippery conditions, or the potential for footwear to catch on the surfaces.
☐	Energized Sources (electrical equipment or hookups, lines, etc.,) (Lockout/Tagout)	Contractors for all electrical activities, and any facility equipment with moving parts should follow proper lock-out/tag-out procedures, and only properly trained employees will perform the work. Employees will not perform any lock-out/tag-out activities unless personnel are properly trained in lockout/tagout procedures. Heed any caution signs or labels.
☒	Equipment Exhaust	Equipment exhaust should be ventilated away from the work area while drilling inside structures. Industrial fans can be used to move exhaust out of the area.
☒	Ergonomic Issues (job hazard analysis)	Ergonomic hazards will be addressed on a site-specific basis once mobilization to the field has occurred. Workstations will be evaluated on an individual basis.
☒	Evening Work	If work is performed during the evening hours, work shall be limited by the availability and the quality of artificial lighting. Care should also be taken to avoid slip, trip, and fall hazards that are not as easy to identify during low light conditions.
☒	Excavations	Stay clear of excavation walls. INVENTUM personnel will not enter an excavation, in accordance with 1926 Sub Part P. Subcontractor must provide a Competent Person on site, if one is required by the planned activities. Side cuts should conform to 1926 Subpart P requirements, or shoring should be used. All open excavations should be secured using traffic cones, barrier tape, or barricade signs stating “Do Not Enter Excavations”, especially if left open overnight.
☐	Explosives	Be aware of potential explosive materials and how to identify them. No smoking is allowed on-site or near where potential explosive materials may be present.
☐	Facility Conveyors (product or waste lines)	Stay clear of facility conveyors, product process lines, and waste disposal lines. Be aware of any client-specific health and safety requirements to work in these areas.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Facility Equipment/Machinery	Be aware of active and moving client equipment on site.
☒	Facility Piping - aboveground	Stay clear of aboveground pipes. Client is responsible to identify all applicable aboveground facility pipes prior to any work activities in the area. Pipes can be overhead hazards, or trip hazards. Pipes can be hazardous because of the material flowing through them, such as steam, natural gas, toxic chemicals, etc. Some pipes are also coated with hazardous material such as asbestos.
☒	Facility Piping - belowground	Client is responsible to identify all applicable underground facility pipe locations prior to any subsurface activities.
☐	Fall Hazard	Proper tie-off, harnesses, railings, etc. should be used when performing work on ladders, scaffolding, man-lifts, or on the roof of buildings, etc. Stay clear of the edges of pits, trenches, quarries, etc.
☒	Falling Objects	Be aware of any potential falling objects or materials on site. Stay clear of any areas identified as potential falling object areas.
☒	Fences	Be aware of fences in disrepair that may be trip hazards or may have materials that could cause punctures or cuts. Use caution when crossing over or under fences.
☒	Field Equipment	If field equipment is heavy or awkward to carry, get assistance or use carts to help move around the site.
☒	Field Vehicle	Inventum personnel shall follow all applicable state and federal traffic laws while traveling to and from the site, and while working on the site. In particular, the following laws should be followed: speed limits, parking restrictions, use of wipers and lights during precipitation events, limiting cell phone use, etc. It is the responsibility of the driver to verify that all safety equipment on the vehicle is working properly before driving the vehicle. In particular, the following items should be checked: tire pressure, tire tread, windshield wipers, windshield washer, headlights, tail lights, brake lights, spare tire, fire extinguisher, first aid kit, etc.
☒	Fire Hazards	Eliminate sources of ignition in work areas that have ignitable materials. Provide an ABC fire extinguisher in close proximity to the support zone.
☒	Flooded Areas	Do not drive through flooded areas or standing water. Do not wade into moving water, or water deeper than 2 feet without adequate assistance.
☒	Flying Debris/ Eye Injuries	Be aware of any flying debris on site and wear protective eyewear when necessary.
☒	Fork Lifts	Be aware of forklift patterns and stay clear of those routes.
☒	Hand Tools	Use only the appropriate tool for the task at hand. Use the tool(s) as designed, described, and intended by the manufacturer.
☒	Heat Stress	The work schedule may be modified if the ambient temperature is more than 80° F. Take breaks as necessary, and drink plenty of fluids. If necessary, wear sunscreen and sunglasses on bright days. Monitor site personnel for signs of heat stress symptoms (heat rash, heat cramps, heat exhaustion, or heat stroke).

