Remedial Investigation Work Plan

Brownfield Cleanup Program

Location:

Midtown Plaza – NYSDEC BCP #C738045
18 East Cayuga Street & 83-87 East First Street
Oswego, New York 13126

Prepared for:

East Lake Commons LLC
525 Plum Street
Syracuse, New York 13204

LaBella Project No. 2181840

January 2019
Revised May 2019

300 State Street, Suite 201 | Rochester, NY 14614 | p 585-454-6110 | f 585-454-3066
www.labellapc.com

CERTIFICATIONS

"I Jennifer M. Gillen *certify that I am currently a 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)."*

000584	5/23/2019	
NYS Professional Geologist #	Date	Signature

Table of Contents

Tables, Figures and Appendices

Figures

Appendix

1.0 Introduction

LaBella Associates, D.P.C. (LaBella) is pleased to submit this Remedial Investigation Work Plan (RIWP) to conduct additional investigation at the Midtown Plaza Site located at 18 East Cayuga Street and 83-87 East First Street, City of Oswego, Oswego County, New York, hereinafter referred to as the "Site" (see Figure 1).

The Site was entered into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) on December 28, 2018. LaBella is submitting this work plan on behalf of East Lake Commons LLC, the Volunteer. The objective of the RI is to define the nature and extent of contamination at the Site. Implementation of this RIWP will support existing information and fill in data gaps to identify remedial areas of concern. The activities in this RIWP will be carried out in accordance with the NYSDEC's Department of Environmental Remedial (DER)-10 (*Technical Guidance for Site Investigation and Remediation)* issued May 3, 2010.

2.0 Site Description and History

2.1 Site Description and Surrounding Properties

The Site is approximately 2.03-acres and is commercial property developed with one (1) two-story commercial plaza building (Plaza Building) and a concrete parking lot (former parking garage). Tax parcel information is below:

Site Address	SBL	Site Acreage	Features
18 East Cayuga Street	128.47-02-04	±1.07	Commercial Building
83-87 East First Street	128.47-02-05	±0.96	Former Parking Garage

The plaza previously housed numerous commercial tenants but several tenant spaces have been vacant for several years. The remaining tenants are anticipated to vacate the building in summer 2019. The upper deck of the former parking garage structure was demolished in May 2015 due to safety considerations and the lower deck remains at grade with East First Street.

It should be noted the Site was previously listed in the State Superfund Program (NYSDEC Non-Registry Classification Code A Site #738045) solely based on the Site's presence in the Oswego Canal Corridor Brownfield Opportunity Area (BOA) and the potential for subsurface impacts to be present due to historical operations.

The Plaza Building is planned to be demolished and a multi-family housing and commercial use development is planned to be constructed. Demolition of the building is anticipated to begin in August or September of 2019.

2.2 Site History

The property was historically developed with numerous residential and commercial structures which were razed when the current commercial plaza building was constructed in the 1960s as part of urban renewal efforts typical of that time period. Based on a review of historical documentation, past uses of the Site and surrounding properties include the following:

Site:

- A tin shop on the eastern portion of the Site bordering East Second Street in at least 1924;
- A machine shop on the northeastern portion of the Site bordering East Second Street in at least 1924;
- A second machine shop located on the northern portion of the Site, bordering East Cayuga Street, in at least 1960;
- Multiple automotive repair shops and sales facilities located in the northwestern portion of the Site bordering East First Street from at least 1924 to at least 1960;
- One (1) gasoline filling station in the northwestern portion of the Site bordering East First Street in at least 1960; and,
- A photography facility in the southern portion of the Site, bordering Bridge Street, from at least 1907 to 1960.

Surrounding Properties:

- Automotive repair shops currently and historically located to the northeast of the Site, across East Second Street.
- A gasoline filling station located to the northeast of the Site, across East Second Street, in at least 1960;
- An iron foundry (including a machine shop) located to the northeast of the Site, beyond the intersection of East Second Street and East Cayuga Street from the 1800s until at least 1960; and,
- A dry cleaning facility located to the southeast of the Site, across East Second Street, in at least 1960.

Pertinent historical features are outlined on Figure 3.

2.3 Geology and Hydrology

2.3.1 Geology

The following descriptions of Geology and Hydrogeology (refer to Section 2.3.2) are based on limited data from the Phase II Environmental Site Assessment (ESA) completed by LaBella in 2018 (refer to Section 3.3) and available regional information.

Based on information obtained from the New York State Museum, the Project Site appears to be underlain by "recent alluvium" which generally consists of permeable, oxidized fine sand to gravel. This generally correlates with observations made during the Phase II ESA, in which soils at the Site consisted generally of tightly packed red-brown to grey, fine to very coarse sand and lesser amounts of angular to sub-rounded, medium to coarse gravel. A surface layer of sand and gravel-based urban fill was commonly encountered Site-wide and included fragments of concrete, bricks, ash, glass, cinders and wood debris. The greatest thickness of urban fill material was generally observed in the courtyard immediately south of the Site building.

Bedrock encountered at the Site during LaBella's 2018 Phase II ESA was gray, slightly weathered Oswego sandstone. Rock quality designations (RQDs) in the top 5-ft of rock were calculated between 47% and 48% while RQDs in the 5-ft to 10-ft into rock interval were between 80% and 83%. This is indicative of highly weathered shallow bedrock and is common in areas like Oswego which were glacially active during the last ice age. The top of bedrock was encountered between 20.3-ft and 30.0-ft bgs at the Site. Deeper bedrock was encountered in the western portion of the Site, towards the Oswego River.

2.3.2 Hydrology

Groundwater was generally encountered in the wells installed as part of the Phase II ESA between depths of 6.5-ft and 11.0-ft below ground surface (bgs), with deeper groundwater observed on the northwestern portion of the Site. Although a groundwater elevation study was not completed as part of the Phase II ESA, based on the presence of the Oswego River approximately 250-ft to the west-northwest and Lake Ontario approximately 0.5-miles to the northwest of the Site, groundwater flow at the Site is anticipated to be to the northwest. A groundwater flow study is planned to be completed as part of the RI. The RI Report will include groundwater contour mapping and groundwater elevation data.

3.0 Previous Investigations

The following previous investigations were completed for the Site and are summarized in this section:

- *Limited Phase II Environmental Site Assessment*, EMS Environmental, April 19, 2013
- *Phase I Environmental Site Assessment,* EMS Environmental, February 12, 2018
- *Phase II Environmental Site Assessment,* LaBella, May 2018

Refer to Figure 3 for previous testing locations and soil and groundwater impacts.

3.1 Limited Phase II ESA, EMS, April 19, 2013

This investigation consisted of the advancement of eight (8) soil borings in the central/southern portion of the Site. Borings were advanced on an approximately 0.5-acre portion of the 83-87 East First Street parcel. Soil borings were advanced to depths ranging from approximately 8-12-feet (ft) below ground surface (bgs). Soil samples were analyzed for VOCs and SVOCs. SVOCs were detected in soil samples; however, detected compounds were not identified above Unrestricted Use SCOs. Photoionization detector (PID) readings were detected up to 65 parts per million (ppm) in SB-1 advanced in the western portion of the Site in proximity to the former automotive repair facility and gasoline filling station. Groundwater was not assessed during this investigation. Additional investigation of these areas was not included as part of this assessment.

3.2 Phase I ESA, EMS, February 12, 2018

EMS conducted a Phase I ESA in accordance with ASTM E1527-13 for 18 East Cayuga Street (northern parcel) which identified a Recognized Environmental Condition (REC) due to the State Superfund Program non-registry Code A classification (refer to Section 2.1) and recommended further investigation to delist or reclassify the Site. It should be noted that the Site was reportedly listed in the State Superfund Program solely based on the Site's presence in the Oswego Canal Corridor BOA and the potential for subsurface impacts to be present due to historical operations.

3.3 Phase II ESA, LaBella, May 2018

This Phase II ESA was completed in accordance with ASTM 1903-11. Investigation locations were selected based on the historical uses of the Site and surrounding properties as well as access within the Plaza Building. This investigation consisted of the advancement of twenty-one (21) soil borings and installation of four (4) overburden groundwater monitoring wells. Thirteen (13) overburden soil borings were advanced using a Geoprobe® drill rig to equipment refusal which ranged from approximately 2.5 to 16-ft bgs. These borings were designated LBA-SB-01 through LBA-SB-13. Eight (8) borings were advanced for geotechnical purposes to depths up to 40-ft bgs. The geotechnical borings were designated P-1 through P-4 and B-1 through B-4. Borings P-2 and B-2 were extended approximately 10-ft into the top of bedrock (depths of 34 and 40-ft bgs, respectively) while the remaining geotechnical borings were advanced to top of bedrock or 10-ft into structurally competent soil. Bedrock encountered at the Site was gray, slightly weathered Oswego sandstone. Rock quality designations (RQDs) in the top 5-ft of rock were calculated between 47% and 48% while RQDs in the 5-ft to 10-ft into rock interval were between 80% and 83%. This is indicative of highly weathered shallow bedrock and is common in areas like Oswego which were glacially active.

Groundwater was generally encountered in the wells between depths of 6.5-ft and 11.0-ft bgs, with deeper groundwater observed on the northern portion of the Site. Although a groundwater elevation study was not completed as part of this Phase II ESA, based on the presence of the Oswego River approximately 250-ft to the west-northwest and Lake Ontario approximately 0.5-miles to the northwest of the Site, groundwater flow at the Site is anticipated to be to the northwest. Task 4 of the proposed RI will include a groundwater flow study.

Several SVOCs and metals were detected at concentrations above NYCRR Part 375 Restricted Residential SCOs. The samples in which elevated concentrations of SVOCs and metals were detected generally contained a mixture of soil and urban fill including ash and cinders, among other materials. SVOCs detected at elevated concentrations generally included polyaromatic hydrocarbons (PAHs). The greatest concentrations of PAHs were detected in LBA-SB-04, B-4 and P-3. Metals detected at elevated concentrations included arsenic, chromium, lead and mercury. Locations with notably elevated lead and mercury include LBA-SB-04, B-4 and P-3.

Petroleum-related compounds (e.g., benzene, ethylbenzene, naphthalene, etc.) were identified above laboratory method detection limits (MDLs) in several soil samples and one (1) groundwater sample collected from immediately downgradient of former automotive repair and gasoline filling stations. Furthermore, evidence of petroleum impairment (i.e., elevated PID readings, staining and/or odors) was observed in several soil borings, particularly along the periphery of the former automotive repair and gasoline filling station in the northwestern portion of the Site.

Chlorinated VOCs (CVOCs) including PCE and breakdown constituents were identified in groundwater samples obtained from wells MW-01 and MW-02 at concentrations above NYS groundwater standards. These wells were installed on the southeastern and western-central portions of the Site, respectively. PCE is commonly utilized in dry cleaning operations and there was a dry cleaning facility located adjacent to the southeast of the Site in at least 1960 (refer to Figure 3). PCE was measured in wells MW-01 and MW-02 at concentrations of 160 micrograms per liter (ug/L) and 14 ug/L, respectively. The NYCRR Part 703 Groundwater Standard for PCE is 5 ug/L. It should also be mentioned that trichloroethene (TCE), which is a breakdown product of PCE was identified in MW-02 at a higher concentration than PCE was detected in this well. TCE was detected in MW-02 at a concentration of 79 ug/L and the NYCRR Part 703 Groundwater Standard for TCE is 5 ug/L.

Areas of concern were developed based on the findings of this report and are detailed in Section 5.0.

4.0 Standards, Criteria and Guidelines

This section identifies the Standards, Criteria and Guidelines (SCGs) for the Site. The SCGs identified are used in order to quantify the extent of contamination at the Site that requires remedial work based on the cleanup goal. The SCGs to be utilized as part of the implementation of this RI Work Plan are identified below:

Soil SCGs: The following SCGs for soil were used in developing this RI Work Plan:

- NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives (RPSCOs) for the Protection of Groundwater;
- NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives (RPSCOs) for Unrestricted Use;
- NYCRR Subpart 375-6 RPSCOs for the Protection of Public Health/Restricted Residential Use; and,

Groundwater SCGs: The following SCGs for groundwater were used in developing this RI Work Plan:

- NYSDEC Part 703 Groundwater Standards; and,
- Technical and Operational Guidance Series (TOGS) 1.1.1 Water Quality Standards and Guidance Values.

Soil Gas, Sub-Slab Vapor and Indoor Air SCGs: There are no SCGs for soil gas. The NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 and subsequent updates are utilized for soil vapor and indoor air. Note that the existing Plaza Building is planned to be demolished in early 2019 and as such, soil vapor intrusion testing is not proposed to be completed as part of this RI. A sub-slab depressurization system (SSDS) is planned to be installed within occupied portions of the future Site building.

5.0 Objectives and Rationale

The objective of this RI is to determine the nature and extent of contamination at the Site and provide a qualitative risk assessment for contaminants on-Site and migrating off-Site.

5.1 Previously Identified Contamination

Although the nature and extent of impacts has not yet been determined, the following impacts were previously identified at the Site as part of the subsurface investigations described in Section 3.0. Refer to Figure 4 for locations of these impacts.

1. <u>Fill Material Containing SVOCs and Metals -</u> Several SVOCs and metals were detected at concentrations above NYCRR Part 375 Restricted Residential SCOs (and in several cases, above Industrial Use SCOs). The samples in which elevated concentrations of SVOCs and metals were detected generally contained a mixture of soil and urban fill including ash and cinders, among other materials. The highest levels of contamination were identified in the courtyard immediately south of the Plaza Building and in the southeastern and southwestern portions of the Site parking lot. Note that additional soil borings were not able to be advanced immediately north of the courtyard due to access limitations in that portion of the Plaza Building; however, based on the historical uses of the Site and widespread identification of urban fill in areas that were accessible during this investigation, similar urban fill materials are anticipated to be present beneath the Plaza Building. SVOCs detected at elevated concentrations generally included PAHs. The greatest concentrations of PAHs were detected in LBA-SB-04 in the central portion of the Site within the courtyard and B-4 and P-3 within the southern portion of the Site. Concentrations of PAHs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene exceed Restricted Residential Use SCOs.

Metals detected at elevated concentrations included arsenic, chromium, lead and mercury. Although samples were not analyzed via toxicity characteristic leaching procedure (TCLP), several compounds were identified at notably high concentrations. Locations with notably elevated lead and mercury include:

a. LBA-SB-04 in the central portion of the Site within the courtyard.
    i. Lead = 704 mg/kg
    ii. Mercury = 3.64 mg/kg
b. B-4 in the southern portion of the Site within the parking lot.
    i. Lead = 376 mg/kg
    ii. Mercury = 3.52 mg/kg
c. P-3 in the southern portion of the Site within the parking lot.
    i. Lead = 463 mg/kg
    ii. Mercury = 1.06 mg/kg

Note that groundwater samples were not analyzed for metals or SVOCs as part of the pre-BCP investigations.

Although not all urban fill material encountered during the investigation was sampled, trace amounts of urban fill material was generally encountered between depths of 2-ft and 7-ft bgs. The most significant volume of fill material was identified within the courtyard area immediately south of the Plaza Building in which a 4-ft thick zone of cinders and glass was encountered between 2-ft and 6-ft bgs in boring LBA-SB-06.

2. <u>Petroleum Impacts -</u> Petroleum-related compounds (e.g., benzene, ethylbenzene, naphthalene, etc.) were identified at concentrations below NYCRR SCOs but above laboratory MDLs in several soil samples and one (1) groundwater sample collected from immediately downgradient of former automotive repair and gasoline filling stations. Furthermore, evidence of petroleum impairment (i.e., elevated PID readings, staining and/or odors) was observed in several soil borings, particularly along the periphery of the former automotive repair and gasoline filling station in the northwestern portion of the Site. The footprint of historical automotive repair facilities is currently within the footprint of the Plaza Building and

due to access limitations, subsurface conditions in that area could not be fully evaluated. Based on historical operations in this area of the Site, the potential for petroleum underground storage tanks (USTs) to have been utilized and the presence of low-level petroleum impacts in locations hydraulically down-gradient of this area, petroleum impacts above SCOs and groundwater standards and potentially orphan USTs could be present beneath the western portion of the Plaza Building. Based on the petroleum impacts identified, there is a potential for soil vapor intrusion in current and/or future Site buildings. However, note that the current Site building is planned to be demolished and a SSDS is planned to be installed in occupied portions of the future Site building.

3. CVOC Impacts - CVOCs including PCE and breakdown constituents were identified in groundwater samples obtained from wells MW-01 and MW-02 at concentrations above NYS groundwater standards. These wells were installed on the southeastern and western-central portions of the Site, respectively. Total VOCs in MW-01 were 384.37 ug/L or parts per billion (ppb) and in MW-02 were 39.4 ug/L. PCE was detected at 160 ug/L in MW-01 and 14 ug/L in MW-02. PCE is commonly utilized in dry cleaning operations and there was a dry cleaning facility located adjacent to the southeast of the Site in at least 1960. Based on the distribution of contamination and the apparent flow of groundwater to the northwest, towards the Oswego River and Lake Ontario, the CVOC impacts identified in groundwater may be migrating to (and across) the Site from the former adjacent dry cleaning facility. Based on the CVOC impacts identified, there is a potential for soil vapor intrusion in current and/or future Site buildings. However, note that the current Site building is planned to be demolished and a SSDS is planned to be installed in occupied portions of the future Site building.

6.0 Remedial Investigation Scope

The proposed RI field activities to be completed as part of the work plan have been separated into tasks and are presented in this section. A list with contact information for the anticipated personnel involved with the project is included in Appendix 2. Qualifications for the personnel are also included.

During all ground intrusive work conducted at the Site, air monitoring will be conducted in accordance with the NYSDOH Generic Community Air Monitoring Plan (CAMP). A copy of this plan is included as Appendix 1.

6.1 Remedial Investigation Tasks

The RI Field Plan is detailed below:

Task 1: Floor Slab Evaluation - This task is designed to preliminarily evaluate the presence of VOCs in sub-slab vapor within the Plaza Building. The objective of this sub-slab screening evaluation will be to identify any potential source areas and target soil boring and/or monitoring well locations. This evaluation will take place in the western portion of the Plaza Building.

