Site Investigation Work Plan
NYSDEC Site #828196

Location:

68-92 Genesee Street
Rochester, New York 14611

Prepared for:

City of Rochester
Division of Environmental Quality
30 Church Street, Room 300B
Rochester, New York 14614

LaBella Project No. 2182888

August 2019
Revised January 2020
Revised February 2020

LaBella
Powered by partnership.

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

February 25, 2020

Adam Morgan
New York State Department of Environmental Conservation
6274 East Avon-Lima Road
Avon, New York 14414

Re: 68-92 Genesee Street
Rochester, New York 14611
NYSDEC Site 828196
Site Investigation Work Plan
LaBella Project No. 2182888

Dear Mr. Morgan,

LaBella Associates, D.P.C. (LaBella) is pleased to submit this response on behalf of the City of Rochester to the Department's comment letter dated February 21, 2020 on the revised Site Investigation Work Plan dated January 2020 for 68-92 Genesee Street. Responses are provided in bold font.

1. Please identify the locations of the full suite groundwater and soil samples added to the work plan, as well as the locations of the two soil samples being collected for emerging contaminates. **Refer to Figure 6 for sample locations for full-suite and emerging contaminants.**

2. The Departments understand that the 5 previously installed bedrock wells will be sampled for PFAS and 1,4-dioxane. As stated in the comment letter, please identify in the work plan that BW-03 and BW-05 are upgradient samples; BW-04 is a source sample; and BW-01 along with BW-02 are downgradient samples. **This has been added to Section 4.1.**

3. Please include sections for addressing concerns at the following location off site, in addition to the ones already included. These sections should include obtaining access and detail the work proposed at each. The Departments are available to help with outreach and acquiring access to any proposed off-site property.
    - 160 Clifton Street
    - The Bulls Head Plaza
    - St. Mary's Hospital Complex including the Bishop Kearney Education Building

    Refer to Section 4.7.2, 4.7.3, and 4.7.4 of the revised Work Plan which include procedures to assess concerns at these properties. A summary of these procedures is as follows:
    - **160 Clifton Street –The fan within the underground garage will be assessed by a**

mechanical engineer to evaluate the air turnover rate. Repairs will be made to the fan as necessary in order to provide air turnovers that will meet NYS code requirements. Indoor air sampling will be completed, if warranted based on the fan evaluation.

- The Bulls Head Plaza – Indoor air on the ground level (U of R tenant space) will be resampled in accordance with the sampling procedures conducted in 2018.
- St. Mary's Hospital Complex including the Bishop Kearney Education Building – An access agreement has been sent to this property owner for soil gas sampling. A response has not yet been received. Soil gas sampling at this property has been added to the Work Plan.

4. Community Air Monitoring Plan (CAMP): Revise to include the attached Special Requirements CAMP for any ground intrusive activities occurring within 20 feetof an occupied structure or receptor. The Special Requirements CAMP has been added to the Work Plan and will be implemented for ground intrusive activities occurring within 20 feet of an occupied structure or receptor.

A revised SI Work Plan is attached to this letter for your review. If you have any questions, or require additional information, please do not hesitate to contact me at (585) 295-6289.

Respectfully submitted,

LABELLA ASSOCIATES, D.P.C.

Ann A. Barber, PE
Environmental Engineer

\\PROJECTS2\PROJECTSNZ-2\ROCHESTER, CITY\2182888 - 68-92 GENESEE ST SITE INV\REPORTS\SI WORK PLAN\REVISED DEC COMMENTS\828196 68-92 GENESEE STREET SI WORK PLAN RESPONSE TO COMMENTS.DOC

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road, Avon, NY 14414-9516
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February 21, 2020

Jane MH Forbes, MPA
Sr. Environmental Specialist
City of Rochester – Division of Environmental Quality
30 Church Street Room 300B
Rochester, NY 14614

RE: 68-92 Genesee Street
Site Number: 828196
Revised Site Investigation Work Plan

Dear Ms. Forbes,

The New York State Departments of Environmental Conservation (NYSDEC) and Health (NYSDOH), collectively referred to as the Departments, have completed their review of the document entitled "Site Investigation Work Plan" (the Work Plan) resubmitted in January 2020 and prepared by LaBella for the 68-92 Genesee Street site in the City of Rochester, Monroe County. Based on this review, the Departments have determined that the Work Plan does not substantially address the requirements of the Order-On-Consent. In accordance with 6 NYCRR 375-1.6, the Work Plan is hereby disapproved.

The following is intended to provide an overview of the most significant deficiencies associated with the Work Plan along with some additional comments but is not necessarily a complete list of concerns with the document.

1. Please identify the locations of the full suite groundwater and soil samples added to the work plan, as well as the locations of the two soil samples being collected for emerging contaminates.

2. The Departments understand that the 5 previously installed bedrock wells will be sampled for PFAS and 1,4-dioxane. As stated in the comment letter, please identify in the work plan that BW-03 and BW-05 are upgradient samples; BW-04 is a source sample; and BW-01 along with BW-02 are downgradient samples.

3. Please include sections for addressing concerns at the following location off site, in addition to the ones already included. These sections should include obtaining access and detail the work proposed at each. The Departments are available to help with outreach and acquiring access to any proposed off-site property.
    - 160 Clifton Street
    - The Bulls Head Plaza

- St. Mary's Hospital Complex including the Bishop Kearney Education Building

4. Community Air Monitoring Plan (CAMP): Revise to include the attached Special Requirements CAMP for any ground intrusive activities occurring within 20 feet of an occupied structure or receptor.

Per 6 NYCRR Part 375-1.6, please notify me in writing by March 12, 2020 which of the following options you will choose to address this disapproval:

- modify the Work Plan to address the Departments' comments and submit a revised document by March 22, 2020; or
- invoke dispute resolution.

NYSDEC seeks to resolve outstanding differences in a mutually agreeable manner which addresses the requirements of the Order-On-Consent. As such, please contact me at (585) 226-5356 prior to **March 12, 2020** to informally discuss any questions or concerns regarding these comments.

Sincerely,

Adam Morgan
Project Manager, Department of Environmental Conservation

Attachment: Special Requirement CAMP

ec: Ann Aquilina, Labella
Joe Biondalillo, City of Rochester
Sara Bogardus, NYSDOH
Justin Demming, NYSDOH
Dave Pratt, NYSDEC
Frank Sowers, NYSDEC

January 31, 2020

Adam Morgan
New York State Department of Environmental Conservation
6274 East Avon-Lima Road
Avon, New York 14414

Re: 68-92 Genesee Street
Rochester, New York 14611
NYSDEC Site 828196
Site Investigation Work Plan
LaBella Project No. 2182888

Dear Mr. Morgan,

LaBella Associates, D.P.C. (LaBella) is pleased to submit this response on behalf of the City of Rochester to the Department's comment letter dated October 8, 2019 on the Site Investigation Work Plan for 68-92 Genesee Street. Responses are provided in bold font.

1. Based on the Departments' review of previous site investigations, there has been limited full suite analysis in the on-site media. In order to evaluate the current status of the site, the Departments request that a representative number of soil and groundwater samples include full suite analysis. Full suite now includes 1,4- dioxane and a list of 21 per- and polyfluoroalkyl substances (PFAS).
The 2016 Phase II ESA included 2 full-suite soil samples (plus 22 additional VOC, 7 additional SVOC, 1 additional metals and cyanide, and 1 additional PCB sample) and 2 full-suite groundwater samples (plus 3 additional VOC samples). The SI Work Plan includes 12 additional soil samples for VOCs, 8 for metals, and 4 for SVOCs. PCBs and pesticides were previously non-detect in soil and groundwater (2 samples in soil and 2 samples in groundwater). It should also be noted the overburden is unsaturated.

Five (5) wells were already planned to be sampled for PFAS and 1,4-dioxane. The following has been added to the SI Work Plan:
   - **1 full suite soil sample (TCL SVOCs, TAL Metals, cyanide, PCBs and pesticides)**
   - **1 full-suite groundwater sample (TCL SVOCs, TAL Metals, cyanide, PCBs and pesticides)**
   - **2 PFAS and 1,4-dioxane soil samples**

The additional sampling appears adequate based on the size of the Site (0.76-acres).

2. Page 8, Soil Vapor Intrusion Assessment, Bulls Head Plaza (adjacent property), LaBella, April 2018: The Departments reviewed the August 6, 2018 Post- Mitigation Indoor Air Quality Results and based on NYSDOH Soil Vapor Matrix for tetrachloroethene (PCE) additional actions to "Identify source(s) and resample or mitigate" are still necessary in the occupied spaces. Additionally, the indoor air concentrations should continue to decrease as the SSDS becomes active however, the indoor air concentrations in the first

floor increased between samples collected when the SSDS was operating for seven days and when the SSDS was operating for 31 days. Based on this information, it is requested that pressure field extension testing occur to understand the radius of influence and then additional mitigative measures to reduce exposures be taken in the occupied off-site northern building. Resampling should occur early in the heating season.

It is assumed this comment pertains to the U of R/ Monroe County tenant space. The tenant space occupied by U of R and Monroe County in the northern adjacent building was mitigated by installing a sub-slab depressurization system (SSDS). This tenant space is not directly adjacent to the 68-92 Genesee Street site. The City has been proactive in addressing SVI at this adjacent property. PCE was detected at 18 and 23 ug/m^3 in indoor air samples 31 days post-mitigation. While the concentrations have increased slightly from the 7-day post-mitigation sampling from 5.7 and 6.1 ug/m^3, the concentrations are within the same order of magnitude and are below the NYSDOH Indoor Air Guideline of 30 ug/m^3. Furthermore, the concentrations of PCE have decreased approximately an order of magnitude in indoor air from baseline sampling (100 - 110 ug/m^3) indicating the current SSDS is effective in mitigating SVI to levels within NYSDOH guidelines. Pressure field extension testing following startup indicated minimum 0.004" water column sub-slab pressure differential within the tenant space. The SSDS alarm is checked on a weekly basis to ensure the system is operational. Given the significant decrease of PCE in indoor air to below NYSDOH Indoor Air Guidelines (110 ug/m^3 pre-mitigation to 23 ug/m^3 post-mitigation), and the active mitigation system installed and operating in this tenant space, further investigation or mitigation does not appear warranted.

3. Page 10, 4.1 Groundwater Sampling -Existing Monitoring Wells: Please indicate what wells will be sampled for emerging contaminants (PFAS and 1,4-Dioxane). Sample locations should be representative of upgradient, source, and downgradient areas of the site as well as representative of all groundwaterunits.
The five (5) previously installed bedrock wells (BW-01 through BW-05) will be sampled for PFAS and 1,4-dioxane. Locations in proximity to the impacts are as follows:
    - **Upgradient – BW-03, BW-05**
    - **Source – BW-04**
    - **Downgradient – BW-02, BW-01**

4. Page 11, 4.2 Overburden Burden Soil Borings: Please include sampling for emerging contaminates (PFAS and 1,4 Dioxane) in overburden soil samples. A number of samples that is representative of soil conditions should beincluded.
As noted for Comment 1, 2 PFAS and 1,4-dioxane soil samples have been added.

5. Page 14, 4.7 Off-Site Soil Vapor Intrusion Assessment: Due to the site use, and potential presence of preferential pathways (underground utilities), the Departments request expanding the off-site soil vapor intrusion investigation to include the hospital and other building to the west of the site and the building northeast of the site on Churchlea Place, with the address 160 Clifton Street. The anticipated SVI work plan needs to include a representative number of sub- slab, and indoor air samples in these structures.
Based on distances and direction from the impacts at 68-92 Genesee Street as summarized below, it is proposed the scope in the SI Work Plan be completed prior to determining if additional off-Site SVI testing is warranted.

- St. Mary's Hospital is 355 feet cross gradient of the greatest impacts at 68-92 Genesee Street. As shown on Figure 6, a water line is located on the St. Mary's Hospital property which travels west from Genesee Street directly to the west of the former United Cleaners building on-Site. The bedrock monitoring well proposed in the right-of-way adjacent to the west of the Site across Genesee Street (refer to Figure 6) has been moved towards the north to be closer to this water line which could potentially act as a conduit for vapors.
- The commercial building at 160 Clifton Street is 240 feet upgradient of the greatest impacts at 68-92 Genesee Street. Furthermore, the lower level of this building is underground parking and open to the exterior with a high powered ventilation fan in the lower level parking area. PCE was detected at 0.37 ug/L in 2017 in the nearest monitoring well to the 160 Clifton Street building at the Bullhead Plaza Site (BWB-02).