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Heavy Equipment	Contractor is responsible for safe operation of equipment. All mobile heavy equipment must have a functioning backup alarm, and operators must comply with equipment manufacturer's instructions. Maintain proper distance and remain in line of sight of operator and out of reach of equipment. Isolate equipment swings, if possible. Make eye contact with the equipment operator before approaching the equipment. Understand and review hand signals, and wear orange safety vest, if necessary.
☒	Heavy Lifting	Use proper lifting procedures and equipment when handling heavy objects such as drums, manhole covers, tank covers, etc.
☒	High Pressure Gas Lines, etc.	Be aware of high-pressure gas lines and follow approved safety precautions when working with or around the lines.
☐	Highway Traffic	Traffic control within the right-of-way will be in accordance with the WDOT "Work Zone Safety – Guidelines for Construction, Maintenance, and Utility Operations" procedures. Work may be restricted within specific lanes during peak traffic times. Verify peak traffic times, and review planned activities with the WDOT, so that appropriate lane closures can be coordinated.
☒	Housekeeping	All field vehicles, job trailers, and field offices will be properly cleaned and organized to prevent cluttered work and storage areas.
☐	Hunters/Firing Range, etc.	Be aware of surrounding activities that may involve hunting, firearms, etc. that may not be in your immediate area, but could create an unsafe work environment.
☒	Ice (thin)	When project activities include either crossing ice or working directly on the ice, a detailed plan should be developed that will be used to continually evaluate the ice conditions, and to determine when work should be terminated due to unsafe conditions. All staff working on the ice will wear an appropriate and approved personal floatation device. Other emergency equipment such as ropes, a throwable floatation device, a means to warm a wet and cold worker, etc. must be available. A buddy system should also be used for this type of work, such that one person is always on shore or at least on previously determined safe ice.
☒	Insects (ticks, bees, spiders, etc.)	Site workers with known allergies to insect bites should carry their own medication. In case of emergencies, inform fellow workers of any severe allergies. Use insect repellant as necessary, and as specifically allowed on site. If possible, wear long-sleeved shirts and pants. If appropriate, check for ticks at the end of each day. Have other appropriate first aid supplies handy for bites.
☒	Stakeholders	Be aware of the potential for irate neighbors or outsiders that may interfere with work activities, or that may potentially damage equipment or on-site materials, etc.
☐	Ladders	Ladders should only be used if they are in good condition, conform to OSHA requirements, and if they will be used in an appropriate manner. Be especially cautious of slipping on ladders when the ladder or footwear is wet or dirty.
☐	Landfill Gas (Methane, CO2, Hydrogen Sulfide)	Avoid breathing gas, especially in low oxygen areas (simple asphyxiant). Potentially flammable and explosive, so keep ignition sources away from gas. Explosive conditions of LEL >5% in a work area should be ventilated as soon as possible, or the area should be evacuated.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☐	Leachate (Municipal Solid Waste (MSW))	MSW leachate may contain hazardous biological substances, so avoid physical contact with leachate and, if possible, stay up-wind. If contact is made with leachate, wash affected areas thoroughly with soap and water. If boots contact leachate, they should be thoroughly washed with soap and water also.
☒	Lead	Wear gloves when in contact with lead contaminated soil, etc. Thoroughly wash hands and arms when daily work is completed.
☒	Long Hours/Fatigue	Long work hours can lead to fatigue, and fatigue can lead to the physical inability to perform the work in a safe manner, or travel to or from, a work site in a safe manner. If long work hours are scheduled, or if the scheduled work takes longer than planned, field staff should determine if fatigue is, or will be, an issue. Field staff should evaluate whether they are able to complete the work in a safe manner, or whether they are able to travel in a safe manner. If fatigue is an issue, appropriate breaks should be planned or taken, including overnight stays when necessary.
☒	Material Handling	Move containers and heavy material only with the proper equipment, and secure them to prevent dropping, falling, or loss of control during transport. Stay clear of material handling operations, especially near slopes. Do not stand down the slope from equipment, supplies or materials being moved above on the slope, or being deployed onto the slope.
☒	Material Storage	Stored material may be a falling hazard, or a crush hazard. Do not stand adjacent to materials stacked up, such as pipes, geosynthetic rolls, etc., or in the area of deployment.
☐	Methane Gas (Landfill Gas)	Explosive conditions (5% LEL) will be ventilated, if encountered, prior to working in an area. Methane is a simple asphyxiant.
☐	Mine or Quarry	No work shall be performed within 15 feet (or other designated client setback, whichever is greatest) of the mine or quarry walls. Be aware of the potential for falling rocks or slope failures.
☐	Municipal Solid Waste (MSW)	MSW may contain hazardous biological substances, so avoid physical contact, and if possible, stay up-wind. Wear appropriate PPE, such as gloves, safety shoes, and safety glasses. Wash hands, arms, and face after working near MSW. Reusable PPE and equipment should be thoroughly decontaminated after exposure to MSW. MSW may also contain sharp objects with the potential to puncture PPE.
☒	Natural Gas	Natural gas is flammable and explosive. Keep ignition sources away from gas sources. Use spark-proof tools when working with gas lines, etc.
☒	Noise	Hearing protection must be worn when noise levels exceed 85 dBA in the work area. If you need to raise your voice to be heard at the work site, then hearing protection should be worn. Hearing protection will be worn near drill rigs.
☒	Overhead Hazards	Pay attention to overhead equipment, piping, and structures. A hard hat must be worn at all times when overhead hazards are present on site including the operation of a drill rig.
☒	Pedestrian Traffic (public, client, workers)	Be aware of pedestrian traffic patterns and, route traffic around the exclusion zone(s), as necessary, to avoid distractions and the potential for exposures or accidents. Use appropriate barricades and caution tape to mark work areas.
☒	Poisonous Plants	Be able to identify any local poisonous plants and avoid them if possible or wear protective clothing as necessary. When removing potentially exposed clothing or PPE, the clothing or PPE should be carefully and thoroughly washed or decontaminated.
☒	Portable Heaters	Be aware of portable heater locations and stay a safe distance from them.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Power Washing Equipment	Stay clear of the power washing nozzles and equipment.
☒	Propane Tanks	Be aware of propane tank locations, and any gas lines leading to or from the tanks.
☐	Radiation (ionizing)	Exposure to ionizing radiation can be controlled by one of three methods: time, distance, or shielding. Limit your time near the radioactive source. Keep your distance from the radioactive source. Shield yourself from the radioactive source with appropriate shielding material. If the radioactive source(s) are from INVENTUM equipment, the INVENTUM employee using the equipment needs required training to use the equipment and must be monitored using a dosimeter badge.
☐	Rock Blasting	Contractor is responsible for following safe blasting protocol. Heed all contractor warnings at time of blasting and stay well clear until safe to return to area, as indicated by the contractor.
☒	Sample Preservative Chemicals:	Wear safety glasses and nitrile gloves when adding preservative chemicals to sample bottles or vials. Have clean wash water nearby.
☐	Scaffolding	Stay clear of scaffolding. Be aware of the OSHA safety requirements for using constructing and scaffolding.
☒	Severe Weather	Work may be suspended if dangerous weather conditions (lightning, tornadoes, high winds, heavy rain, freezing rain, etc.) occur. Be aware of changing weather conditions and be prepared to take shelter as necessary. Potential shelters should be identified prior to beginning work.
☒	Sharp Objects	Wear appropriate gloves when handling sharp objects or use appropriate equipment to move objects.
☒	Slippery Ground/Surfaces	Exercise caution, especially on slopes, field trailer floors and stairs, after a precipitation event. Use slip resistant boots or implement surface preparations to eliminate the slippery nature of the surface prior to accessing the area. Spill control measures and general housekeeping should be utilized to help prevent slipping on wet floors, wet pavement, and general work areas.
☒	Slips, Trips, and Falls:	Maintain clear walkways for work areas.
☒	Snakes	Be aware of the potential for snakes in the area and wear snake boots, snake chaps, gaiters, or leggings as needed.
☒	Steam Cleaning Equipment	Stay clear of the steam cleaning nozzles and equipment.
☐	Steel Erection	All materials, equipment, and tools, which are not in use while aloft, shall be secured against accidental displacement. The controlling contractor shall bar other construction processes below steel erection unless overhead protection for the employees below is provided. Employees engaged in steel erection activities on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.
☐	Steep Slopes or Banks	Pay attention to footing and walking. Stay a safe distance from unstable or extremely steep slopes. Wear appropriate footwear. Be aware of potential slope or bank failures. Heavy equipment should not be operated on or near unstable slopes or banks.
☒	Strong Nuisance Odors	Strong odors should be ventilated before entering a work area, or a respirator shall be worn as needed.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Sunburn	For extended periods of time outdoors on sunny days, sunglasses, long-sleeved shirts and long pants should be worn to help prevent sunburn and eye problems. Wear sunscreen as appropriate for the project.
☒	Surface Water	Working next to or on, bodies of water shall be done using the buddy system. Staff shall wear USCG-approved personal floatation devices when on or adjacent to bodies of water.
☒	Terrain	Uneven or steep terrain can cause hazardous conditions for walking and transporting equipment around the site. Site personnel should use caution when working on uneven surfaces, and they should avoid working down-slope from heavy equipment, or materials being moved or stored.
☒	Traffic (client, contractors, public, semi-trucks, forklifts, etc.)	Obey all posted speed limits. Park in designated areas only. Be aware of traffic patterns on site, and during access to the site. Use orange traffic cones and barrier warning tape, as needed, or if within 25 feet of the right-of-way. INVENTUM personnel must wear orange safety vests when working in or near traffic areas. Class 2 traffic vests are required with traffic speeds 25 mph or higher. Class 3 traffic vests are required with traffic speeds 50 mph or higher.
☐	Trains/Railroad Tracks	Be aware of any train activities on the site, entering or leaving the site, or immediately adjacent to the site. Do not walk between the rails or on the railroad ties. When driving, stop at all railroad crossings, even if they are unmarked, and look in both directions before proceeding across the tracks.
☒	Transporting Hazardous Materials	INVENTUM personnel who transport hazardous materials shall have the required DOT training prior to transporting materials, and will comply with all applicable DOT regulations and requirements for labeling, packaging, etc.
☐	Tree Cutting	Stay clear of tree cutting activities.
☒	Trenching	INVENTUM personnel will enter trenches in accordance with 1926 Sub Part P. Be aware that some trenching conditions may result in a confined space condition.
☒	Trip Hazards (wires, cords, hoses, debris, corn stubble, uneven surfaces, etc.)	Temporary wires, cords, hoses, etc., should be properly located, marked, and protected to help prevent tripping and disruption to work activities. Trip hazards are particularly a problem early in the morning, late in the day, or under other poor lighting conditions.
☒	Underground Storage Tanks (USTs) (Septic Tanks)	If any unknown USTs are encountered, drilling or excavations will be terminated in that location until a new scope of work, Risk Assessment and Health & Safety Plan can be developed.
☒	Uneven Surfaces	Be aware of uneven walking or driving surfaces and exercise caution when moving around the site.
☒	Utilities – Overhead (electrical, telephone, cable TV, etc.)	A subcontractor, the client, or INVENTUM will locate and identify all overhead utilities. The owner or client will be responsible for identifying all applicable overhead utilities, product lines, pipes, and aboveground tanks. A minimum clearance of 20 feet must be maintained between equipment and overhead utility lines.
☒	Utilities – Underground (electric, gas, telephone, water, storm sewer, sanitary sewer, cable TV, etc.)	A subcontractor, the client, or INVENTUM will call Digger's Hotline to locate all underground utilities. The owner or client will be responsible for marking all applicable on-site underground utilities, product lines, pipes, and tanks.