It should be noted that the existing Plaza Building is planned to be demolished and a soil vapor intrusion (SVI) evaluation of newly constructed buildings will be conducted in the future.

Task 2: Overburden Soil and Groundwater Evaluation - This task will consist of the advancement of additional shallow overburden soil borings and installation of additional shallow overburden groundwater monitoring wells. This task will also include installation of one (1) deep overburden well to evaluate vertical distribution of CVOCs in soil and groundwater in the southeastern portion of the Site. The objective of this task is to define soil and overburden groundwater impacts, particularly to identify potential source areas and further delineate the lateral and vertical extent of previously identified impacts. This task will also include sampling for emerging contaminants 1,4-dioxane and polyfluoroalkyl substances ("PFAS") (refer to Section 6.1.2 for additional details).

Task 3: Test Pit Evaluation - This task will consist of test pitting to further characterize fill material in the central portion of the Site. The objective of this task is to delineate the horizontal and vertical extent of fill material with SVOC impacts and notably elevated concentrations of metals identified in previous investigations.

Task 4: Subsurface Hydrologic Study - This task will consist of the collection of seasonally high and low static water level measurements, groundwater flow modeling and hydraulic conductivity testing. The objective of this task is to determine approximate groundwater flow direction and hydraulic conductivity.

Task 5: Fish and Wildlife Resources Impact Analysis (FWRIA) Part 1: Resource Characterization- A Site characterization will be conducted to identify all fish and wildlife resources in accordance with DER-10 Section 3.10.1. If the results of the characterization indicate the need for further assessment, a FWRIA Part 2: Ecological Impact Assessment will be conducted in accordance with DER-10 Section 3.10.2.

Sampling procedures which require full suite parameters will include the following analyses:

- USEPA Target Compound List (TCL) and NYSDEC Commissioner Policy (CP-51) list VOCs including up to 20 tentatively identified compounds (TICs) using United States Environmental Protection Agency (USEPA) Method 8260;
- USEPA TCL and NYSDEC CP-51 list SVOCs including up to 20 TICs using USEPA Method 8270;
- Target Analyte List (TAL) metals using USEPA Methods 6010/7470/7471;
- Cyanide using USEPA Method 9012;
- PCBs using USEPA Method 8082; and,
- Pesticides using USEPA Method 8081.

In addition to the full suite parameters, "emerging contaminants" 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) will selectively be included for laboratory analysis as identified in the below tasks. The specific list of PFAS compounds included in these analyses are based on the March 2019 *Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) Under DEC's Part 375 Remedial Programs* guidance document issued by the NYSDEC. The reporting limits for 1,4-dioxane will be no higher than 0.35 ug/L in groundwater and 0.1 mg/kg in soil. The reporting limits for PFAS will be no higher than 2 ng/L in groundwater and 1 ug/kg in soil.

QA/QC samples will also be collected and analyzed (e.g., trip blank, duplicate sample, matrix spike/ matrix spike duplicate (MS/MSD)). The specific QA/QC program is detailed in Section 6.4. The soil samples will be delivered under chain of custody procedures to an ELAP-certified laboratory. The laboratory will provide a NYSDEC Analytical Services Protocol (ASP) Category B Deliverables data package, EQUIS Electronic Data Deliverables (EDDs) and Data Usability Summary Reports (DUSRs) will be completed. Tasks will be conducted in accordance with the Quality Control Program (QCP) (refer to Section 6.4 and Appendix 4).

6.1.1 Task 1: Sub-Slab Vapor Screening

This task will evaluate sub-slab soil vapor to potentially identify a source or sources of VOCs beneath the Plaza Building to guide the selection of soil boring locations in Task 2. The sub-slab vapor screening locations are primarily focused in the western portion of the building footprint because this area is situated atop the locations of former automotive repair and gas station structures, which are potential sources of VOC contamination. Additionally, prior soil borings advanced in the eastern portion of the Plaza Building, hydraulically upgradient of the area to be evaluated by this task, did not identify contamination which could be migrating into the evaluation area. These factors indicate that VOC contamination is less likely to be present in the eastern portion of the Plaza Building footprint and thus the focus on the western portion of the building footprint. However, if elevated sub-slab vapor screening levels are identified towards the eastern portion of the building during implementation of this task, additional sub-slab screening points may be advanced in the eastern portion of the building.

Interior borings were limited during previous investigations due to building access constraints, particularly the presence of multiple building tenants. As noted in Section 2.1, the one (1) remaining tenant is anticipated to vacate the building in summer 2019. This tenant is located in the western portion of the building. If the tenant is still occupying this portion of the building when Task 1 is to be implemented, fieldwork for Task 1 will likely be performed “after hours”; i.e., in the evening or on a weekend.

The sub-slab soil vapor screening evaluation will consist of the following:

- Advancement of ½-in. to 1-in. diameter core holes through the lowest levels of the building in the vicinity of the former automotive repair facilities and gasoline filling stations (refer to Figure 5). Note that the anticipated extent of this screening area may change pending results of the screening.
- The core holes will initially be installed in a grid-like pattern with approximate 25-ft. spacing, with additional holes advanced to delineate any elevated readings. Immediately following advancement of each core hole, a ppbRAE PID will be inserted into the top of each core hole to measure relative total VOC concentrations in vapor emitting from beneath the floor slab. During the measurement, the PID probe will be temporarily sealed into the core hole using non-VOC emitting clay, backer rod or similar material to prevent any interference from VOCs in indoor air. Background readings (i.e., indoor air readings) will also be collected with the PID throughout the evaluation.
- Once the measurement is complete, each core hole will be temporarily sealed with non-VOC emitting clay, backer rod or similar material to prevent any VOCs which may be present in vapors beneath the floor slab from entering the indoor air prior to permanently sealing the core holes.
- The location of each core hole will be measured from existing Site features. Based on the findings of this task, planned soil boring and/or groundwater monitoring well locations depicted on Figure 5 may be adjusted.
- Although this this task is anticipated to be completed when tenants are not in this portion of

the building (i.e., after the tenant's working hours), monitoring of ambient air using a PID will be completed to confirm VOCs are not emitted into the indoor air space during this task and also to monitor background VOC concentrations.

- Following completion of the PID measurements, the coreholes will be permanently sealed with grout.

6.1.2 Task 2: Overburden Soil and Groundwater Evaluation

This task will further evaluate overburden soil and groundwater conditions across the Site.

<u>*Soil Boring Program:*</u>

Pending results of Task 1, a total of sixteen (16) additional shallow overburden soil borings and one (1) deep overburden soil boring will be advanced at the Site. Up to eight (8) shallow overburden groundwater monitoring wells and one (1) deep overburden monitoring well are anticipated to be installed as part of this work. Overburden soil borings will be advanced using a direct-push Geoprobe® sampling system. Note that final boring and well numbers may vary based on field conditions.

At this point, only one (1) deep well is planned for the Site. This well is planned for the southeastern corner of the Site, as the likely source of CVOCs identified on-Site is a former dry cleaning facility located across the street from the proposed location of the well. Soil borings advanced in the southeastern portion of the Site during the previous Phase II ESA conducted by LaBella (LBA-SB-01 and LBS-SB-02) identified a confining layer of dense silt and clay bearing till, beginning between 4-ft and 5-ft bgs and extending to equipment refusal. The deep well will be utilized to evaluate if the identified CVOC impacts have penetrated this confining layer at the Site. Should deep CVOC impacts be identified, additional downgradient deep wells may be recommended to determine the nature and extent of any deeper CVOC impacts. If needed any additional deep wells are needed, the scope of this additional investigation would be discussed with the NYSDEC prior to implementation.

Proposed soil boring locations are depicted on Figure 5; however, locations may vary based on field observations, utilities, and the results of Task 1. Any significant alternations to the planned investigation will be discussed with the NYSDEC. The following methods will be followed to complete borings:

- A Dig Safely New York stakeout will be conducted at the Site to locate any subsurface utilities in the areas where the subsurface assessment and delineation will take place.
- Borings will be advanced with a Geoprobe® direct push sampling system. The use of direct push technology allows for rapid sampling, observation, and characterization of relatively shallow overburden soils. Soil cores will be retrieved and cut from polyethylene sleeves for observation and sampling. Borings will be advanced to equipment refusal, into an apparent confining layer or at the discretion of the field geologist or engineer. Based on the previous investigations, the top of a confining layer is present beginning between approximately 4 and 10-ft bgs, varying by location. Shallow overburden soil borings are not anticipated to extend greater than 15-ft bgs. One (1) deep overburden soil boring will be advanced to a depth up to 25-ft bgs in the southeastern portion of the Site to vertically delineate the previously identified CVOC impacts in this area.
- Drilling equipment will be decontaminated prior to use and between boring locations, using

an Alconox® and potable water solution.

- Soils from borings will be continuously screened in the field for visible impairment, olfactory indications of impairment, and/or indication of detectable VOCs with a PID collectively referred to as "evidence of impairment." Field screening findings will be recorded in soil boring logs and included in the RI Report.
- Soil generated during soil sampling activities will be containerized in 55-gallon drums, characterized, and disposed of off-Site in accordance with applicable regulations (refer to Section 6.3).
- The following soil samples are currently anticipated to be collected for analysis:
  - Eight (8) soil samples for the list of "full suite" parameters defined in Section 6.1;
  - Two (2) soil samples for total organic carbon (TOC) (Lloyd Kahn method);
  - Three (3) soil samples for 1,4-dioxane using USEPA Method 8260C SIM. Minimum reporting limits are defined in Section 6.1.
  - Three (3) soil samples for PFAS using Modified USEPA Method 537. Minimum reporting limits are defined in Section 6.1.
- Soil samples collected for VOC analysis will be collected via USEPA Method 5035.

Overburden Groundwater Monitoring Wells:

During the soil boring program, up to eight (8) shallow overburden groundwater monitoring wells and one (1) deep overburden groundwater monitoring well are planned to be installed. Overburden monitoring wells will consist of 1-inch diameter polyvinyl chloride (PVC). Wells will be constructed of 5 or 10 feet of 0.010-slot well screen connected to an appropriate length of solid PVC well riser to complete each well. The annulus will be sand packed with quartz sand to a nominal depth of 1 to 2-ft. above the screen section. A bentonite seal will be placed above the sand pack to several inches bgs. Wells will be finished with flush-mounted protective curb boxes. Anticipated well locations are shown on Figure 5 and are subject to change based on field observations.

The nine (9) newly installed wells in addition to the four (4) wells installed during previous investigations will be sampled for USEPA TCL and CP-51 list VOCs including up to 20 TICs. In addition, the following will be collected.

- Five (5) groundwater samples for the list of "full suite" parameters defined in Section 6.1;
- An additional two (2) groundwater samples for TAL metals;
- An additional two (2) groundwater samples for USEPA TCL and NYSDEC CP-51 list SVOCs including TICs; and
- An additional two (2) groundwater samples for remedial design parameters including sulfate, sulfide, nitrate and nitrite.

In the event that low recharge rates do not provide enough volume to collect all full suite parameters, samples will be collected in the order in which the parameters are listed in Section 6.1.

In addition to the planned analyses described above, samples from three (3) of the shallow overburden wells will also be analyzed for the following emerging contaminants:

- 1,4-dioxane using USEPA Method 8270 SIM. Minimum reporting limits are defined in Section 6.1.
- PFAS using Modified USEPA Method 537. Minimum reporting limits are defined in Section 6.1.

One (1) blind duplicate and one (1) MS/MSD will be collected per shipment. At least one (1) QA/QC sample will be collected per parameter.

Overburden Groundwater Sampling Procedures:

Groundwater sampling procedures for all compounds except PFAS are as follows:

- Following installation, overburden groundwater monitoring wells will be developed by purging a minimum of three (3) well volumes or until dry using a dedicated bailer or pump (depending on well volumes). Development water will be containerized in 55-gallon drums, characterized, and disposed of off-Site in accordance with applicable regulations (refer to Section 6.3).
- Following development, wells will be allowed to recharge for a minimum of 1 week prior to sampling.
- Wells will be sampled using modified low-flow techniques (i.e., peristaltic pump). Water quality parameters including turbidity, pH, temperature, specific conductivity, dissolved oxygen, oxidation reduction potential, and depth to water will be recorded at five (5) minute intervals. Samples will be collected when the parameters have stabilized for three (3) consecutive 5-minute intervals to within the specified ranges below:

    - Water level drawdown (<0.3')
    - Turbidity (+/- 10%, <50 NTU for metals)
    - pH (+/-0.1)
    - Temperature (+/- 3%)
    - Specific conductivity (+/- 3%)
    - Dissolved Oxygen (+/- 10%)
    - Oxidation reduction potential (+/- 10 millivolts)

Wells will be sampled for PFAS using PFAS-free equipment (i.e., peristaltic pump with HDPE tubing). PFAS samples will be collected prior to collection of other parameters and placed in a separate cooler for shipment to prevent contact with PFAS-containing bottleware and/or tubing. In addition to the typical QA/QC samples, one (1) equipment blank will also be collected for PFAS sampling.

Overburden soil borings and groundwater monitoring well locations, including elevations, will be surveyed using a GPS. As previously noted, the planned soil boring and monitoring well locations depicted on Figure 5 are subject to change pending field observations, site conditions and additional data.

6.1.3 Task 3: Test Pit Evaluation

This task will further characterize fill material at the Site. The following procedures will be implemented:

- A Dig Safely New York stakeout will be conducted at the Site to locate any subsurface utilities in the areas where the subsurface assessment and delineation will take place.
- Concrete will be saw-cut in test pit locations. Concrete will be stockpiled on-Site pending disposal.
- An excavator will be utilized to excavate soils in locations of previously-identified fill material (refer to Figure 5). Soils will be continuously screened in the field for visible impairment, olfactory indications of impairment, and/or indication of detectable VOCs with a PID collectively referred to as "evidence of impairment." Depths and types of fill material will be logged.
- Test pits will continue until the vertical extent of fill material has been identified, or to a maximum of 10-ft bgs. Test pits will continue laterally until the horizontal extent of fill material has been identified, to the extent feasible.
- The following soil samples are currently anticipated to be collected for analysis:
    - Five (5) soil samples for TAL metals;
    - Five (5) soil samples for USEPA TCL and NYSDEC CP-51 list SVOCs including TICs; and
    - Six (6) soil samples for Toxicity Characteristic Leaching Procedures (TCLP) metals.
- Test pits will be backfilled with excavated soils and topped with recycled (crushed) concrete (or similar) to be flush with the surrounding area. During excavation, soils will be placed on polyethylene sheeting to prevent contact with the ground surface. Soils will be backfilled on a first-out, last-in basis prior to covering with recycled concrete.
- Test pit locations will be located using a GPS.

6.1.4 Task 4: <u>Subsurface Hydrologic Study</u>

Following installation of overburden monitoring wells, well casing elevations will be measured via survey or GPS. Static water levels will be collected during approximate seasonally high and low water table levels. This data will be utilized to develop groundwater flow modeling using Golden Software Surfer.

<u>Hydraulic Conductivity Testing</u>

Hydraulic conductivity testing will be conducted in the southeastern portion of the Site at two (2) shallow overburden wells and one (1) deep overburden well. This area of the Site has been selected for conductivity testing based on the prior identification of CVOCs in groundwater in this area and the potential for future remediation (potentially in-situ) to be required.

Well locations will ultimately be selected based on data generated by prior tasks. Static water levels of the wells being tested will be measured and recorded prior to initiating the test. A pressure transducer will be placed in the wells being tested, one well at a time, to record water level measurements over time. A slug consisting of a solid PVC cylinder capped at each end with known mass and volume, or a known volume of distilled water, will be introduced to the well with the pressure transducer to quickly displace a known volume of water. A static water level meter will be used periodically to confirm pressure transducer measurements. The slug (if applicable) and pressure transducer will be removed from the well once at least one third of the displaced water has subsided. The test will be repeated for each of the three (3) wells using the same procedures. Hydraulic conductivity will be calculated for each well tested using the Bouwer-Rice Method (or similar).

6.1.5 Task 5: Fish and Wildlife Resources Impact Analysis (FWRIA) Part 1: Resource Characterization

Site characterization will be conducted to identify all fish and wildlife resources within 0.25 miles of the Site in accordance with DER-10 Section 3.10.1. If there are no resources identified, no further assessment will be conducted in regards to the FWRIA. If resources are identified, they will be depicted on a map to be included in the Remedial Investigation Report. In addition, contaminant migration pathways and contaminants of ecological concern will be identified, and conclusions will be made as to the potential adverse effects to fish and wildlife.

If the results of the characterization indicate the need for further assessment, a FWRIA Part 2: Ecological Impact Assessment will be conducted in accordance with DER-10 Section 3.10.2.

6.2 Health and Safety and Community Air Monitoring

LaBella's Health and Safety Plan (HASP) for this project is included in Appendix 3. The NYSDOH Generic CAMP and Fugitive Dust and Particulate Monitoring will be utilized for this RI and is included in Appendix 1.

6.3 Housekeeping and Investigation Derived Waste

Good housekeeping practices will be followed to prevent leaving contaminated material on the ground or floor surface (e.g., precautions will be taken to prevent impacts to the ground surface due to material spilled during soil sampling, etc.). Any material that does spill on to the ground/floor surface will be promptly picked up and placed in an appropriate location and the ground/floor surface will be cleaned.

Waste materials anticipated to be generated during the implementation of this RI Work Plan include soil generated from soil borings and groundwater generated from development and sampling of the wells. These waste materials will be containerized in 55-gallon drums and stored at the Site for characterization and future disposal.

Additional information regarding Investigation Derived Waste is included in Section 9 of the QCP, included in Appendix 4.

6.4 Quality Assurance/Quality Control Plan

Activities completed at the Site will be managed under LaBella's Quality Control Program, which is included in Appendix 4. Laboratory QA/QC sampling will include analysis of one (1) duplicate sample for each matrix type (i.e., soil and groundwater) at a rate of one per 20 samples collected for each parameter group, or one per shipment, whichever is greater. Additionally, one (1) MS/MSD will be collected and analyzed for every twenty samples collected for each parameter group, or one per shipment, whichever is greater. The MS/MSD will be analyzed for the same parameters as that of the field samples. One (1) trip blank will be analyzed per shipment of groundwater samples for VOC analysis. In addition to these QA/QC samples, one (1) equipment blank will be collected for PFAS analysis during PFAS groundwater sampling.

