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Associates, P.C.

Engineering
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Remedial Investigation Work Plan
NYSDEC Site #C828159

Location:

690 Saint Paul Street
Rochester, New York

Prepared for:

Genesee Valley Real Estate Company, LLC
First Federal Plaza
28 East Main Street, Suite 500
Rochester, New York 14614

LaBella Project No. 208492

April 2009

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300 State Street
Rochester, New York 14614

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1.0 Introduction

LaBella Associates, P.C. (LaBella) is pleased to submit this Remedial Investigation Work Plan (Work Plan) to characterize soil and groundwater conditions at 690 Saint Paul Street, Rochester, Monroe County, New York, herein after referred to as the "Site". A Site Location Map is included as Figure 1. LaBella is submitting this Work Plan on behalf of Genesee Valley Real Estate Company, LLC (Genesee Valley).

Genesee Valley intends to investigate the nature and extent of environmental impacts at the Site. As such, Genesee Valley is in the process of entering the Site into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) to conduct a Remedial Investigation (RI).

2.0 Site Description and History

The Site consists of approximately 4.73 acres of land improved with three (3) inter-connected buildings and a fourth separate building. In total, these buildings occupy approximately 89,280 square feet of the Site (footprint area). Building 14B is currently utilized as a city of Rochester School District temporary school (The Audubon School). Building 16 is currently partially occupied by a light industrial tenant (assembly of parts), a janitorial service for storage, and the remainder is vacant. Building 14A is vacant and Building 22 is utilized by Geva Theatre for storage and scene construction. The Site is situated in a mixed commercial, light industrial and residential area of the City of Rochester. The Site is bordered by St. Paul Street to the west with a Monroe County office building beyond, Lowell St. to the south with a City of Rochester park beyond, Martin Street to the east with a restaurant and residential properties beyond, and Hartel Alley to the north with a restaurant and a light industrial (machine shop) building beyond.

The previous environmental work/reports are associated with the Site [Note: The information below was provided previously to NYSDEC Region 8.]:

- *Phase I Environmental Site Assessment – 690 Saint Paul Street, Rochester, Monroe County, NY,* dated February 2008 and completed by LaBella Associates, P.C. (LaBella) for the Site identified Recognized Environmental Conditions (RECs) at the Site including: 1) the listing of the Site as a Small Quantity Generator (SQG) of hazardous waste and 2) historic use of the underground storage tanks (USTs) at the Site. The SQG listing of the Site was associated with the disposal of thorium, light ballasts and asbestos in about 1999. These materials were apparently encountered during building renovations. The UST REC was associated with NYSDEC Spill #0270335 identified for the Site. This Spill relates to contaminated soils encountered during the removal of a 500-gallon underground storage tank (UST). The Spill Report Form indicated that the UST may have contained solvents. Additionally, the Spill Report Form noted that the excavation was backfilled with the contaminated soils. The City of Rochester Building Information System (BIS) database reported a permit was issued in 2002 for the removal of a 300-gallon UST. Confirmatory analytical soil and/or groundwater sampling data was not available for review related to the removal of this UST from the Site. A historical Sanborn Fire Insurance map dated 1950 depicted the presence of four (4) gasoline tanks on the approximate central west portion of the Site. The City of Rochester BIS database reported that a permit was issued in 1998 for the removal of a 1,000-gallon fuel oil UST. Confirmatory analytical soil and/or groundwater sampling data was not available for review related to the removal of this UST from the Site.

- *Phase II Subsurface Report—Data Summary Package: NYSDEC Spill 0270335 (690 Saint Paul Street, Rochester, Monroe County, NY,* dated August 2008 and completed by LaBella. LaBella completed nine (9) test pits, advanced thirteen (13) "direct push" soil borings, and installed four (4) shallow overburden groundwater monitoring wells in the historic UST area of the Site, to the east and northeast of the Site building. The Phase II investigation was conducted to define the extent of soil and/or groundwater impacts associated with then active NYSDEC Spill #0270335. The investigation identified petroleum and chlorinated solvent related soil and groundwater impacts at the Site in the area of the former USTs. Specifically, levels of total petroleum hydrocarbons (TPH) in soils ranged from 243.2 to 1,452.6 parts per million (ppm) with the reported concentrations of total xylenes exceeding its associated NYSDEC Recommended Soil Cleanup Objective (RSCO) referenced in NYSDEC Technical and Administrative Guidance Memorandum (TAGM)#4046 dated January 24, 1994, as amended by supplemental tables dated August 22, 2001. Petroleum related volatile organic compounds (VOCs) were also detected in a groundwater sample collected from monitoring well MW-3 at concentrations exceeding 6 New York Code of Rules and Regulations (6 NYCRR) Part 703 Groundwater Standards. In addition, the chlorinated VOC Trichloroethene (TCE) was detected in groundwater samples from overburden monitoring wells MW-2 and MW-3 at concentrations slightly exceeding 6 NYCRR Part 703 Groundwater Standards.

  The report recommended that an Interim Remedial Measure (IRM) consisting of soil removal be completed in three (3) areas on the eastern portion of the property with *ex-situ* bioremediation of source area soils and monitoring of post-IRM overburden groundwater. The NYSDEC was notified of the findings of the investigation, and on August 11, 2008, opened a new Spill file for the Site under Spill #0890771. NYSDEC Spill file #0270335 was subsequently closed by the NYSDEC on August 14, 2008.

- *Interim Remedial Measure Report - NYSDEC Spill 08907715 690 Saint Paul Street, Rochester, Monroe County, NY,* dated November 2008 and completed by LaBella. In August through October 2008, IRM activities at the Site removed approximately 1,650 cubic yards of petroleum impacted soil and one (1) undocumented "orphan" UST. The petroleum contaminated soil from the remedial excavations was staged off-site at the proposed location of the future bio-cell. In addition, removal of free product from the Southern Remedial Excavation provided additional removal of the source of petroleum impacts in this area at the Site.

  Laboratory analytical results for confirmatory soil samples collected from the Southern Remedial Excavation indicated that the majority of the petroleum contamination in this area has been removed from the Site. The soil removal from the Southern Remedial Excavation was limited on the northeastern and central portions of the excavation due to underground utilities present in these areas.

- Four (4) bedrock groundwater monitoring wells were installed at the Site in August 2008. Wells BW-1, BW-2, BW-3, and BW-4 were installed to a depth of 17.3-feet, 17.0-feet, 20.1-feet, and 13.2-feet, respectively. The monitoring wells were set with a steel casing to isolate bedrock groundwater from overburden groundwater. Following completion and development of the monitoring wells, each well was sampled.

  A pre-IRM groundwater sampling event was conducted in August 2008. The analytical results from this event reported exceedances to the NYS Part 703 Groundwater Standards and Guidance Values for petroleum-related and solvent-related VOCs within each of the four (4) groundwater monitoring wells. Monitoring well BW-2 reported the most exceedances of petroleum-related VOCs. Monitoring well BW-4 reported the most exceedance of solvent-related VOCs.

  A post-IRM groundwater sampling event was conducted in January 2009. The analytical results from this post source removal event reported fewer detections and exceedances of both petroleum-related and solvent-related VOCs.

<u>Summary of Geologic and Hydrogeologic Conditions</u>

This discussion of on-site overburden geology is based upon information obtained from the advancement of test borings, test pits and bedrock well installations during previous environmental investigations of the Site.

- Underneath the asphalt pavement (if present), a Fill Material deposit consisting primarily of sand and gravel was encountered to depths generally ranging between 1.5 feet and 7.0 feet below ground surface (BGS).
- Native soils encountered beneath the Fill Material consisted of lacustrine fine-grained Sand and Silt with trace to no Gravel.
- Depth to bedrock ranged from 4.6-feet to 8.1-feet within bedrock groundwater monitoring wells BW-1 through BW-4.
- Overburden groundwater was encountered within the monitoring wells at depths of 5 to 7 feet BGS.
- Bedrock groundwater was encountered in monitoring wells BW-1 through BW-4 at depths ranging from 4.08-feet to 8.12-feet in August 2008.
- Bedrock groundwater was encountered in monitoring wells BW-1 through BW-4 at depths ranging from 3.38-feet to 7.99-feet in January 2009.
- Groundwater flow beneath the Site appears to generally flow to the west.

3.0 Summary of Areas of Concern

Based on the information obtained from the Phase I ESA, review of historical Sanborn Fire Insurance Maps from 1892, 1911, 1950, and 1971 and the previous work completed at the Site, there appear to be seven (7) Areas of Concern (AOCs) that should be evaluated as part of the RI. The Sanborn Fire Insurance Maps are presented in Appendix 1. A brief summary of each AOC is presented below:

- **AOC #1: Trichloroethene (TCE) Impacts to Bedrock Groundwater, Low-Level Soil Impacts in Interim Remedial Measure (IRM) Confirmatory Soil Samples, and Former Oil House**

  Previous investigations by LaBella involved the installation of four (4) bedrock groundwater monitoring wells. These wells were installed at the Site in the area of the USTs removed as part of the IRMs identified in Section 2.0 above. The initial sampling results from August 2008 as well as from January 2009 reported detections of TCE in bedrock groundwater. The detections of TCE were also found to exceed the New York State Part 703 Groundwater Quality Standards in bedrock wells BW-3 and BW-4.

  Additionally, some of the confirmatory soil samples associated with the IRM excavations reported detections of VOCs that were found to exceed the NYSDEC TAGM 4046 RSCOs.

  The former "Oil House" was identified on the 1950 Sanborn Map as well as on the 1971 Sanborn Map. This structure does not appear on either the 1892 or 1911 Sanborn Maps indicating that it was constructed sometime between 1911 and 1950.

  There is a potential for this building to have used petroleum products and/or stored petroleum products in or around the building. As such, the "Oil House" is considered an AOC and warrants evaluation as part of the RI. The contaminants anticipated to be associated with this AOC are: chlorinated and petroleum related VOCs.

- **AOC #2: Former Foundry Building**

  A single-story steel structure building formerly located along the northern portion of the Site adjacent to Hartel Alley and east of the "Agitator Building" was labeled as "Foundry" on the 1950 and1971 Sanborn Maps. This structure does not appear on either the 1892 or 1911 Sanborn Maps indicating that it was constructed sometime between 1911 and 1950. Additionally, these Sanborn Maps indicate that a "Core Room" and "Grinding and Tumbling" activities were located in the basement of this building.

  The NYSDEC considers foundry sand, slag, cinders, coals, ash, etc. to be Regulated Solid Wastes and these fill materials are typically located in the area of former foundries. As such, the "Foundry" is considered an AOC and warrants evaluation as part of the RI. The contaminants anticipated to be associated with this AOC are: heavy metals and semi-volatile organic compounds (SVOCs).

- **AOC #3: Former Agitator Building**

  A single-story steel structure building formerly located along the northern portion of the Site adjacent to Hartel Alley was labeled as "Agitator Building" on the 1950 and1971 Sanborn Maps. This structure does not appear on either the 1892 or 1911 Sanborn Maps indicating that it was constructed sometime between 1911 and 1950.

  There is a potential for this building to have been used for mixing of chemicals (e.g., liquids) and/or foundry products. As such, the "Agitator Building" is considered an AOC and warrants evaluation as part of the RI. The contaminants anticipated to be associated with this AOC are: VOCs, SVOCs and heavy metals.

- **AOC #4: 125,000-Gallon Reservoir**

  A 125,000-Gallon reservoir was observed on the 1950 and 1971 Sanborn Maps within Building 14A along the southern wall of the building. The historic contents of this reservoir are not known. It is possible this reservoir only contained water; however, it may also have contained wastes and/or received wastewater via spills. As such, this 125,000-Gallon reservoir is considered an AOC and warrants evaluation as part of the RI. The contaminants anticipated to be associated with this AOC are: VOCs, SVOCs and heavy metals.

- **AOC #5: Manufacturing Building Spaces**

  Three (3) buildings on-site totaling approximately 89,280 sq. ft. were formerly utilized for manufacturing. Based on a March 27, 2009 Site visit, LaBella noted areas where current pipe chases are located and areas of newer concrete that appear to be filled-in former pipe chases. The approximate locations of these current and apparent former pipe chases are shown of Figure 2. These areas could represent locations for spilled liquids to accumulate. Depending on the integrity of these structures and potential penetrations through these chases, these chases could be conduits to the subsurface.

  As such, these areas are considered an AOC and warrant evaluation as part of the RI. The contaminants anticipated to be associated with this AOC are: VOCs, SVOCs and heavy metals.

- **AOC #6: General Site Evaluation and Gaps in AOCs**

  Due to the relatively large size of the Site and the known history of the Site, there is a potential for environmental conditions to exist beyond the known AOCs. As such, it is pertinent that a general subsurface evaluation of the Site occur to identify any unknown AOCs and satisfy the requirements of the BCP. The contaminants anticipated to be associated with this AOC are: VOCs, SVOCs and heavy metals.

- **AOC #7: Dust Collector/Thorium and Confirmation of IRM Confirmatory Soil Samples**

  Thorium, in the form of dust and also stored in aboveground storage tanks of an unknown location, quantity and capacity, were utilized by the former occupant, Bausch and Lomb Optical Company. Thorium is a radioactive material added to glass to create a high refractive index while creating a low dispersion resulting in a high quality glass lenses for cameras and other scientific equipment. The 1971 Sanborn Map (included in Appendix 1) references a "Dust Collector" in the central portion of the Site between Building 14B and a former "Factory" building. The dust house also appears to have been located near the Southern Remedial Excavation completed during the IRM in 2008. The principal isotope of Thorium is ^{232}Thorium, which has a half-life of $1.4x10^{10}$ years. Thorium is naturally occurring and is a normal radioactive constituent of cement and concrete. ^{232}Thorium emits alpha particles during its decay process.

  Based on the above, the Dust Collector warrants evaluation as part of the RI. Thorioum is the anticipated contaminant in the area of the Dust Collector.

  In addition to the above, the confirmatory soil samples collected and submitted for laboratory analysis as part of the three (3) IRM excavations at the Site were not reported in an Analytical Services Protocol (ASP) Category B Data Package. As such, it appears warranted to collect select soil samples from the perimeter of the IRM excavations in order to validate this data. The contaminants anticipated to be associated with this AOC are: chlorinated and petroleum related VOCs and petroleum related SVOCs.

These AOCs are illustrated on Figure 2.

In addition to the above AOCs, two former Bausch and Lomb manufacturing operations were located on the Sanborn Maps in the area of the Southern IRM excavation. These areas are discussed below:

- **Former Factory Building**

  A single-story steel structure building formerly located along the eastern portion of the Site adjacent to Martin Street was labeled as "Factory Building" on the 1950 and1971 Sanborn Maps. This structure does not appear on either the 1892 or 1911 Sanborn Maps indicating that it was constructed sometime between 1911 and 1950.

  The specific operations within the "Factory Building" are unknown. However, the location of the former "Factory Building" was within the area excavated during the IRMs. As such, further investigation of this area of the Site does not appear warranted.

- **Former Boiler House**

  A building formerly located along the central portion of the Site between the former "Factory Building" and the former "Oil House" was labeled as "Boiler Room" on the 1971 Sanborn Map. This structure does not appear before the 1950 Sanborn Map indicating that it was constructed sometime between 1950 and 1971.

However, the location of the former "Boiler Room" was within the area excavated during the IRMs. As such, further investigation of this area of the Site does not appear warranted.

4.0 Objectives, Scope and Rationale

The objectives of this Work Plan are to evaluate the above AOCs in order to determine the extent of remedial actions required (if any) at the Site. The investigation work will include evaluating the property boundaries, conducting a qualitative exposure assessment for actual or potential exposures to contaminants at the Site and/or emanating from the Site, and producing data that will support the development of remedial actions (if any are warranted).

Based on the nature of the work, it is necessary to conduct an iterative investigation process. Specifically, the findings of the work presented in this RI Work Plan may warrant additional delineation work in order to define the nature and extent of contamination in select areas where impacts are identified above Standards, Criteria and Guidance (SCGs). In this occurrence, addendum work plans will be submitted to NYSDEC for review and approval in order to determine the nature and extent of all impacts above SCGs.

The Work Plan presents a phased approach with each Task providing data to guide remaining Tasks. The sampling methodologies and locations are generally defined herein; however, actual sampling methodologies and locations may vary depending on accessibility, underground utilities and data obtained in previous tasks. NYSDEC will be contacted for approval prior to varying any sampling methodology or location. The current scope of work is based on previously gathered analytical data; information previously gathered regarding historical operations conducted at the Site and the project objectives.

The RI work will be completed in general accordance with NYSDEC Division of Environmental Remediation: *Draft Technical Guidance for Site Investigation and Remediation* dated December 2002 (DER-10).

5.0 Remedial Investigation Work

The remedial investigation work is provided in this section.

5.1 Field Activities Plan

The field activities to be completed as part of the Work Plan have been separated into ten (10) tasks and are presented below. A list with contact information of the personnel involved with the project is included in Appendix 2. Qualifications for the personnel are also included.

During all ground intrusive work conducted at the Site, air monitoring will be conducted in accordance with the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP). A copy of this plan is included as Appendix 3.

Sampling Parameters from AOCs

The protocol to determine the appropriate parameters for soil and groundwater samples, collected as part of the RI, are identified below. These sampling protocols will be implemented unless specific sampling parameters are identified in the specific Tasks.

Soil Sampling

Every test pit and test boring completed as part of this RI will have at least one soil sample submitted for laboratory testing. The testing to be completed for each boring/test pit will be based on the field observations as defined below:

- If fill materials consisting of slag, cinders, ash, foundry ash, etc. are observed in the test boring or test pit location, then the 'worst-case' sample will be submitted for Target Analyte List (TAL) Metals using United States Environmental Protection Agency (USEPA) Methods 6010 and 7471 and Target Compound List (TCL) Semi-Volatile Organic Compounds (SVOCs) including up to 30 TICs using USEPA Methods 8270.

- If staining is observed, the 'worst-case' soil sample will be submitted for the full suite of parameters. The "full-suite" of parameters is defined as:

    - TCL VOCs plus up to 30 Tentatively Identified Compounds (TICs) using USEPA method 8260;
    - TCL Semi-Volatile Organic Compounds (SVOCs) plus up to 30 TICs by USEPA Method 8270;
    - TAL Metals by USPEA Methods 6010, 7470, and 7471;
    - Polychlorinated Biphenyls (PCBs) by USEPA Method 8082A; and,
    - Pesticides by USEPA Method 8081B.

- If odors are observed, the 'worst-case' sample will be submitted for TCL VOCs including up to 30 TICs using USEPA Method 8260 and TCL SVOCs including up to 30 TICs using USEPA Method 8270.