Risk Analysis (RA)

(Required for all Inventum Type 2 or Type 3 field projects.)

Other Common Physical Hazards

(modify as needed, but include with all project hazard assessments)

☒	PHYSICAL HAZARD	GENERAL CONTROL MEASURE
☒	Waterways	Exercise caution near, around, or in waterways. Harnesses should be worn when working in, or within 4 feet of, the waterway, especially when attempting to sample from shore or a boat or barge. All applicable laws and regulations will be followed when navigating a boat or barge to and from a work site.
☒	Welding Tools	Stay clear of welding operations, and do not look directly at the welding process without appropriate eyewear and shield.
☐	Traffic Control	Traffic Control: Traffic control within the right-of-way will be in accordance with the local Public Right-of-Way Agency. Work may be restricted within specific lanes during peak traffic times. Verify peak traffic times and review planned activities with the local Public Right-of-Way Agency, so that appropriate lane closures can be coordinated.

Proposed Date(s) of Inventum Work: TBD

ON-SITE PROJECT TEAM MEMBER	ON-SITE PROJECT RESPONSIBILITIES
John Black	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight
Todd Waldrop	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight
James Edwards	Inventum Site Health and Safety Representative (Supervisor); Remedial Contractor Oversight

Any required construction/demolition activities: ☒ No ☐ Yes If Yes, complete Section 1

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

1. Construction Tasks: work tasks to be performed by Inventum staff or Inventum subcontractors

Civil

- ☐ Sewer (utility)
- ☐ Water (utility)
- ☐ Electric (utility)
- ☐ Communications (utility)
- ☐ Siding
- ☐ Roofing
- ☐ Drywall
- ☐ Flooring
- ☐ Ceilings
- ☐ Casework
- ☐ Masonry
- ☐ Escalator

- ☐ Steel (erection)
- ☐ Pre-cast (erection)
- ☐ Concrete (erection)
- ☐ Re-bar
- ☐ Elevator
- ☐ Fireproofing
- ☐ Windows
- ☐ Landscaping
- ☐ Painting
- ☐ Insulation
- ☐ Doors
- ☐ Finish Concrete

- ☐ Others
- ☐ Others
- ☐ Others

Mechanical

- ☐ Insulation
- ☐ Millwright
- ☐ Fire Protection
- ☐ Boiler
- ☐ Industrial Ventilation
- ☐ Steel Fabrication/Erection

Other

- ☐ Electrical
- ☐ Demolition (attach a detailed "Demolition Plan")

Estimated Direct-Hire Inventum Employees:

Home Office: ☐ Not Applicable ☐ Specify:

Craft Labor: ☐ Not Applicable ☐ Specify:

Craft	Quantity
Craft	Quantity

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

2. Applicable Safety Standards or Regulations:

☒ Federal OSHA ☐ State OSHA ☐ Owner/Client

Specific Standards:	29 CFR 1910 (OSHA)	29 CFR 1926 (Other Regulations)
☒ Medical Services and First Aid	1910.151	1926.50
☒ Hazard Communication (HAZCOM)	1910.1200	1926.59
☐ Lead Exposure	1910.1025	1926.62
☒ HAZWOPER	1910.120	1926.65
☒ Personal Protective Equipment (PPE)	1910.132-138	1926.95-107
☒ Respiratory Protection	1910.134	1926.103
☒ Ventilation	1910.94	1926.57
☒ Noise Exposure	1910.95	1926.52
☐ Illumination	N/A	1926.56
☐ Fire Protection	1910.157	1926.24 and 150-155
☐ Sanitation	1910.141	1926.51
☐ Materials Handling (rigging, etc.)	1910.176	1926.250-251
☐ Welding/Cutting	1910.251-255	1926.350-354
☐ Lockout/Tagout	1910.147	1926.417
☐ Electrical (flexible cords, etc.)	1910.305	1926.400-449
☐ Scaffolding	1910.28-29	1926.450-454
☐ Fall Protection (elevated work)	1910.23-29, 1910.66-68	1926.104-107; 500-503
☐ Ladders/Stairways	1910.25-27	1926.1050 and 1060
☐ Cranes, Derricks, Hoists, Elevators, etc.	1910.179-181	1926.550-555
☐ Aerial Lifts	1910.66-68	1926.556
☐ Earthmoving Equipment	N/A	1926.602
☐ Powered Industrial Trucks (forklifts)	1910.178	1926.602
☒ Excavations and Trenching	N/A	1926.650-652
☐ Concrete and Masonry	N/A	1926.700-706
☐ Steel Erection	N/A	1926.750-761
☐ Demolition	N/A	1926.850-860
☒ Asbestos	1910.1001	1926.1101
☐ Confined Space Entry	1910.146	1926.21

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

☐ Commercial Diving	1910.401-441	1926.1071-1092
☒ Compressed Gases	1910.101-105	N/A
☐ Ionizing Radiation	1910.1096	1926.53
☒ Benzene	1910.1028	1926.1128
☒ Cadmium	1910.1027	1926.1127
☒ Tools - Hand and Power	N/A	1926.300-307
☐ Blasting and Using Explosives	N/A	1926.900-914

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

3. Training Required

(* required for all "Type 3" sites; but minimum recommended)

Check "A" if training required for everyone, and check "T" if training required for specific task.

A	T	SUBJECT	REFERENCE	
			29 CFR 1910	29 CFR 1926 or Other
☐	☒	HAZWOPER 40 hour*	1910.120	1926.65
☐	☐	3-Day HAZWOPER Supervised On-Site*	1910.120	1926.65
☐	☒	8-Hour HAZWOPER Refresher*	1910.120	1926.65
☐	☐	8-Hour Supervisor HAZWOPER*	1910.120	1926.65
☐	☒	First Aid, CPR*	1910.151	1926.23,.50
☐	☒	Respiratory Protection	1910.134	1926.103
☐	☐	Confined Space ☐ Permit attached	1910.146	1926.21
☐	☐	Mine Safety (MSHA)	N/A	30 CFR 48.8
☐	☐	Lockout/Tagout ☐ Permit attached	1910.147	1926.417
☒	☐	Bloodborne Pathogens	1910.1030	N/A
☒	☐	Noise Exposure	1910.95	1926.52
☐	☒	Competent Person	N/A	1926.32,.450,.650
☐	☐	Construction Health and Safety OSHA 10-Hour	N/A	1926.21
☐	☐	Demolition	N/A	1926.850
☐	☐	Excavations ☐ Permit attached	N/A	1926.650-652
☐	☐	Electrical Work	1910.332	1926.400-.449
☐	☐	Ladders/Stairways	N/A	1926.1050-1060
☐	☐	Scaffolding	1910.28	1926.450-454
☐	☐	Fall Protection	1910.23-29; 1910.66-68	1926.104,.501
☐	☐	Commercial Diving	1910.410	1926.1071-1092
☐	☐	Hot Work ☐ Permit attached	1910.251-255	1926.350
☐	☐	Lead Awareness	1910.1025	1926.62
☐	☐	Asbestos Awareness	1910.1001	1926.1101
☐	☐	Cadmium	1910.1027	1926.1127
☐	☐	Benzene	1910.1028	1926.1128
☐	☐	Ionizing Radiation	1910.1096	1926.53; 10 CFR 19.12
☐	☐	Troxler or NITON Gauge User	1910.1096	10 CFR 19.12
☐	☐	Radiation Safety Program	1910.1096	10 CFR 20.1101
☐	☐	Hazard Communication (HAZCOM)	1910.1200	1926.59
☐	☒	DOT Hazardous Materials Shipping	1910.1201	49 CFR 172.704

Client-specific training: ☒ Not Applicable ☐ Specify

Site-specific orientation: ☒ Not Applicable ☐ Specify

Competent person: ☒ Not Applicable ☐ Specify

Direct-hire employee training/certification: ☒ Not Applicable ☐ Specify

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

4. Medical Surveillance

Surveillance Required: * required for all "Type 3" sites; baseline is minimum recommended
** Specify frequency below