The samples will be delivered under Chain of Custody procedures to an ELAP-certified laboratory. The laboratory will provide a NYSDEC ASP Category B Deliverable data package. A DUSR will be completed for all ASP-B laboratory data packages per DER-10. The laboratory will provide EQUIS EDDs for all samples.

7.0 RI Schedule and Reporting – Deliverables

The information and laboratory analytical data obtained during the RI will be included in a RI Report, completed in accordance with DER-10. A Qualitative Human Health Exposure Assessment will be included in the RI Report.

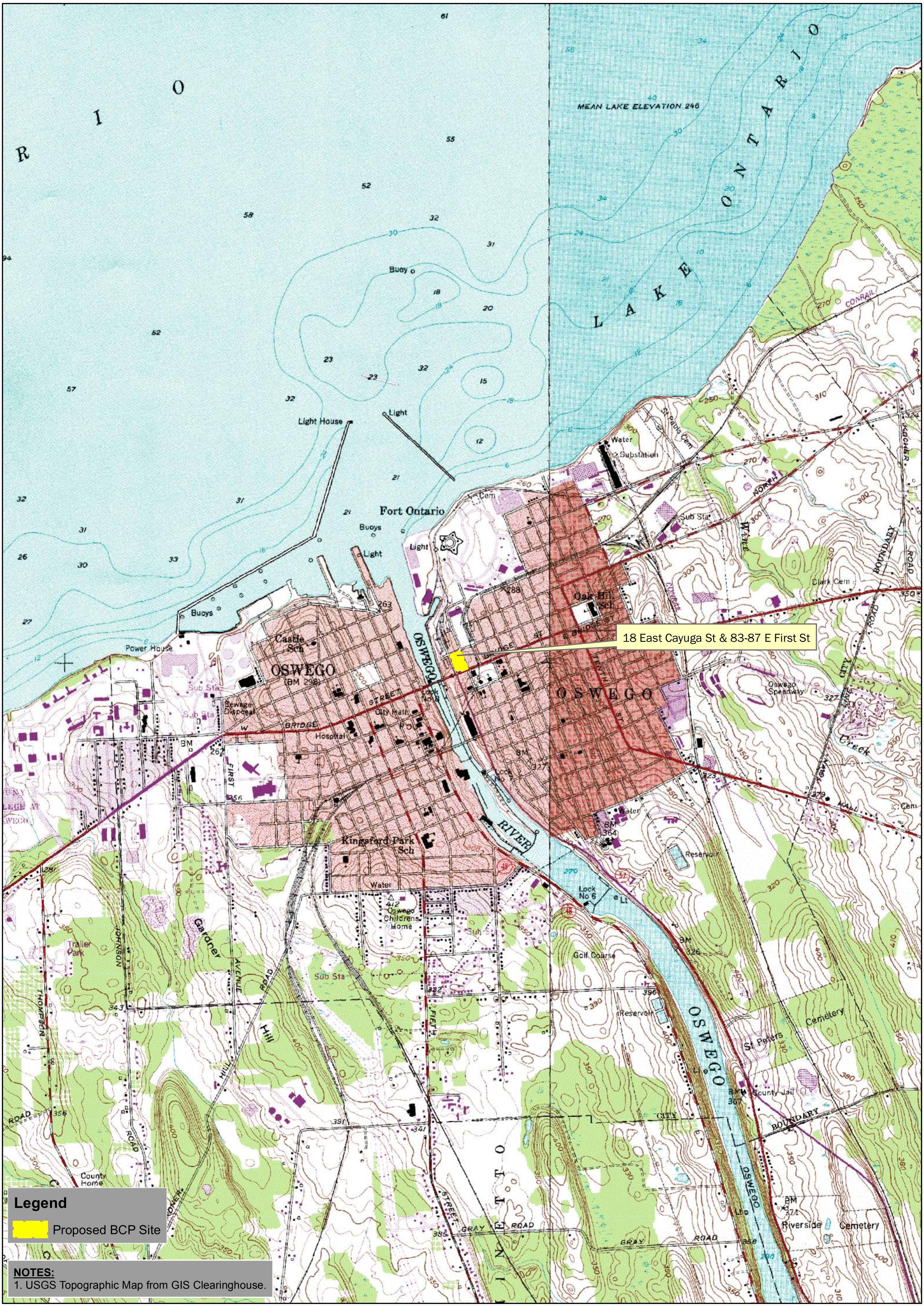
Implementation of the RI Work Plan is anticipated to begin within 60 days after NYSDEC approval of this work plan. The field work is anticipated to require approximately 60 days to complete subsequent to implementation of the RIWP *(Note: this timeframe does not include laboratory analysis or data validation).* The RI Report will be submitted within two (2) months of receipt of DUSRs. It should be noted that, based on timing, the RI Report may not include all static water level data and groundwater flow modeling; this data will be submitted in a separate letter once completed.

The above schedule assumes that an addendum to the RI Work Plan will not be required. If an RI Work Plan addendum is required, it will be submitted as the need is identified and it will include a revised schedule.

All data will also be submitted in the NYSDEC-approved EDD format. The data will be submitted on a continuous basis immediately after data validation occurs.

I:\EAST LAKE COMMONS LLC\2181840 - MIDTOWN OSWEGO BROWNFIELD\REPORTS\RIWP\REVISED MAY 2019\MIDTOWN PLAZA RIWPV4.DOCX

FIGURES



PROJECT #/DRAWING #

2181840

FIGURE 1

DRAWING NAME:

SITE LOCATION MAP

CLIENT:

EAST LAKE COMMONS LLC

PROJECT:

REMEDIAL INVESTIGATION
WORK PLAN
MIDTOWN PLAZA
OSWEGO, NEW YORK

N
W E
S

0 1,000 2,000
Feet
1 inch = 2,000 feet
INTENDED TO PRINT AS: 11" X 17"

LaBella
Powered by partnership.

Path: I:\East Lake Commons LLC\2181840 - Midtown Oswego Brownfield\Drawings\RIWP\Figure 1- Site Location Map.mxd

NOTES:
1. Property boundaries obtained from 2012 Survey Map by Advanced Information Systems.
2. April 2017 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.

PROJECT #/DRAWING #	DRAWING NAME:	CLIENT:
2181840 FIGURE 2	SITE LAYOUT	EAST LAKE COMMONS LLC PROJECT: REMEDIAL INVESTIGATION WORK PLAN MIDTOWN PLAZA OSWEGO, NEW YORK

N W E S

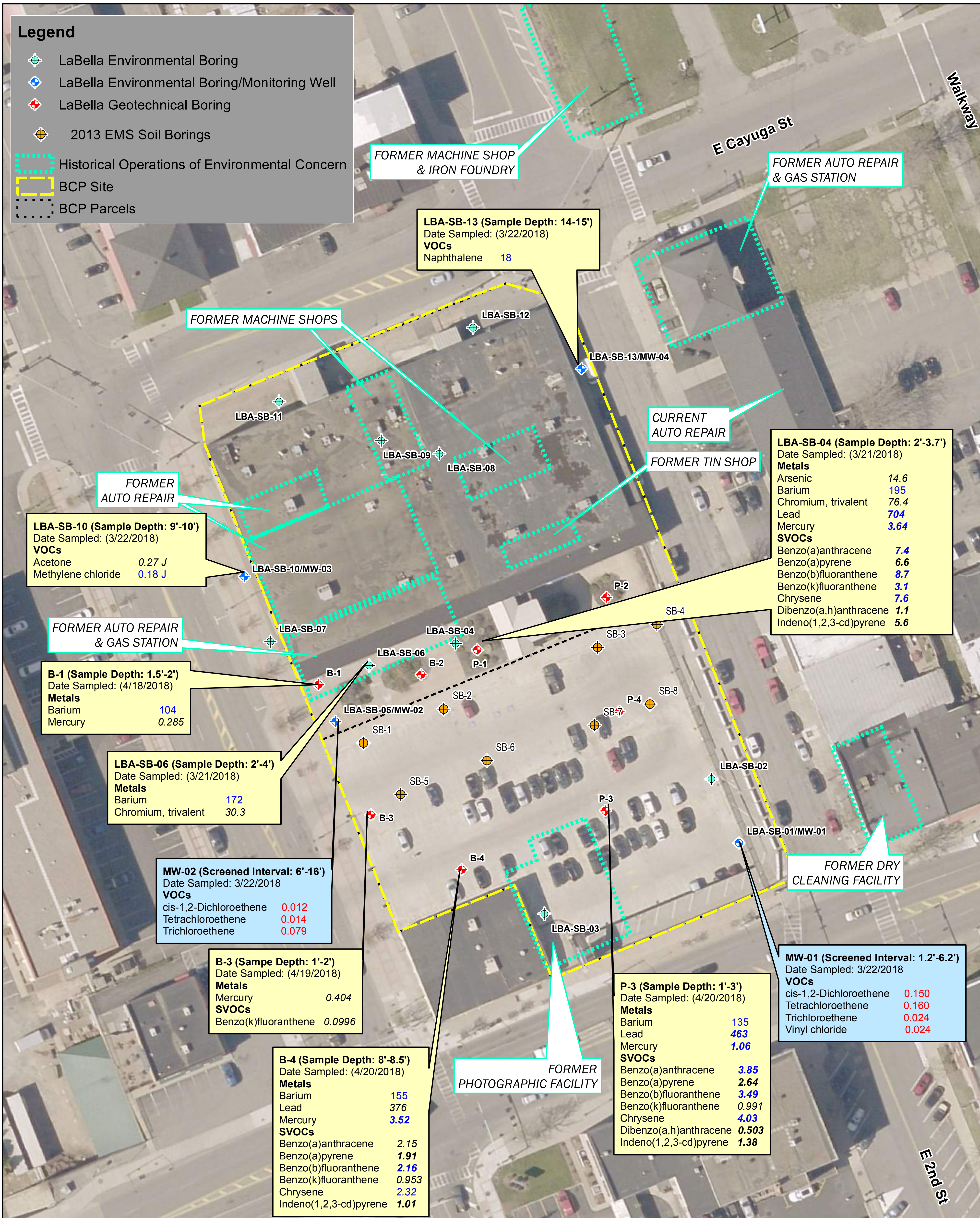
0 30 60 Feet

1 inch = 60 feet

INTENDED TO PRINT AS: 11" X 17"

LaBella Powered by partnership.

Path: I:\East Lake Commons LLC\2181840 - Midtown Oswego Brownfield\Drawings\RIWP\Figure 2- Site Features.mxd



NOTES:

1. Property boundaries obtained from 2012 Survey Map by Advanced Information Systems.
2. April 2017 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
3. LaBella soil boring and monitoring well locations are approximate and measured from existing Site features.
4. Values in *ITALICS* represent concentrations exceeding their respective NYCRR Part 375-6.8(a) Unrestricted Use Soil Cleanup Objective (SCO)
5. Values in **BOLD** represent concentrations exceeding their respective NYCRR Part 375-6.8(b) Restricted Residential Use SCO.
6. Values in BLUE represent concentrations exceeding their respective NYCRR Part 375-6.8(b) Protection of Groundwater SCO.
7. Values in RED represent concentrations exceeding their respective 6 NYCRR Part 703 Groundwater Quality Standard.
8. All concetrations are represented in (mg/kg) or parts per million (ppm).
9. Yellow text boxes represent soil data. Blue text boxes represent groundwater data.
10. Refer to Figure 4 for Areas of Concern.

PROJECT #/DRAWING #	DRAWING NAME:	CLIENT:
2181840 FIGURE 3	HISTORICAL FEATURES AND KNOWN SOIL & GROUNDWATER IMPACTS	EAST LAKE COMMONS LLC PROJECT: REMEDIAL INVESTIGATION WORK PLAN MIDTOWN PLAZA OSWEGO, NEW YORK

N E S W

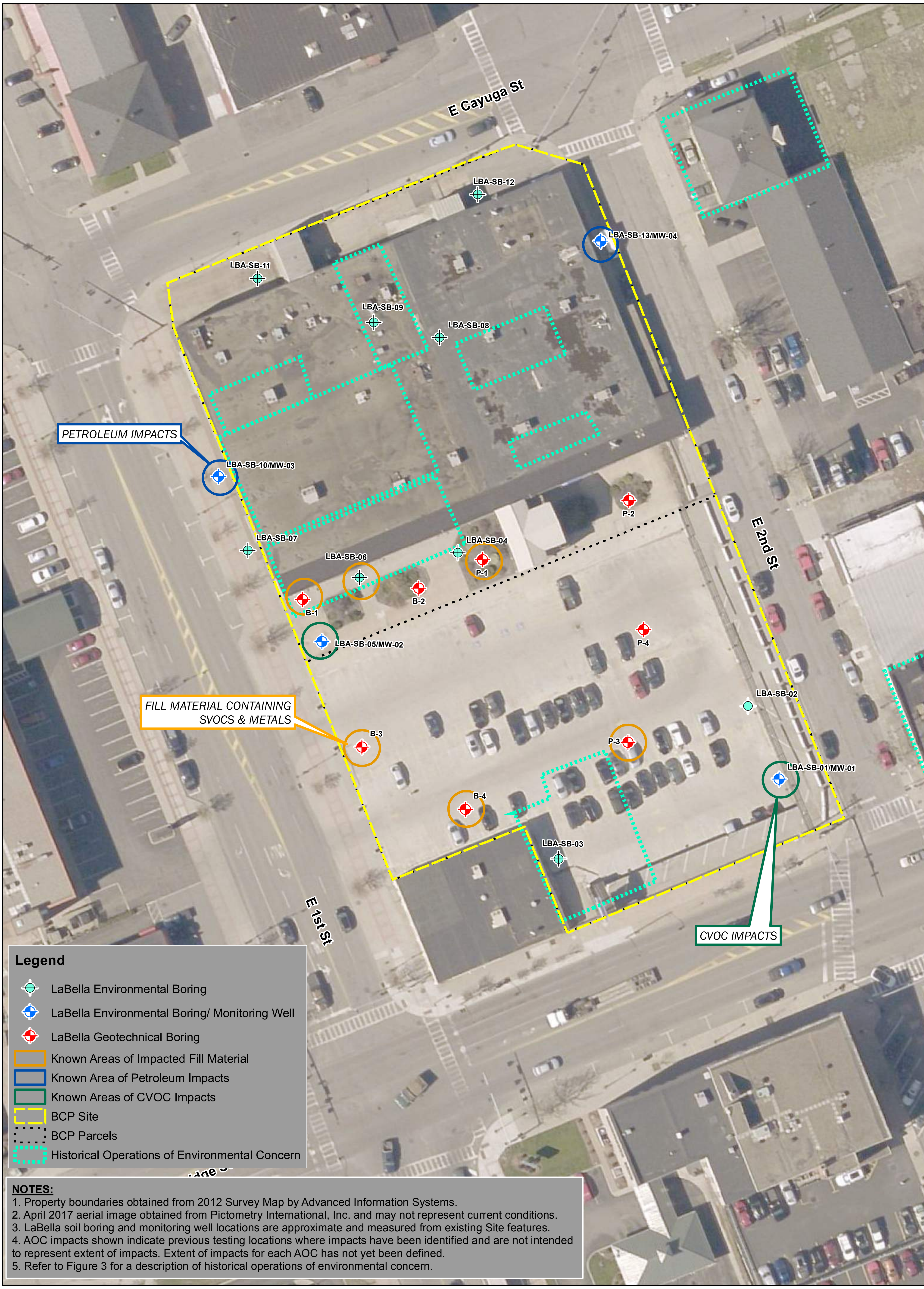
0 30 60 Feet

1 inch = 60 feet

INTENDED TO PRINT AS: 11" X 17"

LaBella Powered by partnership.

Path: \\projects1\projectsAM\East Lake Commons LLC\2181840 - Midtown Oswego Brownfield\Drawings\RIWP\Figure 3- Historical Features.mxd

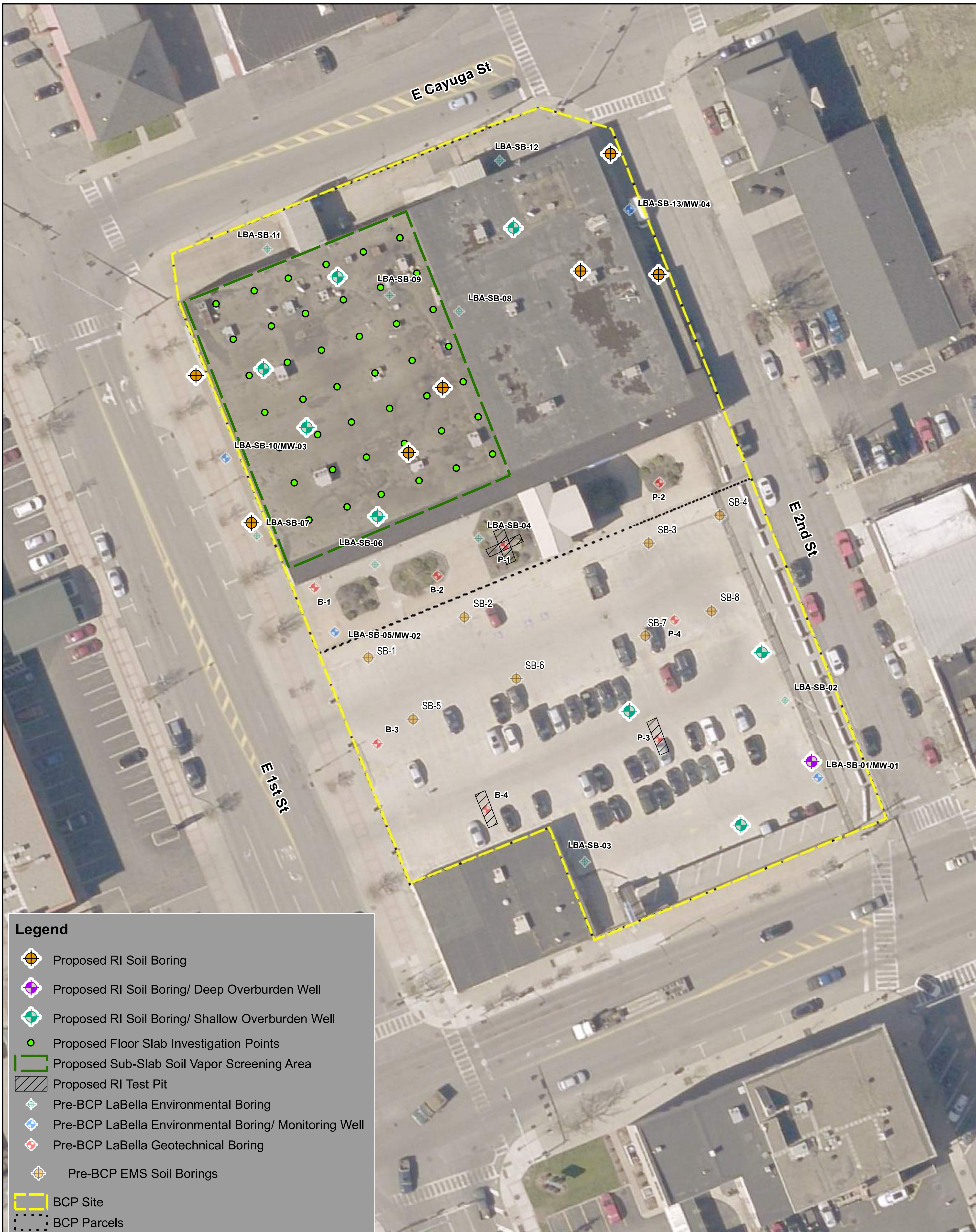


NOTES:

1. Property boundaries obtained from 2012 Survey Map by Advanced Information Systems.
2. April 2017 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
3. LaBella soil boring and monitoring well locations are approximate and measured from existing Site features.
4. AOC impacts shown indicate previous testing locations where impacts have been identified and are not intended to represent extent of impacts. Extent of impacts for each AOC has not yet been defined.
5. Refer to Figure 3 for a description of historical operations of environmental concern.