- If elevated (above background) readings are observed on a photo-ionization detector (PID), the location with the highest PID reading will be submitted for TCL VOCs including up to 30 TICs using USEPA Method 8260 and TCL SVOCs including up to 30 TICs using USEPA Method 8270. [*Note: The PID will be a MinaRae 2000 or equivalent.*]

- If readings on the radiation monitor are greater than 20% above the upper range of the Site background, then the 'worst-case' soil sample will be submitted for ^{232}Thorium using Method RMO 3008 (or equivalent). [*Note: The radiation monitor will be a Ludlum 2241 Digital Survey Meter with 44-9 Pancake Probe (or equivalent). The background range will be established by advancing a soil boring into the backfill of the IRM excavation and field screening the recovered soil with the radiation monitor.*]

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- In the event that two apparently discrete sources are identified within the same boring, a sample of each 'worst-case' source will be collected/analyzed in accordance with the aforementioned laboratory sampling protocol. [*Note: Borings with more than one of the above criteria in the same location (e.g., staining, odors and PID readings above background) will receive only one set of tests from each of the respective parameters (i.e., only one VOC test per depth interval) unless two or more discrete sources are apparent. This does not include quality assurance/quality control sampling.*]

- If no evidence of impairment is identified in a test boring or test pit, then one soil sample will be collected from the interval above the water table and submitted for laboratory analysis of the anticipated contaminants for that AOC (refer to Section 3.0).

- Each AOC will also have at least one soil sample analyzed for the full suite of testing parameters.

- Each soil sample collected for laboratory analysis will be labeled and preserved in accordance with the Quality Control Plan (QCP) included as Appendix 4.

- Laboratory Quality Assurance/Quality Control (QA/QC) sampling will be performed in accordance with Section 5.2 QA/QC Plan.

Groundwater Sampling

Currently two methods of groundwater sample collection are proposed as part of the RI.

- Overburden Groundwater Samples collected via Geoprobe® Screen Point 15 techniques – these samples will be collected from in proximity to the soil gas sampling points and in proximity to the bedrock monitoring wells. These samples will be analyzed for the full suite of parameters. Refer to Task 7 for specifics.

- Overburden and Bedrock Groundwater Samples collected using low-flow sampling techniques in accordance with American Society of Testing and Materials (ASTM) Practice D6771-02. The samples will be analyzed for the full suite of parameters. Refer to Task 7 for specifics.

Each groundwater sample collected for laboratory analysis will be labeled and preserved in accordance with the QCP included as Appendix 4. Laboratory Quality Assurance/Quality Control (QA/QC) sampling will be performed in accordance with Section 5.2 QA/QC Plan.

Task 1: Initial Survey Work:

A crew of licensed surveyors will be mobilized to the Site to locate and elevate the existing subsurface utility structures. These subsurface utilities include catch basins, inverts associated with the catch basins, and sewers on and around the Site. These elevations will be used to evaluate potential preferential pathways for contaminant migration.

Task 2: Standing Water and Floor Drain Evaluation:

Standing Water

Standing water was observed during the March 29, 2009 Site visit in three (3) discrete locations within the buildings at the Site.

1.) Tunnel that extends underneath Saint Paul Street
2.) Elevator sump in Building 14A
3.) Pipe in floor in southern portion of Building 14A (possibly associated with 125,000-gallon reservoir identified on the 1950 and 1971 Sanborn Maps)

Grab samples of the standing water will be collected from each of the three locations described above. The water samples will be delivered under Chain of Custody procedures to a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory. Each of the three (3) water samples will be analyzed for the full-suite of parameters. The laboratory will provide a NYSDEC ASP Category B Deliverables data package. The "full-suite" of parameters includes:

- TCL VOCs plus up to 30 TICs by USEPA method 8260B;
- TCL SVOCs plus up to 30 TICs by USEPA Method 8270D;
- TAL Metals by USPEA Methods 6010, 7470, and 7471;
- PCBs by USEPA Method 8082A; and,
- Pesticides by USEPA Method 8081B.

A Data Usability Summary Report (DUSR) for the standing water data will be prepared in accordance with DER-10 Appendix 2B and included with the RI report.

Floor Drains

Two floor drains are located in the western portion of Building 16. The discharge location of these floor drains will be evaluated in order to confirm discharge to the sanitary sewer. Initially, potential downgradient manholes will be identified (refer to Task 1) and these manholes will be accessed as monitoring points. A fluorescent dye will then be added and flushed into the first floor drain while the monitoring points are observed. Subsequent to observing the dye or allowing sufficient time for the dye to have traversed the distance to the monitoring point, the same procedure will be used on the second monitoring point; however, a different colored dye will be used. In the event that the discharge location is not identified by this method, then video taping of the drain lines will be performed.

Task 3: Outstanding Items Associated with NYSDEC Spill #0890771:

Tasks completed during the Supplemental Phase II ESA and IRMs such as bedrock drilling and monitoring well development resulted in the generation of interim derived waste (IDW) in the form of groundwater and soil cuttings. As such, the removal of these items from the Site will be addressed in the following manner:

1.) Six (6) drums containing purge groundwater from the bedrock monitoring wells remain at the Site. Based on the groundwater analytical data from these monitoring wells, a Monroe County Pure Waters sewer use permit will be obtained and the purge groundwater will be discharged to the sanitary sewer.

2.) Two (2) piles of drill cuttings remain on-site. Waste characterization sampling will be completed on the soil to gain landfill approval for off-site disposal. The analytical parameters will include:

- TCL VOCs by USEPA Method 8260B;
- TAL Metals by USEPA Methods 6010, 7470, and 7471; and,
- Ignitibility by USEPA Method 1010.

In addition to the above items, the above-grade riser piping associated with the two (2) recovery wells located within the IRM southern excavation area will be cut and permanent flush-mount curb boxes will be installed to protect the recovery wells.

Task 4: Subsurface Imaging Surveys:

Electromagnetic Survey

Amec Geomatrix Consultants Inc. (Amec Geomatrix) will complete a geophysical survey throughout the exterior portions of the Site that are accessible. Included in this survey will be parking lot areas, grass areas, and sidewalks. The geophysical survey will consist of a focused Electromagnetic (EM) survey. Specifically, the site will be surveyed using the Geonics EM61 high sensitivity, high resolution time domain electromagnetic (TDEM) metal detector that can detect both ferrous and nonferrous metallic objects. It has an approximate investigation depth of 10 feet.

The geophysical survey will be conducted in order to evaluate for preferential pathways (utilities), orphan USTs, buried piping, buried debris/drums, etc. Subsequent to completing the geophysical survey at the Site, the results shall be provided to the NYSDEC with a letter and a figure that depicts suspect anomalies. LaBella will discuss these results with the NYSDEC in order to determine what, if any, actions are required. Currently it is anticipated that select anomalies will warrant test pits to be completed where suspected and/or significant magnetic anomalies are identified (e.g., orphan USTs).

Electro Resistivity Imaging

In addition to the EM-61 survey, an Electro Resistivity Imaging (ERI) survey will be conducted in the area of the known chlorinated VOC impacts (i.e., around BW-3 and BW-4). Specifically, a GeoTrax Survey™ will be performed by Aestus, LLC (Aestus). The intent of this survey will be to evaluate the extent of chlorinated VOCs in bedrock groundwater and to evaluate for Light Non-Aqueous Phase Liquids (LNAPLs) and Dense Non-Aqueous Phase Liquids (DNAPLs) in these areas. The results of this survey will be used to select specific locations of the bedrock monitoring wells and the soil borings to be advanced to further evaluate this AOC. Currently Tasks 6 and 7 include advancing soil borings and installing bedrock wells in general locations; however, the extent of this testing will be varied based on the results of the ERI survey.

A detailed description of the Aestus survey is included in Appendix 5; however, a summary of the work is also included below.

Survey Layout

Each GeoTrax Survey™ will be performed by installing 56 specialized 3/8-inch diameter stainless steel electrodes into the ground along a straight line. The spacing used on each line will be verified on-site to provide the appropriate depth of imaging and/or to conform to lateral space constraints due to buildings, busy streets, property lines, etc. and/or issues related to extremely thick concrete. The intent of the survey will be to obtain an image depth of 72 feet throughout the survey area.

Data Collection

The electrodes will be connected via specialized geophysical cables to Aestus' data acquisition field instruments. Electrical resistivity data from the subsurface will be collected at each survey location for a period of approximately 2.25 hours. These data will then be checked for quality and integrity and then partially processed in the field to obtain a high resolution draft subsurface image. Full data reduction and processing is performed later (see below).

Data Reduction

Following field data collection, data post-processing will be completed to develop a final electrical resistivity data set for each survey. A final image for each survey will be developed which contains a model of the electrical resistivity of the subsurface in units of ohm-meters. Changes in topography along the survey lines will be accounted for during this data processing work.

The final images will be developed by color contouring and plotting the resistivity data for each survey line using a consistent color scheme for all Site surveys to allow for evaluation of the results of all surveys on a comparative basis.

Summary of Data Interpretation Process

The magnitude of subsurface electrical resistivity values vary from site to site based on a number of factors, related to geology composition and to the chemistry of the groundwater and other fluids trapped in the pore spaces within the soil matrix and the presence or absence of buried debris and structures. For a typical site, fine materials such as clay and silt are generally less resistive (i.e., more conductive) while coarse sand and gravel are generally more resistive (i.e., less conductive). Should the soil (clay or sand) be dry, it will appear more resistive when dry and less resistive when wet.

The presence of fractures in bedrock geology often appear as a vertically oriented anomaly and may be either conductive or resistive depending on what type of fluid (e.g., clean groundwater and/or unweathered/weathered contamination) is present within the fracture.

Should buried tanks or other man-made structures be present, they typically show up in survey images as either low resistivity/highly conductive (metallic construction) or high resistivity/low conductivity (fiberglass, concrete or other construction). If contamination is present underneath former tanks and sump areas, it generally presents as described in the following paragraphs.

Subsurface areas impacted with light or dense non-aqueous liquids (LNAPLs or DNAPLs, respectively) typically present as more resistive anomalous zones relative to areas that contain only non-impacted soils and pore fluids. Areas containing NAPL impacted soils often present as a roughly spherical or lenticular blob shape (obloid) and will typically be identified in survey images by more resistive values. Sometimes, the presence of this type of contamination can cause a less resistive (i.e., very conductive) anomaly or zone, particularly with weathered NAPL related contamination.

Final data interpretation will be enhanced by calibrating or benchmarking the GeoTrax Survey™ electrical resistivity images against existing site data and/or follow-up confirmation boring data. This process will provide a greater understanding of the subsurface and the survey images.

Task 5: Test Pitting Evaluation (If Necessary):

If necessary, a test-pitting program will be conducted in order to evaluate suspected and/or significant magnetic anomalies defined during the geophysical survey of the Site. If necessary, the work to be completed as part of this task is outlined below:

- Initially, an Underground Facilities Protection Organization (UFPO) stakeout will be conducted at the entire Site to locate any subsurface utilities in the areas where the subsurface assessment will take place.
- LaBella Associates will retain the services of a contractor to implement a test pitting and soil-sampling program at the Site using a backhoe.
- Each test pit excavated at the Site will be advanced to bedrock or until the cause of the anomaly is encountered. Test pit locations advanced in areas of magnetic anomalies may be terminated at shallower depths in the event that fill materials or metallic objects are encountered near the surface.
- In the event that a UST is encountered in a test pit, the NYSDEC will be notified immediately. Although the removal of the UST would be beyond the scope of the RI, the contents of any USTs may be addressed immediately, if warranted. In accordance with DER-10, the first priority during site investigation is that contaminants in all media should be contained or stabilized to reduce or eliminate, to the extent possible, receptor exposure to contaminants or to contain further movement of contaminants through any pathway. The timely removal of the contents of any discovered USTs is intended to reduce the potential for migration of contaminants within the confines of the Site as well as reducing the potential for human health related exposure.

  Therefore, the objective of the removal of the contents of any discovered UST is to address the potential source of contamination associated with orphan USTs. This action would not be conducted as a final remedy. Removal of any USTs from the Site would occur under subsequent phases of the project (i.e. under a NYSDEC approved Remedial Action Plan or IRM plan).

Note: *If an emergency-situation arises where a UST is leaking the NYSDEC will be contacted immediately. During this type of situation, actions will be taken to eliminate the immediate threat to the environment. Such actions may include the mobilization of a vacuum truck to the site to remove/contain product, berming the release area to contain product migration, etc. The objective of these activities will be to neutralize the emergency-situation only. It is further understood that the emergency response will not include the removal of the UST from the Site till approved by the NYSDEC.*

- Soils from the test pits will be screened in the field for visible impairment by capturing headspace readings from soils. Headspace readings will be analyzed with a photo-ionization detector (PID) for detectable levels of VOCs. Initially, soil will be placed in a plastic Ziploc® bag. The soil in the bag will be mixed thoroughly inside the bag while sealed. After allowing the soil to warm to approximately "room temperature", the PID will be utilized to screen the air from the headspace inside the bag. Additionally, olfactory indications of impairment and evidence of non-aqueous phase liquids (NAPLs) will be observed during test pitting.
- In addition to the PID screening, soils from the borings will be continuously screened in the field with a Radiation Monitor to screen for the presence of alpha, beta, and gamma radiation as part of evaluating for ^{232}Thorium in soil. The headspace of soil will be screened with the radiation monitor in the same way as the PID is used to screen the headspace of the soil sample inside the bag. Field screening results will be recorded on a soil-boring log (or 'Radiation Log') and will be included in the Remedial Investigation Report.
- The Radiation Monitor will be calibrated off-site prior to usage on-site.
- Test pitting logs will be completed and include soil description, test pit dimensions, PID readings, when groundwater was encountered, etc. Test pitting logs will be included in the Remedial Investigation (RI) Report.
- A test pitting photo log with pictures of each test pit will be included in the RI Report.
- Soil samples will be collected from the test pits based on evidence of impairment. All soil sampling for laboratory analysis will be conducted concurrently with the headspace screening samples. The soil-sampling program will be based on the protocols identified at the beginning of this Section. The QA/QC program (i.e., duplicate sampling, MS/MSD, DUSR, etc.) is identified in Section 5.2.

Test pits will be backfilled with native materials. Any impacts identified in the test pits will be addressed in IRMs or through final remedial actions as necessary.

Each test pit will be located using a Global Positioning System (GPS) GeoXT with GeoBeacon.

Task 6. Geo-Probe Soil Borings, Sampling, & Analysis:

As part of the overburden soil investigation, soil-boring data will be collected for the geologic characterization of the Site and to allow further delineation of contamination, horizontally and vertically. To implement the soil borings at the Site the following will be completed;

- An UFPO stakeout will be conducted at the Site to locate any subsurface utilities in the areas where the subsurface assessment and delineation will take place.
- Borings will be advanced with a "geo-probe" direct push sampling system. The use of direct push technology allows for rapid sampling, observation, and characterization of relatively shallow overburden soils. The geo-probe utilizes a four-foot macro-core sampler, with disposable polyethylene sleeves. Soil cores will be retrieved in four-foot sections, and can be easily cut from the polyethylene sleeves for observation and sampling.
- Based on the geology at the Site, each boring implemented at the Site will be advanced until apparent bedrock refusal is encountered. Previous static water level readings at the Site indicate that overburden groundwater depths range from approximately 4.0-feet to 5.5-feet in depth. Final soil boring locations will be selected based on the information provided by the UFPO stakeout and accessibility.
- The drilling equipment will be required to be decontaminated prior to use, including an alconox and potable water wash followed by a potable water rinse. In between each boring, decontamination procedures will be repeated.
- Soils from the soil borings will be screened in the field for visible impairment by capturing headspace readings from soils. Headspace readings will be analyzed with a PID for detectable levels of VOCs. Initially, soil will be placed in a plastic Ziploc® bag. The soil in the bag will be mixed thoroughly inside the bag while sealed. After allowing the soil to warm to approximately "room temperature", the PID will be utilized to screen the air from the headspace inside the bag. Additionally, olfactory indications of impairment and evidence of non-aqueous phase liquids (NAPLs) will be observed during soil boring investigation. All soil sampling for laboratory analysis will be conducted concurrently with the headspace screening samples.
- Soils from the borings will be continuously screened in the field for visible impairment, olfactory indications of impairment, evidence of NAPLs, and/or indication of detectable VOCs with a PID collectively referred to as "evidence of impairment." Field screening (visual & olfactory observation, PID readings, etc.) will be recorded on a soil-boring log (or 'PID Log') and will be included in the Remedial Investigation Report.
- Additionally, soils from the borings will be continuously screened in the field with a Radiation Monitor to screen for the presence of alpha, beta, and gamma radiation as part of evaluating for 232Thorium in soil. The headspace of soil will be screened with the radiation monitor in the same way as the PID is used to screen the headspace of the soil sample inside the bag. Field screening results will be recorded on a soil-boring log (or 'Radiation Log') and will be included in the Remedial Investigation Report.
- The Radiation Monitor will be calibrated off-site prior to usage on-site.
- Soil Boring Logs will be completed and include soil description, soil boring number and location, PID readings, etc. Soil Boring Logs will be included in the Remedial Investigation Report (RI). If appropriate based on observed conditions, a soil boring photo log with pictures of select soil profiles from individual soil borings will be included in the RI report.
- Headspace screening soil samples and laboratory analytical samples from either direct push or rotary drill rig advanced soil borings will be collected concurrently.