	29 CFR 1910	29 CFR 1926 or Other
☐ HAZWOPER Physical - Baseline*	1910.120	1926.65
☐ HAZWOPER Physical – Annual	1910.120	1926.65
☐ HAZWOPER Physical - Biennial*	1910.120	1926.65
☐ OSHA Respiratory Protection Questionnaire	1910.134	1926.103
☐ Respiratory Certification Exam	1910.134	1926.103
☐ Arsenic (urine) **	1910.1018	N/A
☐ Asbestos **	1910.1001	1926.1101
☐ Cadmium (blood) **	1910.1027	1926.1127
☐ Lead/ZPP (blood) **	1910.1025	1926.62
☐ Mercury (blood) **	N/A	N/A
☐ PCB **	N/A	N/A
☐ Vinyl Chloride **	1910.1017	1926.117
☐ Hepatitis B Vaccine (series) **	1910.1030	N/A
☐ Tetanus/Diphtheria	N/A	Stay Current
☐ Stress Test	N/A	Only as requested
☐ Visual Acuity Test	N/A	Only as requested
☐ Hearing Test (Audiometry)	N/A	Only as requested
☐ Pulmonary Function	N/A	Only as requested

Client-specific drug testing: ☒ Not Applicable ☐ Specify

Client-specific medical monitoring[1]: ☒ Not Applicable ☐ Specify

Site-specific medical monitoring: ☒ Not Applicable ☐ Specify

**Frequency of medical monitoring: ☒ Not Applicable ☐ Specify

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

5. Personal Protective Equipment (PPE)

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work tasks:

Specific Inventum Job Task or Function	Minimum Level of Protection
Task 1 – Site management and Oversight	☒ D
Level D: safety glasses (ANSI), safety shoes (ANSI), ear plugs (ANSI); safety vest (ANSI)	
Task 2 – Surficial Soil Sampling	☒ D ☐ C ☐ B ☐ A
Level D: safety glasses (ANSI), safety shoes (ANSI), ear plugs (ANSI); safety vest (ANSI), nitrile gloves,	
Task 3 – Subsurface Soil Sampling	☒ D ☐ C ☐ B ☐ A
Level D: Hard hat, safety glasses (ANSI), safety shoes (ANSI), nitrile gloves	
Task 4 – Permit Compliance Water and Wastewater Sampling	☒ D ☐ C ☐ B ☐ A
Level D: Hard hat, safety glasses (ANSI), safety shoes (ANSI), nitrile gloves	
Task 5 – Monitoring Well Abandonment	☒ D ☐ C ☐ B ☐ A
Level D: safety glasses (ANSI), safety shoes (ANSI), ear plugs (ANSI); safety vest (ANSI)	
Task 6 – Monitoring Well Installation	☒ D ☐ C ☐ B ☐ A
Level D: safety glasses (ANSI), safety shoes (ANSI), ear plugs (ANSI); safety vest (ANSI)	
Task 7 – Groundwater Monitoring and Sampling	☒ D ☐ C ☐ B ☐ A
Level D: Hard hat, safety glasses (ANSI), safety shoes (ANSI), nitrile gloves	

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Criteria for changing protection levels are as follows:

EVACUATION[2] or PROTECTION LEVEL CHANGE[3] CRITERIA	APPROVALS REQUIRED [1] OSC
Site Evacuation Plan: ☒ Not Applicable ☐ Specify or Attach Plan:	
Change to Level D when: ☐ Not Applicable ☒	☒N/A All site work in Level D
Change to Level C when: ☒ Not Applicable ☐ dust levels exceed 2.5 mg/m^3 in the breathing zone continuously for 5 minutes.	☒ No work will be conducted in Level C. Site work will stop, controls reevaluated, and HASP updated as necessary
Change to Level B when: ☒ Not Applicable ☐ Specify	☒ Inventum will not conduct any work in Level B.
Change to Level A when: ☒ Not Applicable ☐ Specify	☒ Inventum will not conduct any work in Level A. ☒

[1] OSC: Office Safety Coordinator

[2] General Recommendations: Evacuate the area when LEL readings are >10% LEL in the atmosphere, or when PID readings are greater than the PEL in the breathing zone.

[3] General Recommendation: To Level C when PID readings are greater than the PEL in the breathing zone. To Level B or A only after detailed evaluation and planning.

Note: Changes to the level of protection shall be made only after the required approvals are obtained. All changes shall be recorded in the field log and reported to the Project Manager as soon as possible. Inventum's goal is to avoid using respiratory protection unless it is absolutely necessary or required. Administrative controls or engineering controls should always be considered as a means to reduce potential exposures, before PPE is required or considered.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

6. Air Monitoring [1]

The following monitoring instruments shall be used on site to measure airborne contaminant concentrations in either the breathing zone, or as part of the overall site Air Monitoring Plan (attach detailed plan):

MONITORING EQUIPMENT	LOCATION OF MONITORING	FREQUENCY OF MONITORING	ACTION LEVELS
☐ Combustible Gas Indicator	☐ N/A ☐ Monitoring Plan Attached ☐ Confined Space ☐ Manhole	☐ Continuously when potential combustible gases or lack of oxygen are suspected. ☐ Specify	5-10% LEL: continue with caution > 10 % LEL: evacuate the area ☐ Specify
☐ O2 Monitor ☐ CO Monitor ☐ H_2S Monitor	☐ N/A ☐ Confined Space ☐ Manhole – monitor oxygen, carbon monoxide, hydrogen sulfide , and lower explosive limit	☐ Continuously when excess oxygen (>22.5%) or lack of oxygen (<19.5%) are suspected. ☐ Test atmosphere prior to entry and continuous during confined space entry.	< 19.5% Oxygen: evacuate the area; supplied air may be needed. > 22.5% Oxygen: evacuate the area; potential fire hazard. ☐ Specify
☐ Colorimetric Tubes Type: Type: Type:	☐ N/A ☐ Specify ☐ Sample Container ☐ Confined Space ☐ Specify	☐ Periodically during sampling for analytical purposes only. ☐ Whenever noticeable odor is present. ☐ Specify	☐ Specify
☒ PID Lamp Needed: ☐ 9.8 eV ☒ 10.6 eV ☐ 11.7 eV Calibration Gas: Isobutylene Correction Factor:	☒ Personal Monitoring ☒ Sample Container ☐ Confined Space ☐ Specify	☒ Periodically during sampling for analytical purposes only. ☒ Continuously within the employee breathing zone. ☐ Specify ☐ Specify	☒ None. ☒ >5 ppm above background in breathing zone for 5+ min. Stop work and reevaluate potential sources and controls.
☐ FID	☐ N/A ☐ Specify	☐ Specify	☐ Specify
☒ Personal Dust Monitor	☐ N/A ☒ Personal Monitoring in Breathing Zone (Task 2 - 6 only)	☒ Continuously within the employee breathing zone	☒ >2.5 mg/m3 at work perimeter for 15 min sustained. Stop work and apply dust controls

☒Other: Perimeter Monitoring	☒ Perimeter Air Monitoring in accordance with the CAMP	☐ Specify	☐ Specify
☐Laboratory Supported ☐Personal ☐Area ☒Perimeter	☐ N/A ☐ Specify Employee breathing zone	☐ Specify continuous	☒ When visible dust is present apply dust control measures (water spray) until abated.

(1) Whenever air monitoring is required to be performed, a detailed Air-Monitoring Plan should be developed and attached to the HASP. The plan should include Monitoring Locations, Frequency of Readings, and any Action Levels being used to control the work site.

Air Monitoring Plan

Field monitoring of dust production is anticipated only during subsurface soil sampling (Task 2) and installation of monitoring wells (Task 7). A visual assessment of dust levels will be used continuously during the work along with personal employee monitoring and perimeter air monitoring in accordance with an approved CAMP.

