

REMEDIAL INVESTIGATION WORK PLAN

Amherst Commons LLC
47 East Amherst Street
City of Buffalo, New York



Tax Map ID No.: 90.28-8-1
Property County: Erie
Site No.: C915397

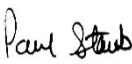

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1.0 INTRODUCTION

This Remedial Investigation Work Plan (RIWP) document presents details of work activities designed to support a Remedial Investigation (RI) at 47 East Amherst Street in the City of Buffalo, New York (refer to **Figure 1**). The 3.33-acre site includes one parcel (SBL: 90.28-8-1) and is located on the south side of E Amherst Street. The Site is zone N-2E (Mixed-Use Edge) in an area consisting primarily of a mix of commercial buildings, residential properties, and various retail stores. The Site is also in a designated En-Zone (Type AB) for Census Tract 40.03, is in a Disadvantaged Community, and a Brownfield Opportunity Area.

A preliminary BCP project schedule is provided in **Figure 2** and a boundary survey map of the Site is provided in **Figure 3**. The Brownfield Cleanup Program (BCP) applicant, Amherst Commons, LLC, has entered the program (Site No.: C915397) as a Volunteer to remediate the Site in preparation for redevelopment of the property.

Environmental assessments and investigations conducted on the Site concluded that there are impacted soils across the site due to the former uses and the presence of urban fill. A Previous Phase II Environmental Site Assessment (ESA) identified site soils that have been impacted with metals and polycyclic aromatic hydrocarbon (PAH) related compounds. Historical use and previous environmental investigations suggest petroleum, solvents and PCB impacts may also exist at the Site.

The purpose of the RI phase of the BCP is to address the following activities and requirements:

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

1.1 SITE DESCRIPTION AND HISTORY

The 3.33-acre site is composed of a single parcel (refer to **Figure 3**), SBL #90.21-8-1 located at 47 East Amherst Street in the City of Buffalo, Erie County, New York. The site is located approximately 0.75 miles east-northeast of the Buffalo Zoo, less than one mile north-northwest of Erie County Medical Center (ECMC) and 1.25 miles southwest of the University at Buffalo South Campus.

The site currently contains one vacant building surrounded by an asphalt parking lot. The building is two stories in addition to a partial basement with limited current access to the second floor due to structural issues. The interior and exterior of the building have significant deterioration.

The topography of the Site is generally flat and gently sloping north towards city streets and Lake Erie. In general, groundwater most likely flows north towards Lake Erie.

Historical records including street directories and Sanborn Maps suggest that the site was occupied as follows:

- From at least 1916-1935: Buffalo Cement Co.
- 1950-1986: Bowling alley (no owner specified)
- 1994: Amherst Bowling Center and Family Pro Shop (joint occupancy)
- 1999-2004: Amherst Bowling Center

1.2 CONTEMPLATED USE OF THE SITE

The re-development of the site will provide work-force rental housing/commercial mix use facilities. The plan is to demolish the existing 52,000 square foot building and replace it with a two and four story, 130-unit apartment complex with ground floor commercial space.

1.3 PROJECT ORGANIZATION

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

Project Manager – Jason M. Brydges, P.E.

Engineers – John Berry, P.E.

Project Staff and Field Technicians – Paul Staub, EIT Environmental Engineer; Alexis Palumbo, Project Engineer; Jim Hall, Field Technician

Health and Safety Officer – Jason M. Brydges, P.E.

QA/QC – John Berry, PE

Project Geologist – John Boyd

Attorney – Linda Shaw-Knauf Shaw, LLP

Asbestos/lead/universal waste subcontractor – to be determined

Drilling/Excavation subcontractors – to be determined.

Analytical Laboratory – to be determined.

2.0 GOALS AND OBJECTIVES

2.1 RI OBJECTIVES

In general, an RI has the following objectives as described in New York Codes, Rules, and Regulations (NYCRR) Part 375-1.8(e):

- Delineation of the extent of the contamination at and emanating from all media at the Site and the nature of that contamination.
- Characterization of the surface and subsurface characteristics of the Site, including topography, surface drainage, stratigraphy, depth to groundwater, and any aquifers that have been impacted or have the potential to be impacted;

- Identification of the sources of contamination, the migration pathways, and actual or potential receptors of contaminants;
- Evaluation of actual and potential threats to public health and the environment;
- Production of data of sufficient quality and quantity to support the necessity for, and the proposed extent of, remediation and to support the evaluation of proposed alternatives; and,
- A qualitative exposure assessment of the contamination that has migrated from the site in accordance with ECL 27-1415(2)(b) and NYSDEC guidance.

2.2 SPECIFIC GOALS

Based on the data collected to date and history of the Site, RI activities have been developed that will allow for further assessment of fill material and depth of native soil, depth to bedrock, and depth to groundwater. The potential for impacted soil vapor will also be further assessed to include a vapor intrusion investigation in accordance with NYSDEC/New York State Department of Health (NYSDOH) protocol. Specific goals for the RI are as follows:

- Perform additional soil borings below the building slab and non- building areas to add to the existing data. The focus will be on impacted areas identified during the previous investigations;
- Install and sample groundwater wells to assess potential contamination and its sources (i.e., on or off-Site), direction of groundwater flow, and potential impacts. It should be noted that prior subsurface assessments did not encounter groundwater in the overburden.
- Conduct building environmental condition assessments related to building Pre-demolition/renovation, as necessary, that may include asbestos containing material (ACM), lead-based paint (LBP), and other indoor hazardous materials within the existing structures.
- Perform a hydraulic assessment of the groundwater in the subsurface using the planned monitoring wells;
- Perform vapor probe sampling to assess the potential for inhalation exposure via soil vapor intrusion across the site.
- Focus on investigation of former underground storage tank (UST) areas identified in the 1935 Sanborn map of the property.
- Further characterize and remove petroleum distillate labeled drums; and
- Fill in any data gaps resulting from previous assessments.

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

2.3 CONTAMINANTS AND AREAS OF CONCERN

Based on the findings related to historic use of the Site and previous investigations, contaminants of concern (COCs) in the soils are semi-volatile organic compounds (SVOCs), and metals. SVOCs identified are mostly polycyclic aromatic hydrocarbons (PAHs) in multiple locations across the Site above restricted residential soil cleanup objectives (SCOs).

The potential for elevated chlorinated solvent and petroleum compounds exist at the site due to potential historic USTs at the western corner of the Site and will be assessed in site soils, groundwater and vapors. The full suite of soil contaminants as identified in 6 NYCRR Part 375

will be analyzed during the RI. Groundwater samples will also be analyzed for TCL VOCs/SVOCs + TICs and TAL metals following the standards and criteria and guidance identified in 6 NYCRR Part 703 AWQS TOGs. The VOCs will be analyzed by EPA Method 8260C, SVOCs by EPA Method 8270D, pesticides by EPA Method 8081B, PCBs by EPA Method 8082A, TAL metal by EPA Methods 6010C, 7471B, and 9012, PFAS compounds by modified EPA Method 1633, and 1-4,dioxane by EPA Method 8270 SIM. See **Figure 4** for an illustration on compound exceedances in soils based upon the previous investigation results.

The existing building on site will also be assessed for hazardous materials and universal wastes prior to demolition. Hazardous material and universal wastes include: ACM in floors/caulk/roofing/insulation; LBP in ceilings/structures/windows/walls/doors; polychlorinated biphenyls (PCBs) in light ballasts and caulk throughout the building; and mercury in fluorescent bulbs. Also, drains and sumps within the building will be assessed and contents, if any, characterized. Existing drums identified within the building will be categorized. Drums will be opened and contents characterized by sampling as necessary. Arrangements will be made for proper offsite disposal of drums/contents as necessary.

3.0 PAST ENVIRONMENTAL ASSESSMENTS/INVESTIGATIONS

Various Environmental assessments have occurred on the property:

Phase I ESA – by BE3 – January 2023

Conclusions

A Phase I ESA was completed at the site by BE3 in January 2023 in conformance with the scope and limitations of the ASTM Practice E1527-21. The assessment identified the following recognized environmental condition (REC):

- Drums were observed on the subject property and are labeled as containing petroleum distillate. It is unknown whether releases to the environment occurred, however, these will need to be further characterized and removed.

The following business environmental risks (BERs) were also identified:

- A spill occurred at the former gas station located at 72 East Amherst Street (Spill #0275094). Soil and groundwater contamination was present which has the potential to migrate to the subject property.
- Historic gas station existed within proximity of the subject property. Tank installation records were provided but no subsequent removal records were found. It is unknown whether any spills or leaks occurred that could potentially migrate to the subject property.

Conclusions

The Phase II report established that contamination of environmental media exists on the site above applicable Standards, Criteria and Guidance (SCGs) based on the reasonably anticipated use of the site. Attached **Figure 4** provides levels of environmental media (soil) above SCGs detected as of this submission. The history and use of the site suggest there is the potential for contaminants for concern associated with fill material and past commercial use. Potential contaminants include metals, polycyclic aromatic hydrocarbons (PAHs), solvents, and PCBs.

Pre-demolition Asbestos & Hazardous Materials Survey – by JMD Service – 2007

Conclusions

The survey identified asbestos, lead-based paint, PCB containing lights and drums with unknown contents on site.

4.0 INVESTIGATION SCOPE OF WORK

4.1 INTRODUCTION

The investigation will include soil sampling and analysis, hazardous building materials inventory/assessment, vapor intrusion sampling and geophysics to assess the historic tank locations (refer to **Figure 5**). Groundwater sampling/analysis; groundwater hydraulic assessment and other groundwater testing as appropriate will be completed. All investigation field work will be completed in accordance with the Health and Safety Plan (HASP) in **Appendix A** and the Community Air Monitoring Program (CAMP) in **Appendix B**. Prior to the demolition of the Site structure, PCBs, mold, etc. will be surveyed as necessary to supplement any previous surveys completed within the structure. In addition, a survey of existing floor drains and sampling of any sediment that may exist for COCs will be completed prior to demolition site prep work. It is anticipated that the RI can be completed in a single phase and include the following:

- Soil investigation to supplement previous investigation findings (surface soil, soil borings, sampling, and chemical analysis),
- Groundwater investigation (see Section 2.2) to include well installation, sampling, chemical analysis, and hydraulic assessment;
- Soil vapor assessment;
- Building Hazardous materials and universal waste survey/assessment
- A geophysical survey of the historic tank locations. An additional survey will be completed around the building to locate any stray piping and utilities prior to demolition;
- Floor drain survey and sediment sampling and;
- Collection and analyses of soil vapor and sub-slab vapor, samples to evaluate the potential for inhalation exposure via soil vapor intrusion.

4.2 SOIL ASSESSMENT

The soil assessment will allow the visual inspection and characterization of subsurface soil conditions with the objective of confirming the depth of fill material across the site and to collect and analyze additional fill and native soil samples.

The extent of known contamination will be quantified, and contamination sources identified as data allows. The only soil assessment completed to date had been the January 2023 Phase 2 ESA by BE3. As such, the objective of the RI soil assessment will be to use the previous data and complete soil borings in areas of concern identified in the previous assessments. A total of sixteen (16) soil borings will be completed. The borings will be spread out with a focus on previously identified impacted areas, suspected historic UST locations, and areas where no investigation has been performed (See **Figure 5**). Attempts to sample soils directly beneath the existing building slab will be made using a hand auger due to safety concerns from transporting large equipment into basements. The precise sampling locations will be based on real-time field observations and will specifically target potential contaminant features while ensuring that areas of concern are examined. It should be noted that the entire site is covered with either asphalt parking areas or concrete buildings slabs.

4.2.1 Soil Borings – Subsurface Soil

Exterior borings will be advanced to an estimated depth of between 4-8 feet bgs, to native soil, or refusal using Geoprobe® direct push technology. The borings will advance deeper than 8 feet if environmental impacts appear to continue beyond 8 feet. Interior boring beneath the existing slab will be advanced to an estimated depth of 4 feet below the slab, to native soil, or refusal using a hand auger and core machine. During the Phase II investigation, field observations noted refusal and/or bedrock at 4.3 to 5.6 ft bgs. Continuous soil sampling will be conducted using a Geoprobe® with a two-inch diameter, 4-foot-long sampler. Visual observations and PID readings will be used to assess potential downward migration in the soil below the fill layer. If impacts are observed either by visual/olfactory observations and/or PID readings, the boring will be advanced as deep as possible based on equipment location and limitations. If no impacts are identified in a soil boring slated for soil samples, samples will be collected from the bottom interval of the boring or from immediately above confirmed confining layers. A minimum of 16 subsurface fill/soil samples and 7 native soil samples will be collected from soil borings. An additional 3 soil samples will be collected during groundwater well borings plus associated 3 QA/QC samples for a total of 29 subsurface soil samples.

Table 4.2.1 Summary of Proposed Soil Borings and Sampling

Soil Boring	Boring Depth (ft)	Proposed Sampling Depth (ft)	Target Analyses	Sampling Rationale
RI-BH-1	8'	1-4'	TCL VOCs + CP-51 + TICs, TCL SVOCs + TICs, TAL Metals, PCBs, TCL Pesticides, 1,4dioxane, PFAS (PFOA/PFOS)	Nature and Extent of Fill Layer
RI-BH-2	8'	1-4'	TCL VOCs + CP-51 + TICs, TCL SVOCs + TICs, TAL Metals, PCBs, TCL Pesticides, 1,4dioxane, PFAS (PFOA/PFOS)	Nature and Extent of Fill Layer
		4-8'		Characterize Native Soil
RI-BH-3 through RI-BH-10	8'	1-4'	TCL VOCs + CP-51 + TICs, TCL SVOCs + TICs, TAL Metals, PCBs, TCL Pesticides, 1,4dioxane, PFAS (PFOA/PFOS)	Nature and Extent of Fill Layer
RI-BH-11 through RI-BH-16	8'	1-4'	TCL VOCs + CP-51 + TICs, TCL SVOCs + TICs, TAL Metals, PCBs, TCL Pesticides, 1,4dioxane, PFAS (PFOA/PFOS)	Nature and Extent of Fill Layer
		4-8'		Characterize Native Soil

4.2.2 Geophysics

Prior to any trenching a geophysical survey will be performed by Maddan Geophysics, LLC, to determine the presence or likely presence of the historic USTs. A reference grid will be established, and a time domain electromagnetic (EM61) metal detector will be used to conduct the survey. The geophysical method that will be used is an established, indirect technique for non-destructive subsurface reconnaissance exploration. The device will generate a pulse to generate eddy currents into the subsurface. As the decay rate of these eddy currents is much longer for metals than normal soils, distinctions can be made to discriminate between the two. The results of this survey will be interpreted, and a report generated with a figure to show any anomalies within the established grid. Preliminary data will be provided to the NYSDEC and the New York State Department of Health (NYSDOH) as soon as it is available.

An additional geophysical survey will be completed prior to demolition to locate any stray piping and utilities surrounding the building.

4.2.3 Test Trenches

Once the presence or likely presence can be confirmed, test trenching will be performed to assess if USTs are present. Should a tank be found, test trenches will be excavated to carefully remove surface soils to uncover the tank(s) and determine the size, capacity, and condition. Soil samples may be collected from test trenches depending on what is uncovered and soil conditions. The number of samples collected, if any, will be determined in the field.

According to NYCRR Part 375-1.8(b), any unregistered petroleum tank, which is owned or controlled by the remedial party requires registration in addition to removal. A petroleum Bulk Storage (PBS) registration form will be submitted as soon as possible following the discovery of the tank. Unless the tank is found to be compromised, the removal will occur during the remedial action phase of the project. Removal will be completed in accordance with PBS regulations, including excavation and sampling.

4.2.4 Soil Data Collection and Analysis

At each boring/test trench, the following will be recorded:

- Thickness and characteristics of the cover/fill material;
- Depth to bedrock, if encountered;
- Depth to groundwater, if encountered;
- Thickness and characteristics of the native soil, if encountered;
- PID screening results; and
- Estimated depth of analytical samples collected.

Soil stratigraphy will be recorded along with soil gas readings using a PID. Soil samples will be collected from locations showing the highest PID readings and/or visual/olfactory observations; and/or based on location. A detailed log of these records will be maintained to assist field personnel in selecting the most appropriate sample at each location, and to supplement future analytical results.

Samples will be selected upon (1) areas that appear to be impacted based upon visual, olfactory, or PID detections, (2) areas of natural soil at interface with fill material, and (3) known fill material that may or may not be impacted but believed to represent Site soils. As per DER-10 Section 3.11(b)3, if more than one type of historic fill material is encountered in any boring, one sample is required for each type of fill material encountered. All soil samples collected will be grab samples. Proposed soil samples to be collected are summarized in **Appendix C** – Quality Assurance/Quality Control Plan. The soil samples will be analyzed by a NYSDOH environmental laboratory accreditation program (ELAP) certified laboratory that produces NYSDEC Category B data package deliverables. Data Usability Summary Reports (DUSRs) will be collected for laboratory analyses. See **Appendix C** for proposed sampled summary. All samples will be analyzed for the full Part 375 Brownfields constituent list which includes the following:

- Target Compound List (TCL) VOCs + TICs
- TCL SVOCs + TICs
- Target Analyte List (TAL) Metals (Including mercury and total cyanide)
- PCBs
- TCL Pesticides
- 1,4-dioxane
- Per & Polyfluoroalkyl Substances (PFOA/PFOS)

Any boring or subsurface disturbance will be performed at a minimum distance of 2.5 feet away from marked utilities to reduce the risk damaging an underground utility line. All probe holes will be filled with indigenous soil or clean sand prior to leaving the location. An asphalt patch will be placed, as necessary.

Field equipment will be operated in accordance with standard practices and in a safe and efficient manner to minimize any hydraulic system leaks or lubricant and fuel leaks. (See **Appendix A – HASP** for details).

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

If bedrock is encountered in a sufficient number of soil borings, a top of bedrock contour map will be included in the Remedial Investigation Report (RIR).

4.3 GROUNDWATER

During the Phase II investigation, bedrock was interpreted to be relatively shallow (4.3 feet in some locations), and no groundwater was encountered during the Phase II ESA assessment by BE3 or the geotechnical assessment performed by Foundation Design. Based on these previous subsurface assessments, it is unlikely that groundwater will be encountered in the overburden and it is likely that bedrock wells will be installed during the RI. However, to meet the BCP requirements to sample groundwater, if possible, a total of three (3) overburden groundwater monitoring wells will be installed if groundwater is encountered using a conventional truck mounted drill rig with hollow stem auger drilling techniques. One of the wells will be installed at the northwest corner adjacent to the former UST area along Pannell Street, one will be installed adjacent to the former UST area along the southwestern boundary of the site, and one will be installed up gradient of the other two locations on the eastern side of the site. Well locations may be revised in the field to accommodate logistics and previous PID detections.

If no appreciable volume of groundwater is encountered in the overburden, a total of three bedrock wells will be installed in 1 upgradient and 2 downgradient locations. Bedrock wells will be installed to a depth of at least 20 feet. If groundwater is not encountered at this depth, the DEC PM will be contacted in the field. (Refer to **Figure 5** for locations).

4.3.1 Well Construction

Each well will consist of a 2-inch inside diameter, schedule 40 PVC casing equipped with a well screen that is Schedule 40 pipe with 0.010 slot size. Section 3.1 of **Appendix D** provides a step-by-step method for the open-hole method of installing a groundwater well once a boring or augured hole has been drilled to a desired depth within the subsurface.

Wells will either be completed at the ground surface and covered with a curb box in current or future high traffic areas or be completed as a stick up. Where the top of the well riser pipe will extend approximately three feet above grade and be fitted with a lockable J-plug and protected by a vented, 4-inch diameter protective steel casing. The steel casing will be installed to a depth of approximately 2 feet bgs and anchored in a 2-foot by 2-foot concrete surface pad. Each steel protective casing will be fitted with a locking cap, keyed alike (for all three wells) lock, and labeled with permanent markings for identification. The concrete surface pad will be constructed around the protective steel casing to allow surface water to drain away from the well. Drill cuttings will be disposed of in the borehole that generated them where possible. Excess cuttings and spoils will be placed in sealed NYSDOT-approved drums and labeled for subsequent characterization and disposal. Disposal will be done in accordance with all RCRA standards. Drilling logs and well construction logs will be prepared and maintained for all monitoring well locations.

All fieldwork will adhere to the Health and Safety Plan provided in **Appendix A** and the CAMP provide in **Appendix B**.

4.3.2 Well Development

After installation of monitoring wells, but not within 24 hours, new wells will be developed in accordance with **Appendix D** – Section 3.2 and NYSDEC protocols. Initially, development water will be containerized in NYSDOT-approved drums and labeled per monitoring well location. If light non-aqueous phase liquid (LNAPL), dense nonaqueous phase liquid (DNAPL), odors, or sheen are encountered during well development, water will be properly characterized and disposed accordingly. Based on the RI groundwater analytical results, it will be determined, in consultation with NYSDEC, if the containerized development water is acceptable for surface discharge in the vicinity of the monitoring well being developed or requires subsequent on-site treatment and/or off-site disposal.

4.3.3 Groundwater Sampling

Sampling will commence as soon as adequate recharge has occurred. Although not required, it is recommended that purging and sampling occur 7 days after development to allow for adequate recharge. Prior to sample collection, static water levels will be measured and recorded from all on-site monitoring wells to facilitate the preparation of an isopotential map. Following water level measurement, field personnel will purge and sample monitoring wells using a submersible pump or low-flow surface pump depending on well depth with dedicated pump tubing following low-flow/minimal drawdown purge and sample collection procedures provided in Sections 3.3 – Well Purging and 3.4 – Well Sampling of **Appendix D**. In the event of pump failure or the saturated unit does not permit the proper implementation of low-flow sampling, a dedicated polyethylene bailer will be used to purge and sample the well. Field measurements for pH, temperature, turbidity, DO, ORP, specific conductance and water level, as well as PID, visual and olfactory field observations will be periodically recorded and monitored for stabilization and health and safety purposes. Low-flow purging will be considered

complete when the field measurements stabilize, and turbidity falls below 50 Nephelometric Turbidity Units (NTU) or becomes stable above 50 NTU regardless of volume purged.

Collected groundwater samples will be transported under chain-of-custody to a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory for the analyses indicated in Section 4.3.4.

4.3.4 Groundwater Sample Analyses

One groundwater sample will be collected from each of the 3 monitoring wells. Well development and sampling will be in accordance with Appendix D - FSP. Groundwater samples will be analyzed for the following Part 375 brownfield constituents:

- TCL VOCs and TICs;
- TCL SVOCs;
- TAL Metals + cyanide;
- PCBs;
- Pesticides;
- 1,4-dioxane; and
- Per & Polyfluoroalkyl Substances (PFAS).