The actual sampling to be completed will be based on the field observations, as defined at the beginning of this section; however, below is a list of the minimum anticipated soil sampling to be conducted. In addition, Table 1 provides the borings to be advanced in each AOC as part of the initial sampling effort. [*Note: As previously stated, the RI will be an iterative process and additional sampling may be warranted based on the initial sampling work in order to define the nature and extent of impacts.*]

Table 1
Geoprobe Soil Sampling Plan

Area of Concern	Geoprobe Borings	Test Parameters/Number of Samples					
		TCL VOCs	**TCL SVOCs**	**Pesticides**	**TAL Metals**	**PCBs**	**Thorium**
TCE in Bedrock/Oil House	SB-14 through SB-21	8	1	1	1	1	1
Former Foundry Building	SB-22 through SB-27	1	6	1	6	1	1
Former Agitator Building	SB-28 through SB-30	3	3	3	3	3	1
125,000-Gallon Reservoir	SB-31 and SB-32	2	2	1	2	1	1
Manufacturing Building Spaces (14A, 16, & 22)	Building 14A = SB-33 through SB-44	12	12	1	12	1	1
	Building 16 = SB-45 through SB-56	12	12	1	12	1	1
	Building 22 = SB-57 through SB-64	8	8	1	8	1	1
General Site Evaluation and Gaps in AOCs	SB-65 through SB-73	9	9	1	9	1	1
Dust Collector/USTs/ Manufacturing Bldg. - ASP for IRM Confirmatory Sampling	SB-74 through SB-78	5	5	1	1	1	2*
Totals	**69**	**60**	**58**	**11**	**54**	**11**	**10**

*** Denotes samples to be collected from borings advanced in proximity to the dust collector building (SB-76 and SB-77).**

Analytical Testing Protocols:
- TCL VOCs denotes USEPA TCL and NYSDEC STARS-List VOCs including up to 30 TICs using USEPA Method 8260
- TCL VOCs denotes USEPA TCL SVOCs including up to 30 TICs using USEPA Method 8270
- PCBs denotes PCBs using USEPA Method 8082
- TAL Metals denotes TAL Metals using USEPA Methods 6010 and 7471
- Pesticides denotes Pesticides using USEPA Method 8081
- Thorium denotes ^{232}Thorium using USACE Method RM0-3008

Task 7. Groundwater Investigation, Sampling, and Analysis:

This task includes the collection of Geoprobe® Screen Point 15 groundwater samples at select locations and the installation, development and sampling of overburden and bedrock groundwater monitoring wells. As required by DER-10, a groundwater sample will be collected and analyzed for the full suite of parameters from each monitoring well and each Geoprobe® Screen Point 15 sample (assuming adequate sample volumes can be obtained). The current proposed locations of Geoprobe® Screen Point 15 samples and new monitoring wells are provided on Figure 2 and summarized below:

- Geoprobe® Screen Point 15 samples – Geoprobe® Screen Point 15 samples are proposed for the property boundaries in proximity to the soil gas sampling points and in proximity to the bedrock groundwater monitoring wells. Currently, there are six (6) soil gas sampling points proposed (refer to Task 9) and five (5) bedrock groundwater monitoring wells proposed. As such a total of eleven (11) Geoprobe® Screen Point 15 groundwater samples are proposed to be collected as part of the RI. The currently anticipated locations of the soil gas samples and the bedrock groundwater monitoring wells are shown on Figure 2.
- The two (2) overburden groundwater monitoring wells are proposed to be installed in the former foundry and agitator building area.
- The bedrock groundwater monitoring wells are proposed to be installed as follows:
    - Two (2) along St. Paul Street within the sidewalk.
    - One within the grass area southeast of BW-4.
    - One within the alley way/loading area between Building 16 and Building 14A.
    - The fifth location is not shown on figure 2 and will be the deep well and installed in the area of highest impacts identified in the other bedrock wells (i.e., to determine the vertical extent).

The above locations are considered to be tentative since the actual locations will be based on the data obtained as part of the previous Tasks. However, LaBella will contact NYSDEC for approval of locations prior to implementing the fieldwork.

As part of this task, the following work will be implemented:

Geoprobe® Screen Point 15 Sampling

The following steps will be followed during the collection of the Geoprobe® Screen Point 15 groundwater samples:

1. The drilling subcontractor will advance the borehole to approximately 2-ft. into the uppermost water bearing zone or to 2-ft. above the anticipated depth to bedrock, whichever is shallower.

2. The depth to water will be documented.

3. The drilling subcontractor will prepare the Geoprobe® Screen Point 15™ sampling device according to the manufacturer's instructions and lower the device to the bottom of the borehole (or about 1-ft. above bedrock if encountered).

4. The Drill rod will be sealed with built in gaskets, Teflon tape, or an equivalent sealing method.

5. The drilling subcontractor will drive the sampling device into undisturbed materials below the borehole bottom.

6. The drilling subcontractor will withdraw the rod to expose the screen of the sampling device in accordance with manufacturer's instructions.

7. After waiting a sufficient time to allow the sampler to fill with water, a groundwater sample will be collected by lowering the bailer through the rods and body of the sampler.

8. Field water quality measurements (pH, conductivity, temperature) will be collected

9. Subsequently, the groundwater samples will be collected. Each Geoprobe® Screen Point 15 sampling location will consist of the full suite of parameters. However, if the recoverable groundwater will not be adequate for all testing parameters, VOCs will be collected first followed by the contaminants of concern for the nearest AOC to the sample location and then the remaining parameters (based on the following hierarchy – 1) VOCs, 2) Metals, 3) SVOCs, 4) PCBs, 5) Pesticides).

<u>Installation of Geoprobe Advanced Overburden Groundwater Monitoring Wells</u>

Proposed overburden groundwater monitoring well locations are depicted on Figure 2. Completion of the geoprobe advanced groundwater-monitoring wells will include the following;

- At each overburden monitoring well location, overburden soils will be collected using Macrocore samplers from the ground surface to equipment refusal (i.e., assumed bedrock). Soil will be screened in the field for "evidence of impairment" (as defined in Task 6 above).

- Soils recovered from the Macrocore samplers will be continuously screened in the field with a Radiation Monitor to screen for the presence of alpha, beta, and gamma radiation (i.e., to evaluate for ^{232}Thorium on soil). The headspace of soil will be screened with the radiation monitor in the same way as the PID is used to screen the headspace of the soil sample inside the bag. Field screening results will be recorded on a soil-boring log (or 'Radiation Log') and will be included in the Remedial Investigation Report.

- Each well will be completed with 5 to 10-feet of 1-inch Schedule 40 0.010-slot well screen connected to an appropriate length of schedule 40 PVC well riser to complete the well. The annulus around the screen section will be sand packed with quartz sand to approximately 1 to 2-feet above the screen section. The remaining annulus will be bentonite sealed to approximately 1 to 2-feet below ground surface, and then grouted to ground surface. Each well will be completed with a flush mount well cover. Details on the installation of groundwater monitoring wells are included in the Quality Control Plan in Appendix 4.

Installation of Rotary Drill Rig Advanced Bedrock Groundwater Monitoring Wells:

Proposed bedrock groundwater monitoring well locations are depicted on Figure 2. Completion of the rotary drill rig advanced groundwater-monitoring wells will include the following;

- At each bedrock monitoring well location, overburden soils will be collected using split-spoon samplers from the ground surface to competent bedrock conditions. Soil will be screened in the field for "evidence of impairment" (as defined in Task 6 above).

- Additionally, soils from the split spoon samplers will be continuously screened in the field with a Radiation Monitor to screen for the presence of alpha, beta, and gamma radiation (i.e., to evaluate for ^{232}Thorium on soil). The headspace of soil will be screened with the radiation monitor in the same way as the PID is used to screen the headspace of the soil sample inside the bag. Field screening results will be recorded on a soil-boring log (or 'Radiation Log') and will be included in the Remedial Investigation Report.

- Should saturated conditions be encountered within the shallow overburden soils during split-spoon advancement, a groundwater sample will be collected from the boring utilizing Geoprobe® Screen Point 15 groundwater sampling technology as described in Section 3.7 of DER-10. Each groundwater sample will be analyzed for the full-suite of parameters, unless adequate sample volumes are not obtained (refer to above for Geoprobe® Screen Point 15 sampling methodology).

- Once competent bedrock is encountered, mud-rotary drilling will commence into the bedrock. Initially, an approximately two-foot "socket" will be drilled into the bedrock and a permanent steel casing extending from the ground surface into the two-foot bedrock boring will be placed and grouted to the surface. This grout will set for a minimum of 24-hours. After 24-hours, the bedrock drilling may continue until the bedrock boring is completed to a total depth of 10-feet into competent bedrock. Additional details on bedrock drilling are provided in the Quality Control Plan in Appendix 4.

- The bedrock wells will be set to intersect the top of the bedrock groundwater table. Each well will be completed with 10-feet of 2-inch Schedule 40 0.010-slot well screen connected to an appropriate length of schedule 40 PVC well riser to complete the well. The annulus will be sand packed with quartz sand to approximately 1 to 2-feet above the screen section. The remaining annulus will be bentonite sealed to approximately 1 to 2-feet below ground surface, and then grouted to ground surface. Each well will be completed with a flush mount or stick-up well cover. Details on the installation of groundwater monitoring wells are included in the Quality Control Plan in Appendix 4.

Development of Overburden and Bedrock Groundwater Monitoring Wells

Initially, each monitoring well will be developed by removing the approximate volume of water introduced during drilling (if any) and an additional five (5) well volumes. Well development will be performed using dedicated bailers and/or pumping equipment (depending on volumes). If dedicated equipment is not used, then the equipment will be decontaminated between each well (alconox wash with potable water rinse). If removal of this volume of water proves to be impractical, sampling of the well will be put off for three (3) to six (6) weeks to allow the well to equilibrate. Well development details are included in the Quality Control Plan in Appendix 4.

Low Flow Sampling of Overburden and Bedrock Groundwater Monitoring Wells

At least 2 weeks after development, groundwater samples will be collected from each monitoring well installed as part of the RI. Prior to sample purging, each well will be checked with an oil/water interface probe to evaluate for potential LNAPL in the wells. A DNAPL interface probe will also be used to check for the presence of DNAPL. The interface probe will be slowly lowered into the water column and observed for variations in the audible tone, which indicates the presence of NAPL. Initially, LNAPL will be evaluated for, then DNAPL (subsequent to changing the probe). Care will be taken to minimize disturbance of the water column and the equipment will be decontaminated between each well.

Low flow sampling of the monitoring wells will occur in order to minimize groundwater drawdown and to obtain a representative sample of groundwater conditions. In order to accomplish this task, the following steps will be taken:

1. The following low flow equipment will be utilized to conduct low flow groundwater sampling. This equipment includes:

   - QED Sample Pro Bladder Pump
   - Horiba U-22 Water Quality Monitoring System
   - Air Compressor
   - QED MP10 Low Flow Controller
   - ~100' of ¼" Polyethylene Tubing

2. Low flow purging of the monitoring wells will include collection of water quality indicator parameters. Water quality indicator parameters will be recorded at five (5)-minute intervals during the purging of the well. These water quality indicator parameters will include:

   - Water Level Drawdown
   - Temperature
   - pH
   - Dissolved Oxygen
   - Specific Conductance
   - Oxidation Reduction Potential
   - Turbidity

3. Groundwater sampling will commence once the groundwater quality indicator parameters have stabilized for at least three (3) consecutive readings for the following parameters:

- Water Level Drawdown <0.3'
- Temperature - +/- 3%
- pH - +/- 0.1unit
- Dissolved Oxygen - +/-10%
- Specific Conductance - +/-3%
- Oxidation Reduction Potential - +/-10 millivolts
- Turbidity - +/-10% for values greater than 1 NTU

4. Each overburden monitoring well will be sampled for the full suite of parameters. However, if the recoverable groundwater will not be adequate for all testing parameters, VOCs will be collected first followed by the contaminants of concern for the nearest AOC to the sample location and then the remaining parameters (based on the following hierarchy – 1) VOCs, 2) Metals, 3) SVOCs, 4) PCBs, 5) Pesticides).

5. Approximately 6 months after the initial sampling event, a second round of groundwater samples will be collected from the overburden and bedrock monitoring wells installed as part of the RI. The sampling parameters for the second round of sampling will also be the full suite of parameters. [*Note: In the event that minimal or no impacts are identified in the first round of sampling, NYSDEC may be petition to reduce the sampling parameter list.*]

Table 2 below summarizes the currently anticipated groundwater sampling to be conducted as part of the RI (i.e., Geoprobe® Screen Point 15, Overburden and Bedrock samples). It should be noted that this table does not account for any additional wells that may be warranted as the investigation progresses.

Table 2
Groundwater Sampling Plan

Sample ID	AOC Addressed	Test Parameters/Number of Samples				
		TCL VOCs	TCL SVOCs	TAL Metals	PCBs	Pesticides
BW-5*	TCE in Bedrock/Oil House and Downgradient of Former Oil House	2	2	2	2	2
BW-6*	TCE in Bedrock/Oil House and Downgradient of Building 16	2	2	2	2	2
BW-7*	TCE in Bedrock/Oil House and downgradient of Site and Bldg. 14B	2	2	2	2	2

Table 2 (continued)
Groundwater Sampling Plan

Sample ID	AOC Addressed	Test Parameters/Number of Samples				
		TCL VOCs	**TCL SVOCs**	**TAL Metals**	**PCBs**	**Pesticides**
BW-8*	TCE in Bedrock/Oil House and downgradient of Site and Bldg. 22	2	2	2	2	2
BW-9*	TCE in Bedrock/Oil House (Deep Well)	2	2	2	2	2
MW-5*	Former Foundry Building	2	2	2	2	2
MW-6*	Former Agitator Building	2	2	2	2	2
SG-1	Downgradient sample for Site and Bldg. 22	1	1	1	1	1
SG-2	Downgradient sample for Site and Bldg. 14A	1	1	1	1	1
SG-3	Cross/ Downgradient of Building 16	1	1	1	1	1
SG-4	Upgradient	1	1	1	1	1
SG-5	Upgradient	1	1	1	1	1
SG-6	Cross Gradient for Former Foundry and Site	1	1	1	1	1
Totals		**20**	**20**	**20**	**20**	**20**

Analytical Testing Protocols:
* Assumes two rounds of testing for the full suite of parameters
- TCL VOCs denotes USEPA TCL and NYSDEC STARS-List VOCs including up to 30 TICs using USEPA Method 8260
- TCL VOCs denotes USEPA TCL SVOCs including up to 30 TICs using USEPA Method 8270
- PCBs denotes PCBs using USEPA Method 8082
- TAL Metals denotes TAL Metals using USEPA Methods 6010 and 7471
- Pesticides denotes Pesticides using USEPA Method 8081

- Included on the table above, but not included on Figure 2, is the location of "deep" bedrock monitoring well, BW-9. This well will be installed in accordance with this RI Work Plan. However, the depth of the screened interval will be from 18-feet to 24-feet to evaluate the vertical extent of impacts to bedrock groundwater. The final location of this well will be biased toward the location of the 'worst-case' impacts to groundwater based on groundwater sampling results obtained from the other bedrock monitoring wells. Prior to initiating the installation of this well, NYSDEC will be contacted for approval of the location of the well and the screened interval depth.

- Laboratory Quality Assurance/Quality Control (QA/QC) sampling will be performed in accordance with Section 5.2 QA/QC Plan. An analytical data package for the first round of groundwater monitoring data will be prepared and presented to the NYSDEC.

- A DUSR for the groundwater data will be prepared in accordance with DER-10 Appendix 2B and included with the RI report.

- Soil and groundwater generated during well installation, development and purging activities will be containerized in 55-gallon drums and characterized for off-site disposal.

- Four (4) quarters of collecting groundwater elevations from the monitoring wells on-site will be completed. Quarterly groundwater contour maps will be generated. [*Note: The RIWP may be submitted prior to completion of all four (4) rounds of collecting groundwater elevations. However, addendum letters will be sent containing data and contour maps*].

- Each of the monitoring wells will be surveyed for elevation. In addition, the wells will be located using a GPS GeoXT with GeoBeacon. Each of the monitoring wells will be used for developing groundwater contour maps for the Site (to be included in the Final RI Report). The wells may also be used for evaluating hydraulic conductivity.

Task 8. Surface Soil Sampling:

As required by NYSDEC DER-10 surface soil sampling will be conducted as part of the exposure assessment. However, because structures or asphalt cover a majority of the Site, the portions of the Site where surface soil is exposed is limited. The surface soil samples will be collected within the parking lot area where grassy medians and/or perimeter locations are located and in the limited open grass areas.

Currently eight (8) total surface soil sample locations are proposed. Figure 2 displays the proposed locations of the surface soil samples. Each sampling location will have two (2) samples collected from varying depths. The following describes the method that will be used to collect the surface soil samples.

- The sod/vegetative material will be removed with a clean shovel/trowel. The surface soil sample will be collected using new sterile sampling spoons to prevent cross-contamination of the samples from a depth of 0 to 2-inches below the sod/vegetative material.
- Another sample will be collected from 2-inches to 2-feet below the first sample interval. A sample from the 2-inches to 2-feet interval will be submitted from the "worst-case" portion of the interval. This sample will not be a composite of the interval.
- Soils will be screened in the field for visible impairment by capturing headspace readings from soils. Headspace readings will be analyzed with a PID for detectable levels of VOCs. Initially, soil will be placed in a plastic Ziploc® bag. The soil in the bag will be mixed thoroughly inside the bag while sealed. After allowing the soil to warm to approximately "room temperature", the PID will be utilized to screen the air from the headspace inside the bag. Additionally, olfactory indications of impairment and evidence of non-aqueous phase liquids (NAPLs) will be observed during surface soil sampling work. All soil sampling for laboratory analysis will be conducted concurrently with the headspace screening samples. Each surface soil sample collected for laboratory analysis will be labeled and preserved in accordance with the QCP included as Appendix 4.

- Additionally, soils from the borings will be continuously screened in the field with a Radiation Monitor to screen for the presence of alpha, beta, and gamma radiation as part of evaluating for ^{232}Thorium in soil. The headspace of soil will be screened with the radiation monitor in the same way as the PID is used to screen the headspace of the soil sample inside the bag. Field screening results will be recorded on a soil-boring log (or 'Radiation Log') and will be included in the Remedial Investigation Report.
- The sixteen (16) total surface soil samples will be submitted to a NYSDOH ELAP-certified laboratory and tested for the following parameters:
  - USEPA TCL and NYSDEC STARS-List VOCs including up to 30 TICs using USEPA Method 8260
  - USEPA TCL SVOCs including up to 30 TICs using USEPA Method 8270
  - PCBs using USEPA Method 8082
  - Pesticides using USEPA Method 8081
  - TAL Metals using USEPA Methods 6010 and 7471
- Laboratory Quality Assurance/Quality Control (QA/QC) sampling will be performed in accordance with Section 5.2 QA/QC Plan.
- The analytical test result of the surface soil samples will be provided in a NYSDEC ASP Category B Deliverables package.
- Soil generated during surface soil sampling activities will be containerized (if impacted) in 55-gallon drums, characterized, and disposed of off-Site in accordance with applicable regulations.
- A DUSR for the surface soil data will be prepared in accordance with DER-10 Appendix 2B and included with the RI report.

Task 9. Soil Vapor Intrusion Investigation:

The purpose of this investigation activity will be to determine if subsurface impacts have the potential to adversely affect indoor air quality via the vapor intrusion pathway for on-site and off-site locations. Due to the presence of four (4) on-site structures that are scheduled to remain for re-use, it appears warranted to evaluate on-site soil gas and sub-slab soil vapor. As such, sub-slab soil vapor sampling and property line soil gas sampling is proposed. The sub-slab soil vapor and property line soil gas sampling will be conducted after the soil boring and groundwater evaluations are completed. This approach is proposed in order to locate the sample locations in areas of known impacts identified as part of these prior investigation phases. In the event that multiple areas of impact are identified, additional sampling points could be added. The NYSDEC will be contacted prior to selecting the location and number of sampling points before their installation. To complete this Task the following scope of work will be implemented:

- Prior to initiating the sub-slab soil vapor sampling work, NYSDEC will be contacted in order to discuss this task. Currently, the following vapor intrusion sampling is proposed:
  - ➢ Building 16 – Three (3) sub-slab soil vapor samples with corresponding indoor air samples;
  - ➢ Building 14A - Three (3) sub-slab soil vapor samples with corresponding indoor air samples; and,

- Building 22 – Two (2) sub-slab soil vapor samples with corresponding indoor air samples.