Dust production during monitoring well abandoned, monitoring well installation, and surficial soil sampling is not anticipated due to the typical moisture content of the soil.

This level of nuisance dust is visually observable. If dust is observable continuously in the breathing zone for 5 minutes, dust control methods will be used (*e.g.*, water spray will be applied) until dust is abated. Work will be temporarily discontinued until dust is reduced to acceptable levels within the breathing zone. Should particulate levels above the action level be a continual problem, relevant field personnel will reassess the situation with the project manager.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

7. Site Controls and Work Zones (describe in detail)

Facility Alarms or Signals: ☒ Not Applicable ☐ Specify

Work Permits Required: ☒ Not Applicable ☐ Specify

Work Traffic Issues: ☒ Not Applicable ☐ Specify

Parking Issues: ☒ Not Applicable ☐ Specify

Railway Traffic Issues: ☒ Not Applicable ☐

Support Zone(s):

☒ Field vehicle ☒ Job Trailer On Site ☐ Other:

Contamination Reduction Zone(s):

☒ Field vehicle ☐ Facility restroom/utility room ☐ Other:

Exclusion Zone(s):

☒ Area immediately surrounding work area ☐ Other:

Site Entry Procedures:

☒ Notify Site Safety Contact Representative.

☒ Read HASP Plan and sign Acknowledgment Statement.

☒ Check in with the facility contact person. ☒ Check in with owners full time site representatives.

☒ Check in with facility security guard. ☒ All visitors must check in and sign visitor logbook in guard house.

☒ Wear proper personal protective equipment.

☐ Attend facility orientation. ☐

☒ Conduct daily safety meeting (document).

☐ Other: Confined space – do not enter the confined space if LEL >10%, oxygen <21% or >23.5%, carbon monoxide >35 ppm, or hydrogen sulfide >7 ppm. Exit the confined space if the atmospheric conditions become hazards as noted.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Decontamination Procedures:

Personnel: (specify)	Work will be performed in Level D or Modified Level D, and minimal contamination is expected. Follow standard decontamination procedures, and good personal hygiene. Disposable PPE should be removed, contained, and disposed in an appropriate manner. Prior arrangements should be made if disposal is planned for at the project site. Site workers should plan and stage for wash water and soap at the site, prior to beginning the work. Site workers should wash hands and any exposed skin extremely well with soap and water, prior to leaving the contamination reduction zone, eating, drinking, driving, or leaving the site. Any soiled or contaminated clothing should be removed and handled appropriately, by either washing as soon as possible, or if necessary, disposing. Soiled or contaminated clothing should be carefully bagged prior to disposal or washing, to reduce potential exposure.
Equipment: (specify)	Site workers should plan and stage for the appropriate decontamination method at the site prior to beginning the work. Any contaminated single-use disposable equipment or PPE should be appropriately containerized and disposed as soon as possible in an appropriate manner. Prior arrangements should be made if disposal is planned for at the project site. Contaminated equipment or PPE that will be re-used should be handled and cleaned while wearing the appropriate PPE. Typically, equipment is decontaminated using Alconox soap and deionized water.

Disposal of Investigation-derived Material:

☒ Leave on site for disposal. Location TBD ☐ Other:

Work Limitations (time of day, buddy system, etc.):

☐ Buddy system required for some tasks.

☒ Work will be performed during daylight hours only.

☐ Work will be performed using artificial light.

Describe or attach a lighting plan: A lighting plan is attached.

☒ No eating, drinking, or smoking in contamination reduction zone(s) or exclusion zone(s).

☒ When temperatures are either above 80°F or below 20°F, work schedules may be modified.

☒ Other site-specific limitations: Do not enter battery building

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Radiation Safety:

- ☒ Radiation information is not applicable to this project.
- ☐ Notify RSO.
- ☐ Wear dosimeter badge when handling gauge.
- ☐ Post applicable radiation signs and documents.
- ☐ Post emergency numbers.
- ☐ Provide at least two lock systems for overnight storage.
- ☐ Maintain storage at least 15 feet from full-time workstations.
- ☐ Block, brace, and securely lock the gauge during “all” transportation.
- ☐ Limit “public” exposure to gauge while in use.
- ☐ Provide sketch of gauge storage to RSO.

Site-Specific Health and Safety Plan

(Required for all Inventum Type 2 or Type 3 field projects.)

Acknowledgment Statement:

As an employee of Inventum, I have reviewed the Hazard Assessment (HA)/Health & Safety Plan (HASP). I hereby acknowledge that I have received the required level of training and medical surveillance as necessary, that I am knowledgeable about the contents of this site-specific RA/HSP, and that I will use personal protective equipment (PPE) and follow procedures specified in the HASP.

Signatures of Inventum Site Personnel:

	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	
	Date:	

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

Location/Project Name: _____	**Date:** _____
Observer Name: _____	
Observee Name: _____	**Time:** _____
Task Observed	
Description of Task Observed and Background Information	
Positive Comments	

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

Conclusions / Why the Questionable Items Occurred?

Feedback Session Conducted By: _____ **Date:** _____

Name of Observee's Supervisor: _____ **Time:** _____

At-Risk Observations/Root Cause Analysis

Personal Factor:
(1) Lack of skill or knowledge
(2) Correct way takes more time/requires more effort
(3) Shortcutting standard procedures is rewarded or appreciated
(4) In past, did not follow procedures or acceptable practices and no incident occurred

Job Factor:
(5) Lack of or inadequate operational procedures or work standards
(6) Inadequate communication of expectations or work standards
(7) Inadequate tools or equipment

At-Risk Observation #	Root Cause Analysis #	Solution(s) To Prevent Potential Incident from Occurring	Person Responsible	Agreed Due Date	Date Completed

Results of Verification (were solutions done?) and Validation (were solutions effective?)

Reviewed by (PM/Supervisor): _____ **Date:** _____

Approved by (Practice Safety Leader): _____ **Date:** _____

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

PERSONAL PROTECTIVE EQUIPMENT	Safe	At-Risk	Comments
1. Hearing Protection (e.g., Ear Plugs)			
2. Head Protection (e.g., Hard Hat)			
3. ANSI Rated Eye Protection (e.g., Safety Glasses)			
4. Hand Protection (e.g., Kevlar Gloves)			
5. Foot Protection (e.g., Safety Shoes)			
6. Respiratory Protection			
7. Fall Protection Inspected (e.g., Harness)			
8. ANSI Rated Reflective Vest/High Visibility Clothing			
9. Other (Specify)			
BODY USE AND POSITIONING	**Safe**	**At-Risk**	**Comments**
10. Correct Body Use and Positioning When Lifting/Pushing/Pulling			
11. Pinch Points/Moving Equipment - Hands/Body Clear			
12. Mounts/Dismounts Using 3-Points of Contact			
13. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

WORK ENVIRONMENT	Safe	At-Risk	Comments
14. Work/Walk Surface Free of Obstructions (e.g., Tripping Hazards)			
15. Housekeeping/Storage			
16. Defined and Secured (e.g., warning devices, barricades, cones, flags)			
17. Suspended Load, Swing Radius & Lift Area is Barricaded			
18. Safety Shutdown Devices			
19. Proper Storage & Labeling /Disposal of Sample & Waste Materials			
20. Cylinders Stored Upright, Secured, & Caps in Place			
21. Manhole/vault Inspected for Hazards			
22. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

OPERATING PROCEDURES	Safe	At-Risk	Comments
23. Job Planning (HASP reviewed, JSAs, etc.)			
24. Fire Extinguishers Accessible and Inspections Current			
25. Work Permit/Authorization to Work (Hot, Cold, LOTO, Confined Space)			
26. JSA Reviewed & Followed			
27. Hazard Assessment - Hazard Hunt			
28. Interfaces with Other Functions (awareness with other personnel on site)			
29. Operators Looking Behind Prior to Backing Up			
30. Operators Wearing Seat Belts While Operating Equipment			
31. Subsurface Structures Identified			
32. Proper Trench Protective Equipment in Place			
33. Adequate Egress Is Available for Excavation & Trench (within 25 ft. if depth is <4 ft.)			
34. All Materials Set Back at Least 2 Feet From Edge of Trench/Excavation			
35. Other (Specify)			

INVENTUM SAFETY OBSERVATION FORM

Revised March 2019

TOOLS/EQUIPMENT	Safe	At-Risk	Comments
36. Hand Tools (Proper Equipment Selection, Condition, and Use)			
37. Power Tools (Proper Equipment Selection, Condition, and Use)			
38. Equipment, Including Heavy (Proper Equipment Selection, Condition, and Use)			
39. Hoses Inspected			
40. Required Monitoring Equipment Calibrated & Used			
41. Ladders Set up Correctly & Inspected			
42. Right Tools for the Job are Available and in Good Condition - No Fixed Open Blade Knives (FOBKs)			
43. Other (Specify)			
Total #	0	0	

Daily Hazard Review Topic and Sign-In:

Daily Review Topic	Date

Acknowledgment Statement:

As an affected employee of Inventum Engineering, I hereby acknowledge that I have reviewed the contents of this site-specific HSP and the daily safety meeting topic, and that I will use the applicable personal protective equipment (PPE) and follow the procedures specified in the HASP.