Sample analysis will be in accordance with ASP, Cat B requirements. DUSRs will be completed for all samples. QA/QC requirements for all sample analysis are provided in **Appendix C** Quality Assurance/Quality Control Plan. Table 1 in **Appendix C** summarizes the number of Groundwater samples to be collected.

All detected sample concentrations will be included in a table and compared to NYSDEC Groundwater Standards (TOGS) as well as applicable standards, criteria, and guidance materials (e.g., Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances [PFAS]).

Table 4.3.4 Summary of Proposed Groundwater Monitoring Wells

Well ID	Type	Estimated Depth (ft)	Screen Interval (ft)	Target Analyses
RI-MW-01	Overburden/Bedrock	20	10-20	TCL VOCs + CP-51 + TICs, TCL SVOCs + TICs, TAL Metals, PCBs, TCL Pesticides, 1,4dioxane, PFAS (PFOA/PFOS)
RI-MW-02	Overburden/Bedrock	20	10-20	
RI-MW-03	Overburden/Bedrock	20	10-20	

4.3.5 Groundwater Flow/Hydraulic Assessment

Static depth to groundwater measurements will be obtained from the newly installed RI monitoring wells. Groundwater elevation data will be calculated and used to develop an isopotential map that will indicate the general direction of groundwater flow. Groundwater elevations will be relative to an arbitrary site-specific vertical datum and benchmark (e.g., fire hydrant)/survey). A well construction summary table will be prepared and include top of riser and grade elevations as well as construction depths (elevations) and materials.

If contamination is found in groundwater, in-Situ Hydraulic Conductivity Testing will be determined using the variable-head test method (“rising head”) (Bouwer and Rice Method, 1976). Hydraulic assessment includes the completion of hydraulic conductivity tests and the measurement of water levels in monitoring wells. Variable head tests will be completed using a stainless steel or PVC slug to displace water within the well or by removing water from the well with a bailer or pump. The recovery of the initial water level is then measured with respect to time. Data obtained using this test will be evaluated using procedures presented in “The Bouwer and Rice Slug Test - An Update,” Bouwer, H., Groundwater Journal, Vol. 27, No. 3, May-June 1989, or similar method.

4.4 VAPOR INTRUSION SURVEY

Historical records of operations at the Site indicated the potential use and storage of petroleum compounds. To confirm and further assess if solvent/petroleum vapors exist in the soil beneath future building slabs, a soil vapor intrusion investigation will be undertaken. As such, vapor sampling may involve:

- Vapor probe sampling 1-2 feet above the water table. The DEC PM may be contacted to discuss alternatives if the water table is found to be within bedrock. =
- The conversion of select soil borings into vapor points

The vapor intrusion survey will be conducted after the soil and groundwater samples are collected. This will provide a more accurate estimate of the depth of bedrock across the site, allowing for a better estimate of screening intervals and boring depths of the vapor points.

The sampling will be conducted for a period of 24 hours and analyzed for TCL VOCs by Environmental Protection Agency (EPA) Method TO-15.

Vapor point samples will be completed using a skid-steer mounted Geoprobe to install the sampling probes. A ¼ inch PVC tube with a 3/8-inch stainless steel screen will be installed at the bottom of each probe hole. Vapor Point Installation diagrams will be developed. Porous sand will be backfilled around the screen to a two-foot depth (or less depending on total depth of the borehole) of each hole and a bentonite seal will be placed above the sand layer to seal off the hole around the tubing. Air samples will be collected in regulated summa canisters over a 24-hour period.

Table 4.4 Summary of Proposed Vapor Probes

Vapor Probe	Estimated Depth (ft)	Screen Interval (ft)	Target Analyses
-------------	----------------------	----------------------	-----------------

RI-VP-1 through RI-BH-8	TBD	TBD	TO-15
-------------------------------	-----	-----	-------

Installation/sampling procedures for vapor point samples will be in accordance with the current updated New York State Department of Health Guidance for Evaluating Soil Vapor Intrusion in the State of New York and its amendments. The sampling procedures are also provided in **Section 8.0** of **Appendix D FSP**. NYSDEC Category B analytical data package deliverables will be provided. Air samples to be collected are summarized in Table 1 of **Appendix C** along with QA/QC requirements. DUSRs will be completed for all samples. Locations are shown in **Figure 5**.

4.5 BUILDING ENVIRONMENTAL CONDITION ASSESSMENT

A Pre-Demolition Asbestos and Hazardous Materials Survey was completed in 2007. This survey included sampling and detailing locations of ACM within the building but only stated that lead based paint (LBP) and PCB containing materials were present. The survey also stated numerous drums were present throughout the building and should be handled in accordance with regulations. Because of the age of this survey it will be reviewed for its adequacy to meet current pre-demolition requirements by BE3, and where determined to be inadequate, additional assessments of the above identified environmental conditions will be undertaken as described below.

4.5.1 ACM

Additional assessments for ACM are not anticipated. If necessary, AMD Environments (BE3 Subcontractor) will provide New York State Department of Labor Certified Asbestos Inspectors to identify and quantify homogenous areas, and to collect bulk samples of each homogenous area within the building for laboratory analysis. Asbestos sampling activities will be conducted in accordance with guidelines and techniques identified in New York Code Rule 56. The samples will be sent to a laboratory approved by NYSDOH ELAP for subsequent analysis.

Third party contractor will perform demolition and abatement. Abatement will occur prior to building demolition.

4.5.2 Lead Inspection

The previous survey identified LBP in the building. Specific sampling and identification of LBP materials will be undertaken by AMD if determined to be required prior to demolition.

4.5.3 PCB Survey

PCB containing light ballasts were identified throughout the building in the earlier survey. BE3/AMD will identify other suspect PCB containing materials throughout the existing building and provide a count of light fixtures that are not labelled as being non-PCB containing. A report will be developed for inclusion in the RI report.

Sampling will be performed following the initial PCB survey and identification of and potential PCB containing materials but prior to building demolition in accordance with Environmental

Protection Agency (EPA) Toxic Substances Control Act (TSCA) guidance. The results of the sampling will determine their classification as hazardous or non-hazardous waste.

4.5.4 Floor Drain Survey

A survey of any building floor drains, vaults, pits, and any other penetrations that could release contaminants to the environment will be conducted and contents characterized. The location of these features will be accurately recorded and presented on a figure.

4.5.5 Drum Characterization

Previous environmental assessments noted the presence of a number of drums throughout the existing building. All drums will be inventoried, opened and contents samples as necessary. Based on characterization drum materials will be containerized and disposed off-site to meet all regulatory requirements.

5.0 ADDITIONAL SUPPLEMENTAL FIELD INVESTIGATIONS

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

If the nature and extent of contamination under the on-site building is unable to be investigated fully during the RI, a Supplemental Investigation may be required to fill data gaps after building demolition.

6.0 INVESTIGATION DERIVED WASTE MANAGEMENT

Investigation-derived waste (IDW) will include soil, groundwater, and miscellaneous solid waste generated on site during the RI. IDW generated on site will be properly characterized and sent off-site for disposal in a timely manner. IDW generated on site that cannot be disposed of on site will be containerized and disposed of at an approved facility typically during the remedial phase of the project following NYCRR Part 360 guidance. IDW will be managed in accordance with NYSDEC DER-10 Section 3.3e.

7.0 QUALITATIVE EXPOSURE ASSESSMENT

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

- The Site is a commercial property in a mixed-use zone (N-2E);
- The contamination at the site has very low potential to migrate into or impact any on or

off-site habitat of endangered, threatened, or special concern species or other fish and wildlife resource; there are no critical habitats onsite, and the closest offsite habitat is more than ¾ mile away with the Niagara River and Lake Erie more than 3 miles away per FEAF and Env. Resource Mapper.

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

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

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

8.0 REPORTING

An RI report will be prepared in accordance with the applicable requirements of DER-10 and Part 375. All RI data will be submitted to the NYSDEC data database. Once the approved lab has completed its sample analysis of a lab data sample batch it is inserted by the lab into lab EDD forms (only lab data) and a CAT B is prepared and sent to the independent preparer of DUSRs. Once the DUSRs are received, the final EDD is prepared for the sample batch incorporating the lab data plus the site-specific data called for in the EDD. Any data changes called for in the DUSRs are also incorporated in the final EDD (latest format). The latest NYSDEC EDD Valid values tables are also checked. Select computers and staff have standalone Electronic Data Processors (EDP) inserted from NYSDEC on their computers. The final EDD is inserted in the EDP which confirms if all the data has been correctly inserted and shows where data is incomplete. Corrections are then made until the EDP indicates the EDD data is correct. Once correct the EDP has a process to submit the completed EDD in Zip format to Albany for final check.

A schedule is provided in **Figure 2**. It is anticipated that upon completion of the 30-day public comment period an RI report will be drafted. This report may also include a corresponding AAR that (1) evaluates remedial alternatives based upon the data obtained in the RI, and (2) initiates the 45-day public comment period for the generation of the remedial action work plan (RAWP) and final decision document produced by the NYSDEC.

A Citizen Participation Plan (CPP) has been prepared for the Site under separate cover in accordance with the requirements outlined in NYSDEC's DER-23 Citizen Participation

Handbook for Remedial Programs, issued January 2010, as amended. The CPP provides for issuance of fact sheets and public meetings at various stages in the investigation/remedial process. A fact sheet will be prepared by NYSDEC to announce the availability of the RIWP for review, followed by a 30-day comment period. A public meeting will be held, if requested, during the public comment period.

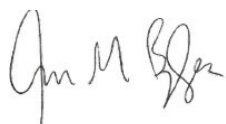
The major components of the CPP are as follows:

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

Summaries of the RI investigation will be submitted to the NYSDEC as monthly progress reports as noted in Section XI of the BCA. Fact sheets documenting the goals and progress of the project will be prepared at key milestones during the project and distributed to those on the project mailing list. The distribution list is included in the CPP.

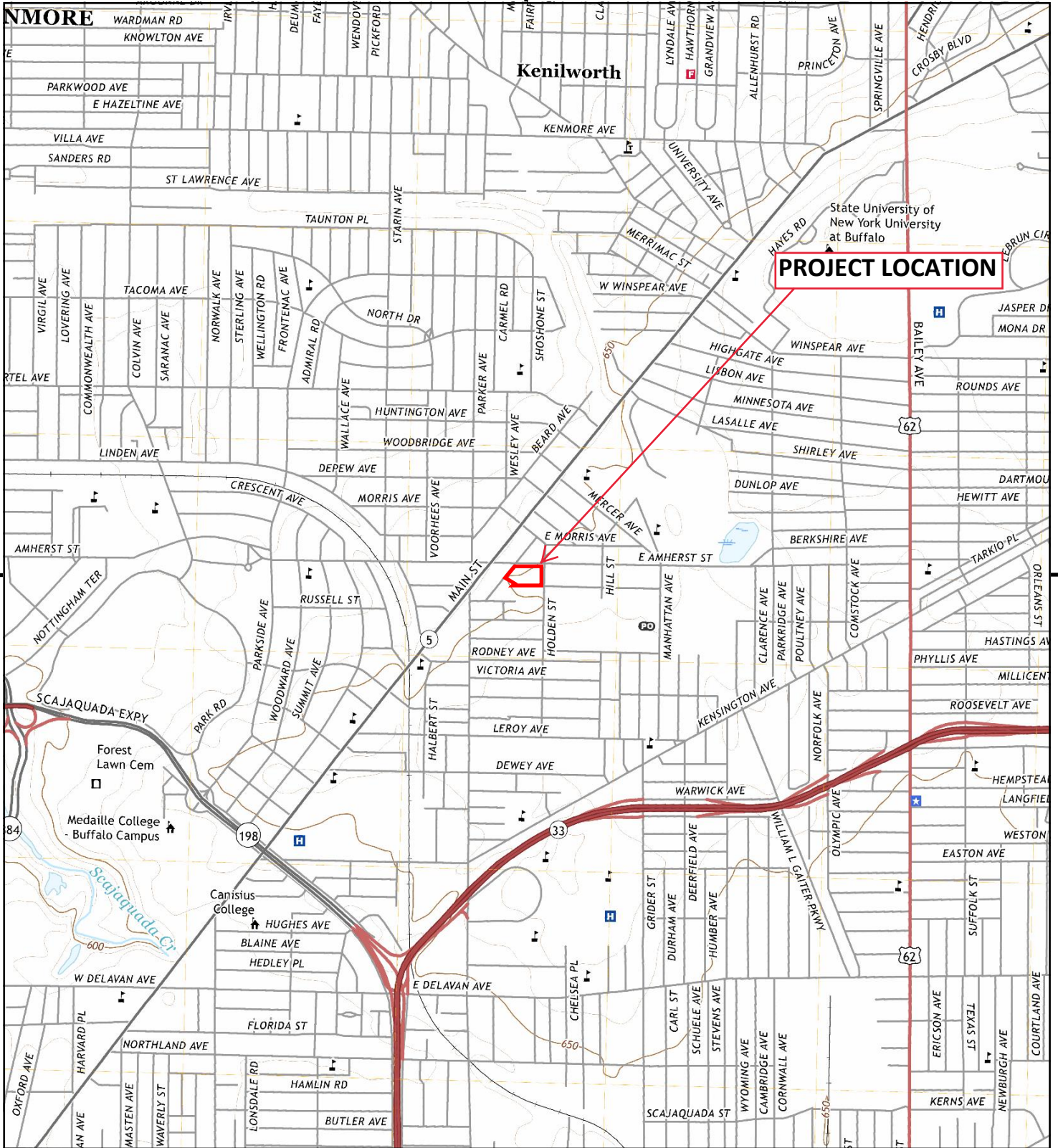
9.0 WORK PLAN CERTIFICATION

I, Jason M. Brydges certify that I am currently a New York State registered professional engineer/Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

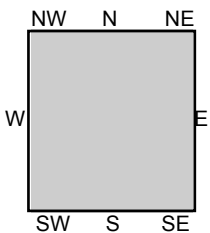
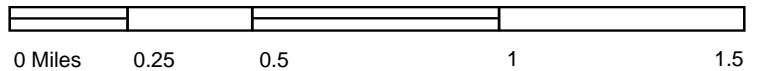


Jason M. Brydges, PE

FIGURES



This report includes information from the following map sheet(s).



TP, Buffalo NE, 2019, 7.5-minute

Figure 1

SITE NAME: 47 East Amherst Street - Buffalo NY
 ADDRESS: 47 East Amherst Street - Buffalo NY
 Buffalo, NY 14214
 CLIENT: BE3



UTILITIES

RESPONDED ☒ NATURAL GAS COMPANY:

NAME/TITLE: ERIC SCHULTZ
COMPANY/DEPT.: NATIONAL FUEL DISTRIBUTION CORPORATION
ADDRESS: 6363 MAIN STREET
TELEPHONE: WILLIAMSVILLE, NEW YORK 14221
PHONE: 716/857-7076

RESPONDED ☐ ELECTRIC COMPANY:

NAME/TITLE: DIANE KEICHER
COMPANY/DEPT.: NATIONAL GRID
ADDRESS: 144 KENSINGTON AVENUE
TELEPHONE: BUFFALO, NEW YORK 14214
PHONE: 716/631-7108

RESPONDED ☒ BUFFALO SEWER AUTHORITY:

NAME/TITLE: ANTHONY HAZZAN
COMPANY/DEPT.: BUFFALO SEWER AUTHORITY
ADDRESS: 1036 BUFFALO CITY HALL
TELEPHONE: BUFFALO, NEW YORK 14202
PHONE: 716/851-4664

RESPONDED ☒ DIVISION OF WATER:

NAME/TITLE: JAMES CAMPOLONG
COMPANY/DEPT.: CITY OF BUFFALO, DIVISION OF WATER
ADDRESS: 2 PORTER AVENUE
TELEPHONE: BUFFALO, NEW YORK 14201
PHONE: 716/851-4766

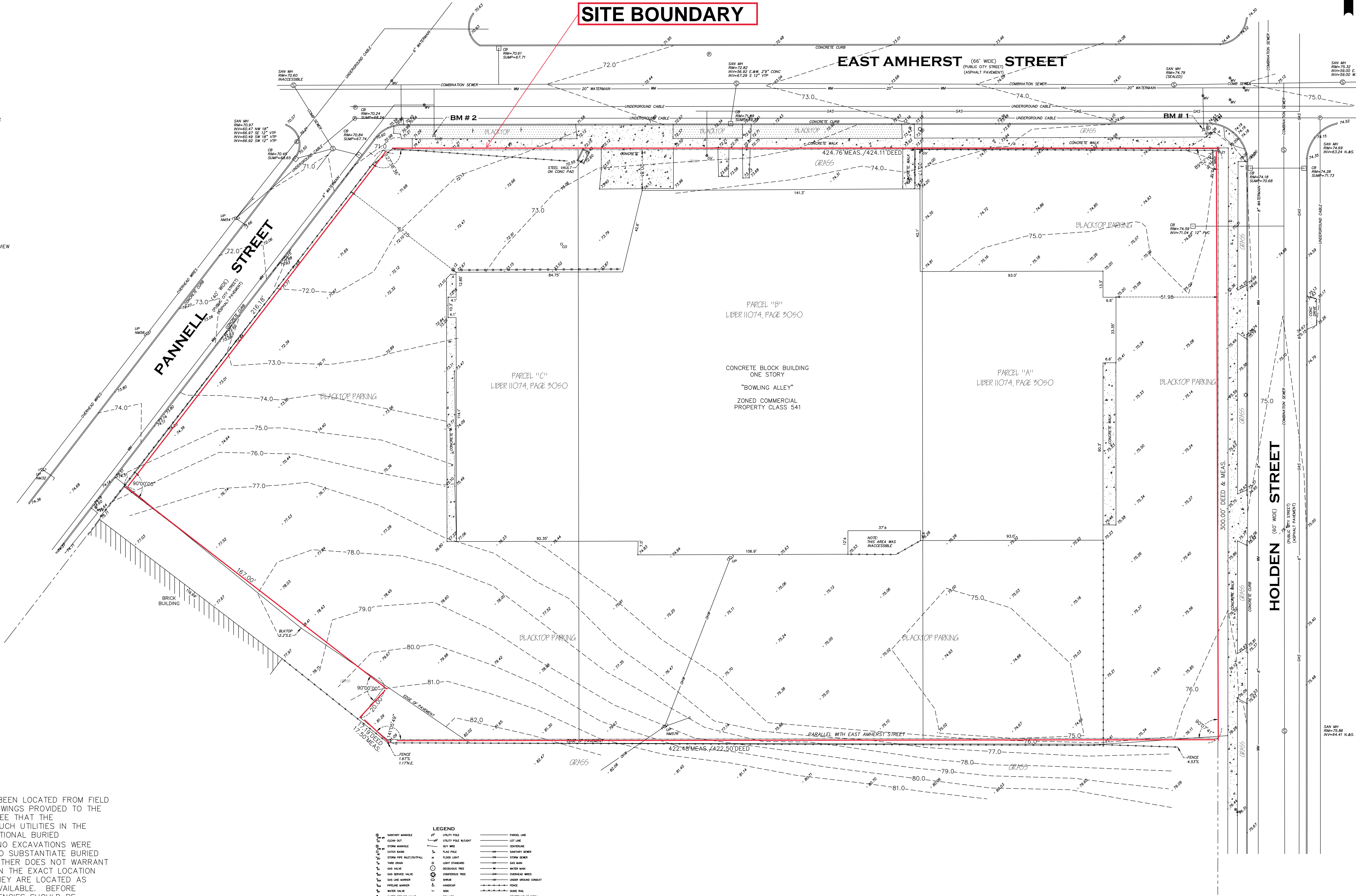
RESPONDED ☒ CABLE TELEVISION COMPANY:

NAME/TITLE: PAM GRACI
COMPANY/DEPT.: TIME WARNER CABLE
ADDRESS: 355 CHICAGO STREET
TELEPHONE: BUFFALO, NEW YORK 14204
PHONE: 716/558-8551

RESPONDED ☒ TELEPHONE COMPANY:

NAME/TITLE: JIM MURPHY
COMPANY/DEPT.: VERIZON
ADDRESS: 65 FRANKLIN STREET
TELEPHONE: BUFFALO, NEW YORK 14202
PHONE: 716/840-8698

AS OF MAY 23, 2007, NOT ALL INFORMATION REGARDING
UNDERGROUND UTILITY LOCATIONS WAS AVAILABLE FOR REVIEW
PRIOR TO COMPLETION OF SURVEY.



UTILITY NOTE

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING RECORD DRAWINGS PROVIDED TO THE SURVEYOR. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED. NO EXCAVATIONS WERE MADE DURING THE PROGRESS OF THIS SURVEY TO SUBSTANTIATE BURIED UTILITIES AND STRUCTURES. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. BEFORE EXCAVATIONS ARE BEGUN, THE APPROPRIATE AGENCIES SHOULD BE CONTACTED FOR VERIFICATION OF UTILITY TYPE AND FOR FIELD LOCATIONS.

LEGEND	
	SANITARY MANHOLE
	CLEAN OUT
	STORM MANHOLE
	CATCH BASIN
	STORM LINE INLET/OUTFALL
	YARD DRAIN
	GAS VALVE
	GAS SERVICE VALVE
	GAS LINE WARDEN
	PELLET WARDEN
	WATER VALVE
	WATER SERVICE VALVE
	FIRE HYDRANT
	WELL
	ELECTRIC MANHOLE
	UTILITY POLE
	UTILITY POLE RIGHT
	GUY WIRE
	FLAG POLE
	FLOOD LIGHT
	LIGHT STANDARD
	DECIDUOUS TREE
	CONIFEROUS TREE
	SHRUB
	HEDGE/SP
	SDO
	BOLLARD
	WALLPOST
	UNKNOWN MANHOLE
	TELEPHONE MANHOLE
	PARCEL LINE
	EOT LINE
	CENTERLINE
	SANITARY SEWER
	STORM SEWER
	GAS MAIN
	WATER MAIN
	EXISTING WIRES
	UNDER GROUND CONDUIT
	DITCH
	GRADE RAIL
	CENTERLINE OF DITCH
	ROAD
	TREE LINE

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

SCALE: 1"=20'
GRAPHIC SCALE IN FEET

FIGURE 3 - SITE BOUNDARY SURVEY

DESIGNED BY:	
DRAWN BY:	TJM
CHECKED BY:	GCW
DATE:	05/15/07

WARNING:
ALTERING THIS DOCUMENT IS IN VIOLATION OF
THE LAW EXCEPTING AS PROVIDED IN SECTION
10259, PART 2 OF THE NEW YORK STATE
EDUCATION LAW. ©COPYRIGHT 2006
WM. SCHUTT & ASSOCIATES P.C.