[*Note: Building 14B has undergone extensive sampling and a sub-slab depressurization system is in-place. As such, Building 14B is not included as part of this assessment. This data has been previously submitted to the NYSDEC.*]

- The currently anticipated sub-slab soil vapor samples are shown on Figure 2. These current locations are evenly spaced across the floor space of each respective building for general coverage purposes. As indicated above, actual sampling locations will be biased towards any identified impacts.
- Prior to initiating the property line soil gas sampling work, NYSDEC will be contacted in order to discuss this task. Soil gas samples will be collected from the following areas of the Site:
    - Eastern boundary of the Site – Two (2) soil gas samples;
    - Western boundary of the Site – Two (2) soil gas samples;
    - Northern boundary of the Site – One (1) soil gas sample; and,
    - Southern boundary of the Site – One (1) soil gas sample.
- The currently anticipated property line soil gas samples are shown on Figure 2. These current locations correspond to the nearest receptors (residential housing, commercial buildings, and industrial areas).
- The installation and sampling of the soil gas points will be completed in general accordance with the procedures provided in the *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006. The applicable procedures to be implemented as part of this investigation are summarized below:
    - Soil gas sampling points will be installed using direct push technology to approximately 4 to 5 feet in-depth, or to bedrock refusal whichever is encountered first. A porous, inert backfill material (e.g., glass beads or coarse sand) will be used to create a sampling zone of 1 to 2 feet in length. The soil gas sampling points will be constructed of 1-inch PVC well screen connected to a riser pipe or inert tubing (e.g., polyethylene, stainless steel, or Teflon®) of the appropriate size (typically 1/8 inch to 1/4 inch diameter) and of laboratory or food grade quality to the surface. The soil vapor probes will be sealed above the sampling zone with a minimum 1-foot bentonite slurry. In addition, the sampling zone will be a minimum of 3-feet below the ground surface in order to minimize outdoor air infiltration. The remainder of the borehole will be backfilled with glass beads or coarse sand. Soil gas sampling points will be finished with protective casings that are grouted in place to minimize infiltration of water or outdoor air and to prevent damage to the soil gas point.
    - Subsequent to installation, the probes will be allowed to equilibrate at least 24 hours prior to purging and sampling. The inert tubing must be sealed to prevent outside air infiltration.

One to three probe volumes (i.e., the volume of the sample probe and tube/riser pipe) will be purged in order to ensure that the samples collected are representative of soil gas conditions. The flow rate during purging will not exceed 0.02 liters per minute (L/min) to minimize outdoor air infiltration.

- During purging of the sample point, a tracer gas evaluation will also be conducted to verify the integrity of the soil gas probe seal. An appropriate tracer gas will be used (e.g., sulfur hexafluoride (SF6), helium, etc.) An enclosure will be constructed around the soil gas sampling point (e.g., plastic bag, plastic bucket, etc.) and sealed to the sample point casing. Subsequently, the enclosure will be enriched with the tracer gas. The purged soil gas will then be tested for the tracer gas by an appropriate meter (i.e., a meter capable of measuring the concentration of the tracer gas in at least percentage increments). In the event that the tracer gas is detected at a concentration of 10% or greater, the sample point will be resealed and retested prior to sampling.
- Soil gas samples will be collected over the same general time period and in the same manner at all locations to minimize possible discrepancies. Soil gas samples will be collected using six (6) Liter Summa Canisters® equipped with pre-calibrated laboratory supplied flow regulators set for a flow rate of 0.02 Liter/minute. The regulators will be calibrated by the laboratory for a sampling time of 6-hours. This sampling time will allow for a detection limit of 1 $\mu g/m^3$ to be achieved. The Summa Canisters® are pre-cleaned by the laboratory. The Summa Canister ®will be connected to the soil gas sampling point via inert tubing (e.g., polyethylene, stainless steel, or Teflon®). A Site sketch and photographs will be completed.
- In addition to the soil gas samples, one ambient air sample will be collected from an upgradient wind location. The upgradient wind location will be selected on the day of sampling based on the observed weather conditions. This sample will also be collected using Summa Canisters over the same approximate sampling periods.

- Subsequent to completing soil gas sampling, the samples will be sent under chain of custody control to the laboratory for testing. The samples will be tested for VOCs using USEPA Method TO-15 with a minimum detection limit of 1$\mu g/m^3$ with 0.25 1$\mu g/m^3$ for TCE.
- At the time of sampling, the following information will be documented that could influence interpretation of the results:
  - a sketch of the Site and sampling locations relative to area streets, neighboring properties and structures (with estimated distance to the Site), outdoor ambient air sample location(s), if applicable, and orientation (north arrow).
  - weather conditions (e.g., precipitation, outdoor temperature, barometric pressure, wind speed and direction) will be noted for the past 24 to 48 hours.
  - any pertinent observations should be recorded, such as odors and readings from field instrumentation.

- In addition to the above information, a sample log sheet summarizing the following information for each sample will be documented:
  - sample identification
  - date and time of sample collection
  - sampling depth
  - identity of sampler(s)
  - sampling methods and devices
  - purge volumes
  - volume of soil vapor extracted
  - the vacuum before and after samples are collected
  - apparent moisture content (dry, moist, saturated, etc.) of the sampling zone
  - chain of custody protocols used to track samples from sampling point to analysis.

- A DUSR for the soil gas data will be prepared in accordance with DER-10 Appendix 2B and included with the RI report.

The installation and sampling of the sub-slab vapor points will be completed in general accordance with the procedures provided in the *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006. The applicable procedures to be implemented as part of this investigation are summarized below:

- Sub-slab vapor probe installations will be temporary. A vacuum will not be used to remove drilling debris from the sampling port. Sub-slab implants or probes will be constructed in the same manner at all sampling locations to minimize possible discrepancies. The following procedures will be utilized.
  - Temporary probes will be constructed with inert tubing (e.g., polyethylene stainless steel, nylon, Teflon®, etc.) of the appropriate size (typically 1/8 inch to 1/4inch diameter), and of laboratory or food grade quality.
  - Tubing will not extend further than 2-inches into the sub-slab material
  - The implant will be sealed to the surface with non-VOC-containing and non-shrinking products for temporary installations (e.g., perma-gum grout, melted beeswax, putty, etc.).

- Sub-slab vapor samples will be collected in the following manner:
  - After installation of the probes, one to three 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 both purging and collecting will not exceed 0.2 liters per minute to minimize ambient air infiltration during sampling.
  - Samples will be collected in six (6) liter Summa® canisters and certified clean by the laboratory.
  - The samples will be collected over the same period of time as concurrent indoor and outdoor air samples.

- The following actions will be documented during sampling and ultimately to aid in the interpretation of the sampling results:
  - Historic and current storage and uses of volatile chemicals will be identified, especially if sampling within a commercial or industrial building (e.g., use of volatile chemicals in commercial or industrial processes and/or during building maintenance).
  - The use of heating or air conditioning systems during sampling will be noted.
  - Floor plan sketches will be drawn that include the floor layout with sampling locations, chemical storage areas, garages, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, HVAC system air supply and return registers, compass orientation(north), footings that create separate foundation sections, and any other pertinent information will be completed.
  - Outdoor plot sketches will be drawn that include the building site, area streets, outdoor air sampling locations (if applicable), compass orientation (north), and paved areas.
  - Weather conditions (e.g., precipitation and indoor and outdoor temperature) and ventilation conditions (e.g., heating system active and windows closed) will be reported.
  - Any pertinent observations, such as spills, floor stains, smoke tube results, odors and readings from field instrumentation (e.g., vapors via PID, ppbRAE, Jerome MercuryVapor Analyzer, etc.), will be recorded.
  - Additional documentation that may be gathered to assist in the interpretation of the results includes information about air flow patterns and pressure relationships obtained by using smoke tubes or other devices (especially between floor levels and between suspected contaminant sources and other areas), the barometric pressure and photographs to accompany floor plan sketches.

- The field sampling team will maintain a sample log sheet summarizing the following
  - Sample identification.
  - Date and time of sample collection.
  - Sampling depth.
  - Identity of samplers
  - Sampling methods and devices.
  - Soil vapor purge volumes,
  - Volume of soil vapor extracted.
  - If canisters used, vacuum of canisters before and after samples collected,
  - Apparent moisture content (dry, moist, saturated, etc.) of the sampling zone.
  - Chain of custody protocols and records used to track samples from sampling point to analysis.

Task 10. Qualitative Exposure Assessment:

The Qualitative Exposure Assessment will be performed in accordance with DER-10 Appendix 3B and Section 3.6 of the May 2004 BCP Guidance. This Qualitative Exposure Assessment will evaluate whether potential or completed exposure pathways exist. This assessment will be based on the soil, groundwater, and soil gas sampling data generated during the RI work. Currently, it is not proposed to collect off-site samples, rather the property line data will be used to assess whether impacts approach or have migrated beyond the site boundary.

The Qualitative Exposure Assessment will include the following areas of evaluation:

- Source Areas – AOCs with identified impacts will be included as part of the exposure assessment.
- Fate & Transport – The property boundary data will be evaluated for potential off-site migration via soil, groundwater, and/or soil gas.
- Route of Exposure – The results of site sampling will be interpreted to determine if contaminant concentrations are at levels that have the potential to be inhaled or injected.
- Receptor Population – The Site will be evaluated to determine the size and makeup of potential down-gradient receptors including residents, workers, and neighbors.

5.2 Quality Assurance/Quality Control Plan

Activities completed at the Site will be managed under LaBella's Quality Control Program, which is included in Appendix 4. Laboratory QA/QC sampling will include analysis of sample blanks as follows: one trip blank, one field blank, and one method blank for each sampling methodology (i.e., geoprobe, test pits, etc.) and matrix type (i.e., soil and groundwater). Additionally, one (1) Matrix Spike/Matrix Spike Duplicate (MS/MSD) will be analyzed for each twenty samples collected within a seven (7) day period. The MS/MSD will be analyzed for the same parameters as that of the field samples. The soil samples will be delivered under Chain of Custody procedures to a NYSDOH ELAP-certified laboratory. The laboratory will provide a NYSDEC ASP Category B Deliverables data package.

Table 4
QA/QC Sampling Plan

QA/QC Sampling Plan				
Matrix	**Trip Blanks**	**Field Blanks**	**Method Blanks**	**MS/MSD**
Test Pit Soil	1	1	1	1 per 20 samples within a 7 day period
Geoprobe Soil	1	1	1	1 per 20 samples within a 7 day period
Surface Soil	1	1	1	1 per 20 samples within a 7 day period
Geoprobe® Screen Point 15 Groundwater	1	1	1	1 per 20 samples within a 7 day period
Bedrock and Overburden Monitoring Well Groundwater	1	1	1	1 per 20 samples within a 7 day period

6.0 Health and Safety Plan

A Health and Safety Plan (HASP) has been developed for the Site and is included in Appendix 6.

7.0 Reporting and Schedule

Subsequent to completing the work outlined above, a Final Remedial Investigation Report will be developed in general accordance with NYSDEC DER-10. The anticipated schedule for the work to be completed is included in Appendix 7. This schedule is dependent on NYSDEC approvals and does not account for potential delays due to public comments, weather conditions, etc.

8.0 Citizen Participation Activities

A citizen participation plan (CPP) will be developed for the project and submitted separately. The CPP requirements will be followed as necessary throughout the RI work.

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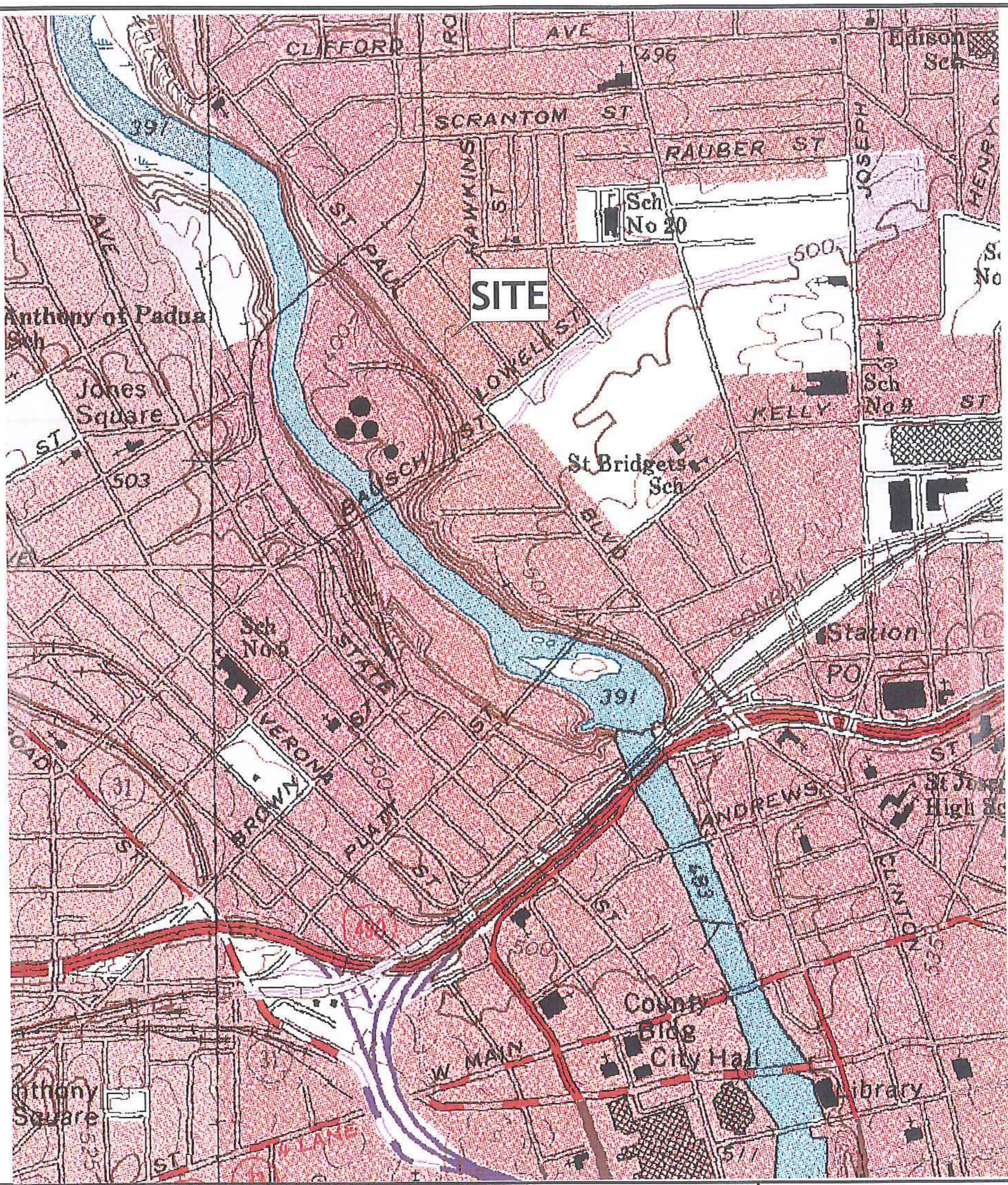
LaBella Associates, P.C.
300 State Street
Rochester, New York 14614

Figures



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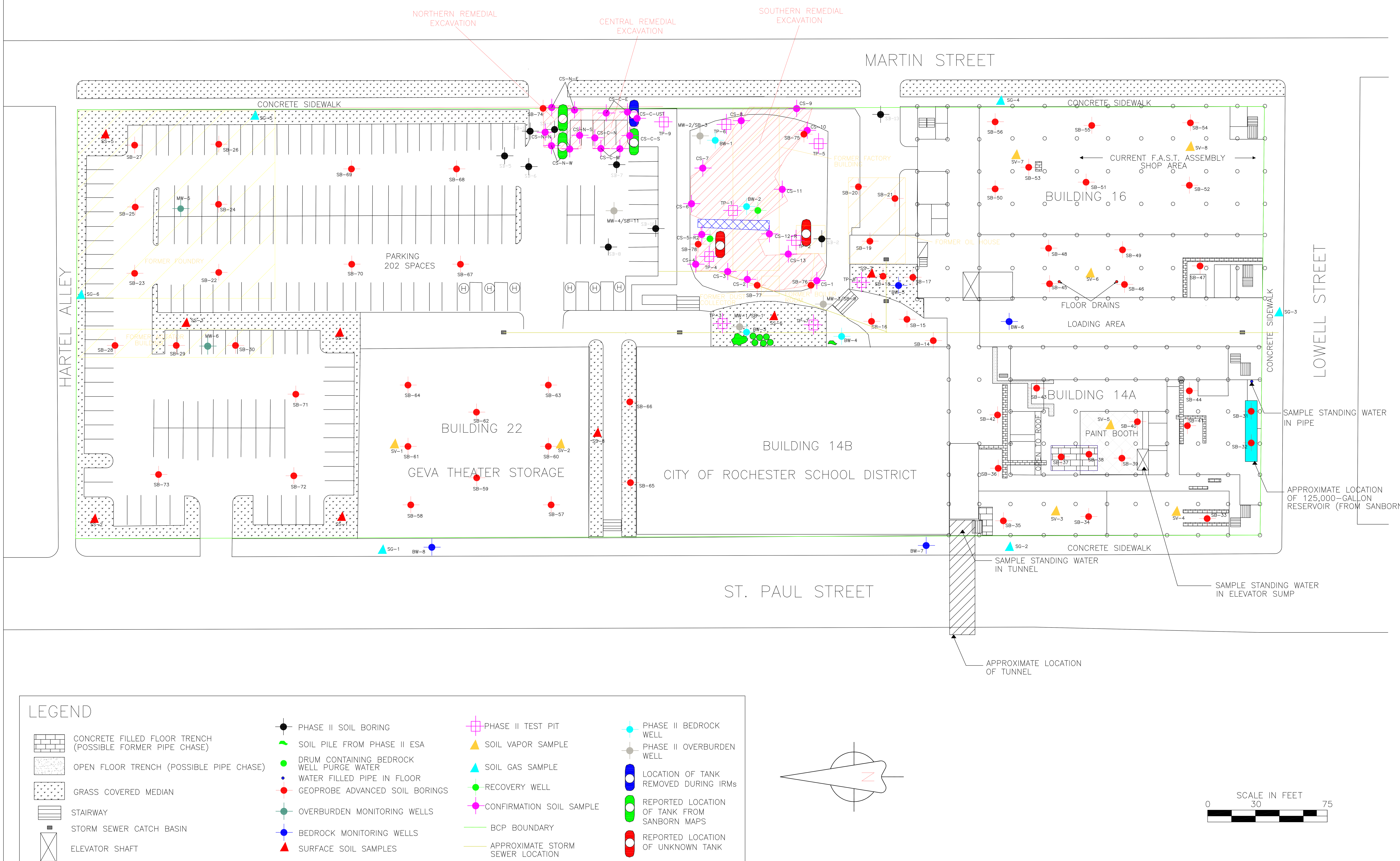
SCALE: 1:12,000

FIGURE 1
SITE LOCATION MAP

Remedial Investigation Work Plan
690 Saint Paul Street
Rochester, New York

LABELLA

PROJECT NO. 208492



* Note: SITE PLAN DEVELOPED FROM BERO ASSOCIATES ARCHITECTS SITE PLAN FOR 690 SAINT PAUL STREET, ROCHESTER CHARTER SCHOOL SCIENCE AND TECHNOLOGY, DATED APRIL 11, 2000

300 STATE STREET
ROCHESTER, NY 14614
P: (585) 454-6110
F: (585) 454-3066
www.labellapc.com

LABELLA Associates, P.C.