Signatures of all onsite Inventum Personnel, including Direct-Hires (Required):

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

_____ Date: _____

Attachment A – Permit Compliance Water and Wastewater Sampling (Task 4) Locations

Appendix B – Quality Assurance Project Plans

INVENTUM ENGINEERING, P.C.

Quality Assurance Project Plan

3125 Highland Avenue

Proposed BCP Site #932169

3219 and 3301 Highland Avenue

Niagara Falls, NY

October 2023

441 CARLISLE DRIVE
SUITE C
HERNDON, VA 20170
WWW.INVENTUMENG.COM

Table of Contents

1 Introduction

The purpose of this Quality Assurance Project Plan (QAPP) is to serve as a guidance document during implementation of the Remedial Investigation Work Plan (RIWP) and proposed Interim Remedial Measures (IRMs) for the proposed Brownfield Cleanup Program Site (BCP Site) located at 3125 Highland Avenue, Niagara Falls, NY (Existing NYSDEC Site No. P932169).

This QAPP is designed to provide an overview of Quality Assurance/Quality Control (QA/QC) procedures. Specific methods and QA/QC procedure for chemical testing of environmental samples obtained from the site as part of the Site Management.

An Inventum Engineering, P.C. (Inventum) Project Manager will be responsible for verifying that QA procedures are followed during the investigation and analysis. This will provide for the valid collection of representative samples. The Project Manager will be in direct contact with the analytical laboratory to ensure that holding times and other QA/QC requirements are met. The selected laboratory will be responsible for overseeing analytical QA/QC activities.

The estimated number of environmental samples and corresponding analytical parameters/methods that will be collected on a routine annual basis in accordance with the SMP are provided in Table 1 below. Additional samples may be collected as necessary.

Table 1 – Analytical Parameters and Methods

Parameter	EPA Method Reference	Soil	Groundwater	Soil Gas
TAL Metals	6010C	26	9	
TAL Metals (Dissolved)	6010C		9	
Mercury	7470A	26	9	
Mercury (Dissolved)	7470A		9	
Volatile Organic Compounds	8260C	26	9	
Volatile Organic Compounds	TO-15			5
Semi-Volatile Organic Compounds	8270D	26	9	

1,4 Dioxane	8270 SIM		9	
PFAS	1633 (Draft)		9	
TCLP Lead	1311/6010	13		
Field Duplicates			1 per semi-annual sample event	
MS/MSD			1 per semi-annual sample event	
Trip Blanks	8260		One per Volatile Shipment	
Rinsate (Equipment) Blanks	All Above Parameters		1 per semi-annual sample event if equipment is decontaminated/reused	

The analytical laboratory utilized will be a certified NYSDOH ELAP laboratory for the appropriate categories. The laboratory QA Manager will be responsible for performing project-specific audits and overseeing the quality control data generated.

2 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements which specify the quality of data required to support the investigation of the Site. DQOs focus on the identification of the end use of the data to be collected. The project DQOs will be achieved utilizing the definitive data category, as outlined in Guidance for the Data Quality Objectives Process, EPA QA/G-4 (September 1994). All samples will provide definitive data, which are generated using rigorous analytical methods, such as the reference methods approved by the United States Environmental Protection Agency (USEPA). The purpose of this investigation is to establish a baseline of current conditions in order to aid in the development of an Alternatives Analysis (AA) for the proposed BCP Site.

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

- To assess the current nature and extent of contamination in environmental media at the site above applicable Standards, Criteria, and Guidelines.

2.1 QA Objectives for Chemical Data Management

Sample analytical methodology for the media sampled and data deliverables will meet the requirements in the most recent NYSDEC Analytical Services Protocol (ASP). Laboratories will be instructed that completed Sample Preparation and Analysis Summary forms are to be submitted with the analytical data packages. The laboratory will also be instructed that matrix interferences must be cleaned up, to the extent practicable. The laboratory will be instructed to report all non-detect values to the method detection limit (MDL). In order to achieve the definitive data category described above, the data quality indicators of

precision, accuracy, representativeness, comparability, and completeness will be measured during offsite chemical analysis.

2.1.1 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, as well as by errors made in field and/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 not only exhibit sampling and analytical precision, but indicate analytical precision through the reproducibility of the analytical results. Relative Percent Difference (RPD) is used to evaluate precision. RPD criteria must meet the method requirements identified in QAPP Section 6.1.

2.1.2 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 exceeds 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.

2.1.3 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 have been selected with the goal of obtaining representative samples for the media of concern.

2.1.4 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 practicable 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. In order for data sets may be comparable, it is imperative that contract-required methods and procedures be explicitly followed.

2.1.5 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 in order 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 NYSDEC, Inventum, and the 3821 River Road project personnel will determine whether the deviations might cause the data to be rejected.

3 Sampling Locations, Custody, Holding Times, and Analysis

Sample locations and procedures are discussed SMP. Procedures for chain of custody, holding times and laboratory analyses shall be followed as per SW-846 and as per the laboratory's Quality Assurance Plan. All holding times begin with validated time of sample receipt (VTSR) at the laboratory. The laboratory must meet the method required detection limits which are referenced within the EPA Methods (QAPP Table 1).

4 Calibration Procedures and Frequency

In order to obtain a high level of precision and accuracy during sample processing procedures laboratory instruments must be calibrated property. Several analytical support areas must be considered so the integrity of standards and reagents is upheld prior to instrument calibration. The following section describe the analytical support areas and laboratory instrument calibration procedures.

4.1 Analytical Support Areas

Prior to generating quality data, several analytical support areas must be considered; these are detailed in the following paragraphs.

- Standard/Reagent Preparation - Primary reference standards and secondary standard solutions shall be obtained from National Institute of Standards and Technology (NIST), or other reliable commercial sources to verify the highest purity possible. The preparation and maintenance of standards and reagents will be accomplished according to the methods referenced. All standards and standard solutions are to be formally documented (i.e., in a logbook) and should identify the supplier, lot number, purity/concentration, receipt/preparation date, preparers name, method of preparation, expiration date, and any other pertinent information. All standard solutions shall be validated prior to use. Care shall be exercised in the proper storage and handling of standard solutions (e.g., separating volatile standards from nonvolatile standards). The laboratory shall continually monitor the quality of the standards and reagents through well documented procedures.

- Balances - The analytical balances shall be calibrated and maintained in accordance with manufacturer specifications. Calibration is conducted with two Class AS" weights that bracket the expected balance use range. The laboratory shall check the accuracy of the balances daily and they must be properly documented in permanently bound logbooks.

- Refrigerators/Freezers - The temperature of the refrigerators and freezers within the laboratory shall be monitored and recorded daily. This will verify that the quality of the standards and reagents is not compromised, and the integrity of the analytical samples is upheld. Appropriate acceptance ranges (2 to 6°C for refrigerators) shall be clearly posted on each unit in service.