CITY OF BUFFALO
COUNTY OF ERIE, STATE OF NEW YORK
PART OF LOT 44, TOWNSHIP 11, RANGE 8
HOLLAND LAND COMPANY'S SURVEY

47 EAST AMHERST STREET
BOUNDARY AND TOPOGRAPHIC SURVEY

**ENGINEERING
LAND SURVEYING**
WM. SCHUTT & ASSOCIATES, P.C.
37 CENTRAL AVE.
LANCASTER, NY 14086-2143
PH: 716/683-5961
FAX: 716/683-0169
WWW.WMSCHUTT.COM
SUSTAINING MEMBERS: THE NEW YORK STATE
SOCIETY OF PROFESSIONAL ENGINEERS

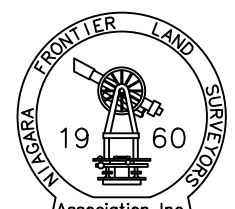
C101

1"=20'
E/07137/01
WSA PROJECT NO. 07137

DRAWING REVISIONS		
ITEM	DATE	DESCRIPTION



MEMBER OF:
NEW YORK STATE ASSOCIATION OF
PROFESSIONAL LAND SURVEYORS



MEMBER OF:
NATIONAL ASSOCIATION OF
PROFESSIONAL LAND SURVEYORS

BENCHMARK TABLE (CITY OF BUFFALO DATUM)

DESIGNATION	ELEVATION	DESCRIPTION
1	77.43	TOP OF HYDRANT SHUTOFF VALVE SOUTHWEST CORNER OF HOLDEN STREET AND EAST AMHERST STREET
2	74.07	TOP OF HYDRANT SHUTOFF VALVE SOUTHEAST CORNER OF PANNELL STREET AND EAST AMHERST STREET

Figure 4 : 2023 Phase II Boring Location Summary

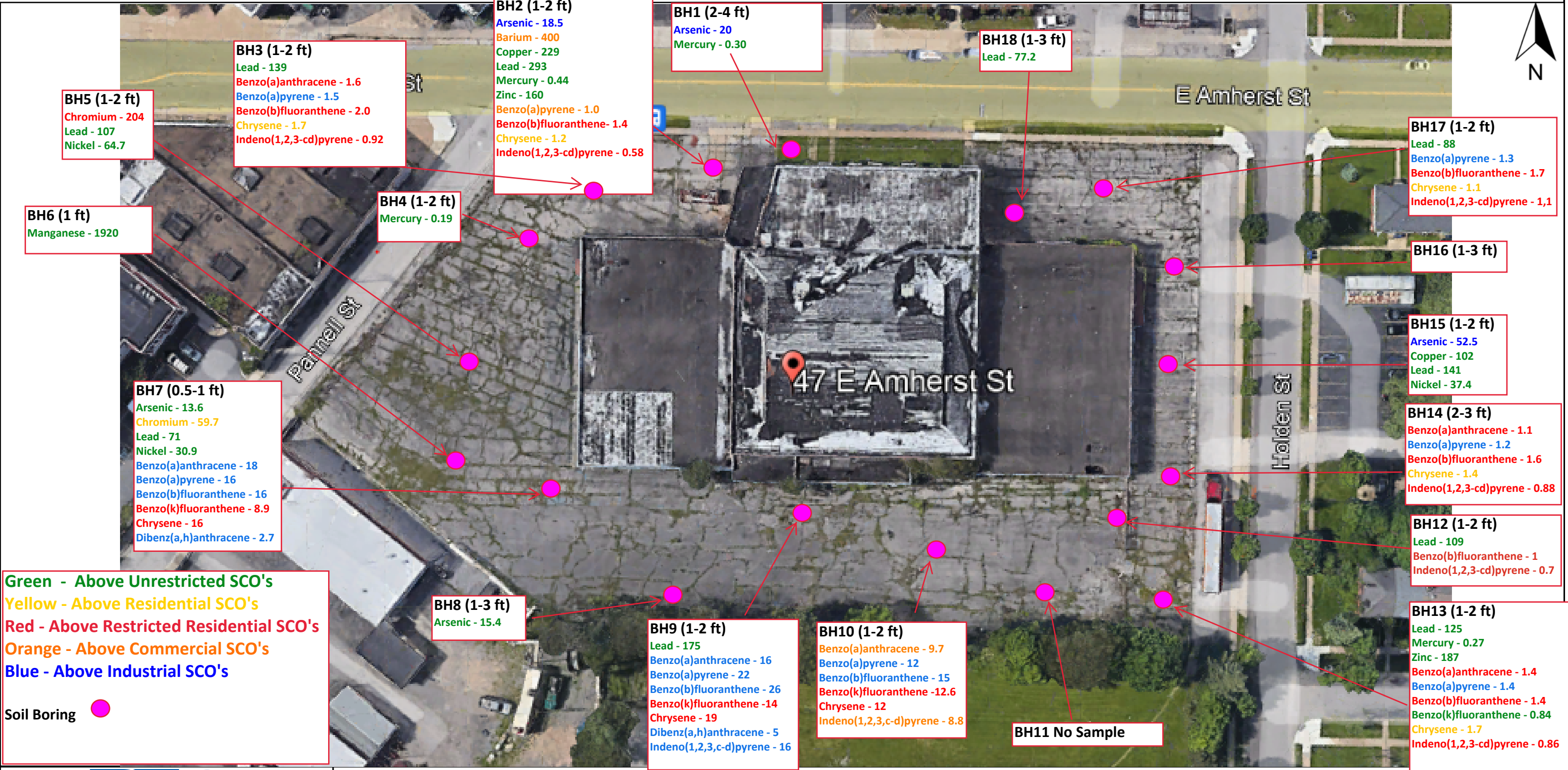

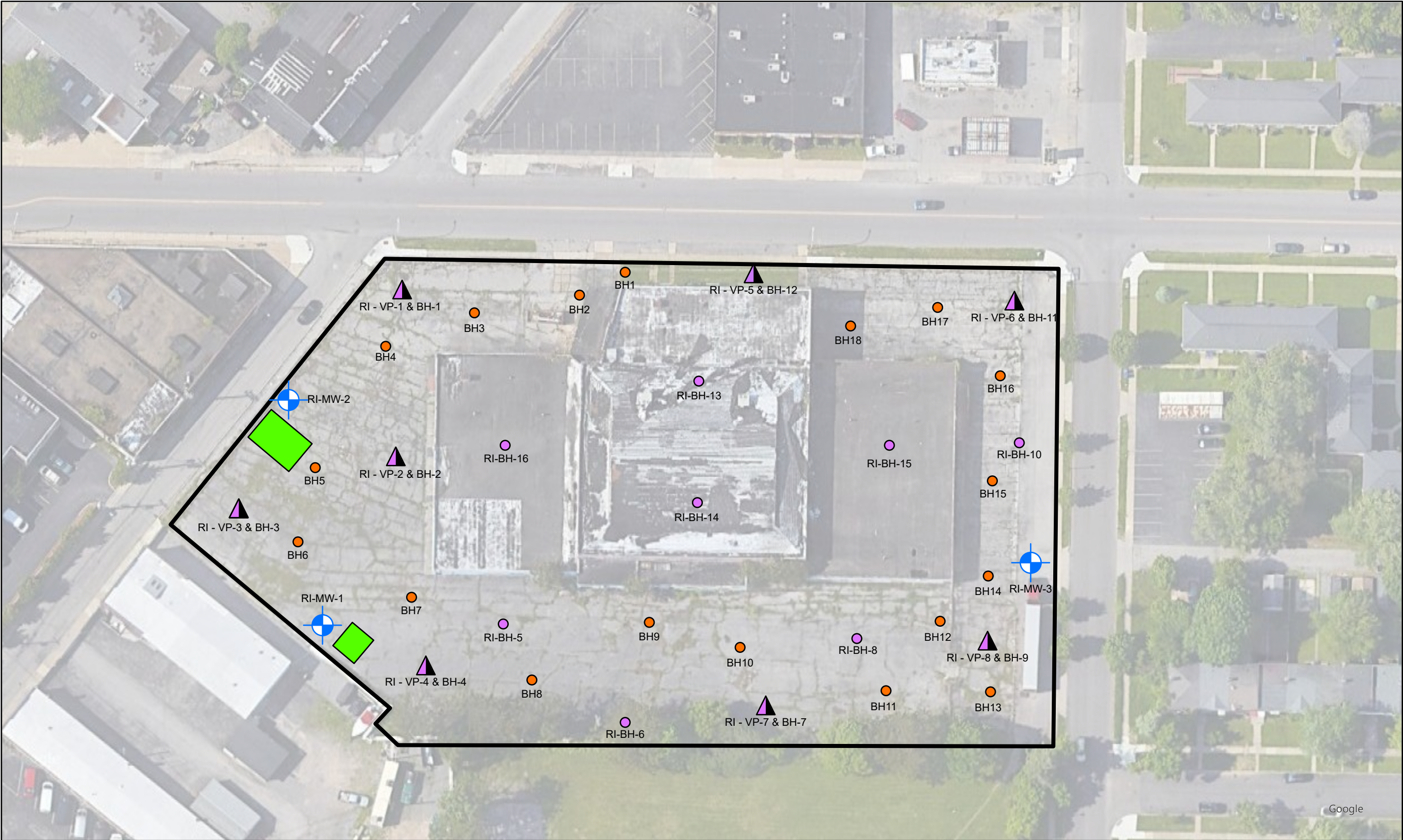


Figure 4: 2023 Boring Locations with Sample Results

	47 East Amherst Street		1/18/2023
	Buffalo, New York 14214		Regan Development



LEGEND
— Property Boundary
 Suspect UST/
Proposed Test Trench Location

Proposed RI Monitoring Well
RI-MW-1
 Phase II ESA Boring Locations (1/17/23)
BH1
 RI Proposed Boring Locations
RI-BH-1

RI Proposed Boring & Vapor Point
RI - VP-1 & BH-1

NOTES

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IN ENVIRONMENT
AND ENERGY, DPC

960 Busti Avenue
Buffalo, NY 14213
716.249.6880
jbrydges@be3corp.com

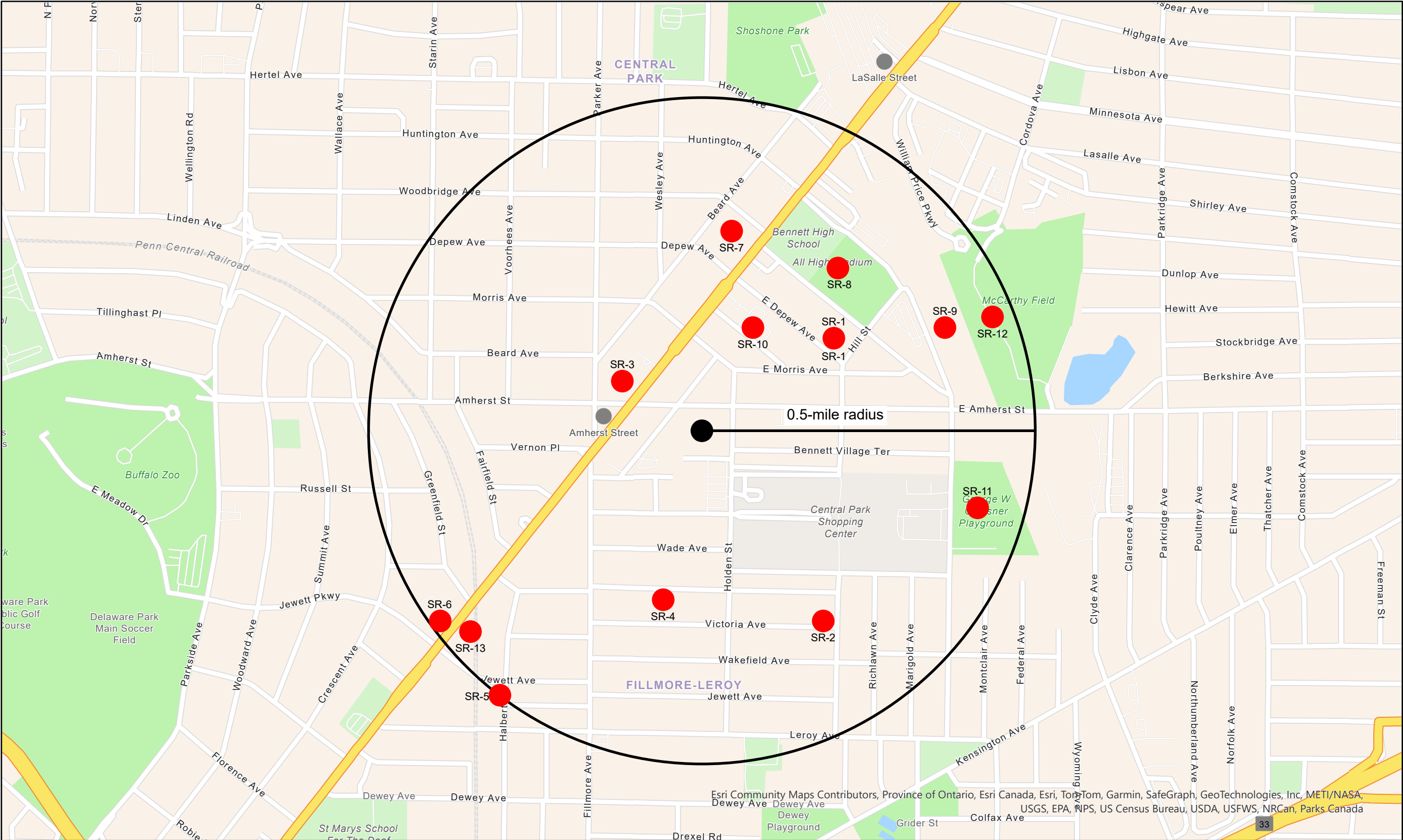
CLIENT: REGAN DEVELOPMENT

FIGURE 5
Previous Phase II & Proposed RI
Sampling Locations
47 E. Amherst Street
Buffalo, NY 14214

W N E S

DATE ISSUED:
December 17, 2024

SCALE: 1:1,288




LEGEND

- Site Location
- Sensitive Receptor Location
- SR-1

NOTES

- (1) Sensitive receptors include daycares, schools, nursing homes, parks, wetlands and other ecological resources.
- (2) No wetlands or other ecological resources noted within a quarter mile of the Site.
- (3) Wetland near NE border of boundary.




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AND ENERGY, DPC

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jbrydges@be3corp.com

CLIENT: REGAN DEVELOPMENT

FIGURE 6
Sensitive Receptors Location Map
(0.5-mile radius)
47 E. Amherst Street
Buffalo, NY 14214



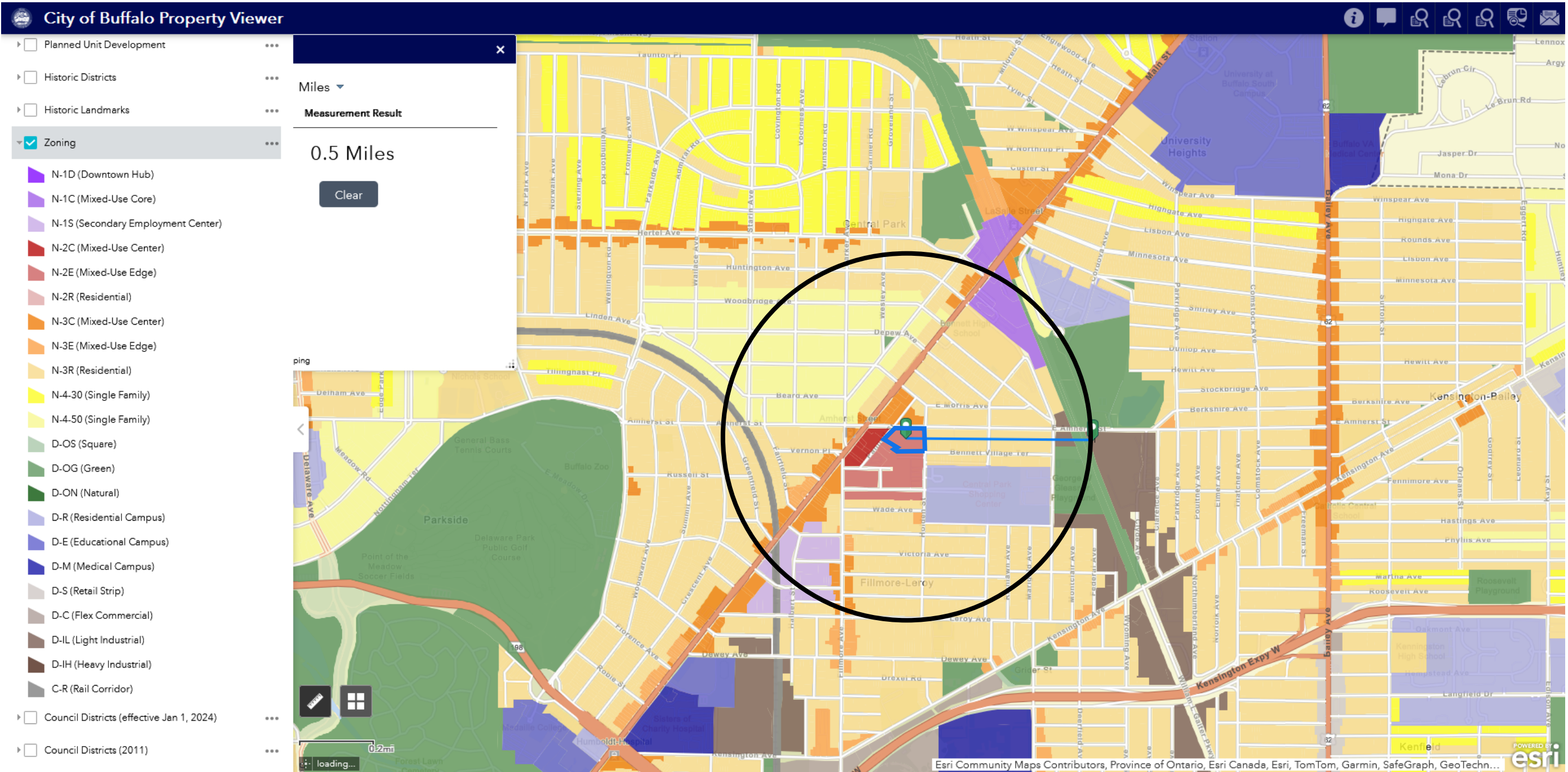
DATE ISSUED:
December 17, 2024

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△
△

SCALE: 1:13,000

Figure 6 Map Details

Map ID	Name	Facility Type	Distance from Site (Miles)	Address
1	Time Well Spent Daycare	Day Care	0.24 NE	104 E Depew Ave, Buffalo, NY 14214
2	Good Hands Day Care Center	Day Care	0.35 SE	192 Victoria Avenue, Buffalo, NY 14214
3	Kidz Zone	Day Care	0.11 NW	2680 Main Street, Buffalo, NY 14214
4	My Baby's Day Care Inc.	Day Care	0.27 S	141 Rodney Ave, Buffalo, NY 14214
5	Buffalo Collegiate Charter School	School	0.52 SW	45 Jewett Ave, Buffalo, NY 14214
6	Aloma D Johnson Charter School	School	0.52 SW	15 Jewett Pkwy, Buffalo, NY 14214
7	Buffalo United Charter School	School	0.37 NE	325 Manhattan Ave, Buffalo, NY 14214
8	Bennett High School	School	0.31 NE	2885 Main Street, Buffalo, NY 14214
9	Middle Early College High School	School	0.30 N	2885 Main Street, Buffalo, NY 14214
10	St Francis-Buffalo Adult Day	Nursing Home	0.16 NE	34 Benwood Ave, Buffalo, NY 14214
11	George's Field	Park	0.43 SE	137 Manhattan, Buffalo, NY 14214
12	McCarthy Park	Park	0.50 NE	McCarthy's Park, Buffalo, NY 14215
13	People's Park	Park	0.48 SW	2435 Main Street, Buffalo, NY 14214



LEGEND

— Approximate Property Boundary

NOTES

Base map adopted from City of Buffalo Property Viewer




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jbrydges@be3corp.com

CLIENT: REGAN DEVELOPMENT

FIGURE 7
Surrounding Land Use
(0.5-Mile Radius)
47 E. Amherst Street Buffalo,
NY 14214



DATE ISSUED:
December 17, 2024

△
△
△

TABLES

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	BE3 Phase II Report February 2023 - Sample Identification, Sample Depth in feet below ground surface (bgs), and Sample Date								NYSDEC Soil Cleanup Objectives (SCOs)				
	BH1	BH2	BH3	BH4	BH5	BH6	BH7	BH8	Unrestricted	Residential	Restricted Residential	Commerical	Industrial
	2-4	1-2	1-2	1-2	1-2	1	0.5-1	1-3					
	1/17/2023												
	METALS/INORGANICS												
Arsenic	20	18.5	8.4	2.8	9.0	5.4	13.6	15.4	13	16	16	16	16
Barium	40	400	78.8	29.4	397	74.1	391	101	350	350	400	400	10,000
Beryllium	0.63	1.30	0.5	0.24	3.4	0.78	1.90	1.30	7.2	14	72	590	2,700
Cadmium	0.35	0.5	0.6	0.26	0.4	0.55	0.31	0.30	2.5	2.5	4.3	9.3	60
Chromium	21.2	23.2	12.4	7.5	204	17.3	59.7	12.0	30	36	180	1,500	6,800
Copper	18.3	229 F2	42.9	15.2	31.8	9.7	25.4	24.0	50	270	270	270	10,000
Lead	46	293 F2	139.0	27.9	107	21.6	71	39	63	400	400	1,000	3,900
Manganese	386 B	359 B	349 B	142 B	213 B	1920 B	203	234 B	1,600	2,000	2,000	10,000	10,000
Mercury	0.30 B	0.44	0.14 B	0.19 B	.054 B	.065 B	0.085	0.034 B	0.18	0.81	0.81	2.8	5.7
Nickel	24.2	18.1	18.3	7.5	64.7	29.9	30.9	20.3	30	140	310	310	10,000
Silver	ND	ND	ND	ND	0.36 J	ND	0.28	ND	2	36	180	1,500	6,800
Zinc	43	160 F1	95.7	36.3	36.7	46.3	39.3	23.7	109	2,200	10,000	10,000	10,000
	SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)												
Acenaphthene	ND	ND	0.31 J	ND	ND	ND	2.5	0.031 J	20	100	100	500	1,000
Acenaphthylene	ND	ND	ND	ND	ND	ND	1.4 J	ND	100	100	100	500	1,000
Anthracene	ND	ND	ND	ND	ND	ND	9.6	0.89 J	100	100	100	500	1,000
Benzo(a)anthracene	0.17 J	0.99 J	1.6 J	0.35 J	ND	ND	18	0.3	1	1	1	5.6	11
Benzo(a)pyrene	0.17 J	1.0 J	1.5 J	0.34 J	ND	ND	16	0.33	1	1	1	1	1.1
Benzo(b)fluoranthene	0.2	1.4 J	2.00	0.51 J	ND	ND	16	0.38	1	1	1	5.6	11
Benzo(g,h,i)perylene	0.1 J	0.68 J	.98 J	0.34 J	ND	ND	10	0.27	100	100	100	500	1,000
Benzo(k)fluoranthene	0.079 J	0.46 J	.71 J	0.19 J	ND	ND	8.90	0.19 J	0.8	1	3.9	56	110
Chrysene	0.18 J	1.2 J	1.7 J	0.38 J	ND	ND	16.0	0.34	1	1	3.9	56	110
Dibenz(a,h)anthracene	ND	ND	ND	ND	ND	ND	2.70	0.07 J	0.33	0.33	0.33	0.56	1.1
Dibenzofuran	ND	ND	ND	ND	ND	ND	1.9	0.029 J	2.1	4.2	18	180	290
Fluoranthene	0.4	3.0	4	0.78 J	ND	ND	37	1	100	100	100	500	1,000
Fluorene	ND	ND	0.32 J	ND	ND	ND	3.8	.025 J	30	100	100	500	1,000
Indeno(1,2,3-cd)pyrene	0.096 J	0.58 J	0.92 J	0.27 J	ND	ND	9.1	0.23	0.5	0.5	0.5	5.6	11
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	12	100	100	500	1,000
Phenanthrene	0.17 J	2.9	3.7	0.43 J	ND	ND	30	0.45	100	100	100	500	1,000
Pyrene	0.31	2.2	3.1	0.6 J	ND	ND	29	0.48	100	100	100	500	1,000