The residential structures proposed for SVI testing in the SI Work Plan are between 185 and 225 feet downgradient from the greatest impacts at 68-92 Genesee Street. SVI sampling will be competed at the residential structures at 177, 179, 185 and 189 Clifton Street as detailed in the SI Work Plan. If, based on these assessments additional off-Site investigation appears warranted, an addendum to the SI Work Plan will be developed.

6. Page 15, 4.7 Off-Site Soil Vapor Intrusion Assessment: Please note that sub- slab, indoor and outdoor air samples must be collected over the same time period. Samples collected in a residence should be taken over 24-hour time period.
   Samples will be collected over the same approximate 24-hour time period. This has been corrected in the SI Work Plan.

7. Appendix 2, Community Air Monitoring Plan (CAMP): Revise to include the attached Special Requirements CAMP for any ground intrusive activities occurring within 20 feet of an occupied structure or receptor.
   The Special Requirements CAMP has been included in Appendix 2 and will be implemented during ground intrusive activities occurring within 20 feet of an occupied structure.

A revised SI Work Plan is attached to this letter for your review. If you have any questions, or require additional information, please do not hesitate to contact me at (585) 295-6289.

Respectfully submitted,

LABELLA ASSOCIATES, D.P.C.

Ann Aquilina, PE
Environmental Engineer

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 8
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October 8, 2019

Jane MH Forbes, MPA
Sr. Environmental Specialist
City of Rochester – Division of Environmental Quality
30 Church Street Room 300B
Rochester, NY 14614

RE: 68-92 Genesee Street
Site Number: 828196
Site Investigation Work Plan

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The New York State Departments of Environmental Conservation (NYSDEC) and Health (NYSDOH), collectively referred to as the Departments, have completed their review of the document entitled "Site Investigation Work Plan" (the Work Plan) submitted in August 2019 and prepared by LaBella for the 68-92 Genesee Street site in the City of Rochester, Monroe County. Based on this review, the Departments have determined that the Work Plan does not substantially address the requirements of the Order-On-Consent. In accordance with 6 NYCRR 375-1.6, the Work Plan is hereby disapproved.

The following is intended to provide an overview of the most significant deficiencies associated with the Work Plan along with some additional comments but is not necessarily a complete list of concerns with the document.

1. Based on the Departments' review of previous site investigations, there has been limited full suite analysis in the on-site media. In order to evaluate the current status of the site, the Departments request that a representative number of soil and groundwater samples include full suite analysis. Full suite now includes 1,4-dioxane and a list of 21 per- and polyfluoroalkyl substances (PFAS).

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pressure field extension testing occur to understand the radius of influence and then additional mitigative measures to reduce exposures be taken in the occupied off-site northern building. Resampling should occur early in the heating season.

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7. Appendix 2, Community Air Monitoring Plan (CAMP): Revise to include the attached Special Requirements CAMP for any ground intrusive activities occurring within 20 feet of an occupied structure or receptor.

Per 6 NYCRR Part 375-1.6, please notify me in writing by October 28, 2019 which of the following options you will choose to address this disapproval:

- modify the Work Plan to address the Departments' comments and submit a revised document by November 12, 2019; or
- invoke dispute resolution.

NYSDEC seeks to resolve outstanding differences in a mutually agreeable manner which addresses the requirements of the Order-On-Consent. As such, please contact me at (585) 226-5356 prior to **October 28, 2019** to informally discuss any questions or concerns regarding these comments.

Sincerely,

Adam Morgan
Project Manager, Department of Environmental Conservation

Attachment: Special Requirement CAMP

ec: Ann Aquilina, Labella
Joe Biondalillo, City of Rochester
Sara Bogardus, NYSDOH
Justin Demming, NYSDOH
Dave Pratt, NYSDEC
Frank Sowers, NYSDEC

ATTACHMENT 1: SPECIAL REQUIREMENTS CAMP

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

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

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3 (micrograms per cubic meter), work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

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

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

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CERTIFICATION

I Ann Aquilina Barber certify that I am currently a NYS registered professional engineer and that this Site Investigation Work Plan was prepared in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

100521	2/28/2020	
NYS Professional Engineer #	Date	Signature

1.0 INTRODUCTION

LaBella Associates, D.P.C. ("LaBella") has developed this Site Investigation Work Plan (SIWP) for the property located at 68-92 Genesee Street, Monroe County, City of Rochester, New York, hereinafter referred to as "the Site". The City of Rochester (City) entered into an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC) on May 1, 2019 (Site #828196). This Work Plan has been developed in accordance with Order on Consent and NYSDEC Division of Environmental Remediation (DER)-10 *Technical Guidance for Site Investigation and Remediation* Issued May 3, 2010.

A Phase I Environmental Site Assessment (ESA) conducted in 2013 identified environmental concerns associated with historical operations including dry cleaning and automotive repair. Subsequently, a Phase II ESA conducted in 2016 identified the presence of tetrachloroethylene (PCE), a dry cleaning solvent, and other chlorinated volatile organic compounds (CVOCs) in the subsurface. Although the primary contaminants of concern are CVOCs, urban fill containing elevated concentrations of select heavy metals and polyaromatic hydrocarbons (PAHs) as well as two (2) isolated areas of petroleum-contaminated soil were also identified. The purpose of this SI is to further investigate subsurface impacts, mainly CVOCs, and characterize the nature and extent of contamination. An Interim Remedial Measures Work Plan will be submitted under separate cover to remediate discrete areas of PAHs and metals impacted soils.

2.0 STIE DESCRIPTION AND HISTORY

2.1 Site Description

The Site comprises approximately 0.76-acres of land located on the northeastern corner of the intersection of Genesee Street and Clifton Street, in a predominately urban area (refer to Figure 2). The Site is currently occupied by one (1) approximately 2,500 sq. ft. structure ("Southern Building") constructed in 1975 which operates as a coin-operated laundromat. The former 25,000-square foot (sq. ft.) United Cleaners building ("Former Northern Building") located in the northern portion of the Site, formerly utilized for dry cleaning operations, was demolished in the spring of 2016. The eastern portion of the Former Northern Building floor slab was left in place (refer to Figure 2). The City acquired the property through a public foreclosure auction held on July 23, 2019. The deed was recorded with the Monroe County Clerk's office on July 23, 2019 in Liber 12213 of Deeds, page 525.

2.2 Adjacent Properties

Adjacent properties include Bulls Head Plaza (which the City of Rochester acquired in October 2018 and is mostly vacant), to the north and east, a pawn shop and residential properties to the south beyond Clifton Street, and St. Mary's Hospital to the west beyond Genesee Street.

LaBella recently conducted a Phase I ESA and Phase II ESA at the northern adjacent Bulls Head Plaza addressed as 835-855 West Main Street and identified CVOCs and urban fill material. The Phase II ESA completed at the adjacent Bulls Head Plaza property included installation of numerous investigation points in close proximity to the north and east of the Site. A sub-slab depressurization system (SSDS) was installed in occupied portions of the Bulls Head Plaza that warranted mitigation. Additional relevant information regarding the Phase II ESA at this adjacent property is summarized in Section 2.4

2.3 Site History

LaBella reviewed a Phase I ESA conducted by Bergmann Associates for the City dated December 6, 2013. The following summarizes the Site history based on a review of the Phase I ESA (refer to Section 2.4 for additional information regarding the 2013 Phase I ESA).

The Site was occupied by residential structures from at least 1892 until at least 1950. Ronda Place, a dead-end street, was previously located across the center of the Site from at least 1912 until at least 1950 (refer to Figure 3). The Former Northern Building was constructed in at least 1938 and utilized for automotive sales and services by Schoen Brothers Automobiles until at least 1950. From at least 1960 until at least 1965, the Former Northern Building was occupied by Dorschel, Inc. and utilized for automotive sales and services. The Former Northern Building appears to have been occupied by United Cleaners from at least 1968 until at least 2008 and utilized for dry cleaning. The Site is listed on the 1977 Monroe County Department of Health Dry Cleaning Database as using 2,200 gallons of perchlorotheylene (also known as tetrachloroethylene, PERC or PCE) annually, which is the second highest volume listed on the database.

A gasoline filling station occupied the southern portion of the Site from approximately the 1920's until the 1960's. The 1938 Sanborn Fire Insurance Map depicts three (3) USTs in the vicinity of the former gasoline filling station. The existing Southern Building was constructed in at least 1975 and has been utilized as a coin-operated laundromat from at least 1975 until present.

One (1) 10,000-gallon UST containing #2 Fuel Oil was reportedly removed from the Site in December 1999. During the Phase I ESA Site visit, two (2) aboveground storage tanks (ASTs) were observed in the basement of the former Northern Building. One (1) tank appeared to be approximately 250-gallons in capacity and the second tank appeared to be approximately 1,000-gallons in capacity. These two (2) tanks were removed during the 2016 building demolition.

The Former Northern Building was demolished in 2016. The eastern portion of the concrete floor slab was in poor condition and was left in place to avoid exposure to the subsurface and prevent the potential further migration of contaminants beneath the slab. Utilities formerly servicing the building were abandoned and the basement was filled in place.

Refer to Figure 3 for a representation of historical features.

2.4 Summary of Previous Environmental Studies

The following environmental reports have been developed for the Site and adjacent properties:

- Phase I ESA, Bergmann Associates, December 6, 2013
- Tank Closure Report, LaBella, October 20, 2016
- Phase II ESA, LaBella, December 20, 2016
- Phase II ESA, Bulls Head Plaza (adjacent property) LaBella, April 2018
- Soil Vapor Intrusion Assessment, Bulls Head Plaza (adjacent property), LaBella, August 2018

These reports are summarized below.

Phase I ESA, Bergmann Associates, December 6, 2013

A Phase I ESA completed by Bergmann Associates (Bergmann) for the City dated December 6, 2013 identified several Recognized Environmental Conditions (RECs) at the Site generally associated with historical operations completed at the Site, surrounding properties, and conditions observed by Bergmann at the time of the Site visits (note this Phase I ESA was conducted prior to demolition of the Former Northern Building). Specifically, RECs were identified associated with the following items. Note that the following summary of RECs includes information from LaBella's review of historical resources such as Sanborn Fire Insurance Mapping and City of Rochester Building Department Permits.

- *Former Hazardous Waste Handler*: The portion of the Site addressed as 68 Genesee Street (i.e., Former Northern Building) is listed as a hazardous waste handler and violations associated with this listing were issued in 1986 and 1987. It should be noted that the Former Northern Building was utilized for dry cleaning operations at that time. Additional information associated with this listing and associated violations were not identified by the Phase I ESA.
- *Former Dry Cleaning Operations*: The Former Northern Building was occupied by United Cleaners for dry cleaning purposes from the late 1960's to approximately 2007. Dry cleaning facilities commonly utilize chlorinated solvents such as PCE in operations.
- *Former Gasoline Filling Station*: A gasoline filling station was identified associated with 94 Genesee Street (previously the southwestern corner of the Site) from the 1920's to the 1960's. Sanborn Fire Insurance mapping depicts the presence of three (3) gasoline tanks on the southwestern portion of the Site in 1938. In addition, the Former Northern Building appears to have been utilized as an automotive sales and service center from at least the 1930's to at least the 1950's (prior to operation as a dry cleaning facility). The 1938 and 1950 Sanborn Fire Insurance Maps depict one (1) gasoline tank within the footprint of the former Northern Building.
- *Potential Underground Storage Tanks*: Records obtained from the City of Rochester identified the following listings associated with tanks:
    - Installation of two (2) pumps on a fuel island in 1947;
    - Installation of three (3) 2,000-gallon gasoline tanks and associated pumps in 1949;
    - Installation of one (1) gasoline tank of unspecified capacity in 1951;
    - Installation of one (1) fuel oil tank of unspecified capacity associated with the dry cleaning facility (i.e., the Northern Building) in 1968; and,
    - Removal of one (1) 8,000-gallon fuel oil UST in 1999.

  The fuel oil tank installed in 1968 appears to be the tank listed as removed in 1999 as the 1968 listing indicates this tank was associated with the dry cleaning facility and mapping included in the permit file for the 1999 fuel oil tank removal shows that the removed tank was located adjacent to the south of the dry cleaning facility's boiler room. In addition, the mapping in the permit file for the 1999 tank removal is originally dated March 7, 1968 and thus may be associated with the installation of the fuel oil tank in 1968.
  Note: The tank pit presumably associated with the fuel oil UST was encountered during advancement of a soil boring during the 2016 Phase II ESA. Two (2) tanks, one (1) 250-gallon and one (1) 1,000-gallon, were removed during building demolition. Two (2) 1,000-gallon USTs were removed in 2016 by LaBella.
- *Hazardous Material Storage*: Numerous containers of hazardous and potentially hazardous containers were identified during Bergmann's site visits. It should be noted that operations within the Northern Building ceased several years prior to Bergmann's site visits and these containers appear to have been abandoned in the building following closure of the United Cleaners facility.