PROJECT/CLIENT

Remedial Investigation Work Plan
690 Saint Paul Street
Former Bausch & Lomb
Rochester, New York

DRAWING TITLE

SITE PLAN
690 SAINT PAUL STREET

ISSUED FOR: REVIEW

DATE: APRIL 2009

DESIGNED BY: EPD
DRAWN BY: EPD
REVIEWED BY: DN

PROJECT/DRAWING NUMBER

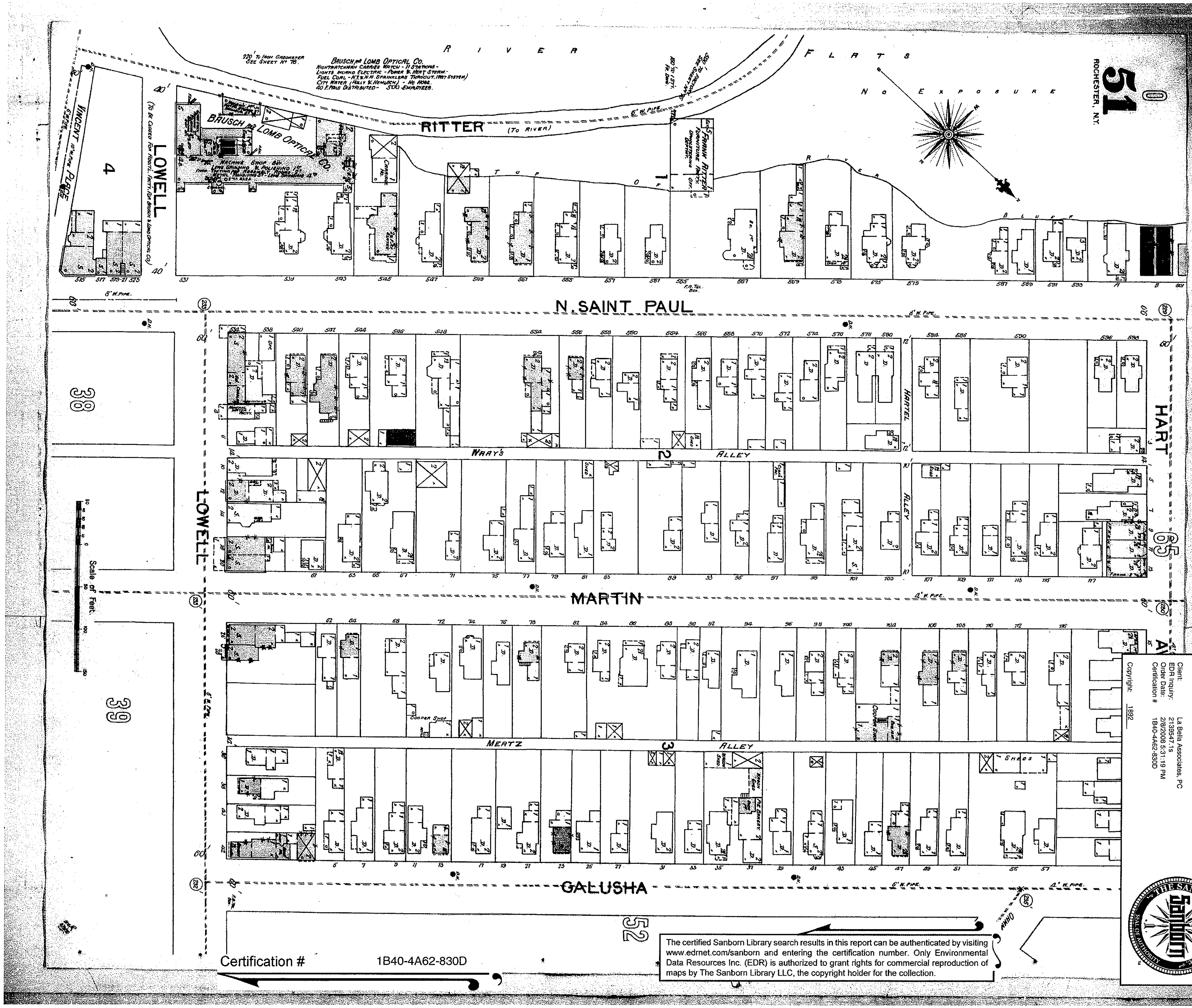
209280

FIGURE 2

LABELLA

LaBella Associates, P.C.
300 State Street
Rochester, New York 14614

Appendix 1
Historic Mapping



Certification # 1B40-4A62-830D

Site Name: 690 Saint Paul Street
Address: 690 Saint Paul Street
City, ST, ZIP: Rochester NY 14605
Client: La Bella Associates, PC
EDR Inquiry: 2139547.1s
Order Date: 2/8/2008 5:31:19 PM
Certification # 1B40-4A62-830D
Copyright: 1892

Certification # 1B40-4A62-830D

Site Name: 690 Saint Paul Street
Address: 690 Saint Paul Street
City, ST, ZIP: Rochester NY 14605
Client: La Bella Associates, PC
EDR Inquiry: 2135647.1s
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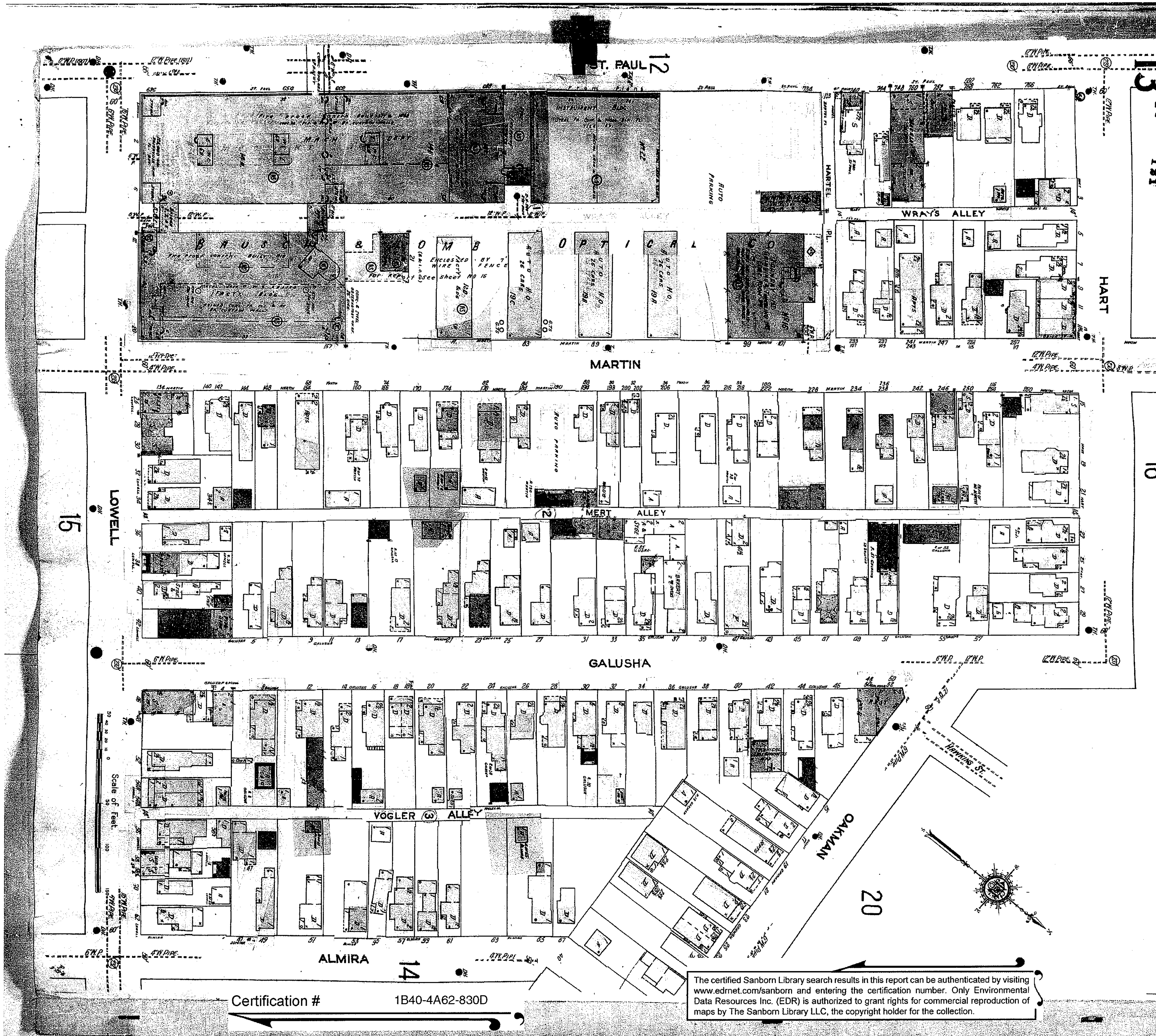

Certification # 1B40-4A62-830D

Site Name:	690 Saint Paul Street
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City, ST, ZIP:	Rochester NY 14605
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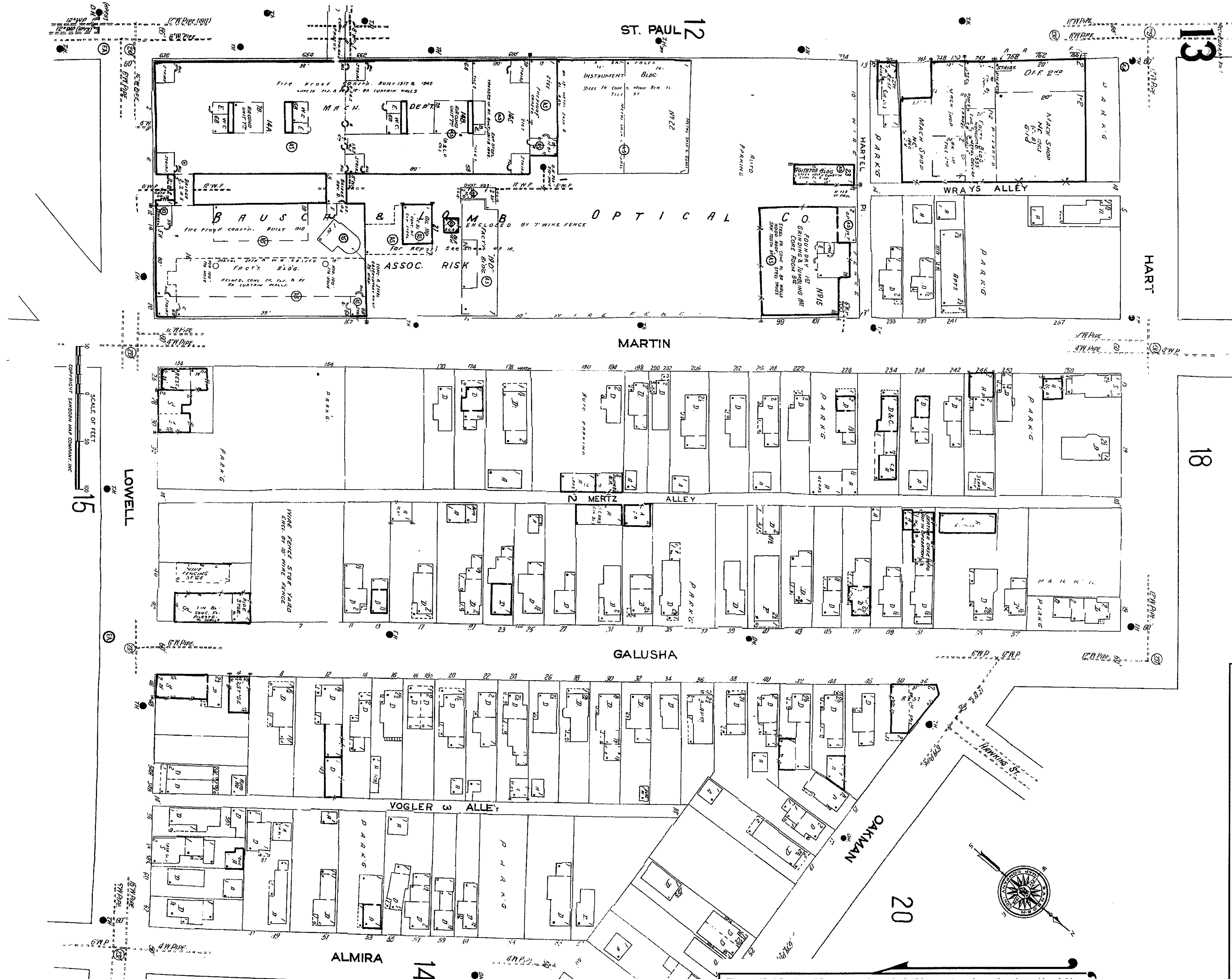

Certification # 1B40-4A62-830D

Site Name: 690 Saint Paul Street
Address: 690 Saint Paul Street
City, ST, ZIP: Rochester NY 14605
Client: La Bella Associates, PC
EDR Inquiry: 2135547.1s
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Certification # 1B40-4A62-830D
Copyright: 1971

LABELLA

LaBella Associates, P.C.
300 State Street
Rochester, New York 14614

Appendix 2

Contact List Information & Qualifications

690 Saint Paul Street
BCP Site #C828159

690 Saint Paul Street
Rochester, New York

Contact List Information

Environmental Professional: LaBella Associates

Environmental Director	Greg Senecal, CHMM	ph. 585-295-6243 cell 585-752-6480
Project Manager/Qualified Environmental Professional	Dan Noll, P.E.	ph. 585-295-6611 cell 585-301-8458
Quality Assurance Officer	Dennis Porter, CHMM	ph. 585-295-6245 cell 585-451-4854
Field Geologist & Site Safety Officer	Evan Dumrese	ph. 585-295-6643 cell 607-227-0838
LaBella Safety Director	Richard Rote, CIH	ph. 585-295-6241

BCP Volunteer: Genesee Valley Real Estate Company, LLC

Contact: Christopher Gullace: cell – 585-330-7173

EM-61 Survey Consultant: Amec Gematrix Consultants, Inc.

Contact: John Luttinger 716-565-0625

GeoTrax® Survey Consultant: Aestus, LLC

Contact: Stuart W. McDonald, P.E. 970-278-9040

Drilling Contractor: Nothnagle Drilling, Inc.

Contact: Steve DiLaura 585-538-2328

Gregory R. Senecal, CHMM

Education:

- SUNY Environmental Science and Forestry at Syracuse: BS, Environmental Science
- SUNY Cobleskill: AAS, Fisheries and Wildlife Technology

Certification/Registration:

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

Mr. Senecal is the Environmental Division Director and is a Certified Hazardous Materials Manager. Mr. Senecal is responsible for the direction of all environmental investigation related projects undertaken by the firm. Mr. Senecal has 17 years experience in designing, managing, and conducting numerous, remedial projects, Brownfield assessment and redevelopment projects groundwater monitoring well installations, test pit excavations, and underground petroleum storage tank removals and spill clean ups.

Key Projects:

- **Foster Wheeler Plant Site Characterization, Dansville, NY**
  Project Manager for this due diligence investigation consisted of a complete Phase I Environmental Site Assessment and Phase II Site Characterization.

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

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

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

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

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

- **NYSDOT Hazardous Waste Projects, Region 4 and Region 5, NY**
  Project Manager
  - Development of a characterization workplan to satisfy City, NYSDEC, NYSDOH, MCEMC, and NYSDOT requirements
  - Implementation of a multiple phase workplan including shallow soil sampling, test pitting, drilling, geo-probing, and groundwater monitoring well installation
  - Environmental liaison between LaBella Associates, the NYSDOT, the NYSDEC, and the City of Rochester
  - Direction of investigative and remedial work
  - Evaluation of contamination levels and impacts
  - Responsible for final report preparation for the City and the NYSDEC

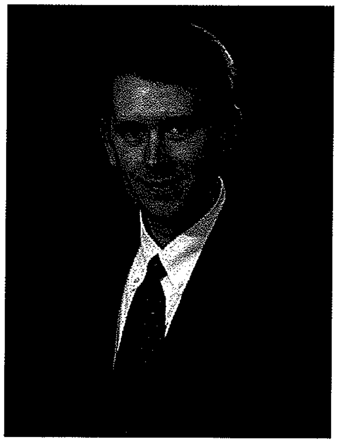
- **Automotive Service Center, Voluntary Cleanup Investigation, Rochester, NY**
  Project Manager responsible for the delineation of an area of impairment for the client, and the release of future environmental liability for the client from the NYSDEC.

- **Pennsylvania Act II Site Characterization, Soil and Groundwater Remediation, Coudersport, Pennsylvania**
  Mr. Senecal was Project Manager for a Pennsylvania Department of Environmental Protection Act II Voluntary Cleanup project. The site consisted of approximately five acres of land, two vacant gas stations and an agricultural chemical retail store.

- **Former Trucking Maintenance Facility, Phase II Site Characterization and Remedial Measures, Bloomfield, New York**
  Project Manager for a multi-phased site characterization and remedial effort. Mr. Senecal was responsible for the oversight of the spill closure, design of a sub slab venting system, removal of 800 tons of impaired soil, and negotiations with the NYSDEC.

- **Former Gas Station, Design and Construction of Bio Remediation Project, Rush, New York**
  Mr. Senecal was Project Manager for the removal of three underground gasoline storage tanks and approximately 600 tons of impaired soil. The design and implementation of a bio-cell remediation for the impaired soils, achieved NYSDEC Spill Closure and resulted in a 50 % savings compared to off-site land filling of the soils.

Dennis E. Porter, CHMM



Education:

- SUNY Oswego: BS, Biology

Certification/Registration:

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

Professional Affiliations:

- New York State Commercial Association or Realtors
- CHMM Local Chapter

Mr. Porter is the Phase II Environmental Site Assessment and Remediation Program Manager and is a Certified Hazardous Materials Manager. Mr. Porter will be the Project Manager for the Project. Mr. Porter has managed numerous Phase I and II Environmental Site Assessments, Remedial Investigations and Design, Feasibility Studies, industrial hygiene studies, project monitoring and asbestos sampling surveys. Mr. Porter also has significant experience in Brownfield Redevelopment and completed numerous Site Redevelopment Projects under the NYSDEC's Brownfield Cleanup Program.