ND Analyte not detected

- Not Applicable or sample not tested for this analyte

J Estimated Concentration

B Analyte detected in method blank

K Result is reported as Benzo(b)fluoranthene

E Results exceeded calibration range

T Result is Tentatively Identifies Compound and an estimated value

Analyte detected

Reported concentration greater than or equal to the NYSDEC Unrestricted SCO

Reported concentration greater than or equal to the NYSDEC Residential SCO

Reported concentration greater than or equal to the NYSDEC Restricted Residential SCO

Reported concentration greater than or equal to the NYSDEC Commercial SCO

Reported concentration greater than or equal to the NYSDEC Industrial SCO

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	BE3 Phase II Report February 2023 - Sample Identification, Sample Depth in feet below ground surface (bgs), and Sample Date								NYSDEC Soil Cleanup Objectives (SCOs)				
	BH9 1-2	BH10 1-2	BH11 No Sample	BH12 1-2	BH13 1-2	BH14 2-3	BH15 1-2	BH16 1-3	Unrestricted	Residential	Restricted Residential	Commerical	Industrial
	1/17/2023												
METALS/INORGANICS													
Arsenic	3.0	1.2 J		1.2 J	10.1	4.8	52.5	11.3	13	16	16	16	16
Barium	20.4	5.3		5.3	69	171	89.4	54.3	350	350	400	400	10,000
Beryllium	0.19 J	0.098 J		0.73	0.86		1.70	0.53	7.2	14	72	590	2,700
Cadmium	0.87	0.24		0.55	1.10	0.87 J	0.63	0.15 J	2.5	2.5	4.3	9.3	60
Chromium	16.9	3.7		23.8	16.6	7.2	20.5	6.9	30	36	180	1,500	6,800
Copper	18.1	4.9 J		42.0	39.1	17.0	102.0	31.8	50	270	270	270	10,000
Lead	175.0	18.3		109.0	125	29	141.0	12.6	63	400	400	1,000	3,900
Manganese	140 B	63 B		271 B	270 B	394 B	152 B	85.1 B	1,600	2,000	2,000	10,000	10,000
Mercury	0.042 B	0.014 JB		0.10	0.27	0.069	0.067	0.064	0.18	0.81	0.81	2.8	5.7
Nickel	11.4	4.2 J		28.6	24.4	9.3	37.4	14.5	30	140	310	310	10,000
Silver	ND	ND		ND	ND	ND	0.50 J	ND	2	36	180	1,500	6,800
Zinc	99.6	18.6		92	187	21.5	103	17.7	109	2,200	10,000	10,000	10,000
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)													
Benzo(a)anthracene	16 J	9.7 J		0.46 J	1.4 J	1.1	0.26 J	0.16 J	1	1	1	5.6	11
Benzo(a)pyrene	22	12 J		0.77 J	1.4 J	1.2	0.29 J	0.19	1	1	1	1	1.1
Benzo(b)fluoranthene	26	15 J		1 J	1.4 J	1.6	0.34 J	0.24	1	1	1	5.6	11
Benzo(g,h,i)perylene	17 J	11 J		0.79 J	1 J	1	0.20 J	0.13 J	100	100	100	500	1,000
Benzo(k)fluoranthene	14 J	7.6 J		0.4 J	0.84 J	0.54 J	ND	0.067 J	0.8	1	3.9	56	110
Chrysene	19	12 J		ND	1.7 J	1.4	0.27 J	0.17 J	1	1	3.9	56	110
Dibenz(a,h)anthracene	5 J	ND		ND	ND	0.31 J	ND	0.041 J	0.33	0.33	0.33	0.56	1.1
Dibenzofuran	ND	ND		ND	ND	ND	ND	ND	2.1	4.2	18	180	290
Fluoranthene	21	19		1 J	2.8	1.9	0.51 J	0.25	100	100	100	500	1,000
Fluorene	ND	ND		ND	ND	ND	ND	ND	30	100	100	500	1,000
Indeno(1,2,3-cd)pyrene	16 J	8.8 J		0.7 J	0.86 J	0.88 J	0.20 J	0.12 J	0.5	0.5	0.5	5.6	11
Naphthalene	ND	ND		ND	ND	ND	ND	ND	12	100	100	500	1,000
Phenanthrene	ND	5.3 J		0.37 J	2.7	0.75 J	0.33 J	0.15 J	100	100	100	500	1,000
Pyrene	17 J	15 J		0.81 J	3.1	1.5	0.41 J	0.25	100	100	100	500	1,000

Notes: All units in parts per million (ppm)

ND Analyte not detected

- Not Applicable or sample not tested for this analyte

J Estimated Concentration

B Analyte detected in method blank

K Result is reported as Benzo(b)fluoranthene

E Results exceeded calibration range

T Result is Tentatively Identifies Compound and an estimated value

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

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	BE3 Phase II Report February 2023 - Sample Identification, Sample Depth in feet below ground surface (bgs), and Sample Date				NYSDEC Soil Cleanup Objectives (SCOs)				
	BH-17	BH-18			Unrestricted	Residential	Restricted Residential	Commerical	Industrial
	1-2	1-3							
	1/17/2023								
METALS/INORGANICS									
Arsenic	11.8	7.5			13	16	16	16	16
Barium	62.4	77			350	350	400	400	10,000
Beryllium	0.56	0.56			7.2	14	72	590	2,700
Cadmium	0.47	0.34			2.5	2.5	4.3	9.3	60
Chromium	10.7	12.2			30	36	180	1,500	6,800
Copper	35.7	26.2			50	270	270	270	10,000
Lead	88	77.2			63	400	400	1,000	3,900
Manganese	120 B	198 B			1,600	2,000	2,000	10,000	10,000
Mercury	0.15	0.097			0.18	0.81	0.81	2.8	5.7
Nickel	15.5	15.9			30	140	310	310	10,000
Zinc	75	92.4			109	1,300	6,600	10,000	10,000
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)									
Acenaphthene	ND	0.079 J			20	100	100	500	1,000
Acenaphthylene	ND	0.041 J			100	100	100	500	1,000
Anthracene	ND	0.19 J			100	100	100	500	1,000
Benzo(a)anthracene	0.84 J	0.55			1	1	1	5.6	11
Benzo(a)pyrene	1.3	0.55			1	1	1	1	1.1
Benzo(b)fluoranthene	1.7	0.57			1	1	1	5.6	11
Benzo(g,h,i)perylene	1.4	0.4			100	100	100	500	1,000
Benzo(k)fluoranthene	0.76 J	0.33			0.8	1	3.9	56	110
Chrysene	1.1	0.56			1	1	3.9	56	110
Dibenz(a,h)anthracene	0.29 J	0.099 J			0.33	0.33	0.33	0.56	1.1
Dibenzofuran	ND	0.056			2.1	4.2	18	180	290
Fluoranthene	1.7	1.4			100	100	100	500	1,000
Fluorene	ND	0.063 J			30	100	100	500	1,000
Indeno(1,2,3-cd)pyrene	1.1	0.36			0.5	0.5	0.5	5.6	11
Naphthalene	ND	0.043 J			12	100	100	500	1,000
Phenanthrene	0.53 J	1.0			100	100	100	500	1,000
Pyrene	1.3	1.1			100	100	100	500	1,000

Notes: All units in parts per million (ppm)

ND Analyte not detected

- Not Applicable or sample not tested for this analyte

J Estimated Concentration

B Analyte detected in method blank

K Result is reported as Benzo(b)fluoranthene

E Results exceeded calibration range

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

APPENDICES

APPENDIX A

HEALTH AND SAFETY PLAN for SITE INVESTIGATIONS AND REMEDIAL OVERSIGHT

Amherst Commons LLC
47 East Amherst Street
City of Buffalo, New York
Tax Map ID No.: 90.28-8-1
Property County: Erie
Site No.: C915397

Prepared for:

AMHERST COMMONS LLC
1055 Saw Mill River Road #204
Ardsley, NY 10502

Prepared by:



960 Busti Avenue, Suite B-150
Buffalo, New York 14213

September 2024

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ATTACHMENTS

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Attachment 4	Map to Hospital
Attachment 5	NYSDOH Generic CAMP and Fugitive Dust and Particulate Monitoring



1.0 INTRODUCTION

The following health and safety procedures apply to Brownfield Cleanup Program (BCP) project personnel, including subcontractors, performing activities described in the Release Investigation Work Plan (RIWP). Please note, however, that contractors performing investigation/remedial work are required to either develop their own Health and Safety Plans (HASPs) meeting these requirements at a minimum or adopt this plan.

1.1 PURPOSE

Directed at protecting the health and safety of the field personnel during field activities, the following HASP was prepared to provide safe procedures and practices for personnel engaged in conducting the field activities associated with this project. The plan has been developed using the Occupational Safety and Health Administration (OSHA) 1910 and 1926 regulations and New York State Department of Environmental Conservation (NYSDEC) Brownfields Department of Environmental Remediation (DER)-10 as guidance. The purpose of this HASP is to establish personnel protection standards and mandatory safety practices and procedures for this task specific effort. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise during the field efforts.

1.2 APPLICABILITY

The provisions of the plan are mandatory for all personnel engaged in field activities. All personnel who engage in these activities must be familiar with this plan and comply with its requirements. The plan is based on available information concerning the project area and planned tasks. If more data concerning the project area becomes available that constitute safety concerns, the plan will be modified accordingly. A member of each contractor on the BCP project will be designated as Field Safety Officer and will be responsible for field safety. Any modifications to the plan will be made by the Field Safety Officer after discussion with the Project Manager and Health and Safety Officer. All modifications will be documented and provided to the Project Manager and the Health and Safety Officer for approval. A copy of this plan will be available to all on-site personnel, including subcontractors, prior to their initial entry onto the site.

Before field activities begin, all personnel will be required to read the plan. All personnel must agree to comply with the minimum requirements of this plan, be responsible for health and safety, and sign the Statement of Compliance before site work begins.

1.3 FIELD ACTIVITIES

The work addressed by this HASP includes remedial investigation (RI) activities such as assessment of subsurface conditions related to soil, groundwater and vapor and oversight activities related to remediation. Field work will be conducted that can include soil borings, monitoring well installation, groundwater, vapor sampling and soil sampling, etc.

1.4 PERSONNEL REQUIREMENTS

Key personnel are as follows:

Health and Safety Officer – Jason M. Brydges, P.E.

Engineer and Project Managers – Jason M Brydges, P.E, Jacob Cox, EIT, Paul Staub, EIT

Geologist – John Boyd, PG

Technicians – Alexis Palumbo, Joe Gambino

QA/QC – John Berry, P.E.

Responsibilities of some of the key personnel are as follows:

Project Manager:

- Assuring that personnel are aware of the provisions of the HASP and are proficient in work practices necessary to ensure safety and in emergencies;
- Verifying that the provisions of this plan are implemented;
- Assuring that appropriate personnel protective equipment (PPE), if necessary, is available and properly utilized by all personnel;
- Assuring that personnel are aware of the potential hazards associated with Site operations;
- Supervising the monitoring of safety performance by all personnel and ensuring that required work practices are employed; and,
- Maintaining sign-off forms and safety briefing forms.

Health and Safety Officer:

- Monitoring work practices to determine if potential hazards are present, such as heat/cold stress, safety rules near heavy equipment, etc.;
- Determining changes to work efforts or equipment to ensure the safety of personnel;
- Evaluating on-site conditions and recommend to the Project Manager modifications to work plans needed to maintain personnel safety;
- Determining that appropriate safety equipment is readily available and monitor its proper use;
- Stopping work if unsafe conditions occur or if work is not being performed in compliance with this plan;
- Monitoring personnel performance to ensure that the required safety procedures are followed.
- Documenting incident and reporting to Project Manager within 48 hours of occurrence if established safety rules and practices are violated; and,
- Conducting safety meetings as necessary.

Field Personnel, including geologists and technicians:

- Understanding the procedures outlined in this plan;
- Taking precautions to prevent injury to themselves and co-workers;
- Performing only those tasks believed to be safe;

- Reporting accidents or unsafe conditions to the Health and Safety Officer and Project Manager;
- Notifying the Health and Safety Officer and Project Manager of special medical problems (e.g., allergies, medical restrictions, etc.);
- Thinking about safety first while conducting field work; and,
- Not eating, drinking or smoking in work areas.

All Site personnel have the authority to stop work if conditions are deemed to be unsafe. Visitors will be required to report to the overall Site Project Manager or designee and follow the requirements of this plan and the Contractor's HASP (if different).

2.0 SITE DESCRIPTION AND SAFETY CONCERNS

2.1 SITE BACKGROUND AND DESCRIPTION

The 3.33-acre site is composed of a single parcel (refer to **Figure 3**), SBL #90.21-8-1 located at 47 East Amherst Street in the City of Buffalo, Erie County, New York. The site is located approximately 0.75 miles east-northeast of the Buffalo Zoo, less than one mile north-northwest of Erie County Medical Center (ECMC) and 1.25 miles southwest of the University at Buffalo South Campus.

The site currently contains one vacant building surrounded by an asphalt parking lot. The building is two stories in addition to a partial basement with limited current access to the second floor due to structural issues. The interior and exterior of the building have significant deterioration.

The topography of the Site is generally flat and gently sloping north towards city streets and Lake Erie. In general, groundwater most likely flows north towards Lake Erie.

Historical records including street directories and Sanborn Maps suggest that the site was occupied as follows:

- From at least 1916-1935: Buffalo Cement Co.
- 1950-1986: Bowling alley (no owner specified)
- 1994: Amherst Bowling Center and Family Pro Shop (joint occupancy)
- 1999-2004: Amherst Bowling Center

2.2 HAZARD EVALUATION

Specific health and safety concerns to the project tasks include working around low levels of heavy metals, semi-volatile organic compounds (SVOCs), and volatile organic compounds (VOCs) in soil and groundwater. Physical hazards include those associated with working near open excavations and adjacent to field equipment and heavy equipment such as back hoes and drill rigs. Contractors will have separate detailed health and safety procedures/requirements for excavations and the transportation and disposal of impacted material that will meet or exceed requirements in this plan. A table of potential hazards and OSHA Standards for consideration during investigation and remedial activities is provided in **Attachment 1**.

2.2.1 Chemical Hazards

Chemical hazards detected at the site include metals and organic compounds that were detected in soil samples at concentrations that exceed NYSDEC Part 375 soil cleanup objectives. These compounds could be encountered during the RI and remedial activities and potential routes of exposure include:

- Skin contact;
- Inhalation of vapors or particles;
- Ingestion; and,
- Entry of contaminants through cuts, abrasions or punctures.

The anticipated levels of personnel protection will include Level D PPE that includes the following:

1. Long sleeve shirt and long pants
2. Work boots with steel toe
3. Hard hats when heavy equipment or overhead hazards are present
4. Safety glasses
5. Work gloves and chemical resistant gloves when sampling potentially contaminated materials
6. High visibility vests or outer gear when Site traffic is significant

Modifications may include booties, overalls, hearing protection, or respiratory protection if air monitoring levels indicate sustained photoionization detector (PID) readings greater than 5 ppm above established background levels. If these levels are reached, work will be halted pending discussions with field and office management. If any readings are recorded above background, work will proceed with caution and breathing zone monitoring will be conducted.

2.2.2 Other Physical Hazards

Depending on the time of year, weather conditions or work activity, some of the following physical hazards could result from project activities:

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

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

Noise. All personnel shall wear hearing protection devices, such as earmuffs or ear plugs, if work conditions warrant. These conditions would include difficulty hearing while speaking to one another at a normal tone within three feet. If normal speech is interfered with due to work noise, the Health and Safety Officer or designee will mandate the use of hearing protection or other noise-producing equipment or events.

Heat/Cold Stress. Heat stress work modification may be necessary during ambient temperatures of greater than 29 degrees Celsius (°C) (85 degrees Fahrenheit [°F]) while wearing normal clothing or exceeding 21°C (70°F) while wearing PPE. Because heat stress is one of the most common and potentially serious illnesses at work sites, regular monitoring and preventive measures will be utilized such as additional rest periods, supplemental fluids, restricted consumption of drinks containing caffeine, use of cooling vests, or modification of work practices. Most of the work to be conducted during the oversight and monitoring operations is expected to consist of light manual labor and visual observation. Given the nature of the work and probable temperatures, heat stress hazards are not anticipated. See **Attachment 2** for heat stress management procedures.

If work is to be conducted during winter conditions, cold stress may be a concern to the health and safety of personnel. Wet clothes combined with cold temperatures can lead to hypothermia. If the air temperature is less than 4°C (40°F) and a worker perspires, the worker should change to dry clothes. The following summary of the signs and symptoms of cold stress is provided as a guide for field personnel.

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

Fire and Explosion. These hazards will be minimal for activities associated with this project. All heavy equipment will be equipped with a fire extinguisher.

Trenching and Excavations. There are a variety of potential health and safety hazards associated with excavations. These include:

- Surface encumbrances, such as structures, fencing, stored materials, etc.;
- Below- and above-ground utilities, such as water and sewer lines, gas lines, telephone lines, and optical cable lines, etc.;
- Overhead power lines and other utilities;
- Vehicle and heavy equipment traffic around the excavations;
- Falling loads from lifting or digging equipment;
- Water accumulation within excavations;
- Hazardous atmospheres, such as oxygen deficiency, flammable gases, and toxic gases;
- Falling into or driving equipment into unprotected or unmarked excavations; and,
- Cave-in of loose rocks and soil at the excavation face.

OSHA requirements for trenching and excavations are contained in 29 Code of Federal Regulations (CFR), Subpart P, 1926.650 through 1926.652. See **Attachment 3** for details on excavation and trenching safety requirements, which include the following basic minimum excavation requirements:

- Personnel entry into excavations should be minimized whenever possible and no entry will occur in pits greater than 4 feet below ground surface (bgs). Sloping, shoring or equivalent means should be utilized.
- Surface encumbrances such as structures, fencing, piping, stored material etc. that may interfere with safe excavations should be avoided, removed or adequately supported prior to the start of excavations. Support systems should be inspected daily.
- Underground utility locations should be checked and determined, and permits should be obtained prior to initiating excavations. Local utility companies will be contacted at least two days in advance, advised of proposed work, and requested to locate underground installations. When excavations approach the estimated location of utilities, the exact location should be determined by careful probing or hand digging and when it is uncovered, proper supports should be provided.
- A minimum safe distance of 15 feet should be maintained when working around overhead high-voltage lines or the line should be de-energized following appropriate lock-out and tag- out procedures by qualified utility personnel.
- Excavations five feet or more, if entered, will require an adequate means of exit, such as a ladder, ramp, or steps and located to require no more than 25 feet of lateral travel. Under no circumstances should personnel exit/enter an excavation using heavy equipment.
- Personnel working around heavy equipment, or who may be exposed to public vehicular traffic should wear high visibility clothes, especially at night.
- Heavy equipment or other vehicles operating next to or approaching the edge of an excavation will require that the operator have a clear view of the edge of the excavation, or that warning systems such as barricades, hand or mechanical signals, or stop logs be used. If possible, the surface grade should slope away from the excavation.
- Personnel should be safely located in and around the trench/excavation face and should not work underneath loads handled by lifting or digging equipment.
- Hazardous atmospheres, such as oxygen deficiency (atmospheres containing less than 19.5% oxygen), flammable gases (airborne concentrations greater than 20% of the lower explosive limit), and toxic gases (airborne concentrations above the OSHA Permissible Exposure Limit or other exposure limits) may occur in excavations. Monitoring should be conducted for hazardous atmospheres prior to entry and at regular intervals. Ventilation

or respiratory protection may be provided to prevent personnel exposures to oxygen deficient or toxic atmospheres. Periodic retesting (at least each shift) of the excavation will be conducted to verify that the atmosphere is acceptable. A log or field book records should be maintained.

- Personnel should not work in excavations that have accumulated water or where water is accumulating unless adequate precautions have been taken. These precautions can include shield systems, water removal systems, or safety harnesses and lifelines. Groundwater entering the excavation should be properly directed away and down gradient from the excavation.
- Safety harnesses and lifelines should be worn by personnel entering excavations that qualify as confined spaces.
- Excavations near structures should include support systems such as shoring, bracing, or underpinning to maintain the stability of adjoining buildings, walls, sidewalks, or other structures endangered by the excavation operations.
- Loose rock, soil, and spoils should be piled at least two and preferably 5 feet or more from the edge of the excavation. Barriers or other effective retaining devices may be used to prevent spoils or other materials from falling into the excavation.
- Walkways or bridges with standard guardrails that meet OSHA specifications will be provided where employees, the public, or equipment are required to cross over excavations.
- Adequate barrier physical protection should be provided, and excavations should be barricaded or covered when not in use or left unattended. Excavations should be backfilled as soon as possible when completed.
- Safety personnel should conduct inspections prior to the start of work and as needed throughout the work shift and after occurrence that increases the hazard of collapse (i.e., heavy rain, vibration from heavy equipment, freezing and thawing, etc.).
- Personnel working in excavations should be protected from cave-ins by sloping or benching of excavation walls, a shoring system or some other equivalent means in accordance with OSHA regulations. Soil type is important in the determination of the angle of repose for sloping and benching, and the design of shoring systems.