- Water Supply System - The laboratory must maintain a sufficient water supply for all project needs. The grade of the water must be of the highest quality (analyte-free) in order to eliminate false-positives from the analytical results. Ultraviolet cartridges or carbon absorption treatments are recommended for organic analyses and ion-exchange treatment is recommended for inorganic tests. Appropriate documentation of the quality of the water supply system(s) will be performed on a regular basis.

4.2 Laboratory Instruments

Calibration of instruments is required to verify that the analytical system is operating properly and at the sensitivity necessary to meet established quantitation limits. Each instrument for organic and inorganic analyses shall be calibrated with standards appropriate to the type of instrument and linear range established within the analytical method(s). Calibration of laboratory instruments will be performed according to specified methods.

In addition to the requirements stated within the analytical methods, the contract laboratory will be required to analyze an additional low-level standard at or near the detection limits. In general, standards will be used that bracket the expected concentration of the samples. This will require the use of different concentration levels, which are used to demonstrate the instrument's linear range of calibration.

Calibration of an instrument must be performed prior to the analysis of any samples and then at periodic intervals (continuing calibration) during the sample analysis to verify that the instrument is still calibrated. If the contract laboratory cannot meet the method required calibration requirements, corrective action shall be taken as discussed in QAPP Section 7. All corrective action procedures taken by the contract laboratory are to be documented, summarized within the case narrative, and submitted with the analytical results.

5 Internal Quality Control Checks

Internal QC checks are used to determine if analytical operations at the laboratory are in control, as well as determining the effect sample matrix may have on data being generated. Two types of internal checks are performed and are described as batch QC and matrix-specific QC procedures. The type and frequency of specific QC samples performed by the contract laboratory will be according to the specified analytical method and project specific requirements. Acceptable criteria and/or target ranges for these QC samples are presented within the referenced analytical methods.

QC results which vary from acceptable ranges shall result in the implementation of appropriate corrective measures, potential application of qualifiers, and/or an assessment of the impact these corrective measures have on the established data quality objectives. Quality control samples including any project-specific QC will be analyzed are discussed below.

5.1 Batch QC

Method Blanks - A method blank is defined as laboratory-distilled or deionized water that is carried through the entire analytical procedure. The method blank is used to determine the level of laboratory background contamination. Method blanks are analyzed at a frequency of one per analytical batch.

Matrix Spike Blank Samples - A matrix spike blank (MSB) sample is an aliquot of water spiked (fortified) with all the elements being analyzed for calculation of precision and accuracy to verify that the analysis that is being performed is in control. An MSB will be performed for each matrix and organic parameter only.

5.2 Matrix-Specific QC

Matrix Spike Samples - An aliquot of a matrix is spiked with known concentrations of specific compounds as stipulated by the methodology. The matrix spike (MS) and matrix spike duplicate (MSD) are subjected to the entire analytical procedure in order to assess both accuracy and precision of the method for the matrix by measuring the percent recovery and relative percent difference of the two spiked

samples. The samples are used to assess matrix interference effects on the method, as well as to evaluate instrument performance. MS/MSDs are analyzed at a frequency of one each per 20 samples per matrix.

Matrix Duplicates - The matrix duplicate (MD) is two representative aliquots of the same sample which are prepared and analyzed identically. Collection of duplicate samples provides for the evaluation of precision both in the field and at the laboratory by comparing the analytical results of two samples taken from the same location. Obtaining duplicate samples from a soil matrix requires homogenization (except for volatile organic compounds) of the sample aliquot prior to filling sample containers, in order to best achieve representative samples. Every effort will be made to obtain replicate samples; however, due to interferences, lack of homogeneity, and the nature of the soil samples, the analytical results are not always reproducible.

Rinsate (Equipment) Blanks - A rinsate blank is a sample of laboratory demonstrated analyte free water passed through and over the cleaned sampling equipment. A rinsate blank is used to indicate potential contamination from ambient air and from sample instruments used to collect and transfer samples. This water must originate from one common source within the laboratory and must be the same water used by the laboratory performing the analysis. The rinsate blank should be collected, transported, and analyzed in the same manner as the samples acquired that day. Rinsate blanks for nonaqueous matrices should be performed at a rate of 10 percent of the total number of samples collected throughout the sampling event. Rinse blanks will not be performed on samples (i.e., groundwater) where dedicated disposable equipment is used.

Trip Blanks - Trip blanks are not required for nonaqueous matrices. Trip blanks are required for aqueous sampling events. They consist of a set of sample bottles filled at the laboratory with laboratory demonstrated analyte free water. These samples then accompany the bottles that are prepared at the lab into the field and back to the laboratory, along with the collected samples for analysis. These bottles are never opened in the field. Trip blanks must return to the lab with the same set of bottles they accompanied to the field. Trip blanks will be analyzed for volatile organic parameters. Trip blanks must be included at a rate of one per volatile sample shipment.

6 Calculation of Data Quality Indicators

6.1 Precision

Precision is evaluated using analyses of a field duplicate and/or a laboratory MS/MSD which not only exhibit sampling and analytical precision but indicate analytical precision through the reproducibility of the analytical results. RPD is used to evaluate precision by the following formula:

$$RPD = \frac{(X1 - X2) \times 100\%}{[(X1 + X2)/2]}$$

Where:

X1= Measured value of sample or matrix spike

X2= Measured value of duplicate or matrix spike duplicate

Precision will be determined through the use of MS/MSD (for organics) and matrix duplicates (for inorganics) analyses.

6.2 Accuracy

Accuracy is defined as the degree of difference between the measured or calculated value and the true value. The closer the numerical value of the measurement comes to the true value or actual concentration, the more accurate the measurement is. Analytical accuracy is expressed as the percent recovery of a compound or element that has been added to the environmental sample at known concentrations before analysis. Analytical accuracy may be assessed through the use of known and unknown QC samples and spiked samples. It is presented as percent recovery. Accuracy will be determined from matrix spike, matrix spike duplicate, and matrix spike blank samples, as well as from surrogate compounds added to organic fractions (i.e., volatiles, semi volatiles, PCB), and is calculated as follows:

$$\text{Accuracy (\%R)} = \frac{(Xs - Xu) \times 100\%}{K}$$

Where:

Xs- Measured value of the spike sample

Xu- Measured value of the unspiked sample

K - Known amount of spike in the sample

6.3 Completeness

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

$$\text{Completeness (\%C)} = \frac{(Xv - Xn) \times 100\%}{N}$$

Where:

Xv- Number of valid measurements

Xn- Number of invalid measurements

N - Number of valid measurements expected to be obtained

7 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.

7.1 Incoming Samples

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

7.2 Sample Holding Times

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

7.3 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.

7.4 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 particular sample matrix, the laboratory must notify Inventum personnel for problem resolution. In order to achieve those detection limits, the laboratory must utilize all appropriate cleanup procedures in an attempt 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.

7.5 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 and/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 and/or re-extracted/redigested, then reanalyzed. Inventum shall be notified as soon as possible to discuss possible corrective actions should unusually difficult sample matrices be encountered.

7.6 Calculation Errors

All analytical results must be reviewed systematically for accuracy prior to submittal. If upon data review calculation and/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.

8 Data Reduction, Validation, and usability

8.1 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. 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 a method's particular analysis and knowledgeable of requirements will perform data reduction.

8.2 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 samples collected will receive a data review by Inventum. All analytical samples will also receive a third-party verification and validation based on completeness and compliance checks of sample receipt conditions and both sample-related and instrument-related QC results. In addition, a minimum of 10 percent of the samples will also receive third-party recalculations checks and review of actual instrument outputs. A third-party Data Usability Summary Report (DUSR) will be prepared for all samples collected during the RI. Inventum personnel may recommend further third-party validation if significant deviations and problems with the analytical data are uncovered during completion of the work.