PROJECT #/DRAWING #	DRAWING NAME:	CLIENT:	
2181840 FIGURE 4	KNOWN AREAS OF IMPACT	EAST LAKE COMMONS LLC PROJECT: REMEDIAL INVESTIGATION WORK PLAN MIDTOWN PLAZA OSWEGO, NEW YORK	N W E S 0 25 50 Feet 1 inch = 50 feet INTENDED TO PRINT AS: 11 x 17 LaBella Powered by partnership.

Path: I:\East Lake Commons LLC\2181840 - Midtown Oswego Brownfield\Drawings\RIWP\Figure 4- Soil & Groundwater Impacts - 2181011_V2.mxd



NOTES:

1. Property boundaries obtained from 2012 Survey Map by Advanced Information Systems.
2. April 2017 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
3. LaBella soil boring and monitoring well locations are approximate and measured from existing Site features.
4. Proposed testing locations are approximate and subject to change based on field conditions and soil screening.
5. Proposed Floor Slab Investigation points are approximate. Number and position may change based on findings during investigation.

PROJECT #/DRAWING #	DRAWING NAME:	CLIENT:	
2181840 FIGURE 5	PROPOSED REMEDIAL INVESTIGATION TESTING	EAST LAKE COMMONS LLC PROJECT: REMEDIAL INVESTIGATION WORK PLAN MIDTOWN PLAZA OSWEGO, NEW YORK	N W E S 0 25 50 Feet 1 inch = 50 feet INTENDED TO PRINT AS: 11 x 17 LaBella Powered by partnership.

Path: I:\East Lake Commons LLC\2181840 - Midtown Oswego Brownfield\Drawings\RIWP\Figure 5- Proposed Testing.mxd

APPENDIX 1

Community Air Monitoring Plan

APPENDIX 1A

New York State Department of Health
Generic Community Air Monitoring Plan

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 volatile organic compounds (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 NYSDEC/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. 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.

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

- If 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.

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

All 15-minute readings must be recorded and be available for State (DEC and DOH) 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.

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

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

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

APPENDIX 2

Anticipated Project Personnel Qualifications

LaBella
Powered by partnership.

Anticipated LaBella Project Personnel

LaBella Staff Member	Title	Phone Number
Greg Senecal	Environmental Director	585-295-6243
Daniel Noll, PE	Senior Environmental Engineer	585-295-6611
Jennifer Gillen, PG	Remediation Program Manager	585-295-6648
Ann Aquilina	Environmental Engineer	585-295-6289
Alex Brett	Environmental Engineer	585-770-2552
Steve Rife	Project Geologist	585-295-7004

Greg Senecal, CHMM

Greg is Director of Environmental Services and is a Certified Hazardous Materials Manager and is responsible for the direction of all environmental investigation related projects undertaken by the firm. He has more than 23 years experience in designing, managing, and conducting numerous site assessments, remedial projects, brownfield redevelopment projects, groundwater monitoring well installations, test pit excavations, and underground petroleum storage tank removals and spill cleanups.

Greg coordinates staffing and client relationships for many of the firm's environmental clients. This effort includes working closely with the client, and forming the best technical project teams for the diverse array of environmental consulting and engineering services offered by the firm.

PHASE I/II INTRO:
As Director of Environmental Services, Greg is responsible for the direction of all environmental investigation related projects undertaken by the firm. Greg has more than 24 years experience scoping, scheduling, and reviewing Phase I Environmental Site Assessments, Phase II Environmental Site Assessments, and remedial efforts undertaken by the firm.

Greg is a Certified Hazardous Materials Manager (CHMM) and has extensive experience in the field of Environmental Management relating to Phase I and Phase II Environmental Site Assessments, remediation, and environmental compliance evaluations. Greg has conducted or supervised over 3,000 Phase I Environmental Site Assessments and over 1,500 Phase II Environmental Site Assessments, as the firm has averaged performing 300-340 assessments per year.

Director, Environmental Division

- State University of New York at Syracuse, School of Environmental Science and Forestry: BS, Environmental Science
- State University of New York at Cobleskill: AAS, Fisheries and Wildlife Technology

Certification / Registration

- Certified Hazardous Materials Manager
- Certified Hazardous Waste Operations & Emergency Response (40-Hour OSHA Health and Safety Training 29)

Project Experience

Monoco Oil Brownfield Cleanup
Pittsford, NY
Greg is responsible for directing all environmental services associated with the NYSDEC Brownfield Cleanup Program for this project. This complex environmental project involves the cleanup and demolition of a 20-acre blighted vacant oil refinery. The redevelopment plan for the project includes redevelopment of an upscale waterfront apartment and town home complex along the Canal.

935 West Broad Street
Rochester, NY
Greg is Client Manager for the Remedial Investigation, Remedial Alternatives Analysis, Site Re-use Concept Plan and a Corrective Action Plan. This project is funded under the NYSDEC 1996 Clean Water/Clean Air Bond Act. Projects tasks completed to date include: geophysical site assessment; comprehensive soil and groundwater characterization; computer model contaminant plume migration trends; GIS mapping to depict site features, analytical data, contaminant plumes; developed reuse concept site plan.

Monroe County Environmental Testing Term Agreement Monroe County, NY
As Director of Environmental Services, Greg has been responsible for the successful completion of over 12 years of term agreements (with annual renewals) for hazardous materials inspection and abatement design with Monroe County. Assignments typically involve

asbestos and lead inspections, but have also included other Regulated Building Materials and mold. Projects have ranged in size from small utility spaces to large multi-story office/housing complexes. A recently completed project involved the inspection of 160,000 sq ft of the Public Safety Building.

Environmental Term Agreement | City of Rochester
Rochester, NY
Client Manager who directs all of the projects under the term. Projects range from Phase I Environmental Site Assessments to Site Characterizations, Remedial Cost Estimates, and Brownfield Cleanups.

690 St. Paul Street | NYSDEC Brownfield Cleanup Project
Rochester, NY
Greg is serving as the project director for this multi-faceted Brownfield investigation and cleanup project. Greg acts as the liaison between the building owners, the former owner (Bausch & Lomb), the Building tenant (City of Rochester School District), and the numerous regulatory agencies involved in the project. This project includes a large SVI investigation, design and installation of a SVI mitigation system, monthly performance monitoring of indoor, sub slab, and exterior air, and communication of the above results to the agencies, tenants, and various stakeholder groups this project also included several IRM's for the removal of orphan tanks and petroleum impacted soils. The RI is currently focusing on the identification and delineation of suspected TCE plumes on the property and under the building structures.

Buffalo Avenue Industrial Corridor Brownfield Opportunity Area | Pre-Nomination Study
Niagara Falls, NY
Greg served as the project director for this 1500 acre, 2500 industrial parcel Brownfield Opportunity Area Project. Greg coordinated the effort between LaBella's Planning and environmental division. He also oversaw the schedule and public outreach components of the project.

Vacuum Oil/South Genesee Brownfield Opportunity Area | Pre-Nomination Study
Rochester, NY
Director of the Project Team for the City of to prepare a pre-nomination study for the proposed Vacuum Oil-South Genesee River Corridor Brownfield Opportunity Area. LaBella developed mapping that allowed for the Brownfield Opportunity Area boundaries to be established in a logical manner at the 56 acre 1.2 mile long corridor along the Genesee River. LaBella conducted economic and demographic research for the project site and gathered zoning, occupancy, and environmental information for potential underutilized Brownfield properties within the BOA.

Port of Rochester Redevelopment Project | Phase II Site Characterization
Rochester, NY
Project Manager for complete Phase II Site Characterization, which involved sub surface characterization of approximately 38 acres. Greg directed the environmental team who received a beneficial re-use determination to re use 80,000 cubic yards of iron foundry slag as on site fill.

Bureau of Water, Lighting, & Parking Meter Operations
Rochester, NY
Greg served as Client Manager to remediate the Water Bureau site to obtain regulatory closure or inactivation. The project scope includes the redevelopment of the current site for reuse as a new facility for the operations center.

CSXT Train Derailment & Hazardous Materials Spill
Rochester, NY
Project Manager responsible for review of all delineation reports, implementation of additional delineation studies, review of remedial work plans, and oversight of all facets of the execution of IRM as it related to achieving a cleanup that would limit long term liability for the City and allow for the planned redevelopment to occur.

Rochester Rhinos Stadium Brownfield Redevelopment
Rochester, NY
Greg served as Project Manager of the NYSDEC Voluntary Cleanup of this prominent urban redevelopment site. The voluntary clean was based around a soils management plan approach that included the re-use of approximately sixty thousand yards of low level petroleum contaminated soils as on site fill under parking lots and in landscaped berm areas of the property.

Daniel Noll, PE

Dan has over 15 years of experience with environmental projects at industrial/manufacturing facilities and environmental investigation projects for a variety of clients including developers, financial institutions, industrial clients, and municipalities. Dan has managed numerous Phase II Environmental Site Assessments and remediation projects such as groundwater monitoring programs, soil vapor investigations, test pit investigations, geo-probe investigations, underground storage tank removals, soil removals, bio-cell remediations, and in-situ groundwater remediation. He also has experience with the design and installation oversight of mitigation systems. In addition, Dan has assisted industrial, municipal and agricultural clients with permitting and annual reporting for State Pollution Discharge Elimination System (SPDES) permits, Part 360 Land Application permits, Composting permits, and Petroleum Bulk Storage (PBS) registrations.

Brownfield Program Manager

- Clarkson University: BS, Chemical Engineering

Certification / Registration

- Professional Engineer, NY
- OSHA 40-Hour Certified Hazardous Waste Site Worker Training
- OSHA 8-Hour Certified Hazardous Waste Site Worker Refresher Training

Project Experience

Carriage Cleaners BCP Site | Springs Land Company
Rochester, NY
As Project Manager, Dan completed a Brownfield Cleanup Program (BCP) Application & Work Plan to conduct a Remedial Investigation at a former dry cleaning facility. A soil, groundwater, and soil gas study was undertaken to develop remedial costs and assist with redeveloping the property. Subsequently, an Interim Remedial Measure was completed to remove the source area of impacts from the Site. Dan completed a remedial alternatives analysis for selecting a treatment approach for the residual groundwater plume. Dan also attended Town Board Meetings regarding this project.

Former Manufacturing Facility - BCP Site | Stern Family Limited Partnership
Rochester, NY
Dan was the Project Engineer for this BCP Site, which underwent a Remedial Investigation, Interim Remedial Measures, and installation of a sub-slab depressurization system. Dan completed and stamped the Final Engineering Report required to obtain the Certificate of Completion for the property owner, allowing them to obtain their tax credits.

Former Bausch & Lomb Facility BCP Site | Genesee Valley Real Estate
Rochester, NY
Dan is Project Manager for this Brownfield site that served as a manufacturing facility from the 1930s to the 1970s. The project includes a Remedial Investigation (RI) of a four-acre parcel with ten areas of concern identified based on historic information. The RI identified four areas requiring remedial actions and Interim Remedial Measures have been completed in three of the locations. The areas of remediation included petroleum impacted soil and groundwater with free floating petroleum product, and chlorinated solvent contamination including bedrock impacts at depth. A remedial alternatives analysis is being completed to determine a final remedy for the site.

Vacuum Oil – BCP Site | One Flint Street Associates
Rochester, NY
Dan was the Project Manager for this Brownfield site that is the oldest oil refinery in the United States. The current project includes developing a remedial investigation plan for two parcels that have had a history of oil refining since the 1800s. The remedial investigation was designed to fill data gaps from previous studies in order to minimize cost to the Client.

Petroleum Soil Removal & Oxygen Injection System| City of Rochester
Rochester, NY
As Project Engineer, Dan developed a soil and groundwater study to investigate former underground storage tanks at a former gasoline/auto repair facility. A remedial alternatives analysis was conducted to evaluate several options for remediating soil and groundwater at the site including light non-aqueous phase liquid. Dan followed this project through remediation which consisted of removing about 1,500 cy of soil and designing/installing an oxygen injection system to remediate groundwater over time.

Former Emerson Power Transmission Facility
Ithaca, NY
Dan completed a detailed review of this 100-acre site with 800,000 sq. ft. of manufacturing space. The site is in the NYSDEC Inactive Hazardous Waste Disposal Site registry and was a heavy industrial facility for over 100 years. The facility closed in 2009 and Dan is the project manager for environmental due diligence activities for a potential buyer. The facility has known issues with chlorinated solvents in bedrock and with significant off-site impacts. The overall project will include a detailed and in-depth environmental site assessment with sampling for soil, bedrock, groundwater, soil gas, sediments, and surface waters in order to document any impacts above NYSDEC criteria and thus limit liability for the purchaser.

Genesee River Dredging Project | City of Rochester
Rochester, NY
Dan managed a project to permit three areas for dredging near the mouth of the Genesee River. The project included evaluating the previous dredging operations in the area, the existing sediment sampling data, sediment levels, discharge points in the area to be dredged and 3-D modeling of the sediments for accurate volume calculations. This information was summarized in a presentation to NYSDEC and the Army Corp of Engineers in order to streamline the permitting process and determine any additional requirements for obtaining a permit. Subsequent to the presentation, Dan developed the permit and submitted them to the Client for signature, and then approval by regulatory agencies.

Port Marina | City of Rochester
Rochester NY
Dan assisted with the environmental investigation of the City of Rochester Port Marina. This project included evaluating the extent of slag fill materials that would require proper management during any redevelopment work. The extent of slag was evaluated by implementing a grid pattern of soil borings and using the resulting data to develop a 3-dimensional model of the subsurface at the Site. This model was used to generate volumes of material to be disturbed during redevelopment and estimate the cost burden of the environmental portion of the project. This project also included evaluating the magnitude and permitting of a massive dewatering program to allow the mass excavation to be completed.

NYSDEC Legacy Site Soil Vapor Intrusion Project | City of Rochester
Rochester, NY
Dan is Project Manager for this project which includes evaluating soil vapor intrusion from a former 230-acre municipal landfill with methane gas and chlorinated solvent impacts. The landfill was converted into an industrial park after closure in 1971 and is now developed with 45 separate parcels and over 2,000,000 square feet of building space. This challenging project included obtaining access from 27 different property owners and conducting site assessments at each facility and separately evaluating groundwater impacts over approximately 20-acre area. The results of this work determined the cost burden and liability of the City for addressing soil vapor intrusion. LaBella utilized all of the following mitigation approaches for minimizing this significant cost burden to the City: sealing of floors, vapor barriers, sub-slab depressurization systems and building pressurization depending on building conditions/uses.

Fill Relocation and Sub-Slab Mitigation System | City of Rochester
Rochester, NY
Dan was project manager for this project which relocated approximately 3,000 cubic yards of fill material from a development site that is located on a former landfill operated by the City of Rochester. This work was conducted for the City but on private property. The fill was relocated and placed in a soil berm on City property with NYSDEC approval. In addition, Dan designed and oversaw construction of a sub-slab depressurization system for the new 8,000 square foot building.

Relationships. Resources. Results.

Jennifer Gillen, MS

Jennifer is a Project Geologist responsible for the coordination and successful completion of Phase II Environmental Site Assessments (ESAs) and several Sites in the NYSDEC Brownfield/ Voluntary Cleanup Programs. Jennifer has also worked on several Brownfield Opportunity Area (BOA) studies. Jennifer was previously the Phase I ESA Program Manager at LaBella and has completed hundreds of Phase I ESAs, numerous Phase II ESAs, and has experience with many Sites with chlorinated solvent impacts as well as NYSDEC Spill Sites.

Project Geologist

- SUNY Albany: BS, Geological Sciences
- SUNY Albany: MS, Geological Sciences
- Certified Hazardous Waste Operations & Emergency Response (40 Hour OSHA Health and Safety Training 29)
- OSHA 8 Hour Hazardous Waste Operations and Emergency Response Course

Project Experience

Canal Corridor Brownfield Opportunity Area Study | Oswego, NY

Jennifer was responsible for the compilation, analysis and dissemination of data associated with the BOA project, which spans 1,344 acres along the Oswego Canal and shore of Lake Ontario, within in the City of Oswego.

Tonawanda Brownfield Opportunity Area Study | Tonawanda, NY

Jennifer was responsible for the compilation, mapping and analysis of data associated with this 1,000 acre BOA on the Niagara River, which included properties used for radiological waste disposal associated with the Manhattan Project.