2.2.3 Biological Hazards

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

Bees, Ants, Wasps and Hornets. Sensitization by the victim to the venom from repeated stings can result in anaphylactic reactions. If a stinger remains in the skin, it should be removed by teasing or scraping, rather than pulling. An ice cube placed over the sting will reduce pain. An analgesic corticosteroid lotion is often useful. People with known hypersensitivity to such stings should consult with their doctor about carrying a kit containing an antihistamine and aqueous epinephrine in a pre-filled syringe when in endemic areas. Nests and hives for bees, wasps,

hornets and yellow jackets often occur in the ground, trees and brush. Before any nests or hives are disturbed, an alternate sampling location should be selected. If the sample location cannot be relocated, site personnel who may have allergic reactions shall not work in these areas.

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

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

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

2.2.4 Activity Hazard Analysis

Table 1 presents a completed activity hazard analysis for the performance of an RI.

Table 1. Activity Hazard Analysis

PRINCIPAL STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
RI soil/groundwater investigation/soil vapor, sub-slab vapor, indoor air, and ambient air investigation	Potential exposure to low levels of metals, VOCs, PAHs, petroleum products and solvents	1. Use of administrative controls (site control and general safety rules), work cloths, dust suppression 2. Use of real-time monitoring and action levels 3. Use Physical Hazards SOPs 4. Wear gloves when handling soil and groundwater 5. Actions levels for dust and vapors
EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS

Excavation and other heavy equipment, Backhoe or Geoprobe	<ol style="list-style-type: none"> 1. Daily inspection of equipment 2. Continuous safety oversight 	<ol style="list-style-type: none"> 1. Safety plan review 2. Routine safety briefings 3. PID and Dust Monitor
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3.0 MONITORING

The purpose of air monitoring for potential airborne contaminants is to verify that protection levels are suitable. Monitoring will be performed for dust/particulates and volatile organic compounds during excavation activities. Daily background and calibration readings will be recorded prior to the start of field activities. All monitoring equipment used during this investigation will be maintained and calibrated and records of calibration and maintenance will be kept in accordance with 29 CFR 1910.120(b)(4)(11)E.

3.1 PARTICULATE MONITORING

Real-time air monitoring readings are obtained from upwind and downwind locations in accordance with DER-10 for community air-monitoring. Daily field reports will be completed that document activities performed, equipment and manpower onsite, screening and monitoring results, general Site conditions, and weather conditions.

3.2 AIR MONITORING FOR WORKER PROTECTION

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

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

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

3.3 TOTAL VOLATILE ORGANICS MONITORING

Monitoring of VOCs will be conducted using a PID. If a sustained reading of 5 ppm above background occurs, then work will be halted, and personnel will evacuate the work area. Levels will be allowed to stabilize, and another reading will be taken in the breathing zone. If background levels continue to be exceeded, then work will not continue at that location and the project manager will be notified of the situation. Action levels will remain the same.

4.0 SAFE WORKING PRACTICES

The following general safe work practices always apply to a construction site:

- Eating, drinking, chewing gum or tobacco and smoking are prohibited within the work area.
- Contact with potentially contaminated substances should be avoided.
- Puddles, pools, mud, etc. should be avoided if possible.
- Kneeling, leaning, or sitting on equipment or on the ground should be avoided if possible.
- Upon leaving the work area, hands, face and other exposed skin surfaces should be thoroughly washed.
- Unusual site conditions shall be promptly conveyed to the project manager, health and safety officer, or site superintendent for resolution.
- A first-aid kit shall be available at the site.
- Field personnel should use all their senses to alert themselves to potentially dangerous situations (i.e., presence of strong, irritating, or nauseating odors).
- If severe dusty conditions are present, then the soil will be dampened to mitigate dust.
- All equipment will be cleaned before leaving the work area.
- Field personnel must attend safety briefings and should be familiar with the physical characteristics of the investigation, including:
 - Accessibility to personnel, equipment, and vehicles.
 - Areas of known or suspected contamination.
 - Site access.
 - Routes and procedures to be used during emergencies.
- Personnel will perform all investigation activities with a “buddy” who is able to:
 - Provide his or her partner with assistance.
 - Notify management or emergency personnel if needed.
- Excavation activities shall be terminated immediately in the event of thunder or electrical storm.
- The use of alcohol or drugs at the site is strictly prohibited.

5.0 PERSONAL SAFETY EQUIPMENT AND SITE CONTROL

5.1 PERSONAL SAFETY EQUIPMENT

As required by OSHA in 29 CFR 1920.132, this plan constitutes a workplace hazard assessment to select PPE to perform the site investigation. The PPE to be donned by on-site personnel during this investigation are those associated with the industry standard of Level D. Protective clothing and equipment to initiate the project will include:

- Work clothes, pants and long sleeves
- Work boots with steel toe
- Work gloves as necessary
- Hard hat if work is conducted near equipment
- Safety glasses
- Hearing protection as necessary

Modifications may include chemically resistant gloves, booties, and overalls. If air monitoring

indicates levels are encountered that require respiratory protection (sustained readings at or above action levels above a daily established background), then work will be halted, and an adequate resolution of PPE will be made by the health and safety manager, field manager, and project manager.

5.2 SITE CONTROL

Site control will be established near each work zone by the Contractor. The purpose is to control access to the immediate work areas from individuals not associated with the project. All work zones will be fenced off with controlled access and appropriately designated as an exclusion area.

Each excavation or drilling area where heavy equipment is being utilized will be set up as a work zone and include an exclusion area and support zone. The exact configuration of each zone is dependent upon location, weather conditions, wind direction and topography. The Contractor's safety manager will establish the control areas daily at each excavation.

An area of 10 feet (as practical) around each excavation will be designated as the exclusion area. This is the area where potential physical hazards are most likely to be encountered by field personnel. The size of the exclusion area may be altered to accommodate site conditions and the drilling/excavation location. If levels of protection higher than Level D are used, this plan will be modified to include decontamination procedure. The Site excavation contractor will be required to have eye/face wash equipment/means available on-site.

A support area will be defined for each field activity where support equipment will be located. Normal work clothes are appropriate within this area. The location of this area depends on factors such as accessibility, wind direction (upwind of the operation.), and resources (i.e., roads, shelter, utilities). The location of this zone will be established daily. Excavation areas will be filled or secured (fencing) to prevent access from the public.

6.0 EMERGENCY INFORMATION

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

6.1 MEDICAL TREATMENT AND FIRST AID

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

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

6.2 EMERGENCY CONTACTS

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

- Ambulance, Fire, Police 911
- Poison Control Center 800-222-1222
- NYSDEC Spills Hotline 800-457-7362
- Jason M. Brydges, BE3 716-830-8636
- Veronica Kreutzer, NYSDEC PM 716 851-7220
- Christine Vooris, NYSDOH PM 518-402-7860
- ECMC Health Campus 462 Grider Street, Buffalo - **(716) 898-3000 See Attachment 4.**

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

6.3 EMERGENCY STANDARD OPERATING PROCEDURES

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

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

6.4 EMERGENCY RESPONSE FOLLOW-UP ACTIONS

Following activation of an emergency response, the health and safety officer shall notify the project manager, and the Contractor's field manager shall submit a written report documenting the incident to the project manager.

6.5 MEDICAL TREATMENT

The Contractor's field manager shall be informed of any site-related injury, exposure or medical condition resulting from work activities. All personnel are entitled to medical evaluation and treatment in the event of a site accident or incident.

6.6 SITE MEDICAL SUPPLIES AND SERVICES

The Contractor's field manager or a trained first aid crew member shall evaluate all injuries at the site and render emergency first-aid treatment, as appropriate. If an injury is minor but requires professional medical evaluation, the field manager shall escort the employee to the appropriate emergency room. For major injuries occurring at the site, emergency services shall be requested. A first-aid kit shall be readily accessible, fully supplied, and maintained at specified locations used for on-site operations.

6.7 PRECAUTIONS

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

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

7.0 RECORDKEEPING

The Contractor's field manager and health and safety officer are responsible for site record keeping. Prior to the start of work, they will review this Plan along with the Contractor's HASP. A Site safety briefing will be completed prior to the initiation of field activities. This shall be recorded in the field logbook. An accident report should be completed by the Field Manager if an accident occurs and forwarded to the project manager.

8.0 PERSONNEL TRAINING REQUIREMENTS

8.1 INITIAL SITE BRIEFING

Prior to site entry, the Contractor's health and safety manager shall provide all personnel (including site visitors) with site-specific health and safety training. A record of this training shall be maintained. This training shall consist of the following:

- Discussion of the elements contained within this plan
- Discussion of responsibilities and duties of key site personnel
- Discussion of physical, biological and chemical hazards present at the site
- Discussion of work assignments and responsibilities
- Discussion of the correct use and limitations of the required PPE
- Discussion of the emergency procedures to be followed at the site
- Safe work practices to minimize risk
- Communication procedures and equipment

- Emergency notification procedures

8.2 DAILY SAFETY BRIEFINGS

The Contractor's health and safety manager will determine if a daily safety briefing is required. The briefing shall discuss the specific tasks scheduled for that day and the following topics:

- Specific work plans
- Physical, chemical or biological hazards anticipated
- Fire or explosion hazards
- PPE required
- Emergency procedures, including emergency escape routes, emergency medical treatment, and medical evacuation from the site
- Weather forecast for the day
- Buddy system
- Communication requirements
- Site control requirements
- Material handling requirements

9.0 COMMUNITY AIR MONITORING PROGRAM (CAMP)

A Community Air Monitoring Program (CAMP) requires real-time monitoring for VOCs and particulates (i.e., dust) at the upwind and downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The program 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 and on-site workers not directly involved with work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. A New York State Department of Health (NYSDOH) generic CAMP obtained from NYSDEC DER-10 is presented in **Attachment 5** that will be followed and adhered to for work activities that could generate dust from an impacted area.

A program for suppressing fugitive dust and particulate matter monitoring will also be conducted in accordance *NYSDEC DER-10* titled *Appendix 1B Fugitive Dust and Particulate Monitoring*, which is also provided in **Attachment 5**. The fugitive dust suppression and particulate monitoring program will be employed at the site during building demolition, IRM site remediation and other intrusive activities which warrant its use.

Both the CAMP and the fugitive dust and particulate monitoring program will be administered by the environmental engineer/consultant. Monitoring results of the CAMP will be reported to the New York State Department of Health daily for review.

ATTACHMENT 1

TABLE OF POTENTIAL HAZARDS AND OSHA STANDARDS

Potential Hazards and OSHA Standards for Consideration during IRMs

Site Exposure/Control	Potentially Applicable OSHA Standard*	
	1910 General Industry	1926 Construction
Hazard Assessment & Employee Training	29 CFR 1910.132(d)	29 CFR 1926.21(b)
Chemical Exposure	29 CFR 1910.1000	29 CFR 1926.55
Noise Exposure	29 CFR 1910.95	29 CFR 1926.52
Sanitation	29 CFR 1910.141	29 CFR 1926.51
Wiring Methods (temporary wiring)	29 CFR 1910.305(a)(2) 29 CFR 1910.333	29 CFR 1926.405(a)(2)
Electrical Hazards		29 CFR 1926.416
Emergency Action Planning	29 CFR 1910.38	29 CFR 1926.35
Excavation	covered by 1926	29 CFR 1926 Subpart P
Confined Space Entry	29 CFR 1910.146	29 CFR 1926.21(b)(6) 29 CFR 1926.353(b)
Material Handling	29 CFR Subpart N	29 CFR Subpart N 29 CFR 1926.600-602 29 CFR 1926.604
Building Demolition	covered by 1926	29 CFR 1926 Subpart T
Site Contaminant Abatement	29 CFR 1910.1000-1029 29 CFR 1910.1043-1052	29 CFR 1926.55 29 CFR 1926.622 29 CFR 1926.1101-1152
Elevated Work Surfaces	29 CFR 1910 Subpart D 29 CFR 1910 Subpart F	29 CFR 1926 Subpart L 29 CFR 1926 Subpart M 29 CFR 1926.552
Chemical Storage	29 CFR 1910 Subpart H 29 CFR 1910.1200	29 CFR 1926.59 29 CFR 1926 Subpart F
Personal Protective Equipment	29 CFR 1910 Subpart I	29 CFR 1926 Subpart E
Heavy Equipment Operation	29 CFR 1910.95 29 CFR 1910 Subpart N	29 CFR 1926.52 29 CFR 1926 Subpart O
Tasks-Long Duration	29 CFR 1910.141-142	29 CFR 1926.51

The Federal General Industry and Construction citations are provided above

ATTACHMENT 2

HEAT STRESS MANAGEMENT PROGRAM AND PROCEDURES

INTRODUCTION

Panamerican employees engage in a variety of activities with potential exposure to excessive ambient temperatures and humidity, with the overall result being Aheat stress@. This procedure establishes the Panamerican Heat Stress Management Program. It establishes responsibilities and basic requirements for personnel who may be required to work in situations where the ambient temperature exceeds 21° C (70° F) while wearing protective equipment (e.g., hazardous waste site investigations) or when the ambient temperature exceeds 29° (85° F) while wearing normal clothing. Because heart stress is one of the most common and potentially serious illnesses at job sites and particularly hazardous waste sites, regular monitoring and other preventive measures are warranted.

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

PROGRAM ADMINISTRATION AND RESPONSIBILITIES

The Heat Stress Management Program is administered by Panamerican Managers and Health and Safety personnel.

These Individuals:

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

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

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

Staff Members are responsible for:

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

HEAT STRESS HAZARDS AND RISK FACTORS

Heat Stress is defined as the total net load on the body with contributions from both exposure to external sources, such as sunshine and hot surfaces, and from internal metabolic heat production. A person=s

exposure to the increased ambient temperatures and humidity produces physiological responses referred to as heat stress which are characterized by an increase in the: a) Acore@ or Adeep body temperature@. b) heart rate, c) blood flow to the skin, and d) water and salt loss due to sweating. Conditions of excessive heat stress may occur either when the physical work is too heavy or the environment is too hot in relation to the work being performed. If work is performed under hot environmental conditions, the work load effort must be reviewed and the heat exposure limit maintained at or below the levels to protect the worker from the risk of acute heat illness.

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

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

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

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

replacement of body water and electrolytes lost through sweating. If this water is not replaced by drinking, continued sweating will draw on water reserves from both tissues and body cells leading to dehydration.

- Use of Alcohol and Medication - Notwithstanding the potential hazards from impaired coordination and judgment, the ingestion of alcohol before or during work in the heat should not be permitted because it reduces heat tolerance and increases the risk of heat illness. Many drugs, including diuretics and antihypertensives, can interfere with the body's thermoregulation.
- Physical Fitness - Physical conditioning enhances heat tolerance by increasing the functional capacity of the cardiovascular system, and reduces the time required to develop heat acclimatization by about 50% over those not physically fit.

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

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

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

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

Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:

- Muscle Spasms
- Pain in the hands, feet and abdomen.

Heat Exhaustion occurs from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale, cool and moist skin
- Heavy sweating
- Dizziness, fainting and nausea

Heat stroke is the most serious form of heat stress. Temperature regulation fails, and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Competent medical help must be obtained. Signs and symptoms are:

- Red, hot and unusually dry skin
- Lack of or reduced perspiration
- Dizziness and confusion

- Strong, rapid pulse and coma.

HEAT AND STRESS PREVENTION

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

Work Schedules and Activity

If possible, work should be scheduled during the coolest part of the day. Early morning and evening work can be considerably more effective than working midday when the additional time for breaks and heat stress monitoring are taken into account.

Employees should also be encouraged to maintain a certain level of activity during the work shift. Prolonged standing in hot environments can lead to heat illness because the blood pools in the lower extremities. Workers should periodically walk about to encourage blood circulation from the feet and legs.

Acclimatization of Workers

A properly designed and applied heat acclimatization program will dramatically increase the ability of workers to work at a hot job and will decrease the risk of heat-related illnesses and unsafe acts. Heat acclimatization can usually be induced in 5 to 7 days of exposure to the hot job. For workers who have had previous experience with the job, the acclimatization regimen should be exposure for 50% on day 1, 60% on day 2, 80% on day 3 and 100% on day 4. For workers new to job the schedule should be 20% on day 1 with a 20% increase in each additional day.

Acclimatization can be induced by sustained elevations of the skin and core body temperatures above levels for the same work in cool environments for an hour or more per day. Acclimatization needs periodic reinforcement such as occurs daily during the work week. Persons may show some loss of acclimatization on the first day of the new shift after being idle for two days or over a weekend. After vacations of two weeks or longer the loss of acclimatization is substantial, several days at work will be needed before heat tolerance is fully restored.

Drinking Sufficient Quantities of Fluids

Under hot conditions where sweat production may reach 6 to 8 liters per day, voluntary replacement of the water lost is usually incomplete. The normal thirst mechanism is not sensitive enough to urge us to drink enough water to prevent dehydration. Individuals are seldom aware of the exact amount of sweat they produce or how much water is needed to replace that lost in sweat; 1 liter/hour is not an uncommon rate of water loss. Every effort should be made to encourage individuals to drink water, low-sodium noncarbonated beverages or electrolyte replacement fluids (e.g., Gatorade). Lightly salted water (1 gram/liter of water (0.1%) or one level teaspoon per 15 quarts of water), should be provided to unacclimated workers. The salt should be dissolved completely and the water kept cool. Salt tablets as dietary supplements are not generally recommended.

Workers should drink at least 500 ml (one pint) of water before beginning work. The fluid should be maintained at temperatures of 10° to 15° (50 to 59° F). If possible, small quantities of fluids should be consumed at frequent intervals (e.g., 150 to 250 milliliters (ml), or at least a quarter pint, every 20 minutes) rather than the intake of 750 ml (3 cups) or more once per hour. Individuals vary, but water intake should total 4 to 8 liters (quarts) per day. When heat stress is considered a potential problem, a minimum of 1 liter/hour/person of water are to be maintained onsite. Individual paper or plastic cups will be provided in order to prevent the spread of communicable disease.

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

Cool, sheltered Work and Rest Areas

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

Cooling Devices

Auxiliary cooling devices can be successfully used to provide body cooling, especially to workers wearing protective garments at hazardous waste sites. Vortex coolers utilize high velocity air which is directed inside the protective clothing. Vortex coolers have been used successfully in some operations. Cooling vests utilizing Ablue ice@ type packs can provide some cooling to the torso, but add weight for the wearer and can inhibit body movements.

Newer, more sophisticated tube and refrigerant systems woven into undergarments are also available. However, some of these systems „may not be effective in situations where the work involves considerable motion, since bending and lifting can crimp the tubes, impeding the flow of refrigerant.

Heat Stress Monitoring

Several heat stress monitoring systems have been devised to help manage heat stress in hot work environments. Panamerican performs heat stress monitoring when: 1) employees are wearing normal work clothing in ambient temperatures exceeding 29° C, (85° F) and 2) employees wearing chemical protective clothing (including paper coveralls) working in ambient temperatures exceeding 21° C (70° F). The temperature differential is related to the reduced ability of a person to maintain a core temperature of $\pm 37^{\circ}$ C (98.6° F) when wearing chemical protective clothing.

It should be noted by personnel that there are no Afast and true@ methods of heat stress monitoring; likewise there are no regulations concerning heat stress monitoring. Individual susceptibility to heat stress is highly variable. Some individuals are highly susceptible to any increase in their internal body temperature while other individuals can work very well with internal body temperatures of 39°C (102.2° F) or higher.

The heat stress monitoring systems should be used by Site Safety Officers as guidelines and not necessarily as hard, fast rules. Individuals working in elevated temperatures should be queried on a regular basis regarding their perceived state of heat stress. If the calculated heat stress index value indicates that work can continue but a person states that they believe they are experiencing heat stress, the work effect should be discontinued and a rest break taken.

Likewise, if the calculated heat stress index value indicates that a rest break should be taken but the workers believe they can work longer, they should be permitted to work longer providing that their heart rates do not exceed 110 beats per minute. If the individual's heart rate rates exceed 110 beats per minute a rest break will be taken. In all cases, individual workers should not be permitted or expected to perform excessive work which could result in heat stress. If a SSO has any concerns that an individual may be pushing himself/herself past the Abreaking point@ the calculated work/rest regimen will be followed.

For strenuous field activities that are part of ongoing site work activities in hot weather, the following procedures shall be used to monitor the body's physiological response to heat, and to monitor the work cycle of each site worker. There are two phases to this monitoring: the initial work/rest cycle is used to estimate how long the first work shifts of the day should be. Heart rate monitoring of each worker will establish the length of the successive work periods. Both phases are to be used are to be used for heat stress monitoring. Failure to use either one could place workers at risk of heat-related disorders.

Phase 1 - Determination of the Initial Work - Rest Regimen

The determination of the initial work - rest regimen can be performed using either of two methods:

- The Modified Dry Bulb Index; or
- The Wet Bulb Globe Thermometer (WBGT) Index

After the initial work - rest regimen has been determined, environmental conditions must be monitored for changes which would require a modification to the work - rest regimen. This, coupled with the heart rate monitoring, determines the work cycles to be followed on a site.