The methods as well as the general guidelines presented in the following documents will be used during the data review USEPA Contract Laboratory Program (CLP) Organic Data Review, SOP Nos. HW-6, Revision #11 and USEPA Evaluation of Metals Data for the Contract Laboratory Program based on 3/90, SOW, Revision XI. These documents will be used with the following exceptions:

- Technical holding times will be in accordance with NYSDEC ASP, 10/95 edition.
- Organic calibration and QC criteria will be in accordance with NYSDEC ASP, 10/95 edition. Data will be qualified if it does not meet NYSDEC ASP, 10/95 criteria.

Where possible, discrepancies will be resolved by the project manager (i.e., no letters will be written to laboratories).

Category B deliverables will be provided for all samples collected to delineate the nature and extent of contamination. Electronic Data Deliverables (EDDs) consistent with the most recent NYSDEC Environmental Information Management System (EIMS) format will be included with the deliverables and will be uploaded to the EIMS.

9 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). 1995. Analytical Services Protocol, (ASP) 10/95 Edition. Albany: NYSDEC.

Appendix C – Community Air Monitoring Program

INVENTUM ENGINEERING, PC

Appendix D
Community Air Monitoring Plan

3125 Highland Avenue Site

Brownfield Cleanup Program Site No. C932169

3219 and 3301 Highland Avenue

Niagara Falls, NY 14305

February 9, 2023

441 CARLISLE DRIVE
SUITE C
HERNDON, VA 20170
WWW.INVENTUMENG.COM

Table of Contents

1 Overview

This Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at the 3125 Highland Avenue Brownfield Cleanup Program (BCP) Site, located at 3219 and 3301 Highland Avenue, Niagara Falls, New York. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required.

- *The 3125 Highland Avenue Site will have intermittent activity. The CAMP will be activity specific. If there are detections at the downwind station, additional monitoring requirements will be considered*[1].

Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

- *There are no sensitive receptors on the property. Depending on wind direction; the closest residence is 1,000 feet east of the proposed activity boundary, and more than 200 feet est of the activity boundary. Industrial properties are north and south of the proposed activities.*

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

2 Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

- *VOC and particulate monitoring will be incorporated into the RI and IRM activities.*

[1] The text in *italic font* are comments inserted by 3125 Highland Avenue in addition to the standard CAMP Template.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

- *During demolition and excavation activities, up- and downwind stations will be in place. During sampling, periodic monitoring will be implemented with hand-held instruments.*

3 VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes shall also be recorded.

4 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations shall be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

Appendix D-1
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility of the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;

(b) Measurement Ranges: 0.001 to 400 mg/m^3 (1 to 400,000 :ug/m^3);

(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m^3 for one second averaging; and +/- 1.5 g/m^3 for sixty second averaging;

(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);

(e) Resolution: 0.1% of reading or $1g/m^3$, whichever is larger;

(f) Particle Size Range of Maximum Response: 0.1-10;

(g) Total Number of Data Points in Memory: 10,000;

(h) Logged Data: Each data point with average concentration, time/date and data point number

(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;

(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;

(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;

(l) Operating Temperature: -10 to 50^o C (14 to 122^o F);

(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m^3 (15 minutes average). While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m^3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential-- such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;

(b) Wetting equipment and excavation faces;

(c) Spraying water on buckets during excavation and dumping;

(d) Hauling materials in properly tarped or watertight containers;

(e) Restricting on site vehicle speeds to 10 mph;

(f) Covering excavated areas and material after excavation activity ceases; and

(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150 ug/m^3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Appendix D – Pre-demolition Inspection Form

Building Demolition Inspection Form

3125 Highland Avenue

BCP Site #C932169

Niagara Falls, NY

Building Number: Click or tap here to enter text.
Building Name: Click or tap here to enter text.
Permit Number: Click or tap here to enter text.

Start Date: Click or tap here to enter text. **Completion Date:**
NY DEC Notification Date: Click or tap here to enter text.

Approvals

HASP updated: Click or tap here to enter text.
NESHAP Notification Date: Click or tap here to enter text.
Landfill: Click or tap here to enter text.
Landfill Notification Date: Click or tap here to enter text.
(notification required for each building wastes stream)
Permits issued: Click or tap here to enter text. **Permit Date:**Click or tap here to enter text.

Regulated Building Materials

Were Asbestos Containing Building Materials (ACM) present: Click or tap here to enter text.
If so, have all ACM been removed and clearance inspection completed: Click or tap here to enter text.
DOL Notification Date (for controlled demolition with ACM in place): Click or tap here to enter text.
Have all Universal Waste, containers, or other regulated contents been removed: Click or tap here to enter text.
If present, have all potential PCB containing equipment has been sampled and removed: Click or tap here to enter text.

Utilities

List utilities entering/leaving the building: Click or tap here to enter text.
Have all utilities entering/leaving the building been decommissioned: YES.
Utility decommissioning completion date: Click or tap here to enter text.

Building Structure Category:

(1) not suitable for use as fill, (2) designated for controlled demolition because of current structural conditions or due ACM integrated with building materials, (3) impacted by identified site contamination which cannot be reasonably be cleaned for use as fill, (4) safety hazards.

Work Zone Delineation Check List

Utilities and utility protection: Click or tap here to enter text.
Fall radius defined: Click or tap here to enter text.
Laydown Areas (Waste, recyclable materials, equipment): Click or tap here to enter text.
Staff parking and break areas:Click or tap here to enter text.

CAMP Requirements

Monitoring station confirmed prior to Demolition: Click or tap here to enter text.
Type and frequency of monitoring: Click or tap here to enter text.

Attach Monitoring Reports

SWPPP Requirements

Dust control plan in place: Click or tap here to enter text.

Dust control methods: Click or tap here to enter text.

If needed, water control plan: Click or tap here to enter text.

Truck wash station in place: Click or tap here to enter text.

Process Piping

Was any process piping present: Click or tap here to enter text.

If so, list inspections prior to management: Click or tap here to enter text.

List disposition of process piping containing residuals, list how the waste and any residuals were managed: Click or tap here to enter text.

Energetic Materials

Did the demolition plan include the use of Energetic Materials: Click or tap here to enter text.

What were the dates of use?Click or tap here to enter text.

Where there any CAMP excursions at the property line on those dates?Click or tap here to enter text.

Material Management

To the extent practicable and safe, materials will be segregated in accordance with their material composition, including but not limited to:

1. **Construction and Demolition (C&D) Debris**
2. **ACM debris**
3. **Potentially mixed waste (ACM and potentially Characteristically Hazardous Materials)**
4. **Brick and Concrete**
5. **Structural Steel**
6. **Non-ferrous metal**
7. **Pipe (process and utility shall be segregated)**
8. **Equipment and machinery**

List generated material categories and disposal facility or fill location for each:

Material Category	Disposal Facility or Onsite Location (Grid #)	Roll-off / truck loads	Manifest / Bill of Loading Included

Attachments:

1. **Permits**
2. **Photo Log**
3. **Air Monitoring Reports**
4. **Shipment log for all material categories that were transported from property**
5. **Fill Log, key to Site Grid, for all materials used as fill on the property**
6. **Sample log for all analytical testing conducted**

Appendix E – Hot Work Permit

Hot Work Permit

Project Name: _____ Project #: _____

Date and start time issued: _____ Expiration Date/Time: _____

Hot Work: ❑ Internal Combustion Engines ❑ Hot Tapping

❑ Sparking ❑ Work on Live Equipment ❑ Welding/Burning ❑ Other

Scope of Work: _____

What equipment preparation is required? (i.e., lockout/tagout, blinding pipes)

_____

Is any area cleanup required? _____ Explain: _____

_____

Is work area ventilation required? _____ What Type? _____

Is fire equipment required? _____ What Type? _____

What methods are to be employed to control sparks? _____

What type of firewatch is required, if any? _____

What periodic air/gas testing is required? _____

What continuous air/gas testing is required? _____

What instruments are required? _____

Where should the continuous air monitor(s) be placed?

What PPE is required? _____

Who must be notified each time work commences? _____

Special Instructions: _____

Signatures: Site Supervisor: _____

Site Safety Officer: _____

Client Representative (if required): _____