NYSDEC BCP Site #C828159, 690 Saint Paul Street | Rochester, NY

Jennifer assisted with the development of two Interim Remedial Measure Work Plans, the Remedial Investigation Report and Remedial Alternatives Analysis/Remedial Action Work Plan for the remediation of a NYSDEC Brownfield Cleanup Program site formerly utilized as an industrial manufacturing facility. Implemented the two Interim Remedial Measures and portions of the Remedial Investigation at the Site which included the excavation of contaminated soil and bedrock, the advancement of soil borings, and the installation and sampling of groundwater monitoring wells. Also, included in this work was the installation of bedrock monitoring wells using conventional rock coring methods and installation of infrastructure for *in situ* chemical treatment. This process involved coordination with the NYSDEC, the NYSDOH, and the City of Rochester School District.

Penn Yan Marine | Penn Yan, NY

Currently completing a groundwater delineation investigation and BCP application as well as a work plan for *in situ* treatment of groundwater contaminated with chlorinated volatile organic compounds. The implementation of the groundwater delineation investigation has included the installation and sampling of nineteen groundwater monitoring wells.

NYSDEC VCP Site #V00585-6, Lake Ontario Mariners Marina | Henderson Harbor, NY

Developed a Remedial Alternatives Analysis/Remedial Action Work Plan for this NYSDEC Voluntary Cleanup Site. This work included the design of a sub-slab depressurization system within a building under which a plume of petroleum-contaminated groundwater is located and the design of a pilot test for an air sparging system.

Former Emerson Power Transmission Facility | Ithaca, NY

Jennifer assisted with a detailed review of this 100-acre site with 800,000 sq. ft. of manufacturing space. The facility was a heavy industrial facility for over 100 years and has known issues with chlorinated solvents in bedrock and with significant off-site impacts. The project included a detailed and in-depth environmental site assessment in order to document any impacts above NYSDEC criteria and thus limit liability for the purchaser.

NYSDEC Spill Site #0906903, 185 Scio Street | Rochester, NY

Oversaw the installation of dedicated bedrock groundwater monitoring wells at the Site using conventional rock coring methods.

City of Rochester Department of Environmental Services, Division of Environmental Quality, Pump Test Report, Port of Rochester | Rochester, NY

which included geotechnical sampling. Implementation of the pump test included the pumping of over 650,000-gallons of water and the analysis of drawdown effects on observation wells. This process involved coordination with the New York State Department of Environmental Conservation, Monroe County Pure Waters, and the City of Rochester Division of Environmental Quality.

NYSDEC Spill Site #0906903, 185 Scio Street | Rochester, NY
Oversaw the installation of dedicated bedrock groundwater monitoring wells at the Site using conventional rock coring methods. Completed sampling of these wells using standard low-flow methods.

NYSDEC Spill #0911669, Phase II Environmental Site Assessment and Remediation, Wemco Corp., Saltonstall Street | Canandaigua, NY
Conducted geoprobe soil boring sampling and groundwater sampling to evaluate for potential subsurface effects related to historic fuel distribution operations. Following the subsurface investigation, assisted with the implementation of remedial excavations at the Site and coordinated with the NYSDEC for the closure of the Spill.

NYSDEC Site #C738046, Former Breneman Site | Oswego, NY
Developed Remedial Investigation Work Plan and Citizen Participation Work Plan in anticipation of the upcoming Remedial Investigation at the Site.

Brownfield Cleanup Program Project, Greenport Crossings LLC., 181 Union Turnpike| Greenport, NY

Phase I Environment Site Assessments | Northeastern United States
Performed numerous Phase I ESAs and Transaction Screens on a wide variety of residential, commercial, industrial, and manufacturing facilities including gasoline stations, repair shops, apartment complexes, office buildings, and restaurants for the following groups:
Financial Institutions
- Bank of Castile
- Canandaigua National Bank
- ESL Federal Credit Union
- First Niagara Bank
- Genesee Regional Bank
- Northwest Savings Bank
- Steuben Trust Company

Municipal and Government Clients
- City of Rochester
- City of Oswego
- New York State Department of Transportation
- Town of Victor
- Yates County

Development and Construction Companies
- Urban Housing League of Rochester
- Edgemere Development
- Chrisanntha, Inc.
- Buckingham Properties
- Morgan Management
- Rochester Cornerstone Group

Relationships. Resources. Results.

Ann Aquilina, EIT

Ann is an Engineer in Training responsible for assisting with Phase II Environmental Site Assessments (ESAs) and environmental remediation projects. Project experience includes conducting Phase I ESAs, Phase II ESAs including soil and groundwater sampling and reporting, data management and analysis, and creating site maps and conceptual site models using geographic information system (GIS). Ann is 40 hour OSHA HAZWOPER certified.

Engineer In Training

- Stevens Institute of Technology:
  B.Eng., Environmental Engineering,
  Minors in Green Engineering and Science Communication

Certification / Registration

- Engineer In Training; National Council of Examiners for Engineering and Surveying
- 40-hour OSHA HAZWOPER Certified

Professional Affiliations

- American Academy of Environmental Engineers and Scientists (AAEES)

Project Experience

Former Emerson Street Landfill, City of Rochester, Rochester, New York
Developed and implemented remedial investigation work plans for a former landfill including soil and groundwater sampling, reporting, and GIS data management. Developed a Delisting Petition for a portion of the NYSDEC Listed Inactive Hazardous Waste Disposal Site.

Phase II Environmental Site Assessment, 177 University Avenue, City of Rochester, Rochester, New York
Conducted a Phase II ESA to delineate subsurface contamination in soil and groundwater. Conducted soil boring logging, soil and groundwater sampling, reporting, and GIS data management.

Institutional Control Program, City of Rochester Rochester, New York
Collected and developed Site Management Plans and site maps for over 175 properties in the City of Rochester with previous environmental investigations and/or remediation. Created a database for properties with environmental related institutional controls consisting of property information and Site Management Plans for use on the City of Rochester's website.

Canandaigua Multi-Brownfield Site, Canandaigua, New York
Conducted a design phase investigation to define interim remedial measures for an approximate 15 acre site in the NYSDEC Brownfield Cleanup Program. Was responsible for soil boring logging, soil sampling, GIS data management, and developing a, interim remedial measures work plan addendum.

Waste Minimization Plan, MTA New York, New York
Developed a waste minimization plan report for a large quantity generator by analyzing quantities and types of waste streams. Compared annual data from previous years and compiled tables to display data in a detailed report.

Pump and Treat Groundwater Treatment System, City of Rochester, Rochester, New York
Compiled annual reports for a groundwater treatment system in order to meet regulatory agency requirements. Compiled and interpreted over a decade worth of analytical data to create graphs and identify emission and concentration trends over time. Compiled graphs and summarized findings into detailed reports.

Ann Aquilina, EIT

Phase II Environmental Site Assessment, 131 Water Street, Penn Yan, New York
Completed a Phase II ESA at a former automobile repair shop. Ann was responsible for soil boring logging, soil and groundwater sampling, GIS data management, and reporting.

Pre-Development Site Assessment, Kodak Park South, Rochester, New York
Conducted a pre-development site assessment for an approximate 122 acre former industrial site. Was responsible for soil and groundwater sampling and GIS data management. Organized the findings of this study and previous environmental studies conducted at the site in a detailed report.

Phase II Environmental Site Assessment, 310 Lyell Avenue, Rochester, New York
Completed a Phase II ESA at a portion of the former Rochester Subway and Canal. Researched historic documentation in order to select soil boring and test pit locations. Conducted soil boring logging, soil and groundwater sampling, GIS data management, and reporting.

LABELLA

Relationships. Resources. Results.

Alexander Brett, EIT

Alex Brett is an Engineer in Training (EIT) in LaBella's Phase II and Brownfield Group. He is responsible for the successful completion of environmental investigation and remediation projects. His experience includes environmental field work, including soil and groundwater sampling, fieldwork oversight, and project reporting.

Environmental Engineer

- University at Buffalo: BS, Environmental Engineering
- Engineer in Training
- 40 Hour OSHA HAZWOPER Certified
- RCRA & DOT Hazardous Waste Shipping Training
- Erosion & Sediment Control Training

Project Experience

Field Activities:
-Low-flow groundwater sampling utilizing bladder and peristaltic pumps.
-Soil sampling and logging using direct push drilling rigs
-Monitoring well installation oversight
-SVI sampling

Monroe Hollywood Collision: 1821 Monroe Avenue—Brighton, NY
Conducted low-flow peristaltic groundwater sampling as part of scheduled quarterly groundwater monitoring.

Corning Hospital NYSDEC BCP Site:
176 Denison Parkway– Corning, NY
Performed low-flow peristaltic groundwater sampling for onsite wells for two separate sampling events. Provided CAMP monitoring for Site demolition activities.

Former Unisys Site Groundwater Monitoring—Lake Success, NY*
Coordinated quarterly groundwater sampling rounds and conducted low-flow bladder pump groundwater sampling according to the Site Sampling and Analysis Plan. Prepared quarterly OMM reports for onsite treatment systems ensuring proper operation.

NYSDEC: Al Tech Specialty Steel , Watervliet, NY*
Conducted low-flow groundwater sampling as part of the annual groundwater monitoring requirement using peristaltic pumps. Conducted the inspection of the landfill looking at the condition of the cover and drainage system. Also inspected the treatment system for the condition of the storage tanks and operational controls.

Confidential Client: Site Demolition & Restoration—Green Island, NY*
Construction manager of site demolition and restoration activities. Restoration included placement of a 40 mil HDPE liner over the former slab location of a previously demolished building to prevent infiltration of water pending further investigation into the subsurface. Responsible for proper shipment of hazardous wastes associated with a previous building demolition. Oversaw the demolition and asbestos abatement of a former steel baghouse containing ACM gaskets.

Confidential Client: Facility Decommissioning & Restoration—Niskayuna, NY*
Provided oversight of contractors for multiple activities including asbestos abatement, and facility cleaning/restoration. The facility restoration included concrete fixes, removing oil from trenches followed by cleaning the trenches, and cleaning floors and beams. Worked directly with on-site employees to ensure proper waste characterization, and scheduling for disposal of wastes. Compiled all project documents and wrote the final decommissioning and restoration report for the site.

*Completed under previous employment

Alexander Brett, EIT

Confidential Client: Nail Creek Sampling—Utica, NY*
Assisted the project manager with oversight and sampling of soil and sediments to be analyzed for PCBs as part of the remedial investigation. Samples were located in a stream channel armored with large loose-fit limestone blocks and next to a highway interchange. Samples were recovered using a Geoprobe in soils surrounding the channel, and undisturbed sediments beneath the large blocks by angling the Geoprobe or by drilling directly through the rocks. Used a hand auger to collect additional soil samples in the stream channel where no rock was present.

Confidential Client: Sludge Drying Beds—Selkirk, NY*
Oversaw contractors to determine the flow path of two sludge drying beds on the site. Oil and water mixture was pumped out of distribution chamber that acted as an oil water separator. Dyed water was added to the each sludge drying bed separately to confirm it drained to the chamber. The dyed water level was raised to find the outlet of the chamber. The tank edges were excavated and a new tank entrance was found to determine that both beds entered the chamber though a single pipe.

Confidential Client: Beacon Park Containment Delineation—Allston, MA*
Contractor oversite of vacuum excavation to a depth of 5 feet to clear boring locations for utility lines and other obstructions using an air vacuum excavation truck. Marked out new boring locations and confirmed new location with the project manager. Oversight of direct push soil borings using a Geoprobe. Logged all soils from borehole locations, collected headspace PID readings, and collected soil samples at designated depth intervals as required to find the extent of impacted soils for the site investigation. Provided daily updates of work progress to project manager.

*Completed under previous employment

APPENDIX 3

Health & Safety Plan

Site Health and Safety Plan

Location:

Midtown Plaza
18 East Cayuga Street & 83-87 East First Street
Oswego, New York 13126

Prepared For:

East Lake Commons LLC
525 Plum Street
Syracuse, New York 13204

LaBella Project No. 2181840

November 2018

Table of Contents

<u>Tables</u>

SITE HEALTH AND SAFETY PLAN

Project Title:	Midtown Plaza
Project Number:	2181840
Project Location (Site):	18 East Cayuga Street & 83-87 East First Street
Environmental Director:	Gregory Senecal
Project Manager:	Jennifer Gillen
Site Safety Supervisor:	To Be Determined
Site Contact:	Louis Fournier
Safety Director:	To Be Determined
Proposed Date(s) of Field Activities:	To Be Determined
Site Conditions:	2.03± acres; Site is currently developed with one (1) commercial plaza building
Site Environmental Information Provided By:	❑ *Limited Phase II ESA,* EMS April 19, 2013 ❑ *Phase I ESA,* EMS February 12, 2018 ❑ *Phase II ESA,* LaBella May 2018
Air Monitoring Provided By:	LaBella
Site Control Provided By:	Contractor(s)

EMERGENCY CONTACTS

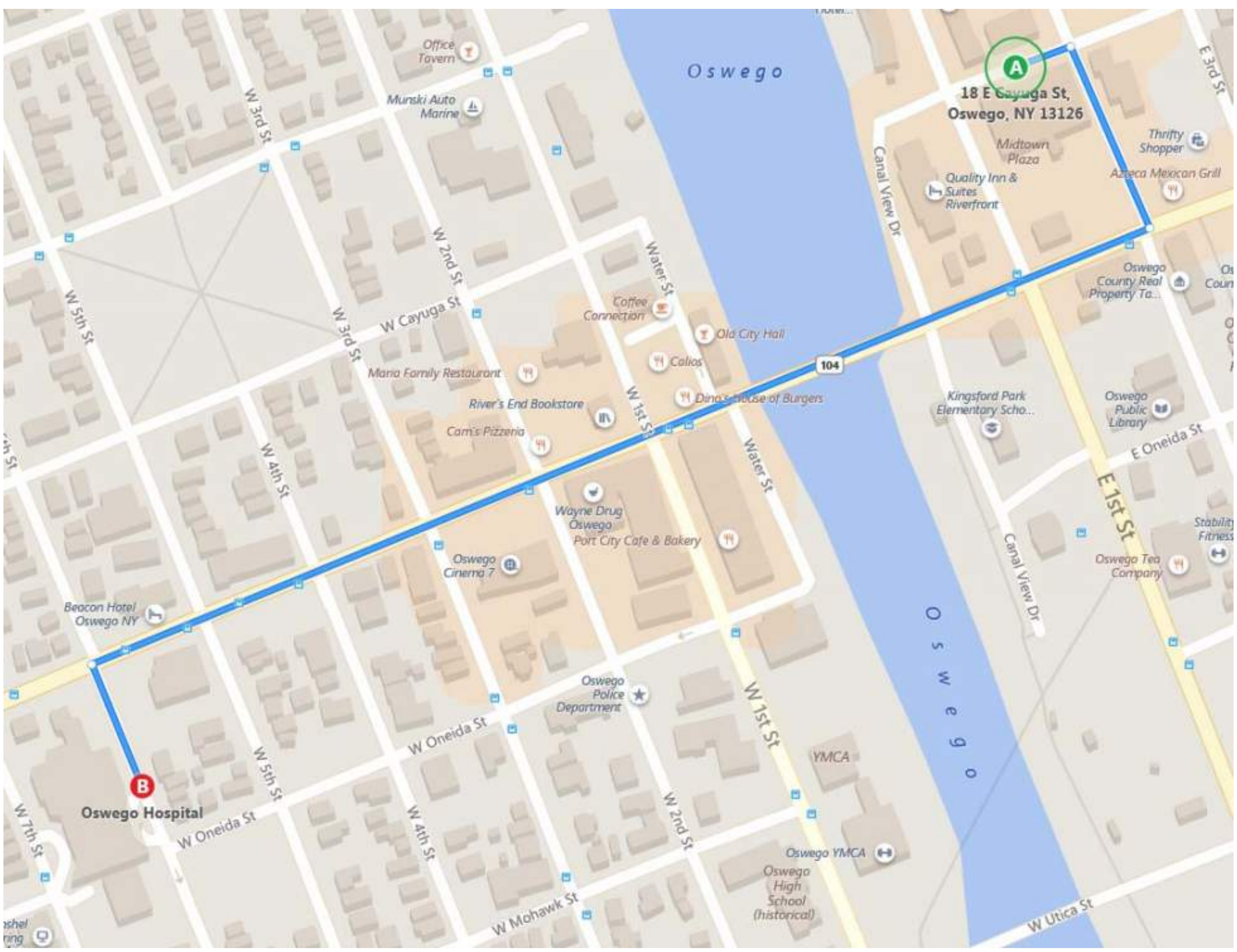
	Name	Phone Number
Ambulance:	As Per Emergency Service	911
Hospital Emergency:	Oswego Hospital	315-349-5511
Poison Control Center:	Finger Lakes Poison Control	716-275-5151
Police (local, state):	Police Department	911
Fire Department:	Fire Department	911
Site Contact:	Louis Fournier	315-218-1102
Agency Contact:	NYSDEC – To Be Determined NYSDOH – To Be Determined	To Be Determined To Be Determined
Environmental Director:	To Be Determined	To Be Determined
Project Manager:	Jennifer Gillen	585-295-6648
Site Safety Supervisor:	To Be Determined	To Be Determined
Safety Director	To Be Determined	To Be Determined

MAP AND DIRECTIONS TO THE MEDICAL FACILITY
OSWEGO HOSPITAL

Total Est. Time: 3 minutes **Total Est. Distance:** 0.7 miles

1:	Head east on E Cayuga Street	
2:	Turn right onto E 2nd Street	144 feet
3:	Turn right onto RT-104/ E Bridge Street	0.5 miles
4:	Turn left onto W 6th Street	328 feet

Arrive at 110 W 6th Street



1.0 Introduction

The purpose of this Health and Safety Plan (HASP) is to provide guidelines for responding to potential health and safety issues that may be encountered during the Remedial Investigation (RI) at the Midtown Plaza Site located at 18 East Cayuga Street and 83-87 East First Street, City of Oswego, Oswego County, New York. This HASP only reflects the policies of LaBella Associates D.P.C. The requirements of this HASP are applicable to all approved LaBella personnel at the work site. This document's project specifications, and the Community Air Monitoring Plan (CAMP), are to be consulted for guidance in preventing and quickly abating any threat to human safety or the environment. The provisions of the HASP do not replace or supersede any regulatory requirements of the USEPA, NYSDEC, OSHA or other regulatory bodies.