The Modified Dry Bulb Index accounts for the effects caused by solar, load, air temperature, and chemical protective clothing, under a light work load (walking at approximately 3 mph). A mercury thermometer, shielded from direct sunlight, is used to measure ambient temperature. The percentages of (of time) of sunlight and cloud cover are then estimated to determine a sunshine quality factor (e.g., 100% sunshine - no cloud cover = 1.0; 50% sunshine - 50% cloud cover = 0.5; 0% sunshine - 100% cloud cover = 0.0). When these two sets of values have been obtained, they are inserted into the following equation to calculate the adjusted temperature:

$$T (^{\circ}\text{C}, \text{adjusted}) = T (^{\circ}\text{C}, \text{actual}) + (7.2 \times \text{sunshine quality factor})$$

-OR-

$$T (^{\circ}\text{F}, \text{adjusted}) = T (^{\circ}\text{F}, \text{actual}) + (13 \times \text{sunshine quality factor})$$

After the adjusted temperature has been calculated, the length of the first work shift can be determined using the following table:

Initial Break and Physiological Monitoring Cycles

ADJUSTED TEMPERATURE	NORMAL WORK CLOTHES	PROTECTIVE CLOTHING
90°F (32.2° C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°-90° F (30.8°-32.2° C)	After each 60 minutes of work	After each 30 minutes of work
82.5°-87.5° F (28.1°-30.8° C)	After each 90 minutes of work	After each 60 minutes of work
77.5°-82.5° F (25.3°-28.1° C)	After each 120 minutes of work	After each 90 minutes of work
72.5°-77.5° F (22.5°-25.3° C)	After each 150 minutes of work	After each 120 minutes of work

NOTE: The standard rest period is 15 minutes

WET BULB GLOBE THERMOMETER INDEX

The Wet Bulb Globe Thermometer (WBGT) Index was developed by the U.S. Army in the 1950s to prevent heat stress in army recruits. The WBGT Index accounts for the effects caused by humidity, air movement, evaporation, air temperature and work rate. It does not, however, account for the effects of chemical protective clothing, non-acclimatized workers, age, or other factors which may affect the likelihood of heat stress. Because of this, it is necessary to make adjustments to the index and conduct Heart Rate Monitoring.

WBGT measurements are usually obtained through the use of are-contained electronic devices. Such devices are easy to set up and can provide the user with the capabilities to store data and download to print out a hard copy.

Heat produced by the body and the environmental heat together determine the total heat load. Therefore, after the WBGT Index has been obtained, the anticipated work load category of each job shall be determined and the initial-rest regimen established using the table below.

The work load category may be determined by ranking each job into light, medium and heavy categories on the basis of type of operation. Examples of each category are:

Light work: sitting or standing to control machines, performing light hand work
Moderate work: walking about with moderate lifting and pushing; and
Heavy work: pick and shovel work.

PERMISSIBLE HEAT EXPOSURE			
WORK-REST REGIMEN	WORK LOAD		
	LIGHT	MODERATE	HEAVY
	30.0° C/86° F	26.7° C/80.1° F	25° C/77° F
75% Work-25% Rest Each Hour	30.6° C/87.1° F	28° C/82.4° F	25.9° C/78.6° F
50% Work-50% Rest Each Hour	31.4° C/88.5° F	29.4° C/85.0° F	27.9° C/82.2° F
25% Work-75 % Rest Each Hour	32.2° C/90.0° F	31.1° C/88.0° F	30.0° C/86.0° F

The table reads as follows:

Light, continuous work is possible at any WBGT reading up to 30° C (86° F) but above that limit work breaks

are needed to recover from the heat; light work at temperatures of between 30.0 and 30.6°C (86 to 87°F) can be conducted, but 15 minute breaks must be taken every hour, etc. It is important to note that this table is applicable primarily to healthy, acclimatized personnel; wearing standard work clothing.

NOTE: An additional 6 to 11°C (42.8 to 51.8°F) must be added to the calculated WBGT temperature for personnel wearing chemical protective clothing prior to determining the initial work - rest regimen from this table. Because the WBGT Index does not take into account unacclimatized workers, or individual susceptibilities, the addition to the WBGT value does not eliminate the requirement for Heart Rate Monitoring after work has begun.

Phase 2 - Heart Rate Monitoring

An increase in the heart rate is a significant indication of stress, whether induced by exposure to heat or through physical labor. Although baseline heart rates can vary significantly between individuals and during the day for an individual, a heart rate of 110 beats per minute or greater is an indication of physiological stress. To prevent heat stress illnesses, the heart rate (HR) should be measured by radial (wrist) or carotid (neck) pulse for 30 seconds as early as possible in the rest period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 33 percent while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats/minute at the beginning of the next rest period, the following work period should be further shortened by 33 percent while the length of the rest period stays the same.

ATTACHMENT 3

**TRENCHING AND EXCAVATION HEALTH AND SAFETY
REQUIREMENTS**

REGULATORY AUTHORITY

Excavations will be performed in accordance with OSHA 29 CFR, subpart P, 1926.650-1926.652 and USACOE EM 385-1-1 section 25 requirements as they apply to project activities.

GENERAL

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

SURFACE ENCUMBRANCES

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

UNDERGROUND UTILITIES

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

OVERHEAD OBSTACLES

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

ENTRY/EXIT ROUTES

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

personnel be raised.

VEHICLE CONTROL/SAFETY

Personnel working around heavy equipment, or who may be exposed to public vehicular traffic will wear a traffic warning vest consisting of at least 400 square inches of red or orange material. At night, at least 400 square inches of florescent or other reflective material will be worn.

For excavation work on or adjacent to highways or streets, signs, signals, and barricades tat conform to the requirements of the current American National Standards Institute (ANSI) D6.1, Manual on Uniform Traffic Control Devices for Streets and Highways will be used to protect work areas. Signs, signals, and barricades will be adequately lighted at night. Flagmen will be provided when signs, signals and barricades do not provide adequate protection. Flagmen will use signals and procedures contained in the current issue of ANSI D6.1. At night, flagmen will be clearly illuminated so as to be easily seen by approaching traffic.

For mobile equipment operating next to or approaching the edge of an excavation, the operator will have a clear view of the edge of the excavation, or a warning system such as barricades, hand or mechanical signals, or stop logs will be used. If possible the surface grade will slope away from the excavation.

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

HAZARDOUS ATMOSPHERES

Hazardous atmospheres, such as oxygen deficiency (atmospheres containing less than 19.5% oxygen), flammable gases or vapors (airborne concentrations greater than 20% of the lower explosive limit), and toxic gases or vapors (airborne concentrations above the OSHA Permissible Exposure Limit or other exposure limits) may occur in excavations, especially around landfills and hazardous waste sites.

In locations where oxygen deficiency or hazardous gaseous conditions are possible, the air in the excavation will be tested before personnel are permitted to enter an excavation deeper than 4 feet. When flammable gases are present, adequate ventilation will be provided and sources of ignition will be eliminated. Ventilation or respiratory protection will be provided to prevent personnel exposures to oxygen deficient or toxic atmospheres. Periodic retesting (at least each shift) of the excavation will be conducted to verify that the atmosphere is acceptable. A log or field book records will be maintained of all test results.

WATER ACCUMULATION HAZARDS

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

subject to heavy rains.

STABILITY OF ADJACENT STRUCTURES

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

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

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

PROTECTION FROM LOOSE ROCK, MATERIALS OR SPOILS

In excavations and trenches that personnel may be required to enter, loose rock, excavated or other material, and spoils will be effectively stored and retained at least two feet or more from the edge of the excavation.

As an alternative to the clearance prescribed above, barriers or other effective retaining devices may be used in order to prevent spoils or other materials from falling into the excavation.

Walkways, runways, and sidewalks will be kept clear of excavated material from other obstructions.

Scaling operations may be used to remove loose material and will be performed only by experienced crews under the direct supervision of a competent supervisor. The scalers will be provided with scaler=s lifelines, safety belts, boatswain chair, and other safety equipment necessary for their protection.

FALL PROTECTION

Walkways or bridges with standard guardrails that meet OSHA specifications will be provided where employees, the public, or equipment are required to cross over excavations.

Adequate barrier physical protection will be provided at all remotely located excavations. All excavations will be barricaded or covered.

EMERGENCY RESCUE

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

stopped to reduce vibration. Pumps should be started if water ensues.

INSPECTION PROGRAM

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

The excavation inspection will include a check for the following:

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

PROTECTIVE SYSTEMS

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

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

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

Soil Classification

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

1. Stable Rock - Solid mineral matter that can be excavated with vertical sides.

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

3. Type B - cohesive soils with an unconfined compressive strength of greater than 0.5 tsf but less than 1.5 tsf. Examples include: angular gravel similar to crushed rock; silt; silty loam; and sandy loam; Type B soils also include : previously disturbed soils that are not type C; Type A soils that are fissured or subject to vibration; and dry rock that is not stable.

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

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

Sloping and Benching

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

- The walls of excavation will be sloped at an angle not steeper than one-and one-half horizontal to one vertical. Sloping configurations will follow the slopes shown for Type C soils in Appendix B of the OSHA Excavation Standard.
- Maximum allowable slopes and sloping and benching configurations will be determined according to soil type as described in Appendices A and B of the OSHA Excavation Standard.
- Use of other written tabulated data and designs, such as tables and charts, to design sloping and benching systems. A copy of the tabulated data must be approved by a registered Professional Engineer. A copy of the tabulated data must be kept at the job site.

Personnel are not allowed to work on the faces of sloped or benched excavations above other workers unless the workers at the lower levels are protected from falling material or equipment. Similar protection will be provided for personnel working in excavations below other workers.

Support Systems, Shield Systems, and Other Protective Devices

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

- Timber shoring, designed according to the conditions and requirements of Appendix C of the OSHA Excavation Standard or aluminum hydraulic shoring designed according to manufacturers tabulated data or Appendix D of the OSHA Excavation Standard. In order to use the information in Appendices C or D, the soil type must first be determined using the classification system in Appendix A. For each soil type the size and spacing of the cross braces, uprights, and walls that comprise the shoring system are then selected based on the depth and width of the trench.
- Use of the manufacturer=s written tabulated to design support systems, shielded systems, and other protective devices. Any deviation from this tabulated data must be approved by the manufacturer. A copy of the tabulated data as well as any approvals to deviate from the tabulated data must be kept at the job site.
- Use of other written tabulated data to design support systems, shield systems, and other protective devices. The tabulated data must be approved by a Registered Professional Engineer. A copy of the tabulated data must be kept at the job site.
- Use of a written support system, shield system, and other protective device design that has been approved by a Registered Professional Engineer. A copy of the written design must be kept at the job site.

Installation and Removal of Support

Cross braces or trench jacks, uprights, and walls will be secured together to prevent sliding, falling or kickouts.

Additional precautions by way of shoring and bracing will be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery, or any other source.

If it is necessary to place or operate power shovels, derricks, trucks, materials, or other heavy objects on a level above or near any excavation, the side of the excavation will be sheetpiled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.

Backfilling and removal of trench supports will progress together from the bottom of the trench. Jacks or braces will be released slowly and , in unstable soil, ropes will be used to pull out the jacks or braces from above after employees have cleared the trench.

Shield Systems

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

EXCAVATION SAFETY LIST

To be completed prior to each work shift, or prior to personnel entering a new trench for the first time, by the Site Safety Officer/Competent Person:

Project _____ Location _____

Job Number _____

Competent Person(CP)* _____ Date _____

		<u>Yes</u>	<u>No</u>	<u>N/A</u>
1.	Has the site been cleared for utilities and other underground obstructions?	_____	_____	_____
2.	If on public property, has the regional utility locating service been notified?	_____	_____	_____
3.	Has the excavation equipment been safety checked by the operator?	_____	_____	_____
4.	Are copies of relevant OSHA excavation regulations available on site?	_____	_____	_____
5.	Will the excavation be 5 feet or more in depth?	_____	_____	_____
6.	If 4 is yes, will personnel enter the excavation at any time?	_____	_____	_____
7.	If 4a is yes, have provisions been made for shoring, sloping, or benching the excavation? Describe: _____ _____ _____	_____	_____	_____
8.	Has an inspection of the site and excavation been conducted by the SSO?	_____	_____	_____
9.	Has the Competent Person conducted visual and manual tests to classify the soil?	_____	_____	_____

* According to Federal OSHA, A Competent Person is a person who is capable of identifying existing and predictable hazards in the surroundings; or working conditions which are unsanitary, hazardous, or dangerous to employees; and who has the authority to take prompt corrective measures to eliminate them.

- | | | | | |
|-----|---|--|--------|-------|
| 10. | G | Visual Test _____ | (type) | |
| | G | Manual Test _____ | (type) | |
| | G | Soil Classification _____ | (type) | |
| | | | | |
| 11. | | Are there any conditions that might expose employees to injury from possible moving ground? | | _____ |
| | | | | |
| 12. | | Is excavated material being placed at least 2 feet from the edge of the excavation? | | _____ |
| | | | | |
| 13. | | Is work in the excavation at all times under the immediate supervision of the SSO or other competent person? | | _____ |
| | | | | |
| 14. | | Is there a stairway, ladder, or ramp securely fastened in place to provide ingress and egress from the excavation? | | _____ |
| | | | | |
| 15. | | If the excavation is 4 feet or more in depth, are safe means of access (see 8) provided so as to require no more than 25 feet of lateral travel to reach them? | | _____ |
| | | | | |
| 16. | | If structural ramps are installed that are used for access/egress: were they designed by a qualified engineer? | | _____ |
| | | | | |
| 17. | | Do the structural ramps have appropriate means to prevent slipping and are the ramps uniform in thickness? | | _____ |
| | | | | |
| 18. | | Are walkways or bridges provided across the excavation to safe crossing? | | _____ |
| | | | | |
| 19. | | If excavations are 7 1/2 or more feet in depth, do the walkways have guardrails and toeboards? | | _____ |
| | | | | |
| 20. | | Are undermined structures adequately supported to safely carry all anticipated loads and protect workers? | | _____ |
| | | | | |
| 21. | | Are there adequate means provided to prevent mobile equipment from inadvertently entering the excavation? | | _____ |
| | | | | |
| 22. | | Is the excavation well marked and barricaded to prevent personnel from falling IN? | | _____ |
| | | | | |
| 23. | | Are means available to prevent surface water from entering the excavation and to provide | | _____ |

adequate drainage of the area adjacent to the trench?

- | | | | | |
|-----|---|-------|-------|-------|
| 24. | Where it is reasonable to expect hazardous atmospheres, including oxygen deficiency, to exist in the excavation, is appropriate atmosphere testing equipment available. | _____ | _____ | _____ |
| 25. | Has the testing equipment been calibrated, and the calibrations recorded, today? | _____ | _____ | _____ |
| 26. | Are employees trained in proper use of this equipment? | _____ | _____ | _____ |
| 27. | Has a harness and lifeline been provided whenever an employee is required to enter a confined footing excavation? | _____ | _____ | _____ |
| 28. | Is appropriate personal protective equipment (hardhat, safety boots, eye protection, etc.) available and in use? | _____ | _____ | _____ |

Notes: _____

CPs Name (Print)

Signature

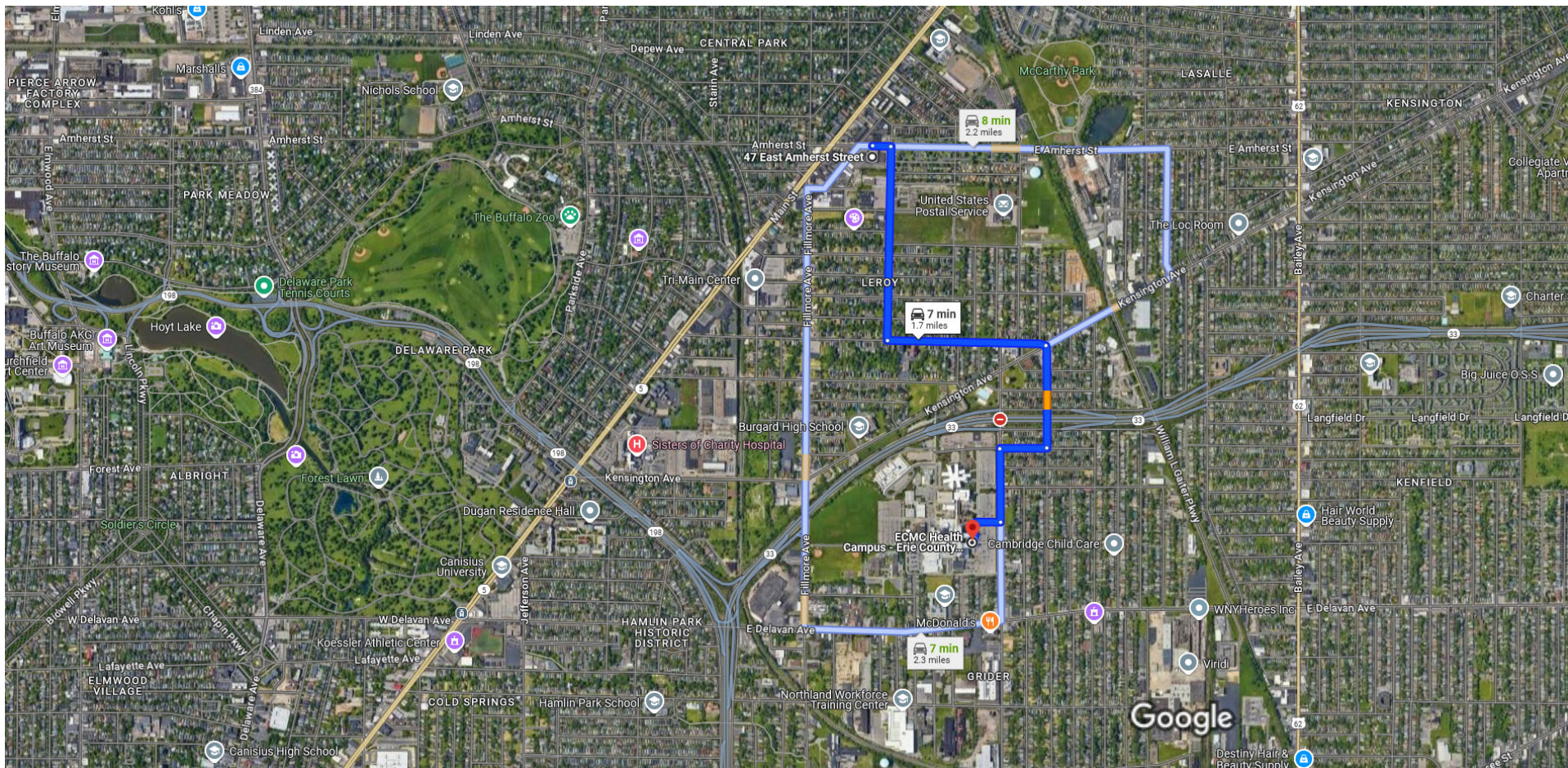
ATTACHMENT 4

MAP TO HOSPITAL



47 E Amherst St, Buffalo, NY 14214 to ECMC Health Campus - Erie County Medical Center


Drive 1.7 miles, 7 min





Imagery ©2024 Airbus, CNES / Airbus, Maxar Technologies, Map data ©2024 1000 ft


47 E Amherst St
Buffalo, NY 14214


- ↑ 1. Head east on E Amherst St toward Holden St
259 ft
- ➡ 2. Turn right onto Holden St
0.5 mi


-  3. Turn left onto Leroy Ave

 0.4 mi
-  4. Slight right onto Deerfield Ave

 0.3 mi
-  5. Turn right onto Maple Ridge Ave

 0.1 mi
-  6. Turn left at the 1st cross street onto Grider St

 0.2 mi
-  7. Turn right

 Destination will be on the right

 0.1 mi

ECMC Health Campus - Erie County Medical Center
462 Grider St, Buffalo, NY 14215

ATTACHMENT 5

NYSDOH GENERIC CAMP AND FUGITIVE DUST AND PARTICULATE MONITORING

Table of Contents

1.0	Community Air Monitoring Program.....	1
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Attachments

1- NYSDOH Generic CAMP and Fugitive Dust and Particulate Monitoring

1.0 COMMUNITY AIR MONITORING PROGRAM (CAMP)

A Community Air Monitoring Program (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the upwind and downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The program 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 and on-site workers not directly involved with work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. A NYSDOH generic CAMP obtained from NYSDEC DER-10 is presented in Attachment 1 that will be followed and adhered to for work activities that could release potential contaminants from an impacted area.

A program for suppressing fugitive dust and particulate matter monitoring will also be conducted in accordance NYSDEC DER-10 titled Appendix 1B Fugitive Dust and Particulate Monitoring, which is also provided in Attachment 1. The fugitive dust suppression and particulate monitoring program will be employed at the site during building demolition, site investigations/remediation and other intrusive activities which warrant its use.

Both the CAMP and the fugitive dust and particulate monitoring program will be administered by the environmental engineer/consultant. Monitoring results of the CAMP will be reported to the New York State Department of Health daily for review.

NYSDEC and NYSDOH are to be provided CAMP data on a daily basis when collected. When sample excursions occur, identify the reason for the excursions and measures to address the excursions.

ATTACHMENT 1

NYSDOH Generic CAMP and Fugitive Dust and Particulate Monitoring

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

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

Community Air Monitoring Plan

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

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ 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 $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

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

December 2009

Appendix 1B

Fugitive Dust and Particulate Monitoring

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

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

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

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

- (a) Objects to be measured: Dust, mists or aerosols;
- (b) Measurement Ranges: 0.001 to 400 mg/m³ (1 to 400,000 µg/m³);
- (c) Precision (2-sigma) at constant temperature: +/- 10 µg/m³ for one second averaging; and +/- 1.5 g/m³ for sixty second averaging;
- (d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 µm, g= 2.5, as aerosolized);
- (e) Resolution: 0.1% of reading or 1 g/m³, whichever is larger;
- (f) Particle Size Range of Maximum Response: 0.1-10;
- (g) Total Number of Data Points in Memory: 10,000;
- (h) Logged Data: Each data point with average concentration, time/date and data point number
- (i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
- (j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
- (k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
- (l) Operating Temperature: -10 to 50° C (14 to 122° 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 µg/m³ (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m³, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m³ above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m³ continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

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

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

- (a) Applying water on haul roads;
- (b) Wetting equipment and excavation faces;
- (c) Spraying water on buckets during excavation and dumping;
- (d) Hauling materials in properly tarped or watertight containers;
- (e) Restricting vehicle speeds to 10 mph;
- (f) Covering excavated areas and material after excavation activity ceases; and
- (g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m³ action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

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

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m³, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m³ or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

APPENDIX B

COMMUNITY AIR MONITORING PROGRAM

Amherst Commons LLC
47 East Amherst Street
City of Buffalo, New York
Tax Map ID No.: 90.28-8-1
Property County: Erie
Site No.: C915397

Prepared for:

AMHERST COMMONS LLC
1055 Saw Mill River Road #204
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Prepared by:



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Buffalo, New York 14213

September 2024

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Attachments

1- NYSDOH Generic CAMP and Fugitive Dust and Particulate Monitoring

1.0 COMMUNITY AIR MONITORING PROGRAM (CAMP)

A Community Air Monitoring Program (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the upwind and downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The program 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 and on-site workers not directly involved with work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. A NYSDOH generic CAMP obtained from NYSDEC DER-10 is presented in Attachment 1 that will be followed and adhered to for work activities that could release potential contaminants from an impacted area.