- *Current Underground Storage Tanks*: A small basement (approximately 275-sf) was present in the former Northern Building. Bergmann identified two (2) ASTs with capacities of approximately 250-gallons and 1,000-gallons in the basement during a 2013 site visit. The basement was flooded with approximately 2-feet (ft.) of water at the time and consequently the contents of those tanks could not be evaluated at that time.
- *Note: These tanks were removed as part of demolition activities and the basement was filled in.*
- *Vapor Intrusion*: Based on the potential for volatile organic compounds (VOCs) to be present in the Site subsurface associated with the historical uses of the Site and/or surrounding properties, the potential for soil vapor intrusion was identified at the Site.
- *Biological Agents*: Bergmann identified the presence of mold and bird droppings throughout the Northern Building during their 2013 site visits. Bulk samples of mold collected as part of the Phase I ESA reported identified at least five (5) types of toxic mold in the former Northern Building. LaBella understands that this issue was resolved as part of the building demolition.
- *Former Automobile Station on Adjoining Property*: An automobile garage was reportedly present adjacent to the north of the Site (i.e., 62 Genesee Street) in at least 1930. Subsurface conditions in the vicinity of this former automobile garage are unknown.

In addition to the RECs identified by the December 2013 Phase I ESA, LaBella identified the following additional potential causes of subsurface impacts at the Site:

- *Long-Term Use of a Hydraulic Elevator in the Northern Building*: Elevator equipment can sometimes release hydraulic fluid (potentially containing polychlorinated biphenyls) into the surrounding subsurface.
- *Former Adjacent Machine Shop*: A machine shop is depicted adjacent to the northeastern corner of the Northern Building in the 1912 Sanborn Fire Insurance Map. Machine shops in this era commonly utilized petroleum products and potentially hazardous substances in their operations.
- *Former Adjacent Underground Storage Tank*: A gasoline UST is depicted on the northern adjacent property in the 1912 Sanborn Fire Insurance Map. The UST is depicted approximately 35-ft. to the north of the Site's northern property line.
- *Preferential Pathways*: Utility mapping depicts the presence of numerous underground utilities entering the Site from Genesee Street, although the extent of these utilities once they enter the Site subsurface is unknown. Underground utilities at the Site may represent conduits for subsurface impacts to be transported. In addition, bedding surrounding underground utilities may act as a preferential pathway to transport impacted groundwater.
  Note: The 2016 Phase II ESA included scoping accessible sewer lines.
- *Unknown Fill Material*: Historical mapping shows the former presence of several residential dwellings and a small street (Ronda Place) in the central and southern portions of the Site from the 1800's until at least 1950. Based on the review of historical mapping, it is unknown if one or more of the prior Site structures had basements and/or other subsurface features. Based on LaBella's experience, basements and other subsurface features were commonly historically filled with readily available material that sometimes included material which is currently considered regulated solid waste by the NYSDEC (e.g., cinders, ash, slag, etc).

Tank Closure Report, LaBella, October 20, 2016

Test pitting activities conducted during the 2016 Phase II ESA (see below) identified two (2) 1,000-gallon underground storage tanks (USTs) within the footprint of the Former Northern Building, presumed to be associated with the former automotive repair facility (refer to Figure 4). One (1) UST contained apparent waste oil and water and one (1) contained unknown petroleum product. The USTs were set approximately 3-ft into bedrock. The USTs were registered with the NYSDEC and

removed during an Interim Remedial Measure (IRM) in 2016. Sidewall soil samples collected indicate that VOCs and SVOCs are present in soil at concentrations that exceed NYSDEC Commissioner Policy (CP)-51 Soil Cleanup Levels. Samples were not collected from the bottom of the UST excavations as the USTs were set into bedrock.

Phase II ESA, LaBella, December 20, 2016

LaBella conducted a Phase II ESA which consisted of:

- evaluation of the Former Northern Building's remaining floor slab;
- evaluation of drains and piping in the Former Northern Building's remaining floor slab;
- geophysical survey;
- advancement of fifty-six (56) overburden soil borings;
- advancement of seven (7) test pits;
- installation of three (3) overburden monitoring wells;
- installation of five (5) bedrock monitoring wells;
- analysis of soil, groundwater, and bedrock samples;
- hydraulic conductivity testing; and
- soil vapor intrusion (SVI) testing at the Southern Building.

Refer to Figure 4 for previous testing locations.

The Phase II ESA identified PCE in groundwater at concentrations up to 36 milligrams per liter (mg/L) and in soil at concentrations up to 35,000 micrograms per kilogram (ug/kg) proximate the former dry cleaning operations within the Former Northern Building. Based on the conceptual Site model developed during the Phase II ESA, PCE impacts in groundwater above NYSDEC criteria appear to be present Site-wide. Based on the elevated levels of PCE identified in soil, NYSDEC Spill #1603662 was opened in July 2016 and is currently active.

An EM-61 geophysical survey and associated test pits identified the presence of two (2) USTs that were removed as an IRM as documented in the 2016 Tank Closure Report.

SVI testing conducted in the Southern Building detected PCE at concentrations that warrant mitigation in accordance with the New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006. In addition, mercury, lead, petroleum compounds, and polycyclic aromatic hydrocarbons (PAHs) were identified in soil above applicable NYSDEC criteria.

The following Site Conceptual Model was developed during the Phase II ESA (refer to Figure 5):

> Chlorinated Volatile Organic Compounds (CVOCs): Based on the Phase II ESA, CVOCs appear to be the primary contaminant of concern at the Site. Worst-case impacts appear to be focused in the central-eastern portion of the remaining floor slab in the northeastern quadrant of the Site with lower level impacts identified in groundwater to the southwest of this area. Groundwater flow modeling has identified shallow bedrock groundwater flow to be to the west-southwest, generally towards Genesee Street. This is indicative of the migration of higher level impacts in the northeastern portion of the Site to the southwestern portion of the Site and could explain the lower level impacts on the southwestern portion of the Site.
>
> Impacts to soil in the northeastern portion of the Site appear to be present from just below the floor slab to the top of bedrock, which is located between approximately 3.5-ft and 4-ft

bgs in this location. Dry cleaning equipment including an apparent still appears to have been used in this general location. Elevated concentrations of PCE have been identified in the concrete floor slab in the immediate vicinity of the former dry cleaning equipment, indicating releases of dry cleaning solvents containing PCE to the floor surface during historical operations. In addition, worst-case PID readings as well as PCE concentrations in soil and groundwater were identified within or in the immediate vicinity of the crock located approximately 15-ft to the north of the former dry cleaning equipment. A hard bottom was not identified in the crock and thus this structure could have provided a conduit for liquids directly to the subsurface. Based on the close proximity of the crock to the former dry cleaning equipment, dry cleaning solvent and/or wastewater containing solvents which was released to the floor surface in the vicinity of the equipment may have been directed or washed into the crock and consequently into the underlying soil and bedrock. This could explain the elevated levels of CVOCs identified in this area of the Site.

Petroleum Compounds: Apparent petroleum-impacted soil has been identified in the following two (2) areas of the Site:

Northwestern Quadrant – The geophysical survey and test pitting completed identified two (2) approximately 1,000-gallon USTs which appeared to contain residual petroleum product. At least one (1) of these tanks may be the tank depicted on historical mapping under the footprint of this building. The test pitting and soil boring studies did not identify widespread impacts in the vicinity of these tanks; however, during the removal of these USTs, petroleum impacts were identified in in confirmatory soil samples. These impacts appear to be residual material from the UST(s) and appear to be limited.

Southwestern Quadrant – Evidence of petroleum impairment (i.e., suspect odors, elevated PID readings) were observed in soil borings SB-45 and SB-52. Maximum PID readings recorded in borings SB-45 and SB-52 were 344 ppm and 48 ppm, respectively. These borings were advanced in the vicinity of the former gasoline filling station on the southwestern portion of the Site, surrounding the footprint of the current Southern Building. Several petroleum-related compounds were identified above Unrestricted Use and Protection of Groundwater SCOs but below Commercial Use SCOs in soil samples collected from these borings. SVI samples collected from within the Southern Building did identify the presence of petroleum compounds in sub-slab vapor and indoor air; however, there are no NYSDOH guidance values for these compounds. An additional ten (10) soil borings and four (4) test pits were advanced in this area of the Site; petroleum impacts were not identified in these additional investigation locations.

Based on the apparent lack of widespread impacts and the relatively low-level concentrations identified in soil samples (i.e., not above Commercial Use SCOs), the petroleum impacts observed on the southwestern portion of the Site may be attributed to residual impacts from the former gasoline filling station. However, soil borings and test pits were not advanced within the footprint of the current Southern Building and as such, the potential exists for isolated, higher concentration impacts to be present beneath the building.

Urban Fill: Urban fill including ash and cinders was identified in several locations in the northern portion of the Site, within the footprint of the Former Northern Building. Depths of this fill material generally ranged from 0 to 3-ft bgs. An elevated concentration of mercury was identified in a sample of this material from test pit TP-03 and an elevated concentration

of lead was identified in a sample from boring SB-04. The concentrations detected were above Unrestricted Use and Protection of Groundwater SCOs but below Commercial Use SCOs.

In addition, concentrations of several PAHs were identified above Commercial Use SCOs in samples from borings SB-17 and SB-46. Although ash and cinders were not specifically noted in these locations, PAHs are typically associated with partially combusted petroleum products (e.g, cinders, coal, asphalt, etc.) and may be indicative of additional urban fill material in these areas of the Site. Boring SB-17 was advanced through the crock in the northeastern portion of the Site and thus the PAH impacts could be associated with the washing of waste material containing PAHs into the crock. SB-46 was advanced to the north of the parking lot in the area in which several residential dwellings were previously noted. There is the potential that fill material was generated as part of the demolition of these structures which lead to the presence of elevated concentrations of PAHs in this area of the Site.

The presence of the ash and cinders is likely due to the historical use of this material as fill at the Site, which was common in urban environments in the early and mid-1900's. Compounds commonly found at elevated levels in this material (i.e., heavy metals and PAHs) typically adhere to the soil matrix and are not readily soluble in groundwater. In addition, heavy metals and PAHs typically associated with urban fill were not identified at elevated concentrations in groundwater samples collected at the Site. As such, the migration of impacts within the urban fill material is unlikely via groundwater. In addition, the heavy metal and PAH impacts have been identified in locations that are either currently capped by impervious surfaces (i.e., asphalt pavement) or are located at least 1-ft bgs. As such, active remediation of these impacts does not appear warranted. However, low-level impacts have been identified in the fill and this material is considered a regulated solid waste by the NYSDEC and thus should be managed through an Environmental Management Plan (or similar).

Phase II ESA, Bulls Head Plaza (adjacent property), LaBella, April 2018

LaBella conducted a Phase II ESA at the northern/eastern adjacent property known as the Bulls Head Plaza in 2018. This report was previously shared with the NYSDEC under separate cover. The assessment consisted of advancement of seven (7) test pits, thirty-three (33) overburden soil borings, six (6) overburden monitoring wells and nine (9) bedrock wells. The following conclusions have been made *relative to the 68-92 Genesee Street Site*:

- Chlorinated VOCs (primarily PCE) have been detected in soil and groundwater at the Bulls Head Plaza Site. These compounds have not been identified in soil above NYCRR Part 375 SCOs; however, they have been identified in three (3) bedrock groundwater samples above NYCRR Part 703 Groundwater Quality Standards, two (2) of which are located in close proximity to the 68-92 Genesee Street Site (i.e., wells BWB-01 and BWB-06). There appear to be at least two (2) potential sources of the chlorinated VOC groundwater impacts identified at the Bulls Head Plaza property:
    1. A former dry cleaning facility previously located in the northern portion of the Bulls Head Plaza Site building, approximately 350-ft north of the 68-92 Genesee Street Site. PCE was detected in bedrock groundwater at concentrations up to 12,000-ug/L in this location (i.e., BWB-08). The impacts in this location appear to be unrelated and isolated from the impacts associated with the 68-92 Genesee Street Site.

2. The former dry cleaning facility located at 68-92 Genesee Street. PCE was detected at the Bulls Head Plaza Site in bedrock groundwater at concentrations of 36-ug/L and 5,000-ug/L in locations immediately northwest (BWB-06) and southeast (BWB-01) of the Site (refer to Figure 5 for locations).