Key Projects:

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

- **Brownfield Clean-Up Grant: Seneca Nation, Salamanca, NY**
  Mr. Porter served as the Remedial Design Manager and assisted in authoring a United States Environmental Protection Agency (USEPA) Brownfield Cleanup Grant for the Seneca Nation. The successful grant application that was prepared sought $200,000 for the cleanup of a vacant rail yard that is contaminated with diesel fuel and heavy metals. The rail yard is located in the Seneca Nation's Allegheny territory in Salamanca, New York.

- **Remedial Investigation, Proposed Port Marina, Port of Rochester, Rochester, NY**
  Mr. Porter served as the Project Manager for the City of Rochester regarding the design and implementation of the Remedial Investigation (RI) regarding the proposed Port Marina Project. The project approach selected consisted of a multi-step investigative process. The main focus for the RI was to evaluate the environmental implications, potential human health exposure issues and associated cost burdens associated with the potential re-development of the site as a marina.

- **Bureau of Water, Lighting, and Parking Meter Operations, Rochester, NY**
  Mr. Porter served as Environmental Project Manager the City of Rochester's new Bureau of Water, Lighting, and Parking Meter Operations complex. Mr. Porter managed a team of LaBella Technical Staff combined with City staff to develop and implement a cost effective site investigation, remedial action plan and successful redevelopment of the Site. This Project was the recipient of the American Public Works Association Environmental Project of the Year for New York State.

- **Port of Rochester Re-Development Project Phase II Site Characterization, Rochester, NY**
  Mr. Porter served as the Technical Team Leader / Sr. Environmental Analyst for complete Phase II Site Characterization of the entire Port of Rochester. This project involved the sub surface characterization of approximately 38 acres of formerly industrial land targeted for redevelopment for the Fast Ferry Project. The site received a beneficial re-use determination to re utilize 80,000 cubic yards of iron foundry slag as on-site fill and part of the redevelopment of the Site.

- **Adelphia Communications World Headquarters ,Coudersport, PA**
  Mr. Porter served as the Field Project Manager regarding all facets of environmental investigation, characterization, and remediation associated with two former gas stations and a former agricultural distribution center that had been purchased to redevelop as a communications firm $26 million dollar World Headquarters. Planning and management were key to the project's success. The success of the project was driven by Mr. Porter's significant involvement with Adelphia's corporate, legal and design groups and numerous public and private organizations; from utilities and construction crews to neighborhood group.

- **NYSDEC Brownfield Cleanup Program, Portland Ave., Roch.**
  As Project Manager, Mr. Porter managed the implementation of a comprehensive environmental due diligence program prior to the Client divesting the real-estate associated with the complex. Due diligence activities included the performance of an ASTM Phase I Environmental Site Assessment, a Pre-Demolition Asbestos Survey, a Preliminary Phase II Environmental Site Assessment/Remedial Investigation a Remedial Alternatives Analysis Report; and Preliminary Remedial Design. This complex project is scheduled to begin remediation late in 2007.

- **NYSDEC Brownfield Cleanup Program, Penfield, NY**
  Mr. Porter served as the Remedial Program Manager for the Project. This complex project involved a detailed investigation and characterization regarding multiple source areas of chlorinated solvent contamination which included installing shallow overburden and deep overburden groundwater monitoring wells and an extensive soil boring grid. In addition, an exposure assessment for evaluating potential on-site and off-site exposures was completed. This project was further complicated by the close proximity of the Site to residential properties and a commercial Day Care Facility. The RI concluded that an Interim Remedial Measure (IRM) was warranted to immediately remove a source area in order to minimize off-site migration and significantly reduce groundwater impacts in a cost effective and timely manner.

- **NYSDEC Brownfield Cleanup Program, Wolcott, NY**
  Mr. Porter served as the Project Manager for all facets of environmental investigation, characterization and remediation associated with an area of mercury contamination. A Remedial Investigation (RI) was designed in accordance with the NYSDEC BCP in order to provide for the investigation and characterization of the extent of mercury contamination at the site including the evaluation of human exposures to mercury. The selected remedial approach will

be to cap the area of mercury contaminated soil with asphalt. This approach will allow for the reduction in potential human exposure to the contaminated soils through direct contact, allow the site owner to develop additional vehicle parking for the employees and eliminate the need for costly off-site landfill disposal of the mercury impacted soils.

- **NYSDEC Brownfield Cleanup Program, Henrietta, NY**
  LaBella Associates, P.C. was retained by a local manufacturing company to complete the site remediation under the NYSDEC Brownfield Cleanup Program. The project was initiated by another consultant; however, due to cost overruns and timing of the work, the Client selected LaBella to complete the project. Mr. Porter served as the Remedial Program Manager for this Project. Timely response and client involvement was the key to bringing the project back on-track.

- **935 Broad Street, City of Rochester, NY**
  Mr. Porter served as the Project Manager for the City of Rochester during the design and implementation of a comprehensive Remedial Investigation, Remedial Alternatives Analysis, Site Re-Use Concept Plan and a Corrective Action Plan for a Former Gasoline Station at 935 West Broad Street. This project was funded under the NYSDEC 1996 Clean Water/Clean Air Bond Act.

- **Valeo, Facility Wide Decommissioning**
  Mr. Porter served as the Project Manager representing Valeo during the decommissioning of the Complex which consists of an approximately 22-acre site with 1.5 million square feet of manufacturing and warehouse space. LaBella provided Valeo with comprehensive environmental engineering design and management services associated with the phased reduction of operations at the Facility. In addition to the technical decommissioning of much of the manufacturing related infrastructure, it was paramount that LaBella design and manage each aspect to the project to minimize Valeo's long term liability associated with the Facility.

- **NYSDEC Brownfield Cleanup Program, North Goodman, Roch.**
  As Project Manager, Mr. Porter guided the Client through the NYSDEC Brownfield Cleanup Program. The project involved the Developer acquiring the contaminated parcel from the existing owner, assuming all responsibility for clean-up and subsequently entering into the NYSDEC Brownfield Cleanup Program as a Volunteer. This complex project involved detailed investigation and characterization regarding multiple source areas, defining off-site migration pathways, installation of a sub-slab vapor mitigation system for the existing structure and completing the evaluation of bedrock groundwater.

- **Project Management: Remediation, Demolition, and Preliminary Site Work, Wegmans Food Markets, Buffalo, New York**
  Mr. Porter provided on-site Project Management for the remediation, demolition and preliminary site work in preparation for the construction of a new retail facility. The site consisted of an approximately 400,000 square foot industrial complex. This complex project involved pre-demolition remedial measures consisting of an asbestos survey, the removal of underground petroleum bulk storage

tanks, above ground paint storage tanks, asbestos abatement, and the dismantlement and disposal of PCB contaminated equipment and materials.

- **Foster Wheeler Plant Site Characterization, Dansville, NY**
  Mr. Porter was the Remedial Investigation Manager for the due diligence investigation regarding Foster Wheeler's Dansville Facility was first developed for industrial purposes in the 1830's as a foundry and heavy industrial operation. The complex consisted of over 500,000 square feet of manufacturing buildings situated on an approximately 80 acre site. The facility had a long history of environmental related issues including Consent Orders from the NYSDEC, being listed as a NYSDEC Inactive Hazardous Waste Disposal Site (IHWDS) and multiple documented chemical releases.

- **Chautauqua County Jail, Mayville, NY**
  Project Manager for environmental services in support the construction of a 240 bed addition to this existing jail facility and renovations in the existing facility. Environmental issues included defining the nature and extent of existing contamination, completing design/bidding documents, on-site management during construction and mitigating human-health expose issues for both on-site construction workers and the future occupants of the structure.

- **Rochester Economic Development, 110 Colfax St. & 690 Portland Ave.**
  Project Manager for a Remedial Investigation, Remedial Alternatives Analysis, Site Re-Use Concept Plan and a Corrective Action Plan for the former municipal landfill and manufacturing facility, respectively.

- **Environmental Term Agreement, City of Rochester, NY**
  Project Manager on the term agreement, whose responsibilities range from Phase I Environmental Site Assessments to Site Characterizations, Remedial Cost Estimates, and Brownfield Cleanups.

- **Pike Company, Rochester, NY**
  Project Manager responsible for the completion of spill closure requirements for a New York State Department of Environmental Conservation (NYSDEC) Active Spill and to delineate and remediate extensive soils impaired with gasoline.

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

- **North Buffalo Street over Camp Brook Creek, PENNDOT District 3-0, Elkland, PA**
  Sr. Environmental Analyst for the new 60 ft, single span bridge replacement.

- **Water District No. 4, Town of Kendall**

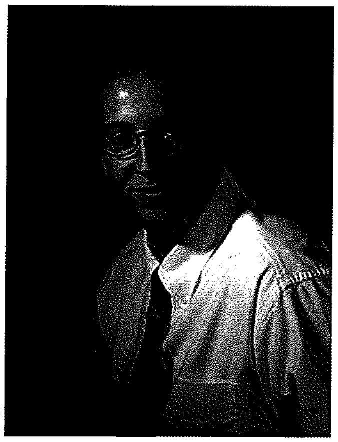
Sr. Environmental Analyst for four projects to install approximately 18 miles of water mains to extend the Town's distribution system.

NYSDOT

Mr. Porter is a Phase II Environmental Site Assessment and Remediation Program Manager and Certified Hazardous Materials Manager. Mr. Porter will be the Senior Environmental Analyst for the Project. Mr. Porter has completed numerous Phase I and II Environmental Site Assessments, Remedial Investigations and Design, Feasibility Studies, industrial hygiene studies, project monitoring and asbestos sampling surveys. Mr. Porter has completed **Hazardous Waste/Contaminated Materials (HW/CM)** Assessments on the following NYSDOT projects

- **Jefferson Road, Route 252 Phases I-IV, PIN 4046.11**
  Sr. Environmental Analyst
- **Lake Avenue, Rochester, NY, PIN 4067.01**
  Sr. Environmental Analyst
- **NY Route 36 & 408, Village of Mt. Morris, PIN 4096**
  Sr. Environmental Analyst
- **Sweethome Road, Amherst, NY, PIN 5803.35**
  Sr. Environmental Analyst
- **NYS Routes 417 & 305, Portville, NY, PIN 5031.03**
  Sr. Environmental Analyst
- **Route 364, Niagara Falls, PIN 5460.30**
  Sr. Environmental Analyst

Daniel P. Noll, PE



Education:

- Clarkson University: BS, Chemical Engineering

Certification/Registration:

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

Mr. Noll has over eight years of experience in investigation and remediation of contaminated sites, and will be the Project Manager for the Project. Mr. Noll has conducted numerous Phase II Environmental Site Assessments including: groundwater monitoring programs, soil vapor investigations, test pit investigations, and geo-probe investigations. Mr. Noll has also conducted numerous underground storage tank removals, and remediation of soil and groundwater contamination at various sites.

Key Projects:

- **Carriage Cleaners, Brownfield Cleanup, Rochester, NY**
  As Project Manager, Mr. Noll completed a Brownfield Cleanup Program Application & Work Plan to conduct a Remedial Investigation at a former dry cleaning facility. A soil, groundwater, and soil gas study was undertaken to develop remedial costs and assist with the redevelopment of property. Mr. Noll attended Town Board Meetings regarding this project.

- **DeCarolis Truck Rental Petroleum Spill Site Remediation, Rochester, NY**
  Mr. Noll was Project Engineer for this site, responsible for the coordination of the removal/disposal of approximately 800 tons of petroleum impacted soil and developed a confirmatory soil sampling program. Mr. Noll also coordinated work with NYSDEC including potential additional requirements to close the spill file.

- **935 Broad Street, City of Rochester, NY**
  As Project Engineer, Mr. Noll developed a soil and groundwater study to investigate former underground storage tanks at a former gasoline/auto repair facility. A remedial alternatives analysis was conducted to evaluate several options for remediating soil and groundwater at the site including light non-aqueous phase liquid.

- **Barthelmes Manufacturing, Brownfield Cleanup, Rochester, NY**
  As Project Engineer, Mr. Noll completed a Remedial Investigation at an active manufacturing plant. This work was conducted through the NYSDEC Brownfield Cleanup Program. Soil and groundwater studies, including deep bedrock wells, were performed to determine the appropriate remedial actions. This project also included drain discharge evaluation to determine sources of contamination.

Completed under previous employment:

- **LNAPL Removal and Monitoring, Various Railroad Yards**
  Serving as a Project Engineer, Mr. Noll oversaw the delineation of LNAPL plumes at three railroad maintenance yards. Subsequent to delineating the extent of the plumes, LNAPL recharge testing was conducted, a removal system was designed and implemented.

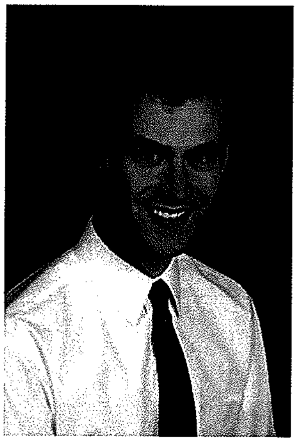
- **PCB Remediation/Encapsulation, Railroad Yard**
  Serving as a Project Engineer, Mr. Noll prepared a remediation plan (approved by the NYSDEC) for decontaminating polychlorinated

biphenyls (PCBs) in piping and encapsulating PCBs in concrete. A site-specific procedure was developed for decontamination of piping.

- **Longterm Groundwater Monitoring, Railroad Maintenance Yard**
  Serving as a Project Engineer, Mr. Noll developed and submitted quarterly monitoring reports to the Connecticut Department of Environmental Protection (DEP). A natural attenuation study was conducted using the USEPA BIOSCREEN computer modeling program.

- **Inactive Hazardous Waste Site RI/FS**
  As Project Manager, Mr. Noll managed additional studies to further delineate soil contamination beneath a building formerly used as a metal plating facility where chromium and solvents spilled into the subsurface and migrated into the groundwater. Also managed a study to evaluate indoor air and sub-slab vapor concentrations for potential sub-slab venting systems. Developed a Feasibility Study report for evaluating remedial alternatives of chromium and volatile organic compounds (VOCs) in soil and groundwater. Specific tasks included screening remedial options for the site, obtaining cost estimates, and meetings with the NYSDEC and NYSDOH.

Evan P. Dumrese



Education:

- Cornell University: BS, Science of Earth Systems – Concentration in Biogeochemistry

Certification/Registration:

- Occupational Safety and Health Administration 40-Hour Hazardous Waste Operations and Emergency Response Course
- Rutgers University Wetland Delineator Program

Mr. Dumrese is a project geologist. He has over three years of experience in the field of environmental evaluation and remediation. Mr. Dumrese has been involved in numerous Phase II investigations as well as with various brownfield cleanup program sites. From these experiences, he commands a solid understanding of both state and federal regulations.

Current work includes assisting with the production of remedial investigation work plans, facilitating field investigations, and project management.

Key Projects:

- **Remedial Investigation Work Plan, Mark IV Enterprises, BCP Site #C828137, Pittsford, New York**
  Assisted with the development of a Remedial Investigation Work Plan for the remediation of a New York State Brownfield Cleanup Program site formerly utilized as a bulk petroleum storage and distribution facility.

- **Remedial Investigation Work Plan, Northern Ethanol, Inc., BCP Site #C932143, City of Niagara Falls, New York**
  Assisted with the development of a Remedial Investigation Work Plan for the remediation of a New York State Brownfield Cleanup Program site formerly utilized in heavy industry for approximately 100 plus years. Responsibilities included identifying potential areas of concern from historic maps and making revisions and additions to the work plan.

- **Phase II Environmental Site Assessment and Implementation of a Sub-Slab Vapor Evaluation, 1700 Lexington Avenue, Rochester, New York**
  Oversaw the advancement of numerous soil borings and the installation of multiple groundwater monitoring wells as part of a Phase II ESA at an 18.9-acre Site to evaluate possible influences to Site soil and groundwater from a nearby landfill and former automotive repair facility.

  Conducted a sub-slab vapor evaluation inside a vacant industrial facility. All phases of this evaluation were in accordance with applicable NYSDOH regulations and guidance documents.

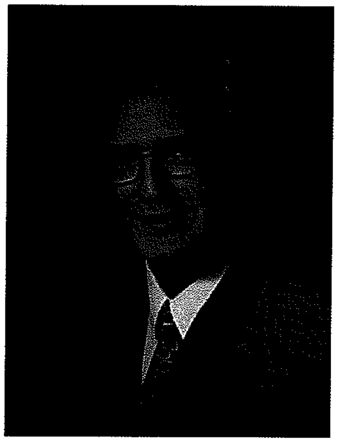
- **Marcus-Whitman Central School District, Middlesex Valley Elementary School, 149 State Route 245, Rushville, New York**
  Provided evaluation of previous Phase I and Phase II investigations conducted at the Site. Based on the findings, recommended further remedial strategies and requirements for a solution.

- **Phase II Environmental Site Assessment, Conifer Realty, LLC, Cortland, New York**
  Performed a Phase II ESA of a parcel of land utilized as a commercial storage area with a history of off-site induced groundwater contamination for due diligence as part of a real estate transaction. Also assisted with project management duties for completion of project.

Work completed under previous employment:

- Provided oversight for the installation of a dual phase soil vapor extraction/groundwater pump and treat system at a retail gasoline station in Rochester, New York.
- Managed environmental concerns due to petroleum impacts during the demolition and rebuild of a retail gasoline station in Penfield, New York.
- Conducted routine operation and maintenance activities on soil vapor extraction and pump and treat systems at various retail gasoline stations throughout Upstate New York.
- Assisted in the design and managed the expansion of an existing dual phase soil vapor extraction/groundwater pump and treat system at a former retail gasoline station in Fairport, New York.
- Field geologist for the implementation and completion of a multi-million dollar remedial work plan at a brownfield site in Elizabeth, New Jersey.
- Conducted quarterly groundwater sampling at numerous locations in New Jersey according to the New Jersey Department of Environmental Protection Technical Regulations.