2.0 Responsibilities

This HASP presents guidelines to minimize the risk of injury to project personnel, and to provide rapid response in the event of injury. The HASP is applicable only to activities of approved LaBella personnel and their authorized visitors. The Project Manager shall implement the provisions of this HASP for the duration of the project. It is the responsibility of LaBella employees to follow the requirements of this HASP, and all applicable company safety procedures.

3.0 Activities Covered

The activities covered under this HASP are limited to the following:

- Management of environmental investigation and remediation activities
- Environmental Monitoring
- Collection of samples
- Management of excavated soil and fill

4.0 Work Area Access and Site Control

The contractor(s) will have primary responsibility for work area access and site control.

5.0 Potential Health and Safety Hazards

This section lists some potential health and safety hazards that project personnel may encounter at the project site and some actions to be implemented by approved personnel to control and reduce the associated risk to health and safety. This is not intended to be a complete listing of any and all potential health and safety hazards. New or different hazards may be encountered as site environmental and site work conditions change. The suggested actions to be taken under this plan are not to be substituted for good judgment on the part of project personnel. At all times, the Site Safety Officer has responsibility for site safety and his instructions must be followed.

5.1 *Hazards Due to Heavy Machinery*

Potential Hazard:
Heavy machinery including trucks, drilling rigs, trailers, etc. will be in operation at the site. The presence of such equipment presents the danger of being struck or crushed. Use caution when working near heavy machinery.

Protective Action:
Make sure that operators are aware of your activities, and heed operator's instructions and warnings. Wear bright colored clothing and walk safe distances from heavy equipment. A hard hat, safety glasses and steel toe shoes are required.

5.2 *Excavation Hazards*

Potential Hazard:
Excavations and trenches can collapse, causing injury or death. Edges of excavations can be unstable and collapse. Toxic and asphyxiant gases can accumulate in confined spaces and trenches. Excavations that require working within the excavation will require air monitoring in the breathing zone (refer to Section 9.0).

Excavations left open create a fall hazard which can cause injury or death.

Protective Action:
Personnel must receive approval from the Project Manager to enter an excavation for any reason. Subsequently, approved personnel are to receive authorization for entry from the Site Safety Officer. Approved personnel are not to enter excavations over 4 feet in depth unless excavations are adequately sloped. Additional personal protective equipment may be required based on the air monitoring.

Personnel should exercise caution near all excavations at the site as it is expected that excavation sidewalls will be unstable. Do not proceed closer than 3 feet to an unsupported or non-sloped excavation side wall.

Fencing and/or barriers accompanied by "no trespassing" signs should be placed around all excavations when left open for any period of time when work is not being conducted.

5.3 *Cuts, Punctures and Other Injuries*

Potential Hazard:
In any excavation and construction work site there is the potential for the presence of sharp or jagged edges on rock, metal materials, and other sharp objects. Serious cuts and punctures can result in loss of blood and infection.

Protective Action:
The Project Manager is responsible for making First Aid supplies available at the work site to treat minor injuries. The Site Safety Officer is responsible for arranging the transportation of authorized on-site personnel to medical facilities when First Aid treatment in not sufficient. Do not move seriously injured workers. All injuries requiring treatment are to be reported to the Project Manager. Serious injuries are to be reported immediately to the Site Safety Officer

5.4 Injury Due to Exposure of Chemical Hazards

Potential Hazards:
Contaminants identified in testing locations at the Site include various petroleum-related volatile organic compounds (VOCs). Volatile organic vapors, chlorinated solvents or other chemicals may be encountered during subsurface activities at the project work site. Inhalation of high concentrations of volatile organic vapors can cause headache, stupor, drowsiness, confusion and other health effects. Skin contact can cause irritation, chemical burn, or dermatitis.

Protective Action:
The presence of organic vapors may be detected by their odor and by monitoring instrumentation. Approved employees will not work in environments where hazardous concentrations of organic vapors are present. Air monitoring (refer to Section 9.0) of the work area will be performed at least every 60 minutes or more often using a Photoionization Detector (PID). Personnel are to leave the work area whenever PID measurements of ambient air exceed 25 ppm consistently for a 5 minute period. In the event that sustained total volatile organic compound (VOC) readings of 25 ppm are encountered personnel should upgrade personal protective equipment to Level C (refer to Section 8.0) and an Exclusion Zone should be established around the work area to limit and monitor access to this area (refer to Section 6.0).

5.5 Injuries due to extreme hot or cold weather conditions

Potential Hazards:
Extreme hot weather conditions can cause heat exhaustion, heat stress and heat stroke or extreme cold weather conditions can cause hypothermia.

Protective Action:
Precaution measures should be taken such as dress appropriately for the weather conditions and drink plenty of fluid. If personnel should suffer from any of the above conditions, proper techniques should be taken to cool down or heat up the body and taken to the nearest hospital if needed.

6.0 Work Zones

In the event that conditions warrant establishing various work zones (i.e., based on hazards - Section 5.0), the following work zones should be established:

Exclusion Zone (EZ):
The EZ will be established in the immediate vicinity and adjacent downwind direction of site activities that elevate breathing zone VOC concentrations to unacceptable levels based on field screening. These site activities include contaminated soil excavation and soil sampling activities. If access to the site is required to accommodate non-project related personnel then an EZ will be established by constructing a barrier around the work area (yellow caution tape and/or construction fencing). The EZ barrier shall encompass the work area and any equipment staging/soil staging areas necessary to perform the associated work. The contractor(s) will be responsible for establishing the EZ and limiting access to approved

personnel. Depending on the condition for establishing the EZ, access to the EZ may require adequate PPE (e.g., Level C).

Contaminant Reduction Zone (CRZ):
The CRZ will be the area where personnel entering the EZ will don proper PPE prior to entering the EZ and the area where PPE may be removed. The CRZ will also be the area where decontamination of equipment and personnel will be conducted as necessary.

7.0 Decontamination Procedures

Upon leaving the work area, approved personnel shall decontaminate footwear as needed. Under normal work conditions, detailed personal decontamination procedures will not be necessary. Work clothing may become contaminated in the event of an unexpected splash or spill or contact with a contaminated substance. Minor splashes on clothing and footwear can be rinsed with clean water. Heavily contaminated clothing should be removed if it cannot be rinsed with water. Personnel assigned to this project should be prepared with a change of clothing whenever on site.

Personnel will use the contractor's disposal container for disposal of PPE.

8.0 Personal Protective Equipment

Generally, site conditions at this work site require level of protection of Level D or modified Level D; however, air monitoring will be conducted to determine if up-grading to Level C PPE is required (refer to Section 9.0). Descriptions of the typical safety equipment associated with Level D and Level C are provided below:

Level D:
Hard hat, safety glasses, rubber nitrile sampling gloves, steel toe construction grade boots, etc.

Level C:
Level D PPE and full or ½-face respirator and tyvek suit (if necessary). [*Note: Organic vapor cartridges are to be changed after each 8-hours of use or more frequently.*]

9.0 Air Monitoring

According to 29 CFR 1910.120(h), air monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection required for personnel working onsite. Air monitoring will consist at a minimum of the procedure listed below. Air monitoring instruments will be calibrated and maintained in accordance with the manufacturer's specifications.

The Air Monitor will utilize a photoionization detector (PID) to screen the ambient air in the work areas (drilling, excavation, soil staging, and soil grading areas) for total Volatile Organic Compounds (VOCs) and a DustTrak tm Model 8520 aerosol monitor or equivalent for measuring particulates. Work area ambient air will generally be monitored in the work area and downwind of the work area. Air monitoring of the work areas and downwind of the work areas will be performed at least every 60 minutes using a PID and the DustTrak meter.

If sustained PID readings of greater than 25 ppm are recorded in the breathing zone, either personnel are to leave the work area until satisfactory readings are obtained or approved personnel may re-enter the work areas wearing at a minimum a ½ face respirator with organic vapor cartridges for an 8-hour duration (i.e., upgrade to Level C PPE). Organic vapor cartridges are to be changed after each 8-hour use or more frequently, if necessary. If PID readings are sustained, in the work area, at levels above 50 ppm for a 5 minute average, work will be stopped immediately until safe levels of VOCs are encountered or additional PPE will be required (i.e., Level B).

If downwind PID measurements reach or exceed 25 ppm consistently for a 5 minute period downwind of the work area, PID readings will be taken within the buildings (if occupied) on Site to ensure that the vapors are not penetrating any occupied building and effecting the personnel working within. If the PID measurements reach or exceed 25 ppm within the nearby buildings, the personnel should be evacuated via a route in which they would not encounter the work area. The building should then be ventilated until the PID measurements within the building are at or below background levels. It should be noted that the site buildings are currently vacant.

10.0 Emergency Action Plan

In the event of an emergency, employees are to turn off and shut down all powered equipment and leave the work areas immediately. Employees are to walk or drive out of the Site as quickly as possible, wait at the assigned 'safe area' and follow the instructions of the Site Safety Officer.

Employees are not authorized or trained to provide rescue and medical efforts. Rescue and medical efforts will be provided by local authorities.

11.0 Medical Surveillance

Medical surveillance will be provided to all employees who are injured due to overexposure from an emergency incident involving hazardous substances at this site.

12.0 Employee Training

Personnel who are not familiar with this site plan will receive training on its entire content and organization before working at the Site.

Individuals involved with the remedial investigation must be 40-hour OSHA HAZWOPER trained with current 8-hour refresher certification.

Table 1
Exposure Limits and Recognition Qualities

Compound	PEL-TWA (ppm)(b)(d)	TLV-TWA (ppm)(c)(d)	STEL (ppm)(b)	LEL (%)(e)	UEL (%)(f)	IDLH (ppm)(g)(d)	Odor	Odor Threshold (ppm)	Ionization Potential
Acetone	750	500	NA	2.15	13.2	20,000	Sweet	4.58	9.69
Anthracene	.2	.2	NA	NA	NA	NA	Faint aromatic	NA	NA
Benzene	1	0.5	5	1.3	7.9	3000	Pleasant	8.65	9.24
Benzo (a) pyrene (coal tar pitch volatiles)	0.2	0.1	NA	NA	NA	700	NA	NA	NA
Benzo (a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (b) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (k) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	10.88
Carbon Disulfide	20	1	NA	1.3	50	500	Odorless or strong garlic type	.096	10.07
Chlorobenzene	75	10	NA	1.3	9.6	2,400	Faint almond	0.741	9.07
Chloroform	50	2	NA	NA	NA	1,000	ethereal odor	11.7	11.42
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethylene	200	200	NA	9.7	12.8	400	Acrid	NA	9.65
1,2-Dichlorobenzene	50	25	NA	2.2	9.2		Pleasant		9.07
Ethyl Alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	100	100	NA	1.0	6.7	2,000	Ether	2.3	8.76
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol	400	200	500	2.0	12.7	2,000	Rubbing alcohol	3	10.10
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	500	50	NA	12	23	5,000	Chloroform-like	10.2	11.35
Naphthalene	10, Skin	10	NA	0.9	5.9	250	Moth Balls	0.3	8.12
n-propylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phosphoric Acid	1	1	3	NA	NA	10,000	NA	NA	NA
Polychlorinated Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium Hydroxide	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
p-Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethane	NA	NA	NA	NA	NA	NA	Sweet	NA	NA
Toluene	100	100	NA	0.9	9.5	2,000	Sweet	2.1	8.82
Trichloroethylene	100	50	NA	8	12.5	1,000	Chloroform	1.36	9.45
1,2,4-Trimethylbenzene	NA	25	NA	0.9	6.4	NA	Distinct	2.4	NA
1,3,5-Trimethylbenzene	NA	25	NA	NA	NA	NA	Distinct	2.4	NA
Vinyl Chloride	1	1	NA	NA	NA	NA	NA	NA	NA
Xylenes (o,m,p)	100	100	NA	1	7	1,000	Sweet	1.1	8.56
Metals									
Arsenic	0.01	0.2	NA	NA	NA	100, Ca	NA	NA	NA
Cadmium	0.2	0.5	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	1	0.5	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	0.05	0.15	NA	NA	NA	700	NA	NA	NA
Mercury	0.05	0.05	NA	NA	NA	28	NA	NA	NA
Selenium	0.2	0.02	NA	NA	NA	Unknown	NA	NA	NA

(a) Skin = Skin Absorption
(b) OSHA-PEL Permissible Exposure Limit (flame weighted average, 8-hour): NIOSH Guide, June 1990
(c) ACGIH – 8 hour time weighted average from Threshold Limit Values and Biological Exposure Indices for 2003.
(d) Metal compounds in mg/m3
(e) Lower Exposure Limit (%)
(f) Upper Exposure Limit (%)
(g) Immediately Dangerous to Life or Health Level: NIOSH Guide, June 1990.

Notes:
1. All values are given in parts per million (PPM) unless otherwise indicated.
2. Ca = Possible Human Carcinogen, no IDLH information.

APPENDIX 4

Quality Control Plan

LaBella
Powered by partnership.

Quality Control Program (QCP)

Site Location:

Midtown Plaza
18 East Cayuga Street & 83-87 East First Street
Oswego, New York 13126

November 2018

300 State Street, Suite 201 | Rochester, NY 14614 | p 585-454-6110 | f 585-454-3066
www.labellapc.com

Table of Contents

Table of Contents (continued)

1.0 Introduction

LaBella's Quality Control Program (QCP) is an integral part of its approach to environmental investigations. By maintaining a rigorous QC program, our firm is able to provide accurate and reliable data. This QCP should be followed during implementation of environmental investigation and remediation projects and should serve as a basis for quality control methods to be implemented during field programs. Project-specific requirements may apply.

The QC program contains procedures which allow for the proper collection and evaluation of data and documents that QC procedures have been followed during field investigations. The QC program presents the methodology and measurement procedures used in collecting quality field data. This methodology includes the proper use of equipment, documentation of sample collection, and sample handling procedures.

Procedures used in the firm's QC program are compatible with federal, state, and local regulations, as well as, appropriate professional and technical standards.

This QC program includes the following:

- QC Objectives and Checks
- Field Equipment, Handling, and Calibration
- Sampling and Logging Techniques
- Sample Handling, Packaging, and Shipping
- Laboratory Requirements and Deliverables

It should be noted that project-specific work plans (e.g., Remedial Investigation Work Plans) may have project specific details that will differ from the procedures in this QC program. In such cases, the project-specific work plan should be followed (subsequent to regulatory approval).

The characteristics of major importance for the assessment of generated data are accuracy, precision, completeness, representativeness, and comparability. Application of these characteristics to specific projects is addressed later in this document. The characteristics are defined below.

1.1 Accuracy

Accuracy is the degree of agreement of a measurement or average of measurements with an accepted reference or "true" value and is a measure of bias in the system.

1.2 Precision

Precision is the degree of mutual agreement among individual measurements of a given parameter.

1.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount expected to be obtained under correct normal conditions.

1.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition

Careful choice and use of appropriate methods in the field will ensure that samples are representative. This is relatively easy with water or air samples since these components are homogeneously dispersed. In soil and sediment, contaminants are unlikely to be evenly distributed, and thus it is important for the sampler and analyst to exercise good judgment when removing a sample.

1.5 Comparability

Comparability expresses the confidence with which one data set can be compared to another. The data sets may be inter- or intra- laboratory.

2.0 Measurement of Data Quality

2.1 Accuracy

Accuracy of a particular analysis is measured by assessing its performance with "known" samples. These "knowns" take the form of EPA standard reference materials, or laboratory prepared solutions of target analytes spiked into a pure water or sample matrix. In the case of gas chromatography (GC) or GC/MS (mass spectrometry) analyses, solutions of surrogate compounds are used. These solutions can be spiked into every sample and are designed to mimic the behavior of target analytes without interfering with their determination.

In each case the recovery of the analyte is measured as a percentage, correcting for analytes known to be present in the original sample if necessary, as in the case of a matrix spike analysis. For EPA supplied known solutions, this recovery is compared to the published data that accompany the solution.

For the firm's prepared solutions, the recovery is compared to EPA-developed data or the firm’s historical data as available. For surrogate compounds, recoveries are compared to EPA CLP acceptable recovery tables.

If recoveries do not meet required criteria, then the analytical data for the batch (or, in the case of surrogate compounds, for the individual sample) are considered potentially inaccurate. The analyst or his supervisor must initiate an investigation of the cause of the problem and take corrective action. This can include recalibration of the instrument, reanalysis of the QC sample, reanalysis of the samples in the batch, or flagging the data as suspect if the problems cannot be resolved. For highly contaminated samples, recovery of the matrix spike may depend on sample homogeneity. As a rule, analyses are not corrected for recovery of matrix spike or surrogate compounds.

2.2 Precision

Precision of a particular analysis is measured by assessing its performance with duplicate or replicate samples. Duplicate samples are pairs of samples taken in the field and transported to the laboratory as distinct samples. Their identity as duplicates is typically not known to the laboratory. For most purposes, precision is determined by the analysis of replicate pairs (i.e., two samples prepared at the laboratory from one original sample). Often in replicate analysis the sample chosen for replication does not contain target analytes so that quantitation of precision is impossible. For EPA CLP analyses, replicate pairs of spiked samples, known as matrix spike/matrix spike duplicate samples, are used for precision studies. This has the advantage that two real positive values for a target analyte can be compared.

Precision is calculated in terms of Relative Percent Difference (RPD).

- Where X_1 and X_2 represent the individual values found for the target analyte in the two replicate analyses or in the matrix spike/matrix spike duplicate analyses.
- RPDs must be compared to the method RPD for the analysis. The analyst or his supervisor must investigate the cause of RPDs outside stated acceptance limits. This may include a visual inspection of the sample for non-homogeneity, analysis of check samples, etc. Follow-up action may include sample reanalysis or flagging of the data as suspect if problems cannot be resolved.
- During the data review and validation process, field duplicate RPDs are assessed as a measure of the total variability of both field sampling and laboratory analysis.