Soil Vapor Intrusion Assessment, Bulls Head Plaza (adjacent property), LaBella, August 2018
A SVI assessment was conducted in occupied areas of the Bulls Head Plaza in 2017 which included three (3) tenant spaces as documented in a letter dated August 6, 2018. Based on the results of the SVI assessment, the southernmost occupied tenant space warranted mitigation. This tenant space is located approximately 50-ft north of the 68-92 Genesee Street Site. A sub-slab depressurization system (SSDS) was installed within this tenant space in 2018 and it is currently operating.

2.5 Geology & Hydrogeology

Fifty-six (56) soil borings, five (5) bedrock borings, and seven (7) test pits were advanced at the Site during the 2016 Phase II ESA. Soil borings extended to depths ranging from 1.0 to 12.0-ft. bgs. Bedrock was encountered in a majority of soil borings at depths generally ranging from 2.6-6.1-ft. bgs. Equipment refusal in the northern portion of the Site was generally encountered at depths less than 4-ft. bgs and in the southern portion of the Site was generally encountered at depths greater than 4-ft. SB-42 extended to 12.0-ft. bgs and SB-46 extended to 7.8-ft. bgs which appeared to extend into bedrock. SB-42 was advanced in an apparent former 8,000-gallon UST pit and is assumed to extend to the depth that rock was removed to install the former UST. Refer to Figure 4 for previous testing locations.

Soils encountered generally consisted of fine to coarse gravel, coarse sand and silty sand. Urban fill material consisting of ash and cinders was encountered in several testing locations (SB-08, SB-09, SB-12, SB-13, SB-14, SB-15, SB-22, SB-25, and TP-03) generally located in the northern portion of the Site. Depths of fill material ranged from 0 to 3-ft. bgs.

Bedrock was cored in four (4) locations (BW-01, BW-02, BW-03, and BW-04); however, due to the highly fractured nature of the rock, coring was not completed in BW-05 (note only 3.5-ft. of bedrock was recovered in BW-03 and 0.5-ft. of bedrock was recovered in BW-04). The top of bedrock was encountered during the bedrock drilling at depths ranging from 2.8 to 6.2-ft. bgs with bedrock encountered at shallower depths in the northeastern portion of the Site and deeper in the southwestern portion of the Site. Although recovery was limited due to highly weathered rock, based on known regional geology and observations made at the Site, Decew Dolostone appears to have been encountered immediately below overburden soils in wells BW-01 through BW-04. Several pin to dime-sized vugs and mineralization (apparent calcite) were observed in the dolostone layer observed at the Site. The dolostone appeared gray and sandy in composition. According to the United States Geological Survey (USGS), Decew Dolostone was formed in the Early Silurian Period. Apparent Rochester Shale was encountered in BW-02 beneath the dolostone at a depth of approximately 12-ft bgs. The shale appeared dark gray and silty in composition. USGS indicates that Rochester Shale was also formed in the Early Silurian Period and conformably underlies the Decew Dolostone formation in the Rochester, New York region.

Bedrock wells extended to depths ranging from 14 to 16-ft. bgs. Rock Quality Designation (RQD) values ranged from 0% to 50% which corresponds with the higher weathered and fractured nature of the rock observed during drilling. Photographs of bedrock cores are included in Appendix 5.

Elevated PID readings were observed in twenty-one (21) soil borings and one (1) test pit. The greatest PID readings were generally encountered in the northeastern portion of the Site, with the highest PID reading (10,000 ppm) encountered in SB-17 at 3-4-ft. bgs. SB-17 was advanced in the crock (A-2) located in the eastern-central portion of the remaining floor slab. The crock has a perforated metal cover and does not appear to have a hard bottom. Several influent pipes were observed within the crock. Elevated PID readings were also encountered proximate the former gasoline filling station in the southern portion of the Site, with the maximum PID reading in this location (344 ppm) encountered in SB-45 at approximately 2-ft. bgs.

Groundwater was encountered at the Site from depths ranging from 8.62 to 10.29-ft. bgs below top of PVC casing (measured on August 10, 2016). Bedrock wells were surveyed by a licensed surveyor, and groundwater elevations were calculated from the August 10, 2016 static water levels ranging from 533.67 to 535.58 feet above mean sea level (fmsl). Groundwater flow direction was mapped and groundwater at the Site appears to flow towards the west-southwest, with a gradient of approximately 1.7-ft. from BW-05 to BW-01. The deepest sewer invert elevation (532.19 fmsl) in the area was identified in the intersection of Genesee Street and Clifton Street, to the southwest of the Site. The sewer line and surrounding relatively porous bedding may at least partially account for the groundwater flow direction to the west-southwest at the Site.

Hydraulic conductivity testing was completed on August 10, 2016 for the five (5) bedrock wells (BW-01 through BW-05). Hydraulic conductivity values were relatively high, and ranged from approximately 6.72E-04 centimeters per second (cm/sec) or 58 cm/day to approximately 2.48E-03 cm/sec or 214 cm/day.

3.0 OBJECTIVE

The objective of this SI is to further investigate subsurface impacts, mainly CVOCs, characterize the nature and extent of contamination in soil, groundwater, bedrock, and soil vapor and conduct an exposure assessment.

4.0 SCOPE OF WORK

The following scope of work was developed based on the data collected during the Phase II ESAs by LaBella for both the Site and the adjacent Bulls Head Plaza property. The following subtasks are planned. Tasks will be completed in the order listed.

1. Groundwater Sampling- Existing Wells
2. Overburden Soil Borings
3. Bedrock Wells
4. Test Pits
5. Comprehensive Round of Groundwater Sampling
6. Survey of Wells/ Utility Inverts and Groundwater Flow Contouring
7. Off-Site Soil Vapor Intrusion Assessment

The SI will be conducted in accordance with NYSDEC's *DER-10/ Technical Guidance for Site Investigation and Remediation* Issued May 3, 2010.

4.1 Groundwater Sampling- Existing Monitoring Wells

This task will include sampling of five (5) previously installed bedrock wells BW-01 through BW-05. BW-03 and BW-05 are upgradient samples; BW-04 is a source sample; and BW-01 and BW-02 are downgradient samples. Wells will be sampled for per- and polyfluoroalkyl substances (PFAS), 1,4-dioxane and VOCs. All PFAS and 1,4-dioxane sampling will be conducted in accordance with NYSDEC's "*Guidelines For Sampling and Analysis of PFAS"* dated January 2020.

PFAS (bailer sampling)
Samples for PFAS analysis will be collected first, using dedicated disposable high density polyethylene (HDPE) and/or PVC bailers. Samples will be collected in bottleware provided by the laboratory. Because PFAS are found in numerous everyday items, the following special precautions will be taken during sampling activities:

- No use of Teflon®-containing materials (e.g., Teflon® tubing, bailers, tape, sample jar lid liners, plumbing paste).
- No use of low density polyethylene (LDPE)-containing materials.
- No Tyvek® clothing will be worn by samplers.
- Clothes treated with stain-resistant or rain-resistant coatings (e.g., Gortex®) will be not be worn by samplers.
- All clothing worn by sampling personnel must have been laundered multiple times.
- No fast food wrappers, disposable cups or microwave popcorn will be within the vicinity of the wells/ samples.
- There will be no use of chemical (blue) ice packs, aluminum foil, or Sharpies® within the vicinity of the wells/ samples.
- No use of sunscreen, insect repellants, cosmetic, lotions or moisturizers will be allowed by sampling personnel the day of sampling.
- If any of the above items are handled by the field personnel prior to sampling activities, field personnel will wash their hands thoroughly with soap and water prior to any sampling activities.
- Powder-free nitrile gloves will be worn during all sample collection activities.

Quality assurance/ quality control (QA/QC) samples for PFAS sampling will include one (1) field duplicate, one (1) matrix spike / matrix spike duplicates (MS/MSD) and one (1) equipment blank. The procedures and rationale for collecting these samples are described below.

- Field duplicate – Sample will be used to assess the variability in concentrations of samples from the same well due to the combined effects of sample processing in the field and laboratory as well as chemical analysis.
- Matrix spike/matrix spike duplicate – Sample will be used to provide information about the effect of the sample matrix on the design and measurement methodology used by the laboratory.
- Equipment blank – Sample will be collected to help identify possible contamination from sampling equipment (i.e., bailer). One equipment blank will be collected by pouring laboratory certified analyte-free deionized water over a bailer into the sample container.

PFAS samples will be submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory for analysis of the full PFAS target analyte list (21 compounds listed in the NYSDEC Guidance) via modified United States Environmental Protection Agency (USEPA) Method 537 with a method detection limit not to exceed 2 ng/L. Note, the laboratory utilized will be ELAP certified for PFAS in drinking water by EPA method

537 or ISO 25101 as ELAP does not currently offer certification for PFAS compounds in matrices other than finished drinking water.

VOCs and 1,4-dioxane (low-flow sampling)
Each of the five (5) existing bedrock wells as well as BWB-01 installed at the Bulls Head Plaza property will be sampled using low-flow methodology for VOC analysis as follows:

- Wells will be checked for NAPL immediately prior to groundwater sampling and static water levels will be collected.
- Groundwater will be purged from each well using a bladder pump. The top of pump will be placed approximately 2-ft from the bottom of the well.
- Water quality parameters including turbidity, pH, temperature, specific conductivity, dissolved oxygen, and depth to water will be recorded at five (5) minute intervals during sampling until the parameters have stabilized for three (3) consecutive intervals within the specified ranges below, at which time the samples will be collected:
    - Water level drawdown (<0.3')
    - Turbidity (+/- 10%)
    - pH (+/-0.1)
    - Temperature (+/- 3%)
    - Specific conductivity (+/- 3%)
    - Dissolved Oxygen (+/- 10%)
    - Oxidation reduction potential (+/- 10 millivolts)

Samples will be submitted to a NYSDOH ELAP laboratory for analysis of USEPA Target Compound List (TCL) Volatile Organic Compounds (VOCs) including tentatively identified compounds (TICs) using USEPA Method 8260, and 1,4-dioxane using USEPA method 8270 in selective ion monitoring (SIM) mode with a method detection limit not to exceed 0.28 ug/L.

4.2 Overburden Soil Borings

This task will further evaluate PAH impacts in the central portion of the Site, mercury impacts identified in TP-03, lead impacts identified in SB-04, and VOC impacts in the northern portion of the Site (refer to Figure 5). Up to twenty (20) overburden soil borings will be advanced using a direct-push Geoprobe® sampling system. Proposed soil boring locations are included on Figure 6; however, locations may vary based on field observations.

Soil borings will be advanced to equipment refusal (anticipated to be approximately 4-5-ft. bgs). Soils from the borings will be retrieved in 4 or 5-ft. macrocore liners and will be continuously assessed for evidence of impairment. Soils will be continuously screened with a photoionization detector (PID) ppbRAE and x-ray fluorescence (XRF) meter. Soils will be logged by a LaBella representative.

Select soil samples will be submitted for laboratory analysis. Two (2) full-suite soil samples were collected during the Phase II ESA. Two (2) full-suite soil samples were collected in accordance with the IRM Work Plan in 2020. An additional one (1) full-suite soil sample and two (2) 1,4-dioxane and PFAS soil samples will be collected (refer to Figure 6 for sample locations). The proposed full-suite soil sample will be collected from the overburden during the installation of a shallow bedrock well as shown on Figure 6 (refer to Section 4.3 for bedrock well installation procedures). The following laboratory analysis will be performed for soil samples during the overburden evaluation:

- General Site Coverage
    - Four (4) for USEPA TCL VOCs including TICs by USEPA Method 8260;
    - Two (2) 1,4-dioxane by USEPA Method 8270SIM;
    - Two (2) PFAS by USEPA Method 537 modified;

- One (1) for full-suite parameters including:
  - USEPA TCL VOCs including TICs by USEPA Method 8260;
  - USEPA TCL SVOCs including TICS by USEPA Method 8270;
  - Target analyte list (TAL) metals by USEPA Method 6010/7471;
  - Cyanide by USEPA Method 9012;
  - Pesticides by USEPA Method 8081;
  - Polychlorinated biphenyls (PCBs) by USEPA Method 8082;
  - 1,4-dioxane by USEPA Method 8270SIM; and
  - PFAS by USEPA Method 537 modified.

- **Lead and mercury impacts proximate TP-03 and SB-04:** Eight (8) for Resource Conservation and Recovery Act (RCRA) metals by USEPA Method 6010/7470.
- **PAH impacts proximate SB-46:** Four (4) for NYSDEC CP-51 SVOCs by USEPA Method 8270.