Richard K. Rote, MS, CIH



Education:

- University of Rochester: MS, Industrial Hygiene
- St. Lawrence University: Bachelor of Science, Geology

Certification/Registration:

- Certified Industrial Hygienist
- NYSDOL Project Monitor
- Hazardous Waste Operations & Emergency Response

Professional Affiliations:

- American Industrial Hygiene Association
- American Board of Industrial Hygience
- Air & Waste Management Association Association
- American Society of Safety Engineers

Mr. Rote, LaBella's Lab Director, is an industrial hygienist certified in the Comprehensive Practice of Industrial Hygiene. He has been providing health, safety and environmental services to LaBella clients for 15 years. Prior to joining LaBella Associates, he worked for over 14 years for Eastman Kodak Company. Mr. Rote has conducted a wide variety of industrial hygiene investigations including:

- **Industrial Hygiene Walk-Through Surveys**
- **OSHA Personnel Exposure Studies**
- **Noise Exposure Studies**
- **OSHA Compliance Programs and Audits**
- **Asbestos Site Surveys**
- **Indoor Air Quality Studies**
- **Mold Assessment and Testing**
- **Non- ionizing Radiation Surveys**
- **Health & Safety Plans for Hazardous Waste Sites**

Mr. Rote has performed exposure studies for a wide variety of agents, from carcinogens and heavy metals to simple irritants and asphyxiants. He is routinely called upon to complete indoor air quality studies, including the assessment of 'Toxic Mold' contamination and potential for occupant exposure. In some studies, computerized data acquisition was used, allowing for complex data analysis and graphical representations of results. In another area of data management, he designed and helped to develop a database for tracking employee exposure histories and training.

Mr. Rote has prepared corporate programs for compliance with OSHA regulations such as Confined Space, Lock Out/Tag Out, Respiratory Protection, Hazard Communications, asbestos and lead.

- **City of Rochester Indoor Air Quality Studies, City of Rochester, NY**
  Project Manager for Indoor Air Quality studies, including toxic mold investigations, have been performed at a number of city facilities. Studies have been triggered by employee complaints of upper respiratory irritation, dry scratchy eyes, illness, odors and stale air. Testing was completed for specific contaminants based on conditions identified during the initial walk-through evaluation. Ventilation system design and function are also evaluated. All work was carried out in close association with the Environmental Services Department, including the development of corrective actions.

- **NYSOGS, Elmira Psychiatric Center, Elmira, NY**
  During a spot check, high radon concentrations were measured in several areas, spurring a comprehensive assessment across the entire facility. Results were reported and at-risk spaces were identified. After consideration of site characteristics, space usage, and existing ventilation performance, a design for a comprehensive ventilation upgrade was provided.

- **Wegmans Food and Pharmacy**
  Project Manager

  - **Employee Exposure Assessment**
    LaBella measured the concentrations of several different solvents and dark room chemicals to assess employee exposures during various printing operations. The exhaust ventilation system was evaluated for effectiveness. Recommendations were provided on chemical handling and modifications to the exhaust system.

  - **Indoor Air Quality**
    LaBella has completed numerous indoor air quality studies in a variety of environments in response to employee complaints such as, upper respiratory tract irritation, odors, head aches and a high rate of illness. Building design, ventilation, equipment, and operations are evaluated for factors which could contribute to poor indoor air quality. Testing has included agents such as carbon dioxide, volatile organic compounds, solvents, dust, noise and bioaerosols. Recommendations for remediation and ventilation improvements are provided.

  - **Employee Exposure**
    Personal and area samples were taken to measure employee exposures to ammonia and dust at a large egg farm. Full shift dosimetry was performed with data logging. Time history graphs were used to identify specific high exposure tasks.

  - **Indoor Air Quality**
    Warehouse guards had expressed concern about exposure to engine exhaust and particulate. Personal sampling was conducted to determine employee exposure concentrations to respirable dust, carbon monoxide, and nitrogen dioxide. Recommendations were made for modifications to the guard house ventilation system to help reduce particulate and exhaust gas infiltration.

- **NYSDOT, Fredonia Maintenance Residency, Fredonia, NY**
  Volatile Organic Compounds were scanned using SUMA canisters and Method TO-15 to achieve very low detection levels in response to employee concerns over sub-slab gasoline and fuel oil contamination. Sample data was compiled and presented in an industrial hygiene format for presentation to employees. Vapor concentrations were concluded to be low enough to not present the potential for adverse health effects.

- **Childtime, Various Sites, Upstate, NY**
  LaBella completed visual inspections and assessments for mold contamination at 10 sites across Upstate New York. Contaminated areas were delineated, limited sampling was completed, remediation recommendations were provided and a remediation specification was prepared. During and post remediation inspections were performed with clearance testing done as needed.

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Appendix 3
NYSDOH Generic Community Air Monitoring Plan

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 CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with the New York State Department of Health (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 the NYSDOH.

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

Community Air Monitoring Plan

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

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 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 shut down.

All 15-minute readings must be recorded and be available for review. Instantaneous readings, if any, used for decision making 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 of 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 review.

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Appendix 4
Quality Control Program

LABELLA
Associates, P.C.

Engineering
Architecture
Environmental

Quality Control (QC) Program

Location:

690 Saint Paul Street
Rochester, New York

Prepared For:

Genesee Valley Real Estate Company
First Federal Plaza
28 East Main Street
Rochester, New York 14614

LaBella Project No. 208492

April 2009

Quality Control (QC) Program

Location:

690 Saint Paul Street
Rochester, New York

Prepared For:

Genesee Valley Real Estate Company
First Federal Plaza
28 East Main Street
Rochester, New York 14614

LaBella Project No. 208492

April 2009

LaBella Associates, P.C.
300 State Street
Rochester, New York 14614

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1. Introduction

LaBella's Quality Control (QC) Program 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. QC also provides safe working conditions for all on-site workers.

The Quality Control program contains procedures, which provide for collected data to be properly evaluated, and which document that quality control procedures have been followed in the collection of samples. The quality control program represents 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 practices.

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

This QC program has been organized into the following areas:

- QC Objectives and Checks
- Field Equipment, Handling, and Calibration
- Sampling Techniques
- Sample Handling and Packaging

It should be noted that the Remedial Investigation (RI) Work Plan may have project specific details that will differ from the procedures in this QC program. In such cases, the RI Work Plan should be followed (subsequent to regulatory approval).

2. Quality Control Objectives

The United States Environmental Protection Agency (EPA) has identified five general levels of analytical data quality as being potentially applicable to site investigations conducted under CERCLA. These levels are summarized below:

- **Level I** - Field screening. This level is characterized by the use of portable instruments, which can provide real-time data to assist in the optimization of sampling point locations and for health and safety support. Data can be generated regarding the presence or absence of certain contaminants (especially volatiles) at sampling locations.

- **Level II** - Field analysis. This level is characterized by the use of portable analytical instruments, which can be used on site or in mobile laboratories stationed near a site (close-support labs). Depending upon the types of contaminants, sample matrix, and personnel skills, qualitative and quantitative data can be obtained.

- **Level III** - Laboratory analysis using methods other than the Contract Laboratory Program (CLP) Routine Analytical Services (RAS). This level is used primarily in support of engineering studies using standard EPA-approved procedures. Some procedures may be equivalent to CLP RAS, without the CLP requirements for documentation.

- **Level IV** - CLP Routine Analytical Services. This level is characterized by rigorous QC protocols and documentation and provides qualitative and quantitative analytical data. Some regions have obtained similar support via their own regional laboratories, university laboratories, or other commercial laboratories.

- **Level V** - Non-standard methods. Analyses, which may require method modification and/or development. CLP Special Analytical Services (SAS) are considered Level V.

Unless stated otherwise, all data will be generated in accordance with Level IV. When CLP methodology is not available, federal and state approved methods will be utilized. Level III will be utilized, as necessary, for non-CLP RAS work which may include ignitability, corrosivity, reactivity, EP toxicity, and other state approved parameters for characterization. Level I will be used throughout the RI for health and safety monitoring activities.

All measurements will be made to provide that analytical results are representative of the media and conditions measured. Unless otherwise specified, all data will be calculated and reported in units consistent with other organizations reporting similar data to allow comparability of data bases among organizations. Data will be reported in µg/L and mg/L for aqueous samples, and µg/kg and mg/kg (dry weight) for soils, or otherwise as applicable.

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.

2.1. 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.

2.2. Precision

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

2.3. 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.

2.4. 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.

2.5. Comparability

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

3. Measurement of Data Quality

3.1. 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 GC or GC/MS analyses, solutions of surrogate compounds, which can be spiked into every sample and are designed to mimic the behavior of target analytes without interfering with their determination, are used.

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.

3.2. 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 sometimes not known to ASC and usually not known to bench analysts, so their usefulness for monitoring analytical precision at bench level is limited. 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 (see Section 9), field duplicate RPDs are assessed as a measure of the total variability of both field sampling and laboratory analysis.

3.3. 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.

3.4. 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.

4. QC 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.

5. Sampling Procedures

This section describes the sampling procedures to be utilized for each environmental medium that will be collected and analyzed in accordance with appropriate state and federal requirements. All procedures described are consistent with EPA sampling procedures as described in SW-846, third edition, September 1986. All samples will be delivered to the laboratory within 24 to 28 hours of collection.

6. Soil & Groundwater Investigation

The groundwater sampling plan outlined in this subsection has been prepared in general accordance with RCRA Groundwater Monitoring Technical Enforcement Guidance Document 9950.1 (September 1986), Office of Solid Waste and Emergency Response.

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

6.1. Test Borings and Well Installation

6.1.1. Drilling Equipment

Direct Push "Geo-Probe" Soil Borings:

Borings will be advanced with a "geo-probe" direct push sampling system. The use of direct push technology allows for rapid sampling, observation, and characterization of relatively shallow overburden soils. The geo-probe utilizes a four-foot macro-core sampler, with disposable polyethylene sleeves. Soil cores will be retrieved in four-foot sections, and can be easily cut from the polyethylene sleeves for observation and sampling. The macro-core sampler will be decontaminated between samples and borings using an alconox and water solution.

Drill Rig Advanced Soil Borings:

The drilling and installation of monitoring wells will be performed using a rotary drill rig which will have sufficient capacity to perform 4 1/2-inch inside diameter (ID) hollow-stem auger drilling in the overburden, retrieve split-spoon samples, and perform necessary rock coring to provide a minimum 3-inch diameter core, known in the industry as "NX." The borehole may be reamed to 5 1/2-inch diameter prior to monitoring well installation as cased hole in the bedrock, or may be left as open hole, with NYSDEC concurrence.

6.1.2. Drilling Techniques

Direct Push "Geo-Probe" Advanced Borings:

Prior to initiating drilling activities, the Geo-probe, macro cores, drive rods, pertinent equipment, well pipe and screens will be steam cleaned or washed with an alconox and water solution followed by a clean water rinse. This cleaning procedure will also be used between each boring. These activities will be performed in a designated on-site decontamination area. 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. The drilling rig and all equipment will be steam cleaned upon completion of the investigation and prior to leaving the site.

Test borings will be advanced with 2-inch direct push macro-cores through overburden soils. 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.

It will be the responsibility of the consultant to arrange for the appropriate drilling equipment to be present at the site. Standby time to arrange for additional equipment or a water supply will not be allowed unless caused by unexpected site conditions.

During the drilling, a Photoionization detector (PID) will be used to monitor the gases exiting the hole. Macro-core cuttings will be contained if the PID meter readings are greater than 5 ppm above background or the cuttings show visible evidence of contamination, or as specified in the RI Work Plan.

Drill Rig Advanced Borings:

Prior to initiating drilling activities, the drilling rig, augers, rods, split spoons, pertinent equipment, well pipe and screens will be steam cleaned. This cleaning procedure will also be used between each boring. These activities will be performed in a designated on-site decontamination area. 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. The drilling rig and all equipment will be steam cleaned upon completion of the investigation and prior to leaving the site.

Test borings will be advanced with 4 1/2-inch (ID) hollow stem augers through overburden, and NX-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 site-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. One sample from each drilling water source may be analyzed for full TCL.

It will be the responsibility of the consultant to arrange for the appropriate drilling equipment to be present at the site. Standby time to arrange for additional equipment or a water supply will not be allowed unless caused by unexpected site conditions.

During the drilling, a photoionization detector (PID) will be used to monitor the gases exiting the hole. Auger cuttings will be contained if the PID meter readings are greater than 5 ppm above background or the cuttings show visible evidence of contamination, or as specified in the RI Work Plan.

Where bedrock wells are required, test borings shall be advanced into rock with NX 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, water levels, 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 to determine proper handling procedure. All core samples shall be retained and stored by the consultant, for review by NYSDEC, in an approved wooden core box for a period of not less than one year.

Bedrock well installation will involve construction of a rock socket. The socket will be drilled into the top of rock at each bedrock well location to allow permanent 3-inch 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.

To construct the rock socket, a core hole will be reamed out to a minimum diameter of 3 7/8-inches and set into the first 5-feet of bedrock. This will allow the placement of permanent 3-inch diameter Polyvinyl chloride (PVC) well casing into the bedrock surface. The method selected may be percussion or rotary drilling at the option of the subcontractor. The method and equipment selected must be capable of penetrating the bedrock at each well location to a depth required by the work plan and will be selected based on the results of the rock coring performed.

While the augers are seated on top of bedrock, a cement grout will be tremied into the bedrock socket. Once sufficient grout has been place, the 3-inch PVC casing will be lowered into the bedrock socket. A PVC plug will be placed in the end of the 3-inch PVC casing, prior to insertion in the borehole, to prevent grout from entering the PVC casing. Once the 3-inch PVC casing is in place, the augers can be removed and the remaining grout should be added. After the grout and 3-inch PVC casing have set up for 24 hours, the remaining amount of bedrock can be NX cored through the 3-inch PVC casing to a depth determined by the RI work plan.

6.1.3. Well Casing (Riser)

Direct Push Geo-Probe Groundwater Monitoring Wells:

Direct Push Geo-Probe advanced groundwater-monitoring wells utilized 1.25-inch threaded flush joint PVC pipe.

Drill Rig Advanced Groundwater Monitoring Wells:

The well riser shall consist of 2-inch or 4-inch diameter, threaded flush-joint PVC pipe. All well risers will conform to the requirements of ASTM-D 1785 Schedule 40 pipe, and shall bear markings that will identify the material as that which is specified. All materials used to construct the wells will be NSF/ASTM approved.

6.1.4. Well Screen

Direct Push Geo-Probe Groundwater Monitoring Wells:

Direct Push Geo-Probe advanced groundwater-monitoring wells utilized 1.25-inch diameter well screen. Groundwater-monitoring wells will set to intersect the top of the shallow overburden groundwater table. Each geo-probe advanced well will be equipped with 5 to 10 feet (based on anticipated groundwater level and bedrock depth) of .010 inch slotted PVC screen connected to an appropriate length of PVC riser to complete the well installation.

Drill Rig Advanced Groundwater Monitoring Wells:

Generally, wells will be constructed with 10-foot machine-slotted screens, unless otherwise specified or dictated by field conditions (i.e., screens of less than 10-feet in length may be used, depending on the characteristics of the well). The well screen slot size will be selected based on the filter pack grain size and the ability to hold back 85 percent or more of the filter pack materials. 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.

All risers and screens shall be set round, plumb, and true to line.

6.1.5. Artificial Sand Pack

Granular backfill will be chemically and texturally clean (as determined using a 10x hand lens), inert, siliceous, and of appropriate grain size for the screen slot size and the host environment. Sand pack grain size will be selected based on sieve analyses of formation samples. The sand pack will be installed using a tremie pipe and the casing will be equipped with centralizers (wells 15 ft. or deeper only) to minimize the tendency for particle separation and bridging. Prior to casing and screen insertion, a minimum of 1-foot of gravel-pack bedding will be placed in the bottom of the hole. The well screen and casing will be installed, and the sand pack placed around the screen and casing to a depth extending at least 25 percent of the screen length above the top of the screen.

6.1.6. Bentonite Seal

A minimum 2-foot thick seal of tamped bentonite pellets will be placed directly on top of the sand pack, and care will be taken to avoid bridging. The seal will be measured immediately after placement, without allowance for swelling.

6.1.7. Grout Mixture

Upon completion of the bentonite seal, the well will be grouted with a non-shrinking cement grout (e.g., Volclay®) 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 shall be added, if permitted.

6.1.8 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 lockable cap shall be installed to prevent material from entering the well. The PVC well riser shall be protected by a flush mounted road box set into a concrete pad. A concrete pad, sloped away from the well, shall be constructed around the flush mount road box 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 and equipped with a "vandal-proof" cover, satisfying applicable NYSDEC regulations or recommendations.

6.1.9. 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. USGS benchmarks will be used whenever available. 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.

6.1.10. 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).

Well development will include washing the entire well cap and the interior of the well casing above the water table, using only water from the well itself. As a result of this operation, the well casing will be free of extraneous materials (grout, bentonite, and sand) inside the riser, well cap, and blank casing between top of the well casing and water table. This washing will be conducted before and/or during development; not after development. 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 a stabilization of pH, specific conductance, temperature, and clarity (goal of <50 NTUs) of the discharge is achieved or for a maximum of two hours.

After final development of the well, water levels will be recorded and approximately 1 liter of water from the well will be collected in a clear glass jar, labeled and photographed, and submitted as part of the well log. The photograph will be taken to show the relative clarity of the water. Visual identification of the physical characteristics of removed sediments will also be recorded.

7. Geologic Logging and Sampling

At each investigative location, the boring will be advanced through overburden using either a drill rig and hollow-stem auger or direct push technology; soils will be visually inspected for stains and monitored with a PID to help determine potential for vertical migration of contaminants. Soil samples will be collected continuously in both the unsaturated soil zone and the saturated zone. Selected wells will be sampled continuously over the entire depth of the well. The sampling device will be decontaminated according to procedures outlined in the Decontamination section of this document. The split-spoon sampler will be driven into the soil using a 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. Soil samples will be screened in the field for volatile organic vapors using a PID, classified in accordance with Unified Soil Classification System (USCS) specifications, and logged. Samples will be stored in glass jars until they are needed for testing or the project is complete.

All samples will be screened with a PID during collection. The headspace of all samples taken in the field will be screened using USEPA method 3810.

Monitoring well borings will be advanced to maximum design depth below the ground surface, as indicated by the work plan for each site. If hard boulders or bedrock result in auger refusal, rock coring will be used to advance the hole to design depth. If hydrogeologic conditions are favorable for well installation at a depth less than design, the well will be installed at the boring or coring termination depth. In the event that maximum design depth is reached and hydrogeologic conditions are not suitable for well installation, the maximum drilling depth will be revised. Hydrogeologic suitability for well emplacement will be determined by the supervising geologist in consultation with NYSDEC, based on thickness and estimated hydraulic conductivity of the saturated zone encountered. If necessary, the borehole will be advanced to water or abandoned.