2.3 Completeness

Completeness for each parameter is calculated as follows:

- The firm's target value for completeness for all parameters is 100%. A completeness value of 95% will be considered acceptable. Incomplete results will be reported to the site managers. In planning the field sample collection, the site manager will plan to collect field duplicates from identified critical areas. This procedure should assure 100% completeness for these areas.

2.4 Representativeness

The characteristic of representativeness is not quantifiable. Subjective factors to be taken into account are as follows:

- The degree of homogeneity of a site;
- The degree of homogeneity of a sample taken from one point in a site; and
- The available information on which a sampling plan is based.

To maximize representativeness of results, sampling techniques and sample locations will be carefully chosen so that they provide laboratory samples representative of the site and the specific area. Within the laboratory, precautions are taken to extract from the sample bottle an aliquot representative of the whole sample. This includes premixing the sample and discarding pebbles from soil samples.

2.5 Comparability

Comparability of laboratory tests is ensured by utilizing only New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)- certified laboratories. This certification is the basis for demonstrating proficiency in testing requirements. Using ELAP certified laboratories will result in consistency amongst analytical data within a specific project and across projects.

3.0 Quality Control Targets

Target values for detection limit, percent spike recovery and percent "true" value of known check standards, and RPD of duplicates/replicates are included in the QCP, Analytical Procedures. Note that tabulated values are not always attainable. Instances may arise where high sample concentrations, non-homogeneity of samples, or matrix interferences preclude achievement of target detection limits or other quality control criteria. In such instances, the firm will report reasons for deviations from these detection limits or noncompliance with quality control criteria.

4.0 Soil Boring Advancement & Monitoring Well Installation Procedures

Soil and groundwater sampling shall be conducted in accordance with NYSDEC Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation dated May 3, 2010 and any Site-specific work plans.

Prior to drilling, all drill sites will be cleared with appropriate utility companies to avoid potential accidents relating to underground utilities. Utility drawings will be reviewed, if available.

4.1 Drilling Equipment and Techniques

<u>Direct Push Geoprobe Advanced Borings:</u>

Soil borings and monitoring wells will be advanced with a Geoprobe direct push sampling system. The use of direct push technology allows for rapid sampling, observation, and characterization of relatively shallow overburden soils. The Geoprobe utilizes a four to five-foot macrocore sampler, with disposable polyethylene sleeves. Soil cores will be retrieved in four or five-foot sections, and can be easily cut from the polyethylene sleeves for observation and sampling. The macrocore sampler will be decontaminated between boring locations using an alconox and water solution.

Prior to initiating drilling activities, the Macrocores, drive rods, and pertinent equipment, will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. Throughout and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.

Test borings will be advanced with 2-inch (or larger) inside diameter (ID) direct push Macrocore through overburden soils. Drilling fluids, other than potable water will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

During the drilling, a properly calibrated photoionization detector (PID) will be used to screen soil cores retrieved from the Macrocores.

Direct Push Geoprobe advanced groundwater-monitoring wells typically utilize minimum 1.25-inch threaded flush joint PVC pipe with 0.010-in. slotted screen or pre-packed well screens. PVC piping used for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe.. All materials used to construct the wells will be NSF/ASTM approved. Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated cap or plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well. Stainless steel wells or pre-packed PVC wells may be used if specified in the work plan and approved by the NYSDEC.

Hollow-Stem Auger Advanced Borings:

The drilling and installation of soil borings and monitoring wells will be performed using a rotary drill rig which will have sufficient capacity to perform 4 1/4-inch inside diameter (ID) hollow-stem auger drilling in the overburden, retrieve Macrocore or split-spoon samples, and perform necessary rock coring using NX, NQ, HQ or core barrel size as specified in the project-specific work plan. The borehole may be reamed up to 5 1/2-inch diameter prior to monitoring well installation as cased hole in the bedrock, or may be left as open bedrock hole, with regulatory concurrence. Equipment sizes and diameters may vary based on project-specific criteria. Any investigative derived waste generated during the advancement of soil borings and monitoring well installations will be containerized and characterized for proper disposal.

Prior to initiating drilling activities, the augers, rods, Macrocore, split spoons, and other pertinent equipment will be steam cleaned or washed with an alconox and water solution. This cleaning procedure will also be used between each boring. Steam cleaning activities will be performed in a designated on-site decontamination area. During and after the cleaning processes, direct contact between the equipment and the ground surface will be avoided. Plastic sheeting and/or clean support structures (e.g., pallets, sawhorses) will be used.
Test borings will be advanced with 4 1/4-inch (ID) hollow stem augers through overburden, and cored with a NX, NQ, HQ or core barrel size as specified in the project-specific work plan sized diamond core barrels in competent rock, driven by truck-, track-, or trailer-mounted drilling equipment. Alternative methods of drilling or equipment may be allowed or requested for project-specific criteria, but must be approved by the NYSDEC. Drilling fluids, other than water from a

NYSDEC-approved source, will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative.

During the drilling, a (PID) will be used to screen soils retrieved from the split spoons or Macrocores.

Where bedrock wells are required, test borings shall be advanced into rock with NX, NQ, HR (or similar) coring tools. Only water from an approved source shall be used in rock coring. The consultant shall monitor and record the petrology, core recovery, fractures, rate of advance, and water lost or produced in each test boring. The Rock Quality Determination (RQD) value shall be calculated for each 5-foot core. Each core shall be screened with a PID upon extraction. All core samples shall be retained and stored by the consultant in an approved wooden core box for a period of not less than one year.

The method selected may be percussion or rotary drilling. The method and equipment selected must be capable of penetrating the bedrock at each well location to a depth required by the work plan.

Bedrock well installation will involve construction of a rock socket in the weathered bedrock. The socket will be drilled into the top of rock (typically 1-ft. to 5-ft. into the top of rock) at each bedrock well location to allow a permanent steel casing to be grouted securely in place prior to completion of the well. The purpose for this is to provide a seal at the overburden/bedrock interface and into the upper bedrock surface, to prevent the entrance of overburden water into the bedrock. After the grout and casing have set up for a minimum of 12 hours, the remaining bedrock can be NX (or similar) cored through the steel casing to a depth determined by the project-specific work plan.

Bedrock wells will either be open coreholes in the rock or consist of threaded, flush-joint PVC piping. Construction will vary depending on the project and as such, specific construction of the wells will be detailed in the project-specific work plan. Bedrock wells which do utilized PVC piping for risers and screens will conform to the requirements of ASTM-D 1785 Schedule 40 pipe. All materials used to construct the wells will be NSF/ASTM approved.

Screen and riser sections shall be joined by flush-threaded coupling to form watertight unions that retain 100% of the strength of the casing. Solvent PVC glue shall not be used at any time in the construction of the wells. The bottom of the screen shall be sealed with a treated cap or plug. No lead shot or lead wool is to be employed in sealing the bottom of the well or for sealant at any point in the well.

4.1.1 Artificial Sand Pack

When utilized, granular backfill will be chemically and texturally clean, inert, siliceous, and of appropriate grain size for the screen slot size and the host environment The sand pack will be installed using a tremie pipe, when possible (i.e., a tremie pipe may not fit into smaller, 2-in. diameter boreholes). When utilized, the well screen and casing will be installed, and the sand pack placed around the screen and casing to a depth extending at least 2-ft.. A pre-packed well screen may be used if pre-approved by the NYSDEC.

An artificial sand pack will not be utilized in bedrock wells without screens (i.e., open borehole wells).

4.1.2 Bentonite Seal

A minimum 2-ft. thick seal will be placed directly on top of the sand pack, and care will be taken to avoid bridging. In the event that Site geology does not allow for a 2-ft. seal (e.g., only 1-ft. of space remains between the top of the sand pack and ground surface), the remaining space in the annulus will be filled with bentonite.

4.1.3 Grout Mixture

Upon completion of the bentonite seal, the well may be grouted with a non-shrinking cement grout (e.g., Volclay^{R}) mix to be placed from the top of the bentonite seal to the ground surface. The cement grout shall consist of a mixture of Portland cement (ASTM C 150) and water, in the proportion of not more than 7 gallons of clean water per bag of cement (1 cubic foot or 94 pounds). Additionally, 3% by weight of bentonite powder may be added.

4.1.4 Surface Protection

At all times during the progress of the work, precautions shall be used to prevent tampering with or the entrance of foreign material into the well. Upon completion of the well, a suitable cap shall be installed to prevent material from entering the well. Where permanent wells are to be installed, the well riser shall be protected by a flush mounted road box set into a concrete pad or locking well cap for stick-up wells. A concrete pad, sloped away from the well, shall be constructed around the flush mount road box or stick-up casing at ground level.

Any well that is to be temporarily removed from service or left incomplete due to delay in construction shall be capped with a watertight cap.

4.2 Surveying

Coordinates and elevations will be established for each monitoring well and sampling location. Elevations to the closest 0.01 foot shall be used for the survey. These elevations shall be referenced to a regional, local, or project-specific datum. The location, identification, coordinates, and elevations of the wells will be plotted on maps with a scale large enough to show their location with reference to other structures at each site.

4.3 Well Development

After completion of the well, but not sooner than 24 hours after grouting is completed, development will be accomplished using pumping, bailing, or surge blocking. No dispersing agents, acids, disinfectants, or other additives will be used during development or introduced into the well at any other time. During development, water will be removed throughout the entire water column by periodically lowering and raising the pump intake (or bailer stopping point).

Development water will be either properly contained and treated as waste until the results of chemical analysis of samples are obtained or discharged on Site as determined by the Site-specific work plans and/or consultation with the NYSDEC representatives on Site.

The development process will continue until removal of a minimum of 110% of the water lost during drilling, three well volumes; whichever is greater, or as specified in the work plan. In the event that limited recharge does not allow for the recovery of all drilling water lost in the well or three (3) well volumes, the well will be allowed to stabilize to conditions deemed representative of groundwater conditions. Stabilization periods will vary by project but will be confirmed with the NYSDEC prior to sampling.

5.0 Geologic Logging and Sampling

At each investigative location, borings will be advanced through overburden using either a drill rig and hollow-stem auger or direct push technology (split spoons or Macrocore). Soils will be evaluated for visual and olfactory evidence of impairment (i.e., staining, odors, and elevated PID readings) by a qualified individual. Sampling devices will be decontaminated according to procedures outlined in the Decontamination section of this document. When utilized, split-spoon samplers will be driven into the soil using a minimum 140-pound safety hammer and allowed to free-fall 30-inches, in accordance with ASTM-D 1586-84 specifications. The number of blows required to drive the sampler each 6-inches of penetration will be recorded. When required, samples will be stored in the appropriate bottleware (refer to Section 10) until analysis or deemed unnecessary.

In the event that maximum design depth of investigation is reached and hydrogeologic conditions are not suitable for well installation, the maximum drilling depth may be revised.

Boulders and bedrock encountered during well installation may be cored by standard diamond-core drilling methods using an NX, NQ, HQ size core barrel or other if specified in the project-specific work plan. All rock cores recovered will be logged by a qualified individual, and stored in labeled wooden core boxes. The cores will be stored by the firm until the project is completed or for at least one year. Drilling logs will be prepared by a qualified individual who will be present during drilling operations. One copy of each field boring and well construction log and groundwater data, will typically be submitted as part of the investigation summary report (e.g., Remedial Investigation Report). The RQD value shall be calculated for each 5-foot section. Information provided in the logs shall include, but not be limited to, the following:

- Date(s), test hole identification, and project identification;
- Name of individual developing the log;
- Name of driller and assistant(s);
- Drill, make and model, auger size;
- Identification of alternative drilling methods used and justification thereof (e.g., rotary drilling with a specific bit type to remove material from within the hollow stem augers);
- Standard penetration test (ASTM D-1586) blow counts;
- Field diagram of each monitoring well installed with the depth to bottom of well/ screen, top of screen, length of riser, depth of steel casing, depths of sand pack, bentonite seal, grout, type of well completion etc.;
- Depth of each change of stratum;
- Identification of the material of which each stratum is composed, according to the USCS system or standard rock nomenclature, as appropriate;

- Depth interval from which each sample was taken, sample identification, and sample time;
- Depth at which hole diameters (bit sizes) change;
- Depth at which groundwater is encountered;
- Drilling fluid and quantity of water lost during drilling;
- Depth or location of any loss of tools or equipment;
- Depths of any fractures, joints, faults, cavities, or weathered zones

6.0 Groundwater Sampling Procedures

The groundwater in all new monitoring wells will be allowed to stabilize for at least 24-hours following development prior to sampling. Water levels will be measured to within 0.01 feet prior to purging and sampling. Sampling of each well will typically be accomplished in one of two ways; active or passive.

<u>Active Sampling:</u>

Active sampling includes bailing or pumping. Purging will be completed prior to active sampling if specified in the project-specific work plan. During purging, the following will be recorded in field books or groundwater sampling logs:

- date
- purge start time
- weather conditions
- presence of NAPL, if any, and approximate thickness
- pump rate
- pH
- dissolved oxygen
- temperature
- conductivity
- redox
- turbidity
- depth of well
- depth to water
- purge end time
- volume of water purged

In general, wells will be purged until the pH, conductivity, temperature, dissolved oxygen, redox, and turbidity of the water being pumped from the well have stabilized with a turbidity goal of 50 NTU (may be lower for metals analysis).

<u>Passive Sampling:</u>

Groundwater samples will be collected via passive methods (i.e., no-purge) according to the following procedures and in the volumes specified in Table 10-1:

Samples will be collected via passive diffusion bag (PDB) samplers. PDB samplers are made of low-density polyethylene plastic tubing (typically 4 mil), filled with laboratory grade (ASTM Type II) deionized water and sealed at both ends.

- Pre-filled PDBs will not be stored for longer than 30 days and will be kept stored at room temperature in a sealed plastic bag until ready to use.
- PDBs filled in the field will be used immediately and not stored for future use.
- PDB samplers will only be used to collect groundwater samples which will be analyzed for VOCs.
- Mesh covers will be utilized for open rock holes as to not puncture the PDB and will be secured to the bag using zip-ties.
- PDB samplers will be deployed by hanging in the well at the depth(s) specified in the project-specific work plan. The PDB samplers will be deployed at least 14 days prior to sampling;
- When transferring water from the PDB to sample containers, care will be taken to avoid agitating the sample, since agitation promotes the loss of volatile constituents;
- Gloves will be changed between collection of each PDB and tools used to open the PDB will be decontaminated with an alconox and potable water solution between each PDB;
- Any volume not used will be treated as investigation derived waste;
- Any observable physical characteristics of the groundwater (e.g., color, sheen, odor, turbidity) at the time of sampling will be recorded; and
- Weather conditions (i.e., air temperature, sky condition, recent heavy rainfall, drought conditions) at the time of sampling will be recorded.

7.0 Soil Vapor Intrusion Sampling Procedures

Soil vapor intrusion (SVI) sampling is to be conducted in accordance with the *NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 and subsequent updates. Tracer gas testing is to be conducted for sub-slab sampling points to ensure concentrations of the tracer gas are not detected in the sub-slab at greater than 10% of the concentration detected in the atmosphere. An outdoor air sample is to be collected at an upwind direction as a control. A building inventory should be completed to document building construction information and identify products that may be contributing to the levels in indoor air.

8.0 Field Documentation

8.1 Daily Logs/ Field Notebook

Daily logs are necessary to provide sufficient data and observations to enable participants to reconstruct events that occurred during the project and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings. Daily logs may be kept in a project-specific notebook labelled with the project name/ number and contact information.

The daily log is the responsibility of the field personnel and will include:

- Name of person making entry;
- Start and end time of work;
- Names of team members on-site;
- Changes in required levels of personnel protection:
  - Level of protection originally used;
  - Changes in protection, if required; and
  - Reasons for changes.
- Air monitoring locations, start and end times, and equipment identification numbers;
- Summary of tasks completed;
- Summary of samples collected including location, matrix, etc.;
- Field observations and remarks;
- Weather conditions, wind direction, etc.;
- Any deviations from the work plan;
- Initials/ signature of person recording the information.

As with any data logbooks, no pages will be removed for any reason. If corrections are necessary, these must be made by drawing a single line through the original entry (so that the original entry can still be read) and writing the corrected entry alongside. The correction must be initialed and dated. Corrected errors may require a footnote explaining the correction.

Sample documents, forms, or field notebooks are not to be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document. If an error is made on a document assigned to one individual, that individual may make corrections simply by crossing a line through the error and entering the corrected information. The incorrect information should not be obliterated. Any subsequent error discovered on a document should be corrected by the person who made the entry. All corrections must be initialed and dated.

8.2 Photographs

Photographs will be taken to document the work. Documentation of a photograph is crucial to its validity as a representation of an existing situation. Photographs should be documented with date, location, and description of the photograph.

9.0 Investigation Derived Waste

Purpose:

The purposes of these guidelines are to ensure the proper holding, storage, transportation, and disposal of materials that may contain hazardous wastes. Investigation-derived waste (IDW) included the following:

- Drill cuttings, drilling mud solids;
- Water produced during drilling;

- Well development and purge waters, unused PDB waters;
- Decontamination waters and associated solids;

<u>Procedure:</u>

1. Contain all investigation-derived wastes in Department of Transportation (DOT)-approved 55-gallon drums, roll-off boxes, or other containers suitable for the wastes.
2. Place different media in separate drums (i.e., do not combine solids and liquids). 3. To the extent practicable, separate solids from drilling muds, decontamination waters, and similar liquids. Place solids within separate containers.
4. Transfer all waste containers to a staging area. Access to this area will be controlled. Waste containers must be transferred to the staging area as soon as practicable after the generating activity is complete.
5. Label all containers with regard to contents, origin, and date of generation. Use indelible ink for all labeling.
6. Collect samples for waste characterization purposes, use boring/well sample analytical data for characterization.
7. For wastes determined to be hazardous in character, be aware on accumulation time limitations. Coordinate the disposal of these wastes with the Owner and NYSDEC.
8. Dispose of investigation-derived wastes as follows;
    - Soil, water, and other environmental media for which analysis does not detect organic constituents, and for which inorganic constituents are at levels consistent with background, may be spread on-site (pending NYSDEC approval) or otherwise treated as a non-waste material.
    - Soils, water, and other environmental media in which organic compounds are detected or metals are present above background will be disposed as industrial waste or hazardous waste, as appropriate. Alternate disposition must be consistent with applicable State and Federal laws.
    - Personal protective equipment, disposable bailers, and similar equipment may be disposed as municipal waste, unless waste characterization results mandate disposal as industrial wastes

9. If waste is determined to be listed hazardous waste, it must be handled as hazardous waste as described above, unless a contained-in determination is accepted by the NYSDEC.