A program for suppressing fugitive dust and particulate matter monitoring will also be conducted in accordance NYSDEC DER-10 titled Appendix 1B Fugitive Dust and Particulate Monitoring, which is also provided in Attachment 1. The fugitive dust suppression and particulate monitoring program will be employed at the site during building demolition, site investigations/remediation and other intrusive activities which warrant its use.

Both the CAMP and the fugitive dust and particulate monitoring program will be administered by the environmental engineer/consultant. Monitoring results of the CAMP will be reported to the New York State Department of Health daily for review.

NYSDEC and NYSDOH are to be provided CAMP data on a daily basis when collected. When sample excursions occur, identify the reason for the excursions and measures to address the excursions.

ATTACHMENT 1

NYSDOH Generic CAMP and Fugitive Dust and Particulate Monitoring

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

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

Community Air Monitoring Plan

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

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

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

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ 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 $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

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

December 2009

Appendix 1B

Fugitive Dust and Particulate Monitoring

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

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

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

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

- (a) Objects to be measured: Dust, mists or aerosols;
- (b) Measurement Ranges: 0.001 to 400 mg/m³ (1 to 400,000 µg/m³);
- (c) Precision (2-sigma) at constant temperature: +/- 10 µg/m³ for one second averaging; and +/- 1.5 g/m³ for sixty second averaging;
- (d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 µm, g= 2.5, as aerosolized);
- (e) Resolution: 0.1% of reading or 1 g/m³, whichever is larger;
- (f) Particle Size Range of Maximum Response: 0.1-10;
- (g) Total Number of Data Points in Memory: 10,000;
- (h) Logged Data: Each data point with average concentration, time/date and data point number
- (i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
- (j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
- (k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
- (l) Operating Temperature: -10 to 50° C (14 to 122° 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 µg/m³ (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m³, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m³ above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m³ continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

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

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

- (a) Applying water on haul roads;
- (b) Wetting equipment and excavation faces;
- (c) Spraying water on buckets during excavation and dumping;
- (d) Hauling materials in properly tarped or watertight containers;
- (e) Restricting vehicle speeds to 10 mph;
- (f) Covering excavated areas and material after excavation activity ceases; and
- (g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m³ action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

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

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m³, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m³ or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

APPENDIX C

QUALITY ASSURANCE/QUALITY CONTROL PLAN

Amherst Commons LLC
47 East Amherst Street
City of Buffalo, New York
Tax Map ID No.: 90.28-8-1
Property County: Erie
Site No.: C915397

Prepared for:

AMHERST COMMONS LLC
1055 Saw Mill River Road #204
Ardsley, NY 10502

Prepared by:



960 Busti Avenue, Suite B-150
Buffalo, New York 14213

November 2024

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1.0 INTRODUCTION

This Quality Assurance/Quality Control (QA/QC) Plan provides an overview of QA/QC procedures required for the project. It also provides methods for laboratory testing of environmental samples obtained from the Site, which helps to ensure the quality of the data produced. The organizational structure for this project is presented in the Work Plan, which identifies the names of key project personnel. The project manager is responsible for verifying that QA procedures are followed in the field so that quality, representative samples are collected. The Project Manager is in contact with the analytical laboratory to monitor laboratory activities so that holding times and other QA/QC requirements are met. The anticipated quantity of field samples collected, and corresponding analytical parameters/methods are provided below.

ANALYTICAL SUMMARY TABLE

PARAMETER	EPA METHOD	QUANTITY(GW) ^A	Soil ^A	Air
Part 375 VOCs + TICs	8260	6	29	-
Part 375 SVOCs + TICs	8270	6	29	-
Part 375 Metals	6010/7470/7471	6	29	-
Part 375 PCBs	8082	6	29	-
Part 375 Pesticides	8081	6	29	-
PFAS Contaminants	1633	6	29	-
1,4 Dioxane	8270SIM	6	29	-
VOCs	TO-15	-	-	8

Note, soil totals include 1 sample for a duplicate per 20 samples. Holding Times: 8260-14 days and 8270, 8081, and 8082-7 days

A = 1 MS, 1MSD and 1 duplicate

All samples analyzed for VOCs and/or SVOCs will report TICs as specified in DER-10 Section 2.1(a)1.i. Sampling for emerging contaminants be conducted in accordance with the NYSDEC Guidance for Sampling and Analysis of PFAS (January 2021). As detailed in the guidance document, PFAS compounds should be analyzed under EPA Method 1633. The analytical laboratory proposed for use for the analysis of samples will be a certified NYSDOH ELAP laboratory. The QA Manager of the laboratory will be responsible for performing project-specific audits and for overseeing the quality control data generated. The field geologist/technician coordinates all personnel involved with field sampling, verifies that all sampling is conducted per the FSP, and communicates regularly with the Project Manager. The ultimate responsibility for maintaining quality throughout the project rests with the Project Manager, including field and laboratory QA/QC.

2.0 DATA QUALITY OBJECTIVES

2.1 BACKGROUND

Data quality objectives (DQOs) are qualitative and quantitative statements, which specify the quality of data required supporting the investigation for the site. DQOs focus on the identification of the end use of the data to be collected. The project DQOs are achieved utilizing the definitive data category as outlined in *Guidance for the Data Quality Objectives Process*, EPA QA/G-4

(September 1994). All sample analyses will provide definitive data, which are generated using rigorous analytical methods such as reference methods approved by the United States Environmental Protection Agency (USEPA). The purpose of this investigation is to determine the nature and extent of contamination at the site.

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

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

2.2 QA OBJECTIVES FOR CHEMICAL DATA MEASUREMENT

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

2.2.1 Precision

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

2.2.2 Accuracy

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

2.2.3 Representativeness

Representativeness expresses the degree to which the sample data accurately and precisely represents the characteristics of a population of samples, parameter variations at a sampling point, or environmental conditions. Representativeness is a qualitative parameter, which is most concerned

with the proper design of the sampling program or sub-sampling of a given sample. Objectives for representativeness are defined for sampling and analysis tasks and are a function of the investigative objectives. The sampling procedures described in the Field Sampling Plan have been selected with the goal of obtaining representative samples for the media of concern.

2.2.4 Comparability

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

2.2.5 Completeness

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

3.0 SAMPLING LOCATIONS, CUSTODY, AND HOLDING TIMES

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

4.0 CALIBRATION PROCEDURES AND FREQUENCY

To obtain a high level of precision and accuracy during sample processing procedures, laboratory instruments must be calibrated properly. Several analytical support areas must be considered so the integrity of standards and reagents is upheld prior to instrument calibration. The following sections 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) 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. All corrective action procedures taken by the contract laboratory are to be documented, summarized within the case narrative, and submitted with the analytical results.

5.0 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 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 that 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 within control limits. 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 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. The 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, 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.

6.0 CALCULATION OF DATA QUALITY INDICATORS

6.1 PRECISION

Precision is evaluated using analyses of a field duplicate or a laboratory MS/MSD that indicate analytical precision through the reproducibility of the analytical results. RPD is used to evaluate precision by the following formula:

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

where:

X_1 = Measured value of sample or matrix spike

X_2 = Measured value of duplicate or matrix spike duplicate

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

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 using 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, semivolatiles, PCB), and is calculated as follows:

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

where:

X_s - Measured value of the spike sample

X_u - Measured value of the unspiked sample

K - Known amount of spike in the sample

6.3 COMPLETENESS

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

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

where:

X_v - Number of valid measurements

X_n - Number of invalid measurements

N - Number of valid measurements expected to be obtained

7.0 CORRECTIVE ACTIONS

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

7.1 INCOMING SAMPLES

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

7.2 SAMPLE HOLDING TIMES

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

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 sample matrix, the laboratory must notify BE3 project personnel for problem resolution. To achieve those detection limits, the laboratory must utilize all appropriate cleanup procedures to retain the project required detection limits. When any sample requires a secondary dilution due to high levels of target analytes, the laboratory must document all initial analyses and secondary dilution results. Secondary dilution will be permitted only to bring target analytes within the linear range of calibration. If samples are analyzed at a secondary dilution with no target analytes detected, the Project Manager will be immediately notified so that appropriate corrective actions can be initiated.

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 or re-extracted/redigested, then reanalyzed within method-required holding times to verify the presence or absence of matrix effects. If matrix effect is confirmed, the corresponding data shall be flagged accordingly using the flagging symbols and criteria. If matrix effect is not confirmed, then the entire batch of samples may have to be reanalyzed or re-extracted/redigested, then reanalyzed at no cost. The Project Manager 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 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.

8.0 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 methods. Analytical results must be reported consistently. Identification of all analytes must be accomplished with an authentic standard of the analyte traceable to NIST or USEPA sources. Individuals experienced with an analysis and knowledgeable of requirements will perform data reduction.

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 results from soil and groundwater samples will have ASP Category B deliverables and DUSRs. The data validation will be in accordance with DER-10 Section 2.2 with ASP - Category B data deliverables provided by the laboratory and a DUSR provided for validation. Where possible, discrepancies will be resolved by the project manager.

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

Note that analytical results from the PCB Survey will also complete DUSRs and be submitted to EQulS, in accordance with the Quality Assurance/Quality Control Plan (QA/QC Plan).

9.0 REFERENCES

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

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

New York State Department of Environmental Conservation (NYSDEC) 2005. *Analytical Services Protocol*, (ASP) 7/2005 Edition. Albany: NYSDEC.

NYSDEC "DER-10 Technical Guidance for Site Investigation and Remediation (DER-10)," dated May 3, 2010, Appendix 2B

Part 375 Metals (ICP)

EPA 6010C

Analyte

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

PCBs EPA 7471B

PCB-1016
PCB-1221
PCB-1232
PCB-1242
PCB-1248

Chlorinated Pesticides

EPA 8081B/ Herbicides EPA 8151

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

**TABLE 2
ANALYTE LIST****Semi-Volatile Organics
(Acid/Base Neutrals)**

EPA 8270D

1,1-Biphenyl
1,2,4,5-Tetrachlorobenzene
1,2,4-Trichlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2,2-Oxybis (1-chloropropane)
2,3,4,6-Tetrachlorophenol
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Methylphenol
2-Nitroaniline
2-Nitrophenol
3&4-Methylphenol
3,3'-Dichlorobenzidine
3-Nitroaniline
4,6-Dinitro-2-methylphenol
4-Bromophenyl phenyl
4-Chloro-3-methylphenol
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Nitroaniline
4-Nitrophenol
Acenaphthene
Acenaphthylene
Acetophenone
Anthracene
Atrazine
Benzaldehyde
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Bis (2-chloroethoxy) methane
Bis (2-chloroethyl) ether
Bis (2-ethylhexyl) phthalate
Butylbenzylphthalate
Caprolactam

QA/QC Plan

Carbazole
Chrysene
Dibenz (a,h) anthracene
Dibenzofuran
Diethyl phthalate
Dimethyl phthalate
Di-n-butyl phthalate
Di-n-octylphthalate
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3-cd) pyrene
Isophorone
Naphthalene
Nitrobenzene
N-Nitroso-di-n-propylamine
N-Nitrosodiphenylamine
Pentachlorophenol
Phenanthrene
Phenol
Pyrene

Volatile Organics

EPA 8260C

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

TABLE 2 (Continued)***Volatile Organics
(Continued)***

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

Volatiles-Air - TO-15

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

PFAS ANALYTE LIST

Chemical Name	CAS Number
Perfluorobutanoic acid (PFBA)	375-22-4
Perfluoropentanoic acid (PFPeA)	2706-90-3
Perfluorohexanoic acid (PFHxA)	307-24-4
Perfluoroheptanoic acid (PFHpA)	375-85-9
Perfluorooctanoic acid (PFOA)	335-67-1
Perfluorononanoic acid (PFNA)	375-95-1
Perfluorodecanoic acid (PFDA)	335-76-2
Perfluoroundecanoic acid (PFUnA)	2058-94-8
Perfluorododecanoic acid (PFDoA)	307-55-1
Perfluorotridecanoic acid (PFTriA)	72629-94-8
Perfluorotetradecanoic acid (PFTeA)	376-06-7
Perfluorobutanesulfonic acid (PFBS)	375-73-5
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4
Perfluorohexanesulfonic acid (PFHxS)	355-46-4
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8
Perfluorooctanesulfonic acid (PFOS)	1763-23-1
Perfluorononanesulfonic acid (PFNS)	68259-12-1
Perfluorodecanesulfonic acid (PFDS)	335-77-3
Perfluorododecanesulfonic acid (PFDoS)	79780-39-5
Perfluorooctanesulfonamide (FOSA)	754-91-6
NMeFOSAA	2355-31-9
NEtFOSAA	2991-50-6

Chemical Name	CAS Number
4:2 FTS	757124-72-4
6:2 FTS	27619-97-2
8:2 FTS	39108-34-4
NEtFOSA	4151-50-2
NMeFOSA	31506-32-8
NMeFOSE	24448-09-7
NEtFOSE	1691-99-2
9Cl-PF3ONS	756426-58-1
HFPO-DA (GenX)	13252-13-6
11Cl-PF3OUdS	763051-92-9
ADONA	919005-14-4
3:3 FTCA	356-02-5
5:3 FTCA	914637-49-3
7:3 FTCA	812-70-4
NFDHA	151772-58-6
PFMBA	863090-89-5
PFMPA	377-73-1
PFEESA	113507-82-7

TABLE 3 - ANALYTICAL METHODS & PROCEDURES SUMMARY

Groundwaters

Analyte(s)	Method	Preservation	Holding Time	Container
Volatile Organics	8260	HCl to pH <2, cool to ≤6°C	14 days	2 - 40 ml septum sealed vials
Semivolatile Organics	8270	cool to ≤6°C	Samples extracted within 7 days and extracts analyzed within 40 days following extraction	1 liter amber with Teflon lined cap
Organochlorine Pesticides	8081	cool to ≤6°C		1 liter amber with Teflon lined cap
Chlorinated Herbicides (silvex)	8151	cool to ≤6°C		1 liter amber with Teflon lined cap
PCBs	8082	cool to ≤6°C		1 liter amber with Teflon lined cap
ICP Metals	6010	HNO3 to pH <2	6 months	250 ml. plastic
Mercury	7470	HNO3 to pH <2	28 days	250 ml. plastic
Hexavalent Chromium	7196	cool to ≤6°C	24 hours	125 ml. plastic
Cyanide, Total	9010	NaOH to pH >12, cool to ≤6°C	14 days	250 ml. plastic
PFAS	1633	cool to ≤6°C	Samples extracted within 14 days and extracts analyzed within 28 days following extraction	250 ml. HDPE
1,4-Dioxane	8270 SIM	cool to ≤6°C	Samples extracted within 7 days and extracts analyzed within 40 days following extraction	1 liter amber with Teflon lined cap

Soils

Analyte(s)	Method	Preservation	Holding Time	Container
Volatile Organics	8260	cool to ≤6°C	14 days	4 oz. widemouth glass with Teflon lined cap
Semivolatile Organics	8270	cool to ≤6°C	Samples extracted within 14 days and extracts analyzed within 40 days following extraction	4 oz. widemouth glass with Teflon lined cap
Organochlorine Pesticides	8081	cool to ≤6°C		4 oz. widemouth glass with Teflon lined cap
Chlorinated Herbicides (silvex)	8151	cool to ≤6°C		4 oz. widemouth glass with Teflon lined cap
PCBs	8082	cool to ≤6°C	none	4 oz. widemouth glass with Teflon lined cap
ICP Metals	6010	none	6 months	4 oz. widemouth glass with Teflon lined cap
Mercury	7471	cool to ≤6°C	28 days	4 oz. widemouth glass with Teflon lined cap
Hexavalent Chromium	3060/7196	cool to ≤6°C	30 days to extraction 7 days from extraction to analysis	4 oz. widemouth glass with Teflon lined cap
Cyanide, Total	9012	cool to ≤6°C	14 days	4 oz. widemouth glass with Teflon lined cap
PFAS	1633	cool to ≤6°C	Samples extracted within 14 days and extracts analyzed within 40 days following extraction	250 ml. HDPE
1,4-Dioxane	8270 SIM	cool to ≤6°C	Samples extracted within 7 days and extracts analyzed within 40 days following extraction	4 oz. widemouth glass with Teflon lined cap

APPENDIX D

FIELD SAMPLING PLAN

Amherst Commons LLC
47 East Amherst Street
City of Buffalo, New York
Tax Map ID No.: 90.28-8-1
Property County: Erie
Site No.: C915397

Prepared for:

AMHERST COMMONS LLC
1055 Saw Mill River Road #204
Ardsley, NY 10502

Prepared by:



960 Busti Avenue, Suite B-150
Buffalo, New York 14213

March 2025

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1.0 INTRODUCTION

This Field Sampling Plan (FSP) provides procedures for the field activities designed in the Work Plan where soil, groundwater, and vapor sampling are required at the Site. The field procedures presented in this manual should be followed by all field personnel, as adherence can help to ensure the quality and usability of the data collected. The FSP should be used collectively with and comply with the following documents:

- The HASP.
- The QA/QC Plan.
- The RI Work Plan.

PFAS sampling and analysis should be done in accordance with the NYSDEC document: “Sampling, Analysis, and Assessment of PFAS under NYSDEC’s Part 375 Remedial Programs document, dated October 2020.” This document is to be used with both soil and groundwater samples.

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

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

2.0 SOIL SAMPLING

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

1. Inspect newly created test pit or boring core stratigraphy once obtained in/from the subsurface.
2. Quickly place the calibrated PID into the exposed soil and record the instrument readings in the logbook.
3. Sample soil, and record depth and any physical characteristics (e.g., contamination, odor, discoloration, debris, etc.) in the logbook.
4. Samples should be collected at locations and frequency per the Work Plan and QA/QC Plan.
5. Decontaminate sampling implements after use and between sample locations. In most cases, dedicated sampling equipment is utilized thereby eliminating equipment decontamination. If dedicated equipment is not used, “dry” decontamination will be applied and “wet” as necessary.
6. Label each sample container with the appropriate sample identification and place samples in a cooler (cooled to 4 degrees C.) for shipment to the laboratory.
7. Initiate chain-of-custody procedures.

2.1 TEST PIT PROCEDURES

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

2.1.1 Field Preparation

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

2.1.2 Excavation and Sample Collection

1. Position backhoe/equipment into appropriate area considering direction of excavation, obstructions, safety concerns, etc.
2. Commence excavation with the backhoe upwind of the excavation, as possible.
3. Ensure continuous air monitoring has been activated.
4. Screen soil regularly for VOCs as excavation progresses and soil is stockpiled.
5. As directed by field technician for each test trench, topsoil, or cover soil (if any) is excavated and placed on poly/plastic sheeting.
6. Soil/material below the topsoil is excavated to the depth as directed by field technician and placed on poly/plastic sheeting separate from the topsoil/cover soil.
7. Segregate 'clean' material from impacted material, as possible, using visual observations and PID screening.
8. Record geologic log as trenches are excavated visually inspecting subsurface material for discoloration or staining and documenting pit/trench with photos. The following information will be recorded for each test pit log:
 - Depth, length, and width of the excavation.
 - Description of each lithological unit including depth and thickness of distinct soil, fill, or rock layers.
 - Description of any man-made impacts or apparent contamination.
 - Depth to groundwater and bedrock, if encountered.
9. Collect soil samples using dedicated stainless-steel spoons directly from the bucket of the backhoe at ground surface. No personnel shall enter the excavation to collect samples unless provisions in the HASP have been addressed for entering an excavation.
10. Place each soil sample directly into appropriate sample bottles/jars.
11. Clearly label the sample bottles and jars.
12. Place each jar in an ice-filled cooler.
13. Ship samples to the laboratory as soon as possible, but no later than 24 hours after collection.
14. Document the types and numbers of samples collected on Chain-of-Custody.
15. Record time and date of sample collection and a description of the sample and any associated air monitoring measurements in the field logbook.

16. After sampling, backfill and compact (e.g., bucket and equipment tracks/wheels) the excavated material from each trench or pit prior to moving to the next location.
17. Backfill with indigenous soil in the order in which the material was removed with the topsoil/cover soil placed last to cover the trench, placing impacted material at bottom of pit/trench and covering with 'clean' material.
18. Decontaminate sampling and excavation equipment between sampling locations (i.e., if not dedicated) and at completion over top of excavation area using dry methods initially and steam cleaning, as needed.

2.2 GEOPROBE PROCEDURES

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

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

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

2.3 HOLLOW-STEM AUGER DRILLING AND SAMPLING PROCEDURES

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

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

Field procedures.

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

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

3.0 GROUNDWATER SAMPLING

3.1 WELL INSTALLATION PROCEDURES

The following procedure outlines a NYSDEC-approved method of constructing groundwater wells within unconsolidated material to monitor groundwater elevation and acquiring groundwater samples for laboratory testing. The well screen is 2" Schedule 40 pipe with 0.010 slot size. The

following is a step-by-step method for the open-hole method of installing a groundwater well once a boring or augured hole has been drilled to a desired depth within the subsurface:

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

If installing bedrock monitoring wells is required, the following procedure should be followed:

1. The overburden at each well location will be drilled using a 4.25-inch hollow stem auger until bedrock is encountered.
2. A 4-inch diameter steel casing will then be grouted into place from 1 foot below grade to at least 3 feet into bedrock. The grouted case will be allowed to sit for a minimum of 24 hours (or grout manufacturers specification) to allow the grout to cure before bedrock coring.
3. The bedrock will then be cored using a rock core or low volume air hammer to a depth of approximately 20 feet bgs.
4. A 2-inch diameter schedule 40 polyvinyl chloride (PVC) monitoring well will then be installed consistent with the steps 1 through 9 outlined above. PVC wells will be 10-foot long and have 0.010-inch slot screens.

3.2 WELL DEVELOPMENT PROCEDURES

At least 24 hours after completion of drilling and installation, well development is completed through pumping or bailing until the discharged water is relatively sediment free and the indicator parameters (e.g., pH, temperature, specific conductivity, etc.) have reached steady state. Development removes sediment and can improve the hydraulic properties of the sand pack. The effectiveness of this process is monitored to minimize the volume of discharged waters to obtain sediment-free samples. Well development water will be containerized upon generation and will not be discharged or disposed of without prior department approval.

1. Select an appropriate well development method based upon water depth, well productivity, and sediment content of the water. Well development options include: (a) bailing; (b) manual pumping; and (c) submersible pumps. These options are utilized with surging of the well screen using an appropriately sized surge block.
2. Decontaminate, as needed, and assemble equipment in the monitoring well based upon the method selected. Care should be taken not to introduce contaminants into the equipment or well during installation.
3. Proceed with development by repeated removal of water from the well until the discharged water is relatively sediment-free (i.e., < 50 NTUs). Volume of water removed pH,

temperature and conductivity measurements are recorded on the Well Development/Purging Logs.