4.3 Bedrock Wells

Five (5) shallow bedrock wells were installed during the 2016 Phase II ESA. Eight (8) shallow bedrock wells and four (4) deeper bedrock wells will be installed during the SI. Refer to Figure 6 for proposed locations.

4.3.1 Shallow Bedrock Wells

Based on the data collected during the Phase II ESA and the conceptual Site model, PCE impacted groundwater appears to be present Site-wide with apparent the source area located in the northeastern portion of the Site proximate the former dry cleaning operations. As such, this task will further assess the horizontal extent of VOCs in groundwater, including off-Site.

It is anticipated that five (5) on-Site and three (3) off-Site shallow bedrock monitoring wells will be installed (refer to Figure 6). It is currently anticipated shallow bedrock wells will be installed to depths up to 15-ft. below top of rock (btr); however, groundwater data obtained during the initial groundwater sampling and observations made during drilling will be utilized to determine terminal depths of monitoring wells. Shallow bedrock wells will be completed as follows:

Shallow Bedrock Well Installation:

- Continuous soil sampling will be completed in the overburden in the proposed bedrock well locations. Soils from the borings will be retrieved in split spoons or 4 or 5-ft. macrocore liners and will be continuously assessed for evidence of impairment. Soils will be continuously screened with a PID ppbRAE.
- At least one (1) soil sample is anticipated to be collected from each on-Site location for analysis of TCL VOCs including TICs. The soil samples will be collected from the areas of "worst case" impacts, or from directly on top of bedrock if impacts are not identified in overburden soils. A full-suite soil sample will also be collected from one (1) shallow bedrock well location as indicated in Section 4.2.
- Subsequently, hollow-stem augers will be advanced through the overburden and to approximately 2-ft. through the top of weathered bedrock.
- Based on the anticipated proximity of the bedrock drilling locations to the public, enhanced dust suppression methods will be employed during the air rotary drilling. Specifically, air (and dust) blown from the corehole during drilling will be diverted via piping to a dust control unit. The dust control unit will consist of a 55-gallon drum (or similar, based on air flow) partially filled with water. Air/particulate generated from the drill stem will be directed into the vessel via piping and discharged within the vessel below the water line, which is designed to demobilize any particulate from the corehole. The vessel will be vented to allow air to be

discharged from the system. The water/sediment waste which will be generated within the dust control unit will be properly disposed of off-site as investigation derived waste.

- A 4-inch diameter steel casing will be grouted into the borehole to seal out the overburden.
- Subsequent to curing of the grout for approximately 24-hours, bedrock will be cored to the extent feasible using air rotary methods to a depth of approximately 15-ft. below top of competent rock. It should be noted that during the Phase II ESA, highly fractured bedrock prohibited coring in several locations.
- A LaBella representative will log rock cores retrieved and calculate rock quality designations (RQDs). It is anticipated six (6) sections of rock core will be collected for analysis of TCL VOCs including TICs from this task from on-Site wells.
- Due to the highly fractured nature of the bedrock, wells are anticipated to be constructed with 2-inch diameter slotted PVC connected to an appropriate length of PVC riser.
- A sand pack will be placed around the PVC.
- Each bedrock monitoring well will be finished with a flush-mounted curb box or locking stick-up well cap.
- Details of the rock coring procedures and well installation will be recorded on appropriate field forms.

Shallow Bedrock Well Sampling:

The eight (8) newly installed shallow bedrock monitoring wells will be developed and sampled as follows prior to installing the deep bedrock monitoring wells.

- Bedrock wells will be developed using a dedicated bailer or submersible pump to remove a minimum of three (3) well volumes in addition to any water lost during drilling, if applicable.
- Wells will be monitored for non-aqueous phase liquid (NAPL) prior to and following development.
- Following development, wells will be left to equilibrate for a minimum of one (1) week.
- Wells will be checked for NAPL immediately prior to groundwater sampling and static water levels will be collected.
- Groundwater sampling will be completed via low-flow methodologies (bladder pump) as detailed in Section 4.1.
- Samples will be submitted for laboratory analysis of USEPA TCL VOCs including TICs from each well.
- One (1) well in the northern portion of the Site will be sampled for full-suite parameters which in addition to VOCs includes:
    - USEPA TCL SVOCs including TICS by USEPA Method 8270;
    - TAL metals by USEPA Method 6010/7471;
    - Cyanide by USEPA Method 9012;
    - Pesticides by USEPA Method 8081; and
    - PCBs by USEPA Method 8082.
- 1,4-dioxane and PFAS sampling is included in Section 4.1.

4.3.2 Deep Bedrock Wells

The purpose of this task is to evaluate the vertical extent of VOCs in bedrock groundwater. It is anticipated three (3) on-Site and one (1) off-Site deep bedrock wells will be installed (refer to Figure 6). *Shallow bedrock wells will be sampled prior to installation of deep bedrock wells to determine the final locations and vertical extent of the deep bedrock wells.*

The on-Site deep bedrock wells will be located in the immediate vicinity of the apparent source area

near existing shallow bedrock well BW-04 and in apparent down-gradient locations from the source area. The off-Site deep bedrock well will be located hydraulically down gradient of the apparent source area and next to a proposed shallow bedrock well. Deep bedrock wells will be advanced using the same methods as the shallow bedrock wells.

It is anticipated deep bedrock wells will be advanced to approximately 30-ft. btr; however, the terminal depths will be dependent on the final depths of the shallow bedrock monitoring wells and shallow bedrock well groundwater data. Deep bedrock wells will extend at least 15-feet past the shallow bedrock wells and will be sealed out except for the bottom 10-feet (i.e., sealed 5-feet below the shallow bedrock wells).

It is anticipated two (2) sections of rock core will be collected for analysis of TCL VOCs including TICs from this task.

The four (4) newly installed deep bedrock monitoring wells will be developed and sampled in the same manner as shallow bedrock wells (refer to Section 4.3.1). Samples will be submitted for laboratory analysis of USEPA TCL VOCs including TICs.

4.4 Test Pits

Approximately four (4) test pits will be advanced in the northeastern portion of the Site to assess "ripability" of the bedrock for the purpose of remedial design (refer to Figure 6). Test pits will be conducted as follows:

- Test pits will be advanced to approximately 8-ft. btr, to the extent feasible, using an excavator and breaker attachment.
- One (1) bedrock sample per test pit location will be selected for analysis of TCL VOCs and permanganate natural oxidant demand (PNOD).
- Excavated soils and bedrock will be staged on temporary containment areas consisting of 2 layers of 10-mil poly with wood frame constructed of 2x4 lumber or similar, pending disposal (refer to Section 4.8 for additional information on investigation derived waste).
- It is anticipated temporary containment areas will be constructed or roll-off dumpsters will be utilized to stage soil and rock prior to disposal. Staged materials will be staged on and covered with 2 layers of 10-mil poly. Roll-offs (if used) will be lined. Staged soils will be segregated based on PID readings; soils exhibiting PID readings less than 50 ppm will be segregated from soils exhibiting PID readings above 50 ppm.
- A demarcation layer will be placed in each test pit prior to backfilling.
- Test pits will be backfilled with crushed stone and covered with flowable fill.

Following completion of the test pitting and bedrock well installations in the area of remaining Former Northern Building floor slab, the remaining slab is anticipated to be covered with another thin layer of flowable fill to reinforce the cap of this area. The objective of this reinforcement is to prevent precipitation from entering any cracks or other deficiencies in the concrete which may penetrate the subsurface and cause further contaminant migration.

4.5 Complete Round Groundwater Sampling

Approximately 3 months following completion of the initial shallow and deep bedrock well groundwater sampling as detailed in Section 4.3, a second complete round will be completed using the same methods (i.e., low-flow sampling as detailed in Section 4.1). The following wells will be sampled:

- Eight (8) newly installed shallow bedrock wells

- Four (4) newly installed deep bedrock wells
- Previously installed on-Site BW-01 through BW-05
- Off-Site BWB-01 (Bullshead Plaza)

Wells will be checked for NAPL immediately prior to groundwater sampling and static water levels will be collected. Samples will be analyzed for USEPA TCL VOCs including TICs.

4.6 Survey of Wells/ Utility Inverts and Groundwater Flow Contouring

Newly installed monitoring wells as well as utility inverts within/ proximate to Genesee Street and Clifton Street which are not included in historical Monroe County Mile Square Mapping will be surveyed by a licensed surveyor. Necessary permits will be obtained for any survey work in the right-of-way.

Static water levels will be obtained on two (2) additional occasions; 3 months and 6 months following the complete round of groundwater sampling (Section 4.5) for the purpose of evaluating seasonal groundwater flow direction. Groundwater elevation contours will be developed and included in the SI Report.

4.7 Off-Site Soil Vapor Intrusion Assessment

Results of SVI sampling conducted at the Southern Building on-Site during the 2016 Phase II ESA indicated that mitigation is warranted in this building. Due to the close proximity of other buildings to the inferred source area in the northeastern portion of the Site, and residential homes in the downgradient direction (i.e., south) of the Site, assessment of off-Site properties will be conducted. The City will coordinate with the property owners and tenants for access and will execute access agreements with each property owner prior to implementing any work on off-Site properties that are not owned by the City.

4.7.1 177, 179, 185 and 189 Clifton Street

Sampling will be conducted in substantial accordance with the *NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 and subsequent updates. Access agreements have been sent to the property owners; the City has not received any responses. If access is granted, SVI sampling will be conducted during the heating season as follows:

- An initial Site visit will be conducted at each residence proposed for SVI sampling to select sample locations and identify if there is a basement/ crawl space.
- SVI samples (sub-slab and indoor air) will be collected from the lowest level of each of the four (4) residences shown on Figure 6. For buildings with a basement, an indoor air sample will also be collected from the lowest occupied living space if the basement is not an occupied living space. If any of the basements have dirt floors, a sub-slab sample will not be collected from that location.
- Sub-slab samples will be collected by coring an approximately 5/8-inch diameter hole through the floor slab in each sampling location. The Vapor Pin® assembly consisting of a metal barbed fitting with 5/8-diameter tubing will be installed in the corehole.
- A tracer-gas test will be performed at each sub-slab vapor sample location to confirm the integrity of the seal.
- Subsequent to the tracer gas test, tubing will be connected to the metal barbed fitting extending above the floor surface and will be connected to a Summa® canister with a pre-set

regulator for sample collection over an approximate 24-hour period.

- Subsequent to the installation of each sub-slab vapor point, an indoor air sample will be set-up for collection within the immediate vicinity (i.e., approximately 15-ft.) of each sub-slab vapor sample. Indoor air samples will also be collected using a Summa® canister with a pre-set regulator for sample collection over an approximately 24-hour period. The indoor air samples will be placed approximately 3-ft. to 5-ft. above the floor surface.
- One (1) outdoor air sample will be collected using a Summa® canister with a pre-set regulator for sample collection over an approximate 24-hour period to evaluate background conditions. It is assumed all the off-Site SVI sampling will be conducted during the same timeframe and one (1) outdoor air sample will be collected.
- A NYSDOH Indoor Air Quality Questionnaire and Building Inventory will be completed in each building sampled as part of the SVI study. Materials containing potential contaminants of concern (e.g., cleaning chemicals, etc.) will be listed to identify any potential indoor air sources of impacts.
- Following sample collection, the sampling points will be removed, sealed with grout, and the floor will be restored to pre-sample conditions to the extent feasible.
- Samples will be sent under standard chain of custody procedures to an ELAP certified laboratory for analysis of VOCs by USEPA Method TO-15.

4.7.2 160 Clifton Street

The City of Rochester recently acquired this property. This property has an underground parking garage across the entire footprint of the Site Building. The lowest level of occupied space is at ground level, above the garage. Due to the underground garage open to the outdoor air in this building, SVI within the upper floors is unlikely. The vent fan within the garage will be evaluated by a mechanical engineer to assess the air turnovers in the garage space. If the air exchange meets NYS code, no further sampling or repairs will be completed. If the fan does not appear to provide sufficient fresh air to the underground garage area, indoor air sampling may be completed. Following evaluation of the fan, the NYSDEC and NYSDOH will be notified of the results and a plan for indoor air sampling will be provided, if warranted. Indoor air samples would consist of 8-hour Summa® canisters collected from the occupied space, and analyzed for VOCs via USEPA Method TO-15.

4.7.3 835-855 West Main Street (Bulls Head Plaza)

A SSDS is installed and operating in the occupied space nearest to 68-92 Genesee Street. The SSDS was installed in 2018 and post-mitigation indoor air sampling was completed and determined that the indoor air concentrations do not exceed the NYSDOH Air Guideline Values. Indoor air samples will be collected again from the lowest level of the occupied space (U of R tenant space) using the same procedures complete in 2018 and in accordance with the *NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006 and subsequent updates.