10.0 Decontamination Procedures

Sampling methods and equipment have been chosen to minimize decontamination requirements and to prevent the possibility of cross-contamination. Decontamination of equipment will be performed between discrete sampling locations. Equipment used to collect samples between composite sample locations will not require decontamination between collection of samples. All drilling equipment will be decontaminated after the completion of each drilling location. Special attention will be given to the drilling assembly and augers.

Split spoons and other non-disposable equipment will be decontaminated between each sampling location. The sampler will be cleaned prior to each use, by one of the following procedures:

- Initially cleaned of all foreign matter;
- Sanitized with a steam cleaner;

OR

- Initially cleaned of all foreign matter;
- Scrubbed with brushes in alconox solution;
- Triple rinsed; and
- Allowed to air dry.

Other sampling equipment including but not limited to low-flow sampling pumps, surface soil sampling trowel, water level meters, etc. will be decontaminated between sample location using an alconox solution. Consumables including gloves, tubing, bailers, string, etc. will be dedicated to one sample location and will not be reused.

11.0 Sample Containers

The containers required for sampling activities are pre-washed and ordered directly from a laboratory, which has the containers prepared in accordance with USEPA bottle washing procedures. The following tables detail sample volumes, containers, preservation and holding time for typical analytes.

Table 11-1
Groundwater Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	40-ml glass vial with Teflon-backed septum	Two (2); fill completely, no headspace	Cool to 4° C (ice in cooler), Hydrochloric acid to pH <2	14 days
Semi-volatile Organic Compounds (SVOCs)	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Pesticides	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Polychlorinated biphenyls (PCBs)	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Metals	250-ml HDPE	One (1); fill completely	Cool to 4° C (ice in cooler) Nitric acid to pH <2	180 days (28 for mercury)
Cyanide	1,000-mL HDPE		Cool to 4° C (ice in cooler) Nitric acid to pH <2	14 days

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

TABLE 11-2
Soil Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14 days
VOCs via EPA 5035	40 mL vials with sodium bisulfate, methanol, and/or DI water	Three (3), 5 grams each	Cool to 4° C (ice in cooler)	2 days
SVOCs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	7/40 days
PCBs	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	7/40 days
Pesticides	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14/40 days
Metals	4-oz. glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	180 days (28 for mercury)
Cyanide	4-oz, glass jar with Teflon-lined cap	One (1), fill as completely as possible	Cool to 4° C (ice in cooler)	14 days

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

Table 11-3
Air Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Holding Time Until Extraction/ Analysis
VOCs	1 – Liter Summa® Canister	One (1) 1-Liter 1.4- Liter for MS/MSD	N/A	14 days

Note:
All sample bottles will be prepared in accordance with USEPA bottle washing procedures.
Consult with laboratory as bottleware may vary by laboratory.
Holding time begins at the time of sample collection.

12.0 Sample Custody and Shipment

12.1 Sample Identification

All containers of samples collected from the project will be identified using the following format on a label or tag fixed to the sample container:

AA-BB-CC-DD-EE

AA:	This set of initials indicates an abbreviation for the Site from which the sample was collected.
BB	This set of initials represents the type of sample (e.g., SB for soil boring and MW for monitoring well)
CC:	These initials identify the unique sample location number.
DD:	These initials identify the sample start depth (if soil sample)
EE	These initials identify the sample end depth (if soil sample)

Each sample will be labeled, chemically preserved (if required) and sealed immediately after collection. To minimize handling of sample containers, labels will be filled out prior to sample collection when possible. The sample label will be filled out using waterproof ink and will be firmly affixed to the sample containers. The sample label will give the following information:

- Date and time of collection
- Sample identification
- Analysis required
- Project name/number
- Preservation

Sample tags attached to or affixed around the sample container must be used to properly identify all samples collected in the field. The sample tags are to be placed on the bottles so as not to obscure any QC lot numbers on the bottles; sample information must be printed in a legible manner using waterproof ink. Field identification must be sufficient to enable cross-reference with the logbook. For chain-of-custody purposes, all QC samples are subject to exactly the same custodial procedures and documentation as "real" samples.

12.2 Chain of Custody

This section describes standard operating procedures for sample identification and chain-of-custody to be utilized for all field activities. The purpose of these procedures is to ensure that the quality of the samples is maintained during their collection, transportation, and storage through analysis. All chain-of-custody requirements comply with standard operating procedures indicated in USEPA sample handling protocol.

Sample identification documents must be carefully prepared so that sample identification and chain-of-custody can be maintained and sample disposition controlled. Sample identification documents include:

- Field notebooks;
- Sample label; and
- Chain-of-custody records.

The primary objective of the chain-of-custody procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of all required analyses. A sample is in custody if it is:

- In someone's physical possession;
- In someone's view;
- Locked up; or
- Kept in a secured area that is restricted to authorized personnel.

As few persons as possible should handle samples. Sample bottles will be obtained pre-cleaned from the a laboratory. Sample containers should only be opened immediately prior to sample collection. The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under chain-of-custody rules. The sample collector will record sample data in the field notebook and/or field logs.

The chain-of-custody record must be fully completed in duplicate, using black carbon paper where possible, by the field technician who has been designated by the project manager as responsible for sample shipment to the appropriate laboratory for analysis. In addition, if samples are known to require rapid turnaround in the laboratory because of project time constraints or analytical concerns (e.g., extraction time or sample retention period limitations, etc.), the person completing the chain-of-custody record should note these constraints on the chain of custody.

12.3 Transfer of Custody and Shipment

The coolers in which the samples are packed must be accompanied by a chain-of-custody record. When transferring samples, the individuals relinquishing and receiving them must sign, date, and note the time on the chain-of-custody record. This record documents sample custody transfer.

Shipping containers must be sealed with custody seals for shipment to the laboratory. The method of shipment, name of courier, and other pertinent information are entered on the chain-of-custody.

All shipments must be accompanied by the chain-of-custody record identifying their contents. The original record accompanies the shipment. The other copies are distributed appropriately to the site manager.

12.4 Custody Seals

Custody seals are preprinted adhesive-backed seals. Sample shipping containers (coolers, cardboard boxes, etc., as appropriate) are sealed in as many places as necessary to ensure security. Seals must be signed and dated before shipment. On receipt at the laboratory, the custodian must check (and certify, by completing the package receipt log and LABMIS entries) that seals on boxes and bottles are intact. Strapping tape should be placed over the seals to ensure that seals are not accidentally broken during shipment.

12.5 Sample Packaging

Samples must be packaged carefully to avoid breakage or contamination and must be shipped to the laboratory at proper temperatures. The following sample packaging requirements will be followed:

- Sample bottle lids must never be mixed. All sample lids must stay with the original containers.
- The label should not cover any bottle preparation QC lot numbers.
- All sample bottles are placed in a plastic bag and/or individual bubble wrap sleeves to minimize the potential for cross-contamination and breaking.
- Shipping coolers must be partially filled with packing materials and ice when required, to prevent the bottles from moving during shipment.
- The sample bottles must be placed in the cooler in such a way as to ensure that they do not directly come in contact with other samples. Ice will be added to the cooler to ensure that the samples reach the laboratory at temperatures no greater than 4°C.
- Any remaining space in the cooler should be filled with inert packing material. Under no circumstances should material such as sawdust, sand, etc., be used.
- A chain of custody record must be placed in a plastic bag inside the cooler. Custody seals must be affixed to the sample cooler.

12.6 Sample Shipment

Shipping containers are to be custody-sealed for shipment as appropriate. The container custody seal will consist of tape wrapped around the package and custody seals affixed in such a way that access to the container can be gained only by cutting the filament tape and breaking the seal. Chain of custody seals shall be placed on the container, signed, and dated prior to taping the container to ensure the chain of custody seals will not be destroyed during shipment. In addition, the coolers must also be labeled and placarded in accordance with DOT regulations if shipping medium and high hazard samples.

Field personnel will make arrangements for transportation of samples to the lab. The lab must be notified as early as possible regarding samples intended for Saturday delivery. The transportation and handling of samples must be accomplished in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects due to the possible hazardous nature of samples. Regulations for packaging, marking, labeling, and shipping hazardous materials are promulgated by the United States DOT in the Code of Federal Regulation, 49 CFR 171 through 177. All samples will be delivered to the laboratory and analyzed within the holding times specified by the analytical method for that particular analyte.

All chain-of-custody requirements must comply with standard operating procedures in the USEPA sample handling protocol.

12.7 Laboratory Custody Procedures

A designated sample custodian accepts custody of the shipped samples and verifies that the sample identification number matches that on the chain-of-custody record and traffic reports, if required. Pertinent information as to shipment, pickup, and courier is entered on the chain of custody or attached forms.

13.0 Deliverables

This section will describe laboratory requirement and procedures to be followed for laboratory analysis. Samples collected in New York State will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory. When required, analyses will be conducted in accordance with the most current NYSDEC Analytical Services Protocol (ASP). For example, ASP Category B reports will be completed by the laboratory for samples representing the final delineation of the Remedial Investigation, confirmation samples, samples to determine closure of a system, and correlation samples taken using field testing technologies analyzed by an ELAP-certified laboratory to determine correlation to field results. Data Usability Summary Reports will be completed by a third party for samples requiring ASP Category B format reports. Electronic data deliverables (EDDs) will also be generated by the laboratory in EQUIS format for samples requiring ASP Category B format reports.

NYSDEC DER-10 DUSR requirements are as follows:

a) Background. The Data Usability Summary Report (DUSR) provides a thorough evaluation of analytical data with the primary objective to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use.

    1. The development of the DUSR must be carried out by an experienced environmental scientists, such as the project Quality Assurance Officer, who is fully capable of conducting a full data validation. The DUSR is developed from:

        i. A DEC ASP Category B Data Deliverable; or
        ii. The *USEPA Contract Laboratory Program National Functional Data Validation Standard Operating Procedures for Data Evaluation and Validation.*

    2. The DUSR and the data deliverables package will be reviewed by DER staff. If full third party data validation is found to be necessary (e.g. pending litigation) this can be carried out at a later data on the same data package used for the development of the DUSR.

b) Personnel Requirements. The person preparing the DUSR must be pre-approved by DER. The person must submit their qualifications to DER documenting experience in analysis and data validation. Data validator qualifications are available on DEC's website identified in the table of contents.

c) Preparation of a DUSR. The DUSR is developed by reviewing and evaluating the analytical data package. In order for the DUSR to be acceptable, during the course of this review the following questions applicable to the analysis being reviewed must be answered in the affirmative.

1. Is the data package complete as defined under the requirements for the most current DEC ASP Category B or USEPA CLP data deliverables?
2. Have all holding times been met?
3. Do all the QC data; blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?
4. Have all of the data been generated using established and agreed upon analytical protocols?
5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?
6. Have the correct data qualifiers been used and are they consistent with the most current DEC ASP?
7. Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?

d) Documenting the validation process in the DUSR. Once the data package has been reviewed and the above questions asked and answered the DUSR proceeds to describe the samples and the analytical parameters, including data deficiencies, analytical protocol deviations and quality control problems are identified and their effect on the data is discussed.

14.0 Equipment Calibration

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations as well as criteria set forth in the applicable analytical methodology references. Operation, calibration, and maintenance will be performed by personnel properly trained in these procedures. Section 11 lists the major instruments to be used for sampling and analysis. In addition, brief descriptions of calibration procedures for major field and laboratory instruments follow.

14.1 Photovac/MiniRae Photoionization Detector (PID)

Standard operating procedures for the PID require that routine maintenance and calibration be performed every six months. Field calibration will be performed on a daily basis. The packages used for calibration are non-toxic analyzed gas mixtures available in pressurized containers. All calibration procedures will follow the manufacturer recommendations.

14.2 Conductance, Temperature, and pH Tester

Temperature and conductance instruments are factory calibrated. Temperature accuracy can be checked against an NBS certified thermometer prior to field use if necessary. Conductance accuracy may be checked with a solution of known conductance and recalibration can be instituted, if necessary.

14.3 O_2/Explosimeter

The specific meter used at the time of work shall be calibrated in accordance with manufacturer recommendations. The model 260 O_2/ Explosimeter is described below.

The primary maintenance item of the Model 260 is the rechargeable 2.4 volt (V) nickel cadmium battery. The battery is recharged by removing the screw cap covering receptacle and connecting one end of the charging cable to the instrument and the other end to a 115V AC outlet.

The battery can also be recharged using a 12V DC source. An accessory battery charging cable is available, one end of which plugs into the Model 260 while the other end is fitted with an automobile cigarette lighter plug.

Recommended charging time is 16 hours.

Before the calibration of the combustible gas indicator can be checked, the Model 260 must be in operating condition. Calibration check-adjustment is made as follows:

1. Attach the flow control to the recommended calibration gas tank.
2. Connect the adapter-hose to the flow control.
3. Open flow control valve.
4. Connect the adapter-hose fitting to the inlet of the instrument; after about 15 seconds the LEL meter pointer should be stable and within the range specified on the calibration sheet accompanying the calibration equipment. If the meter pointer is not in the correct range, stop the flow; remove the right hand side cover. Turn on the flow and adjust the "S" control with a small screwdriver to obtain a reading as specified on the calibration sheet.
5. Disconnect the adapter-hose fitting from the instrument.
6. Close the flow control valve.
7. Remove the adapter-hose from the flow control.
8. Remove the flow control from the calibration gas tank.
9. Replace the side cover on the Model 260.

CAUTION: Calibration gas tank contents are under pressure. Use no oil, grease, or flammable solvents on the flow control or the calibration gas tank. Do not store calibration gas tank near heat or fire or in rooms used for habitation. Do not throw in fire, incinerate, or puncture. Keep out of reach of children. It is illegal and hazardous to refill this tank. Do not attach the calibration gas tank to any other apparatus than described above. Do not attach any gas tank other than MSA calibration tanks to the regulator.

14.4 Nephelometer (Turbidity Meter)

LaMotte 2020WE Turbidity Meter is calibrated before each use. The default units are set to NTU and the default calibration curve is formazin. A 0 NTU Standard (Code 1480) is included with the meter. To calibrate, rinse a clean tube three times with the blank. Fill the tube to the fill line with the blank. Insert the tube into the chamber, close the lid, and select "scan blank".

TABLE 14-4
List of Major Instruments
for Sampling and Analysis

- MSA 360 0_2 /Explosimeter
- Geotech Geopump II AC/DC Peristaltic Pump
- QED MP50 Controller and QED Sample Pro MicroPurge Bladder Pimp
- Horiba U-53 Multi-Parameter Water Quality Meter
- LaMotte 2020WE Turbidity Meter
- EM-31 Geomics Electromagnetic Induction Device
- Mini Rae Photoionization Detectors (3,000, ppbRAE, etc.)

15.0 Internal Quality Control Checks

QC data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of field equipment. Field-based QC will comprise at least 10% of each data set generated and will consist of standards, replicates, spikes, and blanks. Field duplicates and field blanks will be analyzed by the laboratory as samples and will not necessarily be identified to the laboratory as duplicates or blanks. For each matrix, field duplicates will be provided at a rate of one per 10 samples collected or one per shipment, whichever is greater. Field blanks which may consist of trip, routine field, and/or rinsate blanks will be provided at a rate of one per 20 samples collected for each media, or one per shipment, whichever is greater. Frequency of QC data may vary from project to project; refer to the project-specific work plan for QC requirements.

Calculations will be performed for recoveries and standard deviations along with review of retention times, response factors, chromatograms, calibration, tuning, and all other QC information generated. All QC data, including split samples, will be documented in the site logbook and/or appropriate field logs. QC records will be retained and results reported with sample data.

15.1 Field Blanks

Various types of blanks are used to check the cleanliness of field handling methods. The following types of blanks may be used: the trip blank, the routine field blank, and the field equipment blank. They are analyzed in the laboratory as samples, and their purpose is to assess the sampling and transport procedures as possible sources of sample contamination. Field staff may add blanks if field circumstances are such that they consider normal procedures are not sufficient to prevent or control sample contamination, or at the direction of the project manager. Rigorous documentation of all blanks in the site logbooks is mandatory.

- Routine Field Blanks or bottle blanks are blank samples prepared in the field to access ambient field conditions. They will be prepared by filling empty sample containers with deionized water and any necessary preservatives. They will be handled like a sample and shipped to the laboratory for analysis.
- Trip Blanks are similar to routine field blanks with the exception that they are not exposed to field conditions. Their analytical results give the overall level of contamination from everything except ambient field conditions. For the RI/FS, one trip blank will be collected with every shipment of water samples for VOC analysis. Each trip blank will be prepared by filling a 40-ml vial with deionized water prior to the sampling trip, transported to the site, handled like a sample, and returned to the laboratory for analysis without being opened in the field. Trip blanks may be provided by the laboratory, shipped with the bottleware, and kept with the sampling containers until analysis.
- Field Equipment Blanks are blank samples (sometimes called transfer blanks or rinsate blanks) designed to demonstrate that sampling equipment has been properly prepared and cleaned before field use, and that cleaning procedures between samples are sufficient to minimize cross contamination. If a sampling team is familiar with a particular site, they may be able to predict which areas or samples are likely to have the highest concentration of contaminants. Unless other constraints apply, these samples should be taken last to avoid excessive contamination of sampling equipment.

15.2 Duplicates

Duplicate samples are collected to check the consistency of sampling and analysis procedures. The following types of duplicates may be collected.

- Blind duplicate samples consist of a set of two samples collected independently at a sampling location during a single sampling event. Blind duplicates are designed to assess the consistency of the overall sampling and analytical system. Blind duplicate samples should not be distinguishable by the person performing the analysis.
- Matrix Spike and Matrix Spike Duplicates (MS/MSDs) consist of a set of three samples collected independently at a sampling location during a single sampling event. These samples are for laboratory quality control checks.