Stratigraphic logs detailing soil/rock physical descriptions, well installation details, well development data (including volumes purged) and any field instrument readings detected will be included in the Remedial Investigation Report per DER-10 Section 3.14(c)5.

3.3 WELL PURGING PROCEDURES

To collect representative samples, groundwater wells must be adequately purged prior to sampling. Purging will require removing three to five volumes of standing water in rapidly recharging wells and at least one volume from wells with slow recharge rate. In addition to the required well volumes, water quality parameters (pH, temperature, specific conductivity and turbidity) should have stabilized prior to sampling. Sampling should commence as soon as adequate recharge has occurred. Although not required, it is recommended that purging and sampling occur at least 7 days after development. Well development water will be containerized upon generation and will not be discharged or disposed of without prior department approval.

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

3.4 WELL SAMPLING PROCEDURES

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

4. Use verifiably clean sample bottles (containing required preservatives) and place samples on ice in coolers for transport to the analytical laboratory, who will certify bottles are analyte-free.
5. Initiate chain-of-custody.
6. Record well sampling data field notebook and on the Well Development/Purging Log.

4.0 SAMPLE DOCUMENTATION

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

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

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

5.0 SAMPLING CONTAINER SELECTION

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

6.0 SAMPLE LABELING

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

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

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

- BH = Geoprobe Borehole
- SW = Surface Water

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

7.0 SAMPLE SHIPPING

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

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

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

8.0 SOIL VAPOR SAMPLING

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

8.1 SUB-SLAB AIR SAMPLING PROCEDURES

8.1.1 Sampling Locations

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

8.1.2 Sampling Probes

Drill a 5/8-inch diameter hole approximately one inch deep into the concrete floor using a 5/8-inch diameter drill bit and a hammer drill. Extend the hole through the remaining thickness of the slab and about three inches below the base of the slab using a 1/2-inch diameter drill bit.

Remove the concrete cuttings using the 1/2-inch drill bit in an up-down motion. Clean out the shallow 5/8-inch drilled hole using a round steel wire brush. Carefully clean the surface of the concrete adjacent to the 5/8-inch hole using a flat wire brush to remove any residual concrete dust from the floor's surface. Dabbing the surface with clay can also remove the dust. These steps will allow the clay seal (see below) to better adhere to the concrete surface.

Insert one end of a 1.5-foot length of 1/4-inch diameter (OD) Teflon or HDPE tubing through the center hole of a 5/8-inch diameter rubber stopper. About two inches of the tubing should extend beyond and below the narrow end of the stopper. Insert the tubing into the 5/8-inch diameter borehole so that the bottom of the stopper rests on top of the 1/2-inch diameter drilled hole. Pack the annulus of the 5/8-inch diameter hole with Sculpy modeling clay and extend the clay about 1.5-inches above the floor adhering tightly to the tubing. The clay should be in a volcano-like shape with a wide base adhering to the concrete floor and narrowing at the upper end of contact with the tubing. This shape allows the tubing to move without disturbing the contact of the clay with the floor and the tubing. The clay should cover and adhere to a minimum of one-half inch of the concrete surface beyond the borehole.

8.1.3 Helium Tracer Gas Testing

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

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

Connect the sample tubing to a GilAir vacuum pump or equivalent using 3/8-inch O.D. silicone tubing. Connect a 1-liter Tedlar bag to the outlet of the pump using silicone tubing and collect a

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

8.1.4 Sample Collection

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

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

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

8.2 INDOOR/OUTDOOR AIR SAMPLING PROCEDURES

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

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

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

After 8 or 24 hours, record the gauge vacuum reading, close the Summa canister valve completely and record the end time on the Summa Canister Data Sheet. There should still be a slight vacuum in the Summa canister. If no vacuum remains in the canister, or the canister does not show a

significant net loss in vacuum after sampling, the sample should be re-collected using a new Summa canister and flow controller. Disconnect any tubing and candy cane fittings from the Summa canister and remove the flow controller. Replace the brass plug on the canister. Ship canister, with COCs, overnight, to the selected laboratory

8.3 QUALITY CONTROL

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

8.4 SAMPLE LABELING

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

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

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

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

8.5 FIELD DOCUMENTATION

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

- Sample Identification
- Date and time of sample collection
- Identity of samplers
- Sampling methods and devices

- Purge volumes (soil vapor)
- Volume of soil vapor sample extracted
- The Summa canister vacuum before and after samples collected
- Chain of Custody and shipping information

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

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

8.6 SAMPLE SHIPPING

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

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

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

APPENDIX E

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

APPENDIX F

Hazardous Materials Reports

47 EAST AMHERST

PRE-DEMOLITION
**ASBESTOS and HAZARDOUS MATERIALS
SURVEY REPORT**

Location:

**47 East Amherst Street
Buffalo, NY 14214**

Conditions as of 10 May 2007

Prepared For:

**El Team, Inc.
2060 Sheridan Drive
Buffalo, NY 14223**

30 May 2007

Prepared by:



ASBESTOS / HAZARDOUS MATERIALS SURVEY– 47 East Amherst Street

JMD Services was retained to perform an asbestos (ACM) / hazardous materials survey for pre-demolition purposes at the above referenced site (former Amherst Bowling Center building) on 10 May 2007. Previous suspect asbestos sampling had been performed by JMD at the above referenced site on 14 August 2006.

- A visual site inspection to identify suspect ACM, and LBP, PCB Fixtures;
- A review of all available previous testing reports
- A walk-through of the Scope of Work area.
- Identification of suspect ACM, LBP, PCBs and potential contaminants;
- Identification of the location and estimated quantities of confirmed
- Hazardous Materials.

ASBESTOS CONTAINING MATERIALS

The purpose of the asbestos survey was to determine the presence, location and condition of ACM (asbestos containing materials) at the above referenced location. This survey includes the following:

- Identification of suspect asbestos containing materials.
- Sampling and analysis of suspect materials and incorporation of previous sampling.
- Identification of the location, approximate quantity, friability and condition of confirmed asbestos containing materials.

In total, nineteen (19) samples were collected for asbestos analysis from the area (AmeriSci Job # 106081421 and AmerSci Job # 107051725), and only represent conditions as of 10 May 2007. Polarized Light Microscopy (PLM) and Transmission Electron Microscopy (TEM) revealed asbestos in the following analyzed samples:

<i>Asbestos Containing Material</i>	<i>Approximate Quantity and Location</i>	<i>Friability</i>	<i>Condition</i>
Silver Roofing / Flashing	30500 SF – Exterior	Non-friable	Poor
9x9 Floor Tile and mastic	3700 SF – Offices, 2 nd Floor, Lounge, throughout	Non-friable	Fair
Pipe Insulation	700 LF – Throughout basement, select areas on main floor	Friable	Poor
Transite Pipe	140 LF – Fan Room, roof drains	Non-friable	Poor

Please refer to the enclosed chain-of-custody form for a complete listing of all suspect sampled materials.

GENERAL CONDITIONS OF ASBESTOS INSPECTION

The above listed quantities, if applicable, are field approximations only and should be *verified prior to abatement*. Please, find enclosed the laboratory analytical results and chain of custody documentation.

These laboratory results are submitted pursuant to JMD Services current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted.

This report is based on the condition and contents present at the above referenced location at the time of inspection.

ASBESTOS SURVEY TRANSMITTAL

As required by NYS, as per NYCRR 56, Subpart 56-5, and prior to **demolition**, one copy of this completed survey shall immediately be sent *by the building/structure owner* to both the local government agency charged with issuing applicable permits and to the Asbestos Control Bureau district office that is closest to the building or structure location.

BUFFALO DISTRICT: Asbestos Control Bureau District Offices for Cattaraugus, Chautauqua, Erie, Genesee, Livingston, Monroe, Niagara, Ontario, Orleans, Wayne, Wyoming and Yates Counties:

65 Court Street - Rm. 405
Buffalo, NY 14202
(716) 847-7601
(716) 847-7126
(FAX) (716) 847-7138

HAZARDOUS MATERIALS

Lead Containing Materials:

Lead-based Paint: For renovations undertaken that require disturbance or demolition of these painted surfaces, and recycling of the steel contractors should be advised of the presence of lead, and required to comply with all regulations including OSHA Lead Exposure in Construction Rule 29 CFR Part 1926.62.

PCB Containing Materials:

PCB containing light ballast has been identified throughout the building, removal and disposal of these materials shall be done under US Environmental Protection Agency regulations under the Toxic Substances Control Act (TSCA) found in 40 CFR Part 761 and OSHA 29 CFR 1926 for worker protection. Disposal shall be in accordance with New York State DEC NYCRR parts 370 through 376

Drums:

Throughout the facility numerous empty steel drums were observed, the drums should be opened to verify empty and cleaned and crushed and disposed of as per New York State DEC NYCRR parts 370 through 376.

Should you have any questions, please do not hesitate to contact us at 716.775.8066.

Sincerely,

Robert Barr
Inspector
NYS DOL Cert# 93-19183

47 E AMHERST

09/17/2006 20:53 7168558508

CENTERSTONE DEVELOPT

PAGE 01/10

CENTERSTONE DEVELOPMENT



FACSIMILE TRANSMITTAL SHEET

TO: Hormoz Mansouri FROM: Tina Bonifacio (716)855-8500
COMPANY: _____ DATE: Sept. 18 /06
FAX NUMBER: 876.8004 TOTAL NO. OF PAGES INCLUDING COVER: 10.
PHONE NUMBER: _____ SENDER'S REFERENCE NUMBER: _____
RE: Asbestos Survey 47 E Amherst. YOUR REFERENCE NUMBER: _____

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

Good Morning Hormoz..
Please see following report

Tina Bonifacio
Centerstone Development
393 Delaware Avenue
Buffalo, New York 14202
855-8500 fax 855-8508



13 September 2006

Mr. John Giardino
Cornerstone Development
393 Delaware Avenue
Buffalo, NY 14202

RE: Asbestos Survey - 47 East Amherst Street - Amherst Bowling Center - Buffalo, NY

Dear Mr. Giardino:

Asbestos sampling was performed at the above referenced site on 14 August 2006. CEM, Inc. collected ten (10) samples for asbestos analysis from the accessible area of the building. Boiler room and some second floor areas of this building were not accessible at time of inspection. Polarized Light Microscopy (PLM) and Transmission Electron Microscopy (TEM) revealed asbestos in the following analyzed samples:

<i>Asbestos Containing Material</i>	<i>Approximate Quantity and Location</i>	<i>Friability</i>	<i>Condition</i>
9-inch Floor tiles and mastic	>2700 SF - throughout	Non friable	Poor
Silver coated roofing	>10000 SF - exterior	Non friable	Fair
Pipe Insulation	>1000 LF - basement areas	Friable	Fair

Suspect sampled materials that were not found to contain asbestos include: plaster, drywall, ceiling tiles, roof shingles, 12-inch floor tile.

The above listed quantities, if applicable, are field approximations only and should be verified prior to abatement. Please, find enclosed the laboratory analytical results and chain of custody documentation, if applicable.

As required by NYS, as per NYCRR 56, Subpart 56-5, one copy of this completed survey shall be sent by the owner or their agent to both the local government agency charged with issuing applicable permits and to the Asbestos Control Bureau district office that is closest to the building or structure location.

These laboratory results are submitted pursuant to CEM, Inc.'s current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted.

Should you have any questions, please do not hesitate to contact us at 716.775.8066.

PO Box 709, Buffalo, NY 14213 Phone 716-775-8066 Fax 716-775-8067



Sincerely,

Robert Barr
Inspector
NYS DOL Cert# 93-19183



AmeriSci Richmond

13635 GENITO ROAD
MIDLOTHIAN, VA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

August 18, 2006

JMD Environmental, Inc
Attn: Heather Perry
PO Box 821
Grand Island, NY 14072

RE: JMD Environmental, Inc
Job Number 106081421
P.O. # Perry
Amherst Bowling Center

Dear Heather Perry:

Enclosed are the results of Asbestos Analysis - Bulk Protocol of the following JMD Environmental, Inc samples, received at AmeriSci on Wednesday, August 16, 2006, for a 48 hour turnaround:

01, 02, 03, 04, 05, 06, 07, 08, 09, 10

The 10 samples, placed in zip lock bag, were shipped to AmeriSci via Fed Ex 8547 5806 1215 B. JMD Environmental, Inc requested ELAP PLM/TEM analysis of these samples.

The results of the analyses which were performed under NYSDOH ELAP Lab Certification # 10984 following ELAP 198.6 PLM & 198.4 TEM guidelines are presented within the Summary Table of this report. The presence of matrix reduction data in the Summary Table normally indicates an NOB sample. For NOB samples the individual matrix reduction, combined PLM and TEM analysis results are listed in the Summary Bulk Asbestos Analysis Results in Table I. Complete PLM results for individual samples are presented in the PLM Bulk Asbestos Report. This combined report relates ONLY to sample analysis expressed as percent composition by weight and percent asbestos. This report must not be used to claim product endorsement or approval by these laboratories, NVLAP, ELAP or any other associated agency. The National Institute of Standards and Technology Accreditation requirements, mandates that this report must not be reproduced, except in full without the written approval of the laboratory. This report may contain specific data not covered by NVLAP or ELAP accreditations respectively, if so identified in relevant footnotes.

AmeriSci appreciates this opportunity to serve your organization. Please contact us for any further assistance or with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "T. Brian Keith". The signature is stylized with a large, sweeping initial "T" and "B".

T. Brian Keith
Asbestos Laboratory Director

**AmeriSci Richmond**

13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

PLM Bulk Asbestos Report

JMD Environmental, Inc
Attn: Heather Perry
PO Box 821
Grand Island, NY 14072

Date Received 08/16/06
Date Examined 08/17/06
ELAP Number 10984
RE Amherst Bowling Center

AmeriSci Job No. 106081421
P.O. # Perry
Page 1 of 3

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
01	106081421-01L1 Location: 9x9 Dark Brown F.T. & Mastio; 2nd FL	Yes	13.8 % (by NYS ELAP 198.6) by Donna M. Blackwell on 08/17/06
Description: Brown, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 13.8 % Other Material: Non-Asbestos/Inert 55 %			
01	106081421-01L2 Location: 9x9 Dark Brown F.T. & Mastio; 2nd FL	Yes	1.9 % (by NYS ELAP 198.6) by Donna M. Blackwell on 08/17/06
Description: Black, Heterogeneous, Non-Fibrous, Mastio Asbestos Types: Chrysotile 1.9 % Other Material: Non-Asbestos/Inert 7.3 %			
02	106081421-02 Location: Roofing; E. Side	Yes	Trace (<1 %) (by NYS ELAP 198.6) by Donna M. Blackwell on 08/17/06
Description: Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <1 % pc Other Material: Non-Asbestos/Inert 2.9 %			
03	106081421-03 Location: Flashing	Yes	12.6 % (by NYS ELAP 198.6) by Donna M. Blackwell on 08/17/06
Description: Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 12.6 % Other Material: Non-Asbestos/Inert 28.3 %			
04	106081421-04 Location: Red Shingle	No	NAD (ELAP 198.6; 400pc) by Donna M. Blackwell on 08/17/06
Description: Red/Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-Asbestos/Inert 36.4 %			

See Reporting notes on last page

AmeriSci Job #: 106081421

Page 2 of 3

Client Name: JMD Environmental, Inc

PLM Bulk Asbestos Report

Amherst Bowling Center

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
05	106081421-05 Location: Ceiling Plaster; 2nd Floor	No	NAD (ELAP 198.1; 400pc) by Donna M. Blackwell on 08/17/06
Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 5 %, Non-fibrous 95 %			
06	106081421-06.1 Location: Wall Plaster; 1st Floor	No	NAD (ELAP 198.1; 400pc) by Donna M. Blackwell on 08/17/06
Description: Ivory, Homogeneous, Non-Fibrous, Cementitious, Skim Coat (Plaster)			
Asbestos Types:			
Other Material: Non-fibrous 100 %			
06	106081421-06.2 Location: Wall Plaster; 1st Floor	No	NAD (ELAP 198.1; 400pc) by Donna M. Blackwell on 08/17/06
Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Base Coat (Plaster)			
Asbestos Types:			
Other Material: Cellulose 5 %, Non-fibrous 95 %			
07	106081421-07 Location: Drywall; 1st Floor	No	NAD (ELAP 198.1; 400pc) by Donna M. Blackwell on 08/17/06
Description: Brown/Lt.Gray, Heterogeneous, Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 20 %, Non-fibrous 80 %			
08	106081421-08L1 Location: Floor Tile 9x9 Dk Brw & Tan; Cocktail Lounge	Yes	1 % (by NYS ELAP 198.6) by Donna M. Blackwell on 08/17/06
Description: Brown, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types: Chrysotile 1.0 %			
Other Material: Non-Asbestos/Inert 35.3 %			
08	106081421-08L2 Location: Floor Tile 9x9 Dk Brw & Tan; Cocktail Lounge	Yes	3.2 % (by NYS ELAP 198.6) by Donna M. Blackwell on 08/17/06
Description: Black, Heterogeneous, Non-Fibrous, Mastio			
Asbestos Types: Chrysotile 3.2 %			
Other Material: Non-Asbestos/Inert 50.5 %			

See Reporting notes on last page

AmeriSol Job #: 106081421

Client Name: JMD Environmental, Inc

Page 3 of 3

PLM Bulk Asbestos Report

Amherst Bowling Center

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
09	106081421-09 Location: 12x12 Bm (Lt.); Lane Area	Yes	Trace (<1 %) (by NYS ELAP 198.6) by Donna M. Blackwell on 08/17/06
Description: Lt. Brown, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile <1 % pc Other Material: Non-Asbestos/Inert 7.3 %			
10	106081421-10L1 Location: 1x1 CT & Mastic	No	NAD (ELAP 198.1; 400pc) by Donna M. Blackwell on 08/17/06
Description: Brown, Heterogeneous, Fibrous, Ceiling Tile Asbestos Types: Other Material: Cellulose 90 %, Non-fibrous 10 %			
10	106081421-10L2 Location: 1x1 CT & Mastic	No	NAD (ELAP 198.6; 400pc) by Donna M. Blackwell on 08/17/06
Description: Brown, Heterogeneous, Non-Fibrous, Mastic Asbestos Types: Other Material: Non-Asbestos/Inert 44.9 %			

Reporting Notes:

Analyzed by: Donna M. Blackwell

Date 8/18/06

"NAD" = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%;
"Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab #101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples (198.6 for NOB samples)(NYS DOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

Reviewed By: DMB

AmeriSci Job #: 106081421

Client Name: JMD Environmental, Inc

Table I
Summary of Bulk Asbestos Analysis Results
 Amherst Bowling Center

AmeriSci Sample #	Client Sample Location	HQ Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01L1	01 9x8 Dark Brown F.T. & Mastic; 2nd FL		0.442	28.5	2.7	55.0	Chrysotile 13.8	NA
01L2	01 9x8 Dark Brown F.T. & Mastic; 2nd FL		0.237	91.6	0.5	7.9	Chrysotile 1.7	NA
02	02 Roofing; E. Side		0.321	97.4	0.2	2.4	Chrysotile <1	Chrysotile Trace
03	03 Flashing		0.479	52.3	8.7	28.3	Chrysotile 12.6	NA
04	04 Red Shingle		0.435	40.9	22.7	36.4	NAD	NAD
05	05 Ceiling Plaster; 2nd Floor		---	---	---	---	NAD	NA
06.1	06 Wall Plaster; 1st Floor		---	---	---	---	NAD	NA
06.2	06 Wall Plaster; 1st Floor		---	---	---	---	NAD	NA
07	07 Drywall; 1st Floor		---	---	---	---	NAD	NA
08L1	08 Floor Tile 9x9 DK Brw & Tan; Cocktail Lounge		0.646	34.3	29.5	35.3	Chrysotile 1.0	NA
08L2	08 Floor Tile 9x9 DK Brw & Tan; Cocktail Lounge		0.097	51.7	0.2	48.1	Chrysotile 2.9	NA
09	09 12x12 Brn (L.L.); Lane Area		0.546	19.7	72.8	7.4	Chrysotile <1	Chrysotile Trace
10L1	10 1x1 CT & Mastic		---	---	---	---	NAD	NA

See Reporting notes on last page

AmeriSci Job #: 106081421



Client Name: JMD Environmental, Inc

Table I

Summary of Bulk Asbestos Analysis Results

Amherst Bowling Center

AmeriSci Sample #	Client Sampled Location	HQ Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
10L2	10 1x1 CT & Mastic		0.664	49.7	5.5	44.9	NAD	NAD

Reviewed by:  Date Reviewed: 8/21/06 Analyzed By: T. Brian Keith  Date Analyzed: 8/18/2006

Semi-Quantitative Analysis: NAD = no asbestos detected; NA = not analyzed due to positive stop; Trace = <1%;
 PLM analysis by EPA 800/M4-82-020 per 40 CFR 763 (NVLAP Lab #101904-0) or NY ELAP 198.1 for New York tieable samples (198.6 for NOB samples) (NY ELAP Lab # 10984);
 TEM analysis by EPA 800/R-93/146 (not covered by NVLAP Bulk accreditation); or NY ELAP 198.4 for New York NOB samples (NY ELAP Lab # 10984);

** Warning Notes: Consider PLM fiber diameter limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris, soils or other heterogeneous materials for which a combination PLM/TEM evaluation is recommended; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only.

106081431

JMD Project Number		14 AUG 2006		48hr	
Type of Survey and Address		Survey Date		Turnaround Time TAT	
AMHURST BOLLIV CENTER		10			
Owner / Agent		Number of Samples			
Field Sample #	Material Description	Location	Amount	Cnd	F/NF
01	Grp Dark Gran FT. of Marsh	2 nd FL	1150+		
02	Roofing	E. Side	15000		
03	Plumbing		300		
04	Red Shingles				
05	Ceiling Plaster	2 nd Floor			
06	Wall Plaster	1 st Floor			
07	Driveway	1 st Floor			
08	Flammable Gas Distribution	Curtain Large	1500+		
09	Leak Gas (L.G.)	Leak area	1000+		
10	IX/ CT + Muri.				
Comments / Special Instructions / Notes:			<div style="border: 1px solid black; padding: 5px; display: inline-block;"> RECEIVED AUG 16 2006 By: RCM </div>		
Analyze PLM then TEM if negative AND NOB			Redesign P.T. - Budget 1000 LF		
Sampled / Relinquished By		Date and Time		Received By:	
[Signature]					

email - rbarr27@yahoo.com