Prior to sampling, the interior space to be sampled will be screened with a ppbRAE to assess for the potential for VOCs to be present. ppbRAE screening will be completed at doors connected to adjacent spaces, and floor penetrations associated with previously installed sub-slab pressure testing locations.

Samples will be collected using Summa® canister set to 8-hours. Two (2) indoor air samples and one (1) outdoor air sample will be collected over the same timeframe within the heating season. A NYSDOH Product Inventory will be completed. Samples will be analyzed by an ELAP-certified laboratory for VOCs via USEPA Method TO-15. The laboratory will provide an ASP-Category B-like report. Results will be validated by a third party.

4.7.4 89 Genesee Street (St. Mary's Hospital)

It should be noted the City has sent an access agreement to the owner and the City has not received a response. If the owner grants access, a soil gas sample will be collected consistent with the *New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated 2006 and subsequent updates. A soil gas sample point will be installed outside the building using a track mounted Geoprobe® (refer to Figure 6). The sample point will consist of 1-inch diameter PVC piping installed to approximately 4 to 5-ft bgs, and backfilled with porous inert material (e.g., glass beads, or similar) from approximately 3-5-ft bgs. The remainder of the annulus will be sealed with bentonite to the ground surface.

One (1) to three (3) volumes (i.e., the volume of the sample probe and tube) will be purged prior to collecting the samples to ensure samples collected are representative. Flow rates for purging will not exceed 0.2 liters per minute to minimize the ambient air infiltration during sampling. A tracer gas evaluation will be conducted to verify the integrity of the sampling point seal using helium. Tubing will be connected to the sampling point and an enclosure will be placed over the sampling point. Subsequently, the enclosure will be enriched with the tracer gas (e.g., helium). The tracer gas will be tested within the enclosure and the sampling point to ensure the tracer gas does not leak into the sampling point.

A Summa® canister will be connected to the sampling point above ground using tubing. An outdoor air sample will also be collected to document background conditions. Samples will be collected over an approximate 8-hour timeframe. Samples will be analyzed by an ELAP-certified laboratory for VOCs via USEPA Method TO-15. The laboratory will provide an ASP-Category B-like report. Results will be validated by a third party.

Results of the soil gas sample will be provided to NYSDEC and NYSDOH. If based on the results, additional sampling appears to be warranted at this off-Site property, an addendum to this Work Plan may be provided.

4.8 Investigation Derived Waste

Investigation derived waste including drilling cuttings, drilling water, purge water, decontamination water, etc. will be containerized in 55-gallon drums stored on-Site and disposed of following all investigation activities at a permitted facility pending waste characterization. For security purposes, drums will be stored in a locked storage container at the Site. Drums will be labeled identifying the contents.

Test pit soils will be stockpiled as detailed in Section 4.4. Temporary locked fencing will be installed surrounding the area with staged soils until the soils are disposed of. Each stockpile will be sampled for TCL and toxicity characteristic leaching procedure (TCLP) VOCs for a contained-in determination.

Based on previous TCLP testing on soils from SB-17 which exceed the Maximum Concentration of Contaminants for Toxicity Characteristics for PCE, soil from the test pit proximate SB-17 is assumed to be characterized as hazardous. All rock is anticipated to be disposed of off-site as hazardous. The remaining soil is anticipated to be characterized as non-hazardous via contained-in determination. It is assumed groundwater will be disposed of as hazardous in drums.

Pending approval of the contained-in determination request, non-hazardous soil and rock will be transported to Mill Seat Landfill in Bergen, NY for disposal and hazardous soil and rock will be

transported to Horizon Environment Inc. in Quebec Canada, or other appropriately permitted facilities.

It is estimated up to ten (10) drums of hazardous groundwater, fifty-five (55) tons of hazardous soil/ rock, and thirty (30) tons of non-hazardous soil will be generated.

5.0 HEALTH AND SAFETY

LaBella's Health and Safety Plan (HASP) for this project is included in Appendix 1. The NYSDOH Generic Community Air Monitoring Plan (CAMP) and Fugitive Dust and Particulate Monitoring will be utilized for this SI and is included in Appendix 2. The Special Requirements CAMP included in Appendix 2 will be implemented during ground intrusive work occurring within 20 feet if an occupied structure. Dust collection procedures will be implemented for bedrock drilling as detailed in Section 4.3.

6.0 QUALITY CONTROL

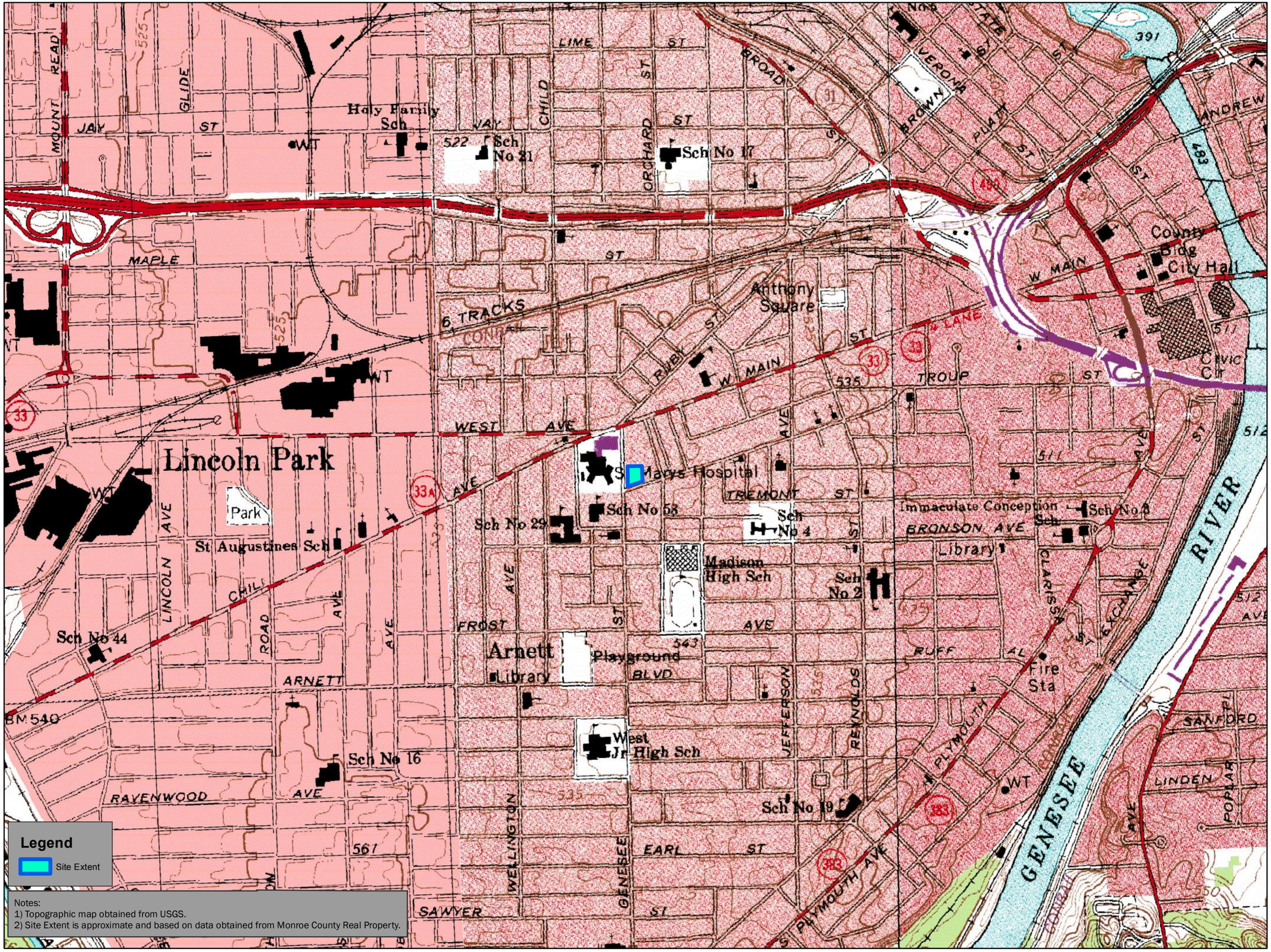
Activities completed at the Site will be managed under LaBella's Quality Control Program, which is included in Appendix 3. Quality assurance/ quality control (QA/QC) sampling will include analysis of one matrix spike/ matrix spike duplicate (MS/MSD) and one (1) blind duplicate sample for each matrix type (i.e., soil, air, sub-slab soil vapor and groundwater) at a rate of one per 20 samples collected for each parameter group, or one per shipment, whichever is greater. One (1) trip blank will be included in each shipment of groundwater samples for VOC analysis. QA/QC sampling will not be conducted for waste characterization or bedrock core samples.

All samples will be delivered under Chain of Custody procedures to a NYSDOH ELAP-certified laboratory. The laboratory will provide NYSDEC ASP Category B Deliverables and NYSDEC EQUIS Electronic Data Deliverables (EDDs) for all samples except waste characterization and bedrock core samples. A data usability summary report (DUSR) will be completed for all ASP Category B format laboratory data packages per DER-10.

7.0 SCHEDULE AND DELIVERABLES

At the conclusion of the investigation a SI Report will be developed including investigation methods, results, findings, and conclusions. The report will contain data tables with results compared to applicable regulatory criteria and mapping depicting testing locations and contaminant contours. Work is anticipated to begin within 60 days of Work Plan approval from NYSDEC. The scope of work included herein is anticipated to take approximately 10 to 12 months to complete. A Final SI Report is anticipated to be complete approximately 60 days following receipt of all validated data.

FIGURES



Legend

Site Extent

Notes:
1) Topographic map obtained from USGS.
2) Site Extent is approximate and based on data obtained from Monroe County Real Property.

Path: \\Projects2\Projects NZ-2\Rochester, City\2182888 - 68-92 Genesee St Site Inv\Drawings\SI Work Plan\Figure 1 - Site Location.mxd

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Feet
1 inch = 1,000 feet

INTENDED TO PRINT AS: 11" X 17"

CLIENT:

CITY OF ROCHESTER

PROJECT:
SITE INVESTIGATION
WORK PLAN
68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

DRAWING NAME:

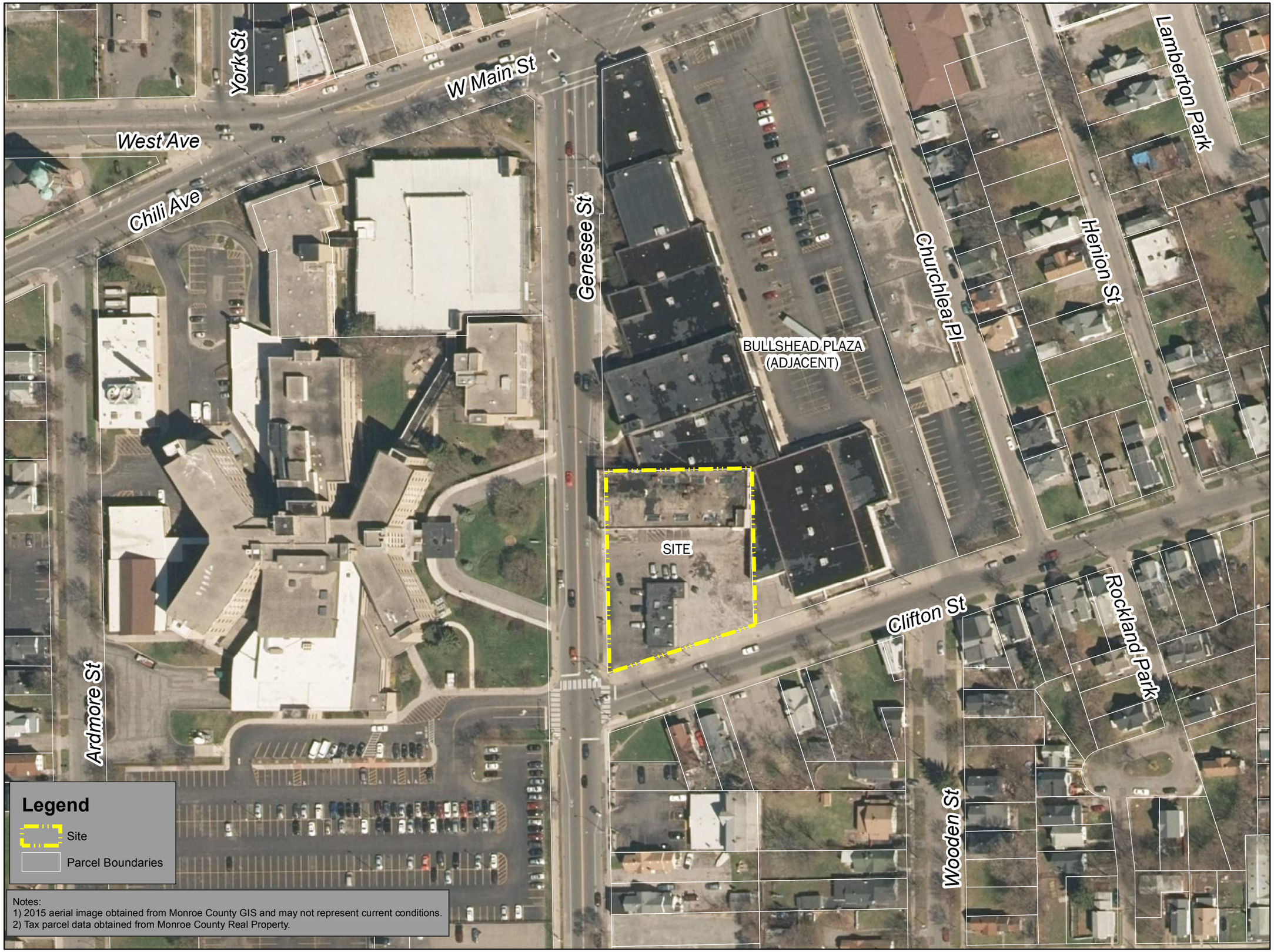
SITE LOCATION MAP

PROJECT #/DRAWING #/ DATE

2182888

FIGURE 1

6/13/2019



Notes:
1) 2015 aerial image obtained from Monroe County GIS and may not represent current conditions.
2) Tax parcel data obtained from Monroe County Real Property.

Path: \\Projects\Projects NZ-2\Rochester, City\2182888 - 68-92 Genesee St Site Inv\Drawings\SI Work Plan\Figure 2- Site and surrounding area.mxd

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1 inch = 100 feet

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PROJECT:
SITE INVESTIGATION
WORK PLAN
68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

DRAWING NAME:
SITE AND
SURROUNDING AREA

PROJECT #/DRAWING #/ DATE

2182888

FIGURE 2

6/13/2019

SUSPECT AREAS OF CONCERN KEY:
1. Dry cleaning equipment
2. Two (2) ASTs in basement
3. Five (5) 25-gal containers with toxic labels
4. Two (2) unlabeled drums with apparent spilled contents & hydraulic elevator
5. Waste dry cleaning filters stored along N. wall
6. Large, rusted metal container filled with liquid
7. Staticol drum
8. Waste dry cleaning filters
9. Staticol drum
10. Staticol drum
11. Two (2) unlabeled drums
12. #2 Fuel Oil UST removed in 1999
13. Adjacent machine shop in 1912 Sanborn Map

Former Northern Building
(Demolished Spring 2016)

Genesee St

Clifton St

Legend

- Approximate Remaining Floor Slab
- Floor Drains
- Surrounding Sewer Lines
- Surrounding Water Lines
- Former Ronda Place
- Former Gas Station Building Footprint
- Approx. Footprints of Former Dwellings (1912 & 1938 Mapping)
- Suspect Areas of Concern
- USTs on Sanborn Maps
- Site

Notes:
1) April 2015 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
2) Tax parcel data obtained from Monroe County Real Property.
3) Suspect Areas of Concern based on review of the Phase I ESA report completed by Bergmann Associates in December 2013 (including Sanborn Fire Insurance Mapping) and observations by LaBella Associates during 2016 asbestos abatement and demolition. Note that the Areas of Concern refer to previous site conditions and that LaBella understands all containers and ASTs have been removed from the Site.
4) Utilities obtained from Monroe County GIS.

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1 inch = 30 feet

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SITE INVESTIGATION
WORK PLAN
68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

DRAWING NAME:

SITE FEATURES

PROJECT #/DRAWING #/ DATE

2182888

FIGURE 3

6/13/2019

Path: \\Projects2\Projects\NZ-2\Rochester, City\2182888 - 68-92 Genesee St Site Inv\Drawings\SI Work Plan\Figure 3- Site Layout.mxd

Legend

- Bedrock Monitoring Well (LaBella 2016)
- Soil Boring (LaBella 2016)
- Soil Boring/ Overburden Monitoring Well (LaBella 2016)
- Bulls Head Plaza Bedrock Wells (LaBella 2017)
- Former USTs (removed 2016)
- Test Pits (LaBella 2016)
- Approx. Footprint of Remaining Slab
- Site Boundary

Notes:
1) April 2015 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
2) Tax parcel obtained from Monroe County Real Property.
3) Soil borings and monitoring wells located using a Carlson S320 GPS with horizontal accuracy of 0.1-ft.
4) MW-01 and MW-02 were dry and were not sampled.
5) Not all off-Site testing locations are shown.

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1 inch = 25 feet

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CLIENT:

CITY OF ROCHESTER

PROJECT:
SITE INVESTIGATION WORK PLAN
68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

DRAWING NAME:
PREVIOUS TESTING LOCATIONS

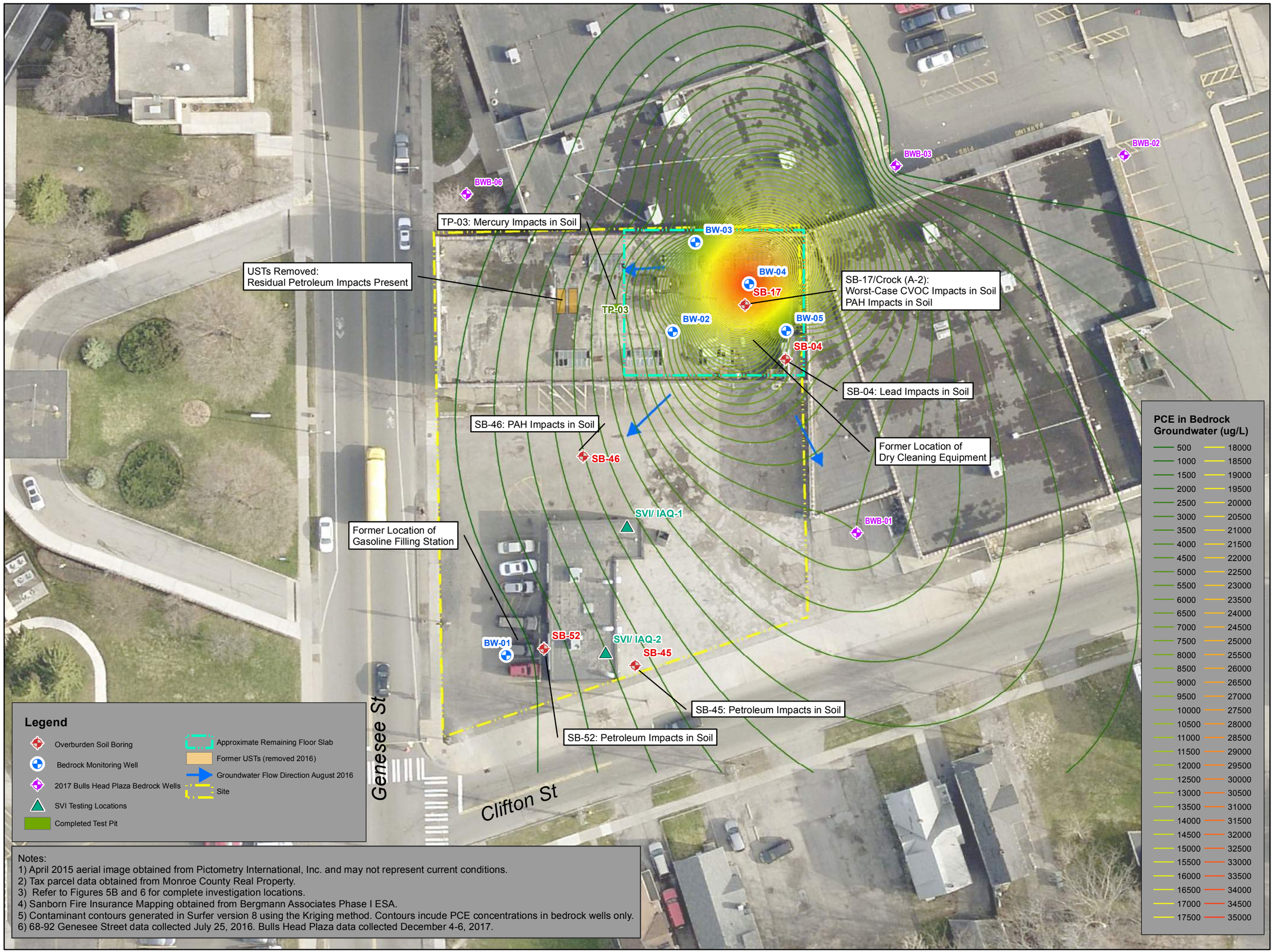
PROJECT #/DRAWING #/ DATE

2182888

FIGURE 4

6/27/2019

Path: \\Projects2\Projects\NZ-2\Rochester, City\2182888 - 68-92 Genesee St Site Inv\Drawings\SI Work Plan\Figure 4- Soil Boring and Monitoring Well Locations.mxd



Notes:
1) April 2015 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
2) Tax parcel data obtained from Monroe County Real Property.
3) Refer to Figures 5B and 6 for complete investigation locations.
4) Sanborn Fire Insurance Mapping obtained from Bergmann Associates Phase I ESA.
5) Contaminant contours generated in Surfer version 8 using the Kriging method. Contours incude PCE concentrations in bedrock wells only.
6) 68-92 Genesee Street data collected July 25, 2016. Bulls Head Plaza data collected December 4-6, 2017.

Path: \\Projects2\Projects\NZ-2\Rochester, City\2182888 - 68-92 Genesee St Site Inv\Drawings\SI Work Plan\Figure 5- Site Conceptual Model.mxd

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Feet
1 inch = 40 feet

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SITE INVESTIGATION
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68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

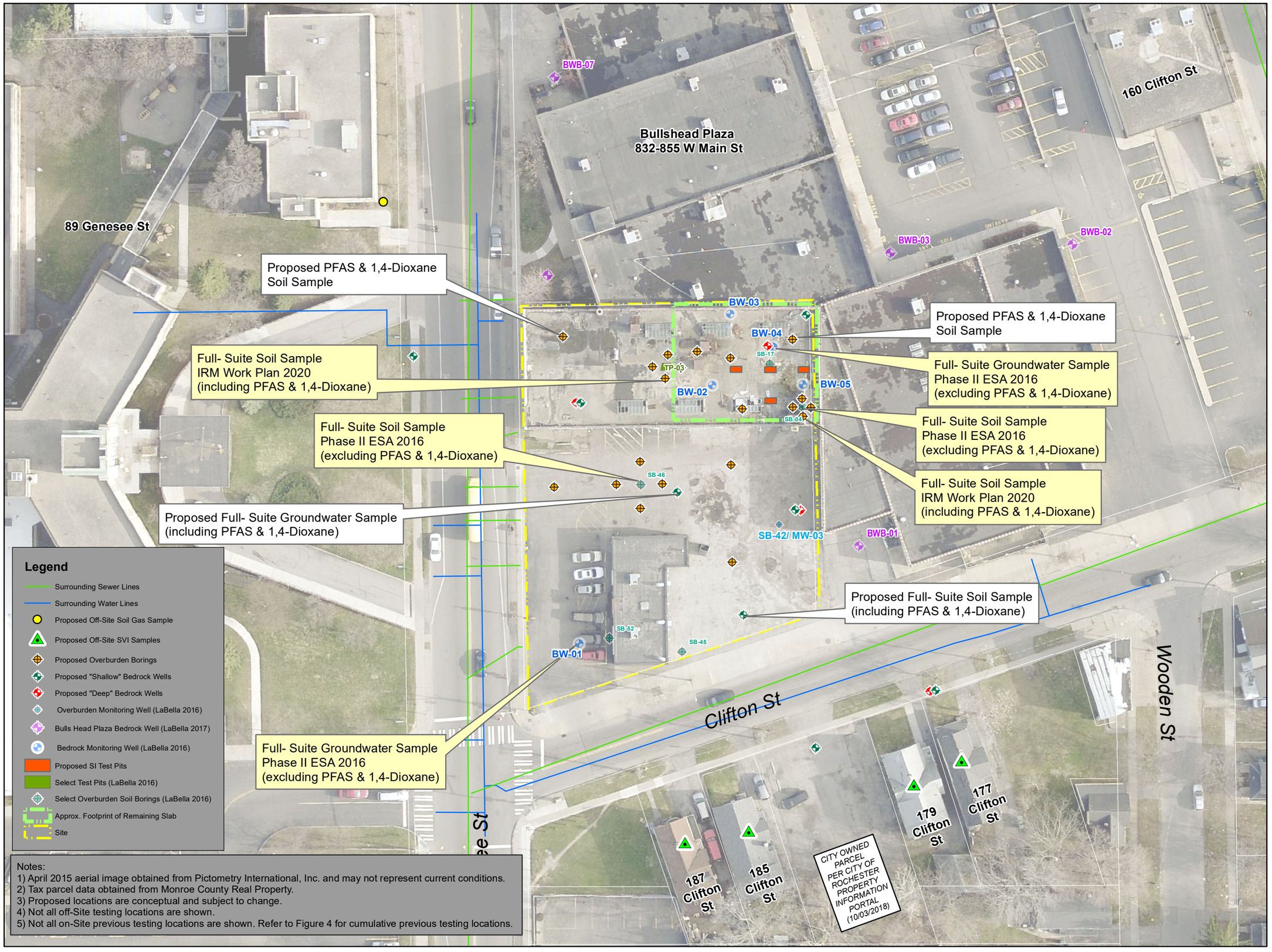
DRAWING NAME:
FINDINGS OF
PREVIOUS
INVESTIGATIONS

PROJECT #/DRAWING #/ DATE

2182888

FIGURE 5

6/27/2019



Legend

- Surrounding Sewer Lines
- Surrounding Water Lines
- Proposed Off-Site Soil Gas Sample
- Proposed Off-Site SVI Samples
- Proposed Overburden Borings
- Proposed "Shallow" Bedrock Wells
- Proposed "Deep" Bedrock Wells
- Overburden Monitoring Well (LaBella 2016)
- Bulls Head Plaza Bedrock Well (LaBella 2017)
- Bedrock Monitoring Well (LaBella 2016)
- Proposed SI Test Pits
- Select Test Pits (LaBella 2016)
- Select Overburden Soil Borings (LaBella 2016)
- Approx. Footprint of Remaining Slab
- Site

Notes:
1) April 2015 aerial image obtained from Pictometry International, Inc. and may not represent current conditions.
2) Tax parcel data obtained from Monroe County Real Property.
3) Proposed locations are conceptual and subject to change.
4) Not all off-Site testing locations are shown.
5) Not all on-Site previous testing locations are shown. Refer to Figure 4 for cumulative previous testing locations.

Path: \\Projects2\Projects\NZ-2\Rochester, City\2182888 - 68-92 Genesee St Site Inv\Drawings\SI Work Plan\Figure 6 - SI UpdatedOct2018.mxd

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Feet
1 inch = 50 feet

INTENDED TO PRINT AS: 11" X 17"

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CITY OF ROCHESTER

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SITE INVESTIGATION WORK PLAN
68-92 GENESEE STREET
ROCHESTER, NY
NYSDEC SITE #828196

DRAWING NAME:

PROPOSED SITE INVESTIGATION TESTING LOCATIONS

PROJECT #/DRAWING #/ DATE

2182888

FIGURE 6

2/28/2020

APPENDIX 1

Health and Safety Plan

Site Health and Safety Plan

Location:

68-92 Genesee Street
Rochester, New York 14611

Prepared for:

City of Rochester
Division of Environmental Quality
Room 300-B
Rochester, New York 14614

LaBella Proposal No. 2182888

June 2019

Table of Contents

SITE HEALTH AND SAFETY PLAN

Project Title:	68-92 Genesee Street
Project Number:	2182888
Project Location (Site):	68-92 Genesee Street, Rochester, NY
Environmental Director:	Gregory Senecal, CHMM
Site Safety Manager:	David Engert, CHMM
Site Control Provided By:	LaBella Associates, D.P.C.
Project Manager:	Jennifer Gillen, PG
Plan Review Date:	TBD
Plan Approval Date:	TBD

Site Conditions:	0.76-acre commercial land
Site Environmental Information Provided By:	• Phase I ESA by Bergmann Associates dated December 2013 • Tank Closure Report by LaBella October 2016 • Phase II ESA by LaBella December 2016
Air Monitoring Provided By:	LaBella Associates, D.P.C.
Site Control Provided By:	Contractor(s) TBD

EMERGENCY CONTACTS

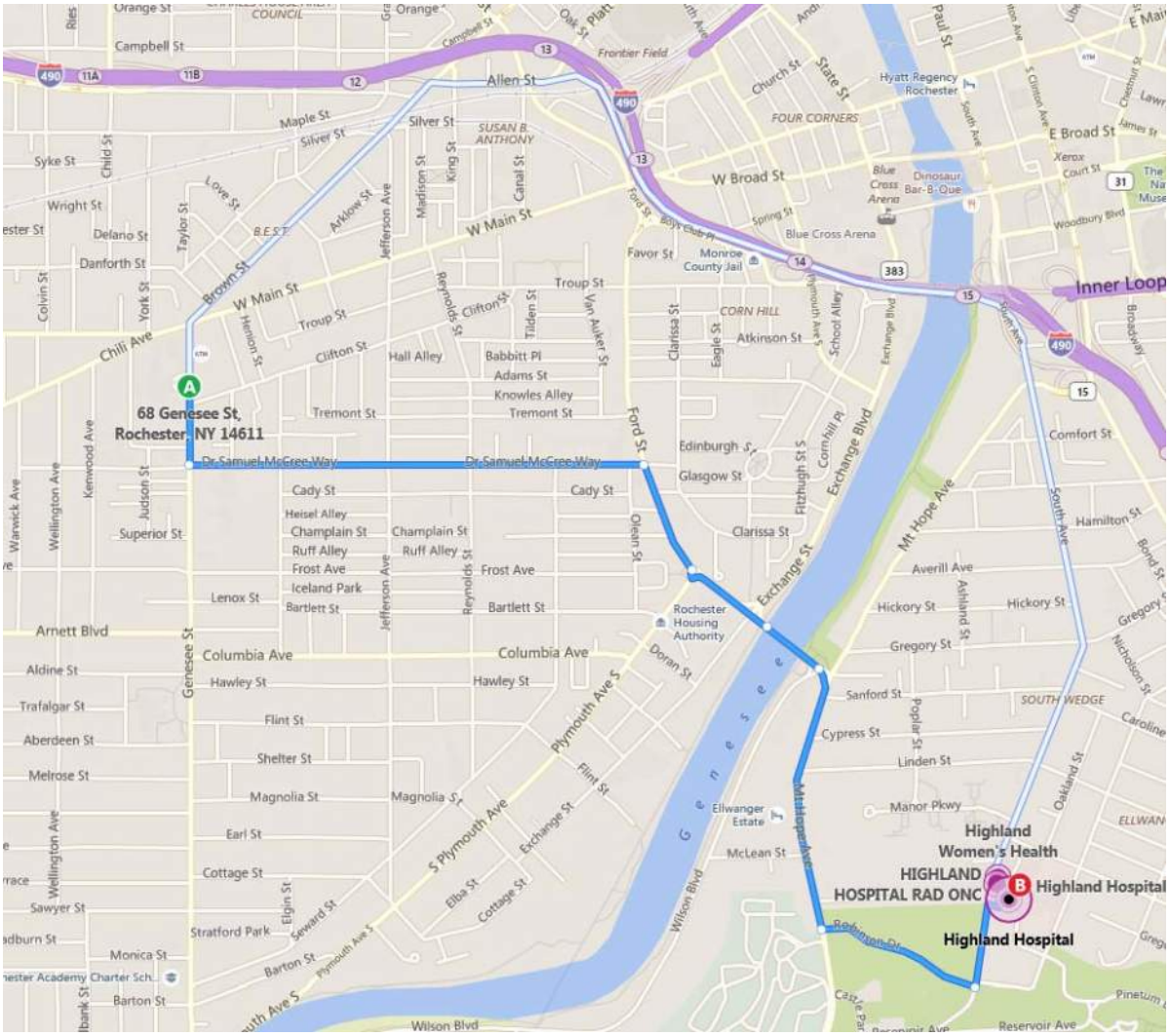
	Name	Phone Number
Ambulance:	As Per Emergency Service	911
Hospital Emergency:	Highland Hospital	585-473-2200
Poison Control Center:	Finger Lakes Poison Control	585-273-4621
Police (local, state):	Rochester Police Department	911
Fire Department:	Rochester Fire Department	911
Site Contact:	Jane Forbes, City of Rochester DEQ	585-428-7892
Project Manager	Jennifer Gillen, PG	585-295-6648
Site Safety Manager:	David Engert, CHMM	585-295-6630

MAP AND DIRECTIONS TO THE MEDICAL FACILITY
HIGHLAND HOSPITAL

Address: 1000 South Ave, Rochester, NY

1. Exit the Site heading south on Genesee Street
2. Turn left on Dr. Samuel McCree Way
3. Turn right onto Ford Street
4. At roundabout, take 2nd exit onto Ford Street
5. Turn right onto Mt. Hope Avenue
6. Turn left onto Robinson Drive
7. Turn left onto South Avenue
8. Turn right onto Bellevue Drive
9. Arrive at hospital

Total travel distance: 2.5 miles
Approximate travel time: 10 minutes



1.0 Introduction

The purpose of this Health and Safety Plan (HASP) it to provide guidelines for responding to potential health and safety issues that may be encountered during the field activities relating to the implementation of investigation activities at the property addressed as 68-92 Genesee Street, Monroe County, City of Rochester, New York (the Site). 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. The provisions of the HASP were developed in general accordance with 29 CFR 1910 and 29 CFR 1926 and do not replace or supersede any regulatory requirements of the USEPA, NYSDEC, OSHA or and other regulatory body.

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
- 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 personnel has responsibility for site safety and his or her instructions must be followed.

5.1 Hazards Due to Heavy Machinery

Potential Hazard:
Heavy machinery including trucks, excavators, backhoes, 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. Tasks 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, and may require additional training. Subsequently, approved personnel are to receive authorization for entry from the Site personnel. Approved personnel are not to enter excavations over 4 feet in depth unless excavations are adequately sloped, shored or otherwise protected. 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.

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 or 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:
Serious injuries are to be reported immediately to the Project Manager. The Project Manager is responsible for making First Aid supplies available at the work site to treat minor injuries. Do not move seriously injured workers. All injuries requiring treatment are to be reported to the Project Manager.

5.4 Injury Due to Exposure of Chemical Hazards

Potential Hazards:
Volatile organic vapors from petroleum products, chlorinated solvents or other chemicals may be encountered during excavation activities at the project work site. Inhalation of high concentrations of 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 is 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 5.4), 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 procedures described below. Site perimeter and community air monitoring and appropriate response actions will be implemented as described in the New York State Department of Health (NYSDOH) Generic Community Air Monitoring guidance.

The Air Monitor will utilize a photoionization Detector (PID) to screen the ambient air in the work areas for total Volatile Organic Compounds (VOCs) and a DustTrak tm Model 8520 aerosol monitor or equivalent for measuring particulates. Air monitoring of the work areas and EZ, if established, will be performed at least every 60 minutes or more often using a PID, and the DustTrak meter.

If sustained PID readings of greater than 25 ppm are recorded in the breathing zone in the work area or EZ, work should be temporarily ceased and personnel are to leave the work area until satisfactory readings are obtained, the source of vapors identified and addressed through corrective actions 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-hours of 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 dust concentrations exceed the upwind concentration by 150 µg/m^3 (0.15 mg/m^3) consistently for a 10 minute period within the work area or at the downwind location, then LaBella personnel may not re-enter the work area until dust concentrations in the work area decrease below 150 µg/m^3

(0.15 mg/m^3), which may be accomplished by the construction manager implementing dust control or suppression measures.

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 and wait at the assigned 'safe area'. Follow the instructions of the Site personnel.

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 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 2

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.

ATTACHMENT 1: SPECIAL REQUIREMENTS CAMP

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

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

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m^3 (micrograms per cubic meter), work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m^3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

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

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

APPENDIX 3

Quality Control Plan

Quality Control Program (QCP)

Location:

68-92 Genesee Street
Rochester, New York 14611

Prepared for:

City of Rochester
Division of Environmental Quality
Room 300-B
Rochester, New York 14614

LaBella Proposal No. 2182888

June 2019

Table of Contents

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.

Active Sampling:

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).

Passive Sampling:

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;

Procedure:

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 0_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.