Boulders and bedrock encountered during well installation shall be cored by standard diamond-core drilling methods using an "NX" size core barrel. All rock cores recovered will be logged by a geologist, labeled, photographed, and stored in wooden core boxes. The photographs will be submitted as part of the completed boring logs. 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 an experienced geologist or geotechnical engineer, who will be present during all drilling operations. One copy of each field boring and well construction log, including color photographs of the rock core, if encountered, and groundwater data, will be submitted as part of the RI 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, 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 screen, top of screen, and pack, bentonite seal, etc.;
- Reference elevation for all depth measurements;
- Depth of each change of stratum;
- Thickness of each 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;
- Depth at which hole diameters (bit sizes) change;
- Depth at which groundwater is encountered;
- Depth to static water level and changes in static water level with well depth;
- Total depth of completed well;
- Depth or location of any loss of tools or equipment;
- Location of any fractures, joints, faults, cavities, or weathered zones;
- Depth of any grouting or sealing;
- Nominal hole diameters;
- Amount of cement used for grouting or sealing;
- Depth and type of well casing;
- Description of well screen (to include depth, length, location, diameter, slot sizes, material, and manufacturer);
- Any sealing-off of water-bearing strata;
- Static water level upon completion of the well and after development;
- Drilling date or dates;
- Construction details of well; and
- An explanation of any variations from the work plan.

8. Hydraulic Conductivity Testing Procedures

If necessary, single-well, rising head tests will be performed in order to determine the in-place hydraulic conductivity of unconsolidated and/or consolidated geologic materials, which occur in the monitoring interval of newly, installed wells. The tests will be performed by a qualified hydrogeologist. These tests involve lowering the water level in the well and measuring the change in head with respect to time as the well is allowed to recover. In wells, which are slow to recover, the water level will be bailed down as described below. The measurements in these wells will be taken manually. Wells, which recover too quickly for this method, will be tested by removing one bailer of water and the recovery measured by means of a pressure transducer system.

The rising head tests for wells with rapid recovery rates will be conducted as follows:

- The static water level in the well to be tested is measured and recorded;
- The pressure transducer is placed in the well to a minimum depth of three feet below the static water level;
- Readings are made using the data logger until three consecutive readings are the same (equilibrium conditions);
- The data logger is then calibrated to read 0.00 feet at static conditions. A pre-cleaned bailer is then lowered into the well and placed just below the water surface.
- Water level measurements are made until the water level returns to static conditions following introduction of the bailer. If static conditions are not reached within 15 minutes following introduction of the bailer, the well will be tested using the procedures described below for slow recovery wells;
- Once static conditions are reestablished, the bailer is rapidly removed from the water column thereby creating an instantaneous decline of the water level in the well. Coincident with the withdrawal of the bailer, automatic logging of the water levels is initiated using the data logger. The primary goal in the recovery test is to "instantaneously" remove a volume of water that will result in a measurable head decline, the recovery of which (to static conditions) can be monitored over time. Such an instantaneous withdrawal results in recovery due to contributions of flow from the surrounding formation. This flow is controlled by its hydraulic conductivity and not by other factors such as storage effects;
- The water level measurements will continue until water levels recover to within a minimum of 10 percent of the original static water level (90 percent recovery), or an elapsed time of one hour. If the well has not recovered to static conditions after one hour at the discretion of the hydrogeologist, the transducer will be removed and the well will be tested at a later date using the procedures described below for slow recovery wells.
- Data stored in the data loggers will be "dumped" to a hard copy printout using a field printer or to a magnetic disk using a portable computer. If field printouts are used, they will be dated and signed by the hydrogeologist.

For wells with slow recovery rates, the following procedures will be used:

- The static water level is measured and recorded;
- The well is bailed by hand until the depth to water appears to stabilize based on the depth of travel of the bailer rope or to the top of the open or screened interval in wells which are screened below the standing water level;
- The bailer is then removed and water level measurements are collected by hand (measuring tape or electronic water level indicator) at a frequency, which will provide approximately 15 to 20 data, points during recovery (to within 10 percent of the total drawdown), if feasible. Water level measurements are recorded on the hydraulic conductivity testing report.

- A pre-cleaned bailer (one for each well) will be used in the rising head testing. All equipment entering the well, such as the transducer and transducer cable, will be cleaned prior to reuse in accordance with the Decontamination section below. All well water and rinse water generated by the tests will be collected in appropriate containers and disposed of in accordance with the Investigation Derived Materials section below.
- The data from both types of rising head tests will be reduces and evaluated.
- The following equation will be used to calculate the in-situ hydraulic conductivity of the formation opposite the interval of the piezometer (Hvorslev, 1951).

$$k = d^2 \ln \frac{\left[\frac{2mL}{D}\right]}{8L(t_2 - t_1)} \ln \frac{H_1}{H_2}$$

Where:

K = hydraulic conductivity (ft./min.)
d = casing diameter (ft.)
L = intake length (ft.)
D = intake diameter (ft.)
t_1 = time 1 from semilog graph (min.)
t_2 = time 2 from semilog graph (min.)
H_1 = residual head (ft.) corresponding to t_1
H_2 = residual head (ft.) corresponding to t_2
m = square root of the ratio of horizontal to vertical permeability (an estimated value)

9. Groundwater Sampling Procedures

The groundwater in all new and existing monitoring wells will be allowed to stabilize for 7 days following development and permeability testing. Water levels will be measured to within 0.01 foot prior to purging and sampling. A temporary staff gauge or other surface water elevation measuring device will be established on any nearby surface water body, which may significantly influence groundwater movement. The surface elevation of these water bodies will be checked whenever groundwater elevations are measured. Purging and sampling of each well will be accomplished using precleaned dedicated PVC bailers on new polypropylene line. Purging will be less aggressive than development to avoid turbidity problems (e.g., avoid "free-falling" bailers). In general, wells will be purged until the pH, conductivity, temperature, and turbidity of the water being pumped from the well have stabilized. All wells will be purged of at least three well-bore volumes or to dryness.

Groundwater samples will be collected according to the following procedures and in the volumes specified in Table 5-1:

- Water clarity will be quantified during sampling with a turbidity meter;

- When transferring water from the bailer or pump line to sample containers, care will be taken to avoid agitating the sample, since agitation promotes the loss of volatile constituents;
- 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.

All groundwater samples and their accompanying QC samples will be run for volatile organic chemicals using NYSDEC ASP 91-1.

10. Geotechnical Sampling

A grain size analysis will be conducted by sieving for two non-cohesive units, and Atterberg limits for one cohesive unit, (ASTM methods D 4318-84 and D 422-63, respectively) in each borehole. Grain size analysis by hydrometer will be performed on soils where 20 percent of the sample is less than No. 200 sieve size (i.e., silt or clay). Site-specific work plans indicate specific sampling requirements for physical or geotechnical testing.

Remolded permeability samples will be analyzed in accordance with ASTM D-5084.

11. Management of Investigative-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, discarded soil samples, drilling mud solids, and used sample containers;
- Well development and purge waters and discarded groundwater samples;
- Decontamination waters and associated solids;
- Soiled disposable personal protective equipment (PPE);
- Used disposable sampling equipment;
- Used plastic sheeting and aluminum foil;
- Other equipment or materials that either contain or have been in contact with potentially-impacted environmental media.
- Because these materials may contain regulated chemical constituents, they must be managed as a solid waste. This management may be terminated id characterization analytical results indicate the absence of these constituents.

Procedure:

1. Contain all investigation-derived wastes in Department of Transpiration (DOT)-approved 55-gallon drums, roll-off boxes, or other containers suitable for the wastes.

2. Contain wastes from separate borings or wells in separate containers (i.e. do not combine wastes from several borings/wells in a single container, unless it is a container used specifically for transfer purposes, or unless specific permission to do so has been provided by the LaBella Project Manager. Unused samples from surface sample locations within a given area may be combined.

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. Pending transfer, all containers will be covered and secured when not immediately attended,

6. Label all containers with regard to contents, origin, and date of generation. Use indelible ink for all labeling.

7. Collect samples for waste characterization purposes, use boring/well sample analytical data for characterization.

8. 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.

9. 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 or otherwise treated as a non0-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. 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

12. Decontamination

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 prior to drilling, after drilling each monitoring well, and after the completion of all drilling. Special attention will be given to the drilling assembly, augers, and PVC casing and screens.

Drilling decontamination will consist of:

- Steam cleaning;
- Scrubbing with brushes, if soil remains on equipment; and
- Steam rinse.

Split spoons and other non-disposable equipment will be decontaminated between each sampling event. 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 trisodium phosphate or alconox solution;
- Rinsed with deionized water;
- Rinsed with pesticide grade methanol;
- Triple rinsed with deionized water; and
- Allowed to air dry.

13. Sample Containers

The volumes and containers required for the sampling activities are included in pre-washed sample containers will be ordered directly from a firm, which prepares the containers in accordance with EPA bottle washing procedures.

Table 1
Water Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Maximum Holding Time
Volatile Organics	40-ml glass vial with Teflon-backed septum	Two (2); fill completely, no air space	Cool to 4° C (ice in cooler), Hydrochloric acid to pH <2	7 days
Semivolatile Organics	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
PCBs	1,000-ml amber glass jar	One (1); fill completely	Cool to 4° C (ice in cooler)	7/40 days
Metals	500-ml polyethylene	One (1); fill completely	Cool to 4° C (Nitric acid to pH <2	6 months

* Holding time is based on verified time of sample receipt at laboratory.

Note: *All sample bottles will be prepared in accordance with USEPA bottle washing procedures. These procedures are incorporated in LaBella Associates Quality Control Procedures Manual, January, 1992*

TABLE 2
Soil Samples

Type of Analysis	Type and Size of Container	Number of Containers and Sample Volume (per sample)	Preservation	Maximum Holding Time
Volatile Organics, Semivolatile Organics, PCBs, and Pesticides	8-oz, glass jar with Teflon-lined cap	Two (2), fill as completely as possible	Cool to 4° C (ice in cooler)	7 days
RCRA Characterization	8-oz. glass jar with Teflon-lined cap	One (1); fill completely	Cool to 4° C (ice in cooler)	Must be extracted within 10 days; analyzed with 30 days

* Holding time is based on the times from verified time of sample receipt at the laboratory.

Note: All sample bottles will be prepared in accordance with USEPA bottle washing procedures. These procedures are incorporated in LaBella Associates Quality Control Procedures Manual, January, 1992.

TABLE 3
List of Major Instruments for Sampling and Analysis

- MSA 360 0_2 /Explosimeter
- S.E. International Radiation Monitor Model 4C
- Photovac Micro Tip FID or PID
- Organic Vapor Analyzer Foxboro (128)
- Hollige Series 963 Nephlometer (turbidity meter)
- EM-31 Geomics Electromagnetic Induction Device
- pH/Temperature/Conductivity Meter - Portable
- Hewlett Packard (HP) 1000 computer with RTE-6 operating system; and HP 9144 computer with RTE-4 operating system equipped with Aquarius software for control and data acquisition from gas chromatograph/mass spectrometer (GC/MS) systems; combined wiley and National Bureau of Standards (NBS) mass spectral library; and data archiving on magnetic tape
- Viriam 6000 and 37000 gas chromatrographs equipped with flame ionization, electron capture, photoionization and wall detectors as appropriate for various analyses,, and interfaced to Variam DS604 or D5634 data systems for processing data.
- Spectra-Physics Model SP 4100 and SP 4270 and Variam 4270 cam puting integrators
- Perkin Eimer (PE) 3000% and 3030% fully Automated Atomic Absorption Spectrophotometers (AAS) with Furnace Atomizer and background correction system
- PE Plasma II Inductively Coupled Argon Plasma (ICAP) Spectre meter with PE7500 laboratory computer
- Dionex 20001 ion chromatograph with conductivity detector for anion analysis, with integrating recorder

14. Sample Custody

This section describes standard operating procedures for sample identification and chain-of-custody to be utilized for all Phase II 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 EPA 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,
- Custody seals, and
- Chain-of-custody records.

15. Chain-of-Custody

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.

15.1. Field Custody Procedures

- As few persons as possible should handle samples.
- Sample bottles will be obtained precleaned from a source such as I-Chem. Coolers or boxes containing cleaned bottles should be sealed with a custody tape seal during transport to the field or while in storage prior to use.
- 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 notebook.
- The site manager will determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required.

15.2. Sample Tags

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.

15.3. 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 in the "Remarks" section of the chain-of-custody record and traffic reports.
- 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 manage.
- If sent by mail, the package is registered with return receipt requested. If sent by common carrier, a bill of lading is used. Freight bills, Postal Service receipts, and bill of lading are retained as part of the permanent documentation.

15.4. Chain-of-Custody Record

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 in the "Remarks" section of the record.

15.5. 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 in the "Remarks" section.

15.6. Custody Seals

Custody seals are preprinted adhesive-backed seals with security slots designed to break if the seals are disturbed. 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 use. 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.

16. Documentation

16.1. 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 (labels are to be covered with Mylar tape):

XX-YY-O/D

- XX This set of initials indicates the specific Phase II sampling project
- YY These initials identify the sample location. Actual sample locations will be recorded in the task log.
- O/D An "O" designates an original sample; "D" identifies it as a duplicate.

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. The sample label will be filled out using waterproof ink and will be firmly affixed to the sample containers and protected with Mylar tape. The sample label will give the following information:

- Name of sampler,
- Date and time of collection,
- Sample number,
- Analysis required,
- pH, and
- Preservation.

16.2. Daily Logs

Daily logs and data forms are necessary to provide sufficient data and observations to enable participants to reconstruct event that occurred during the project and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings. All daily logs will be kept in a bound waterproof notebook containing numbered pages. All entries will be made in waterproof ink, dated, and signed. No pages will be removed for any reason. Corrections will be made according to the procedures given at the end of this section. The daily logs will include a site log and task log.

The site log is the responsibility of the site manager and will include a complete summary of the day's activity at the site.

The **Task Log** will include:

- Name of person making entry (signature).
- Names of team members on-site.
- Levels of personnel protection:
  - Level of protection originally used;
  - Changes in protection, if required; and
  - Reasons for changes.

- Time spent collecting samples.
- Documentation on samples taken, including:
  - Sampling location and depth station numbers;
  - Sampling date and time, sampling personnel;
  - Type of sample (grab, composite, etc.); and
  - Sample matrix.
- On-site measurement data.
- Field observations and remarks.
- Weather conditions, wind direction, etc.
- Unusual circumstances or difficulties.
- Initials of person recording the information.

17. Corrections to Documentation

17.1. Notebook

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. Most corrected errors will require a footnote explaining the correction.

17.2. Sampling Forms

As previously stated, all sample identification tags, chain-of-custody records, and other forms must be written in waterproof ink. None of these documents are 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.

17.3. Photographs

Photographs will be taken as directed by the site manager. Documentation of a photograph is crucial to its validity as a representation of an existing situation. The following information will be noted in the task log concerning photographs:

- Date, time, location photograph was taken;
- Photographer (signature);
- Weather conditions;
- Description of photograph taken;
- Reasons why photograph was taken;
- Sequential number of the photograph and the film roll number; and
- Camera lens system used.

After the photographs have been developed, the information recorded in the field notebook should be transferred to the back of the photographs

18. Sample Handling, Packaging, and Shipping

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 Department of Transportation (DOT) in the Code of Federal Regulation, 49 CFR 171 through 177. All samples will be delivered to the laboratory with 24 to 48 hours from the day of collection.

All chain-of-custody requirements must comply with standard operating procedures in the EPA sample handling protocol. All sample control and chain-of-custody procedures applicable to the Consultant are presented in the Field Personnel Chain-of-Custody Documentation and Quality Control Procedures Manual, January 1992.

18.1. 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 sample volume level can be marked by placing the top of the label at the appropriate sample height, or with a grease pencil. This procedure will help the laboratory to determine if any leakage occurred during shipment. The label should not cover any bottle preparation QC lot numbers.
- All sample bottles are placed in a plastic bag to minimize the potential for vermiculite contamination.
- 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 touch one another.
- The environmental samples are to be cooled. The use of "blue ice" or some other artificial icing material is preferred. If necessary, ice may be used, provided that it is placed in plastic bags. Ice is not to be used as a substitute for packing materials.
- 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 duplicate custody record and traffic reports, if required must be placed in a plastic bag and taped to the bottom of the cooler lid. Custody seals are affixed to the sample cooler.

18.2. Shipping Containers

Shipping containers are to be custody-sealed for shipment as appropriate. The container custody seal will consist of filament tape wrapped around the package at least twice and custody seals affixed in such a way that access to the container can be gained only by cutting the filament tape and breaking a seal.

Field personnel will make arrangements for transportation of samples to the lab. When custody is relinquished to a shipper, field personnel will telephone the lab custodian to inform him of the expected time of arrival of the sample shipment and to advise him of any time constraints on sample analysis. The lab must be notified as early in the week as possible, and in no case later than 3 p.m. (EST) on Thursday, regarding samples intended for Saturday delivery.

18.3. Marking and Labeling

- Use abbreviations only where specified.
- The words "This End Up" or "This Side Up" must be clearly printed on the top of the outer package. Upward pointing arrows should be placed on the sides of the package. The words "Laboratory Samples" should also be printed on the top of the package.
- After a sample container has been sealed, two chain-of-custody seals are placed on the container, one on the front and one on the back. The seals are protected from accidental damage by placing strapping tape over then.
- If samples are designated as medium or high hazard, they must be sealed in metal paint cans, placed in the cooler with vermiculite and labeled and placarded in accordance with DOT regulations.
- In addition, the coolers must also be labeled and placarded in accordance with DOT regulations if shipping medium and high hazard samples.

19. Calibration Procedures and Frequency

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. Documentation of all routine and special maintenance and calibration information will be maintained in an appropriate logbook or reference file, and will be available on request. Table 7-1 lists the major instruments to be used for sampling and analysis. Brief descriptions of calibration procedures for major field and laboratory instruments follow.

20. Field Instrumentation

20.1. Photovac Micro Tip Flameionizer (FID)

Standard operating procedures for the FID 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.

20.2. Photovac/MiniRea 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.

20.3. Organic Vapor Analyzer

Organic vapor analyzers (OVAs) are calibrated and routine maintenance performed every six months when the units are not in use. Calibration is performed and the major system checks are performed prior to the instrument being released for field use.

Calibration of the OVA 128 GC must be performed by a factory-authorized service representative. The instrument is removed from its protective case and the probe is connected to the base unit. After checking for an airtight seal in the sample line (plugging the sample inlet to stop the pump), the hydrogen supply is turned on and the pressure is set to 10 psi. The electronics are turned on and the instrument is allowed to warm up for at least 5 minutes. After warm up, the instrument is zeroed on the "X10" scale using the adjust knob. The flame is then lit and a gas-tight sample bag is filled with a mixture of 100 ppm methane in air. The sample bag is then attached to the probe inlet and the internal pump is allowed to draw in as much sample as is needed. R32 on the control board is adjusted to read 100 ppm on the "X10" scale and then the hydrogen supply is shut down. The pump can now be turned off and the sample bag removed. Using the adjust knob, the meter is set to read 4 ppm on the "X1" scale. Switching back to the "X10" scale the adjust knob is again used to set the meter to 40 ppm. The scale is then set to "X100" and R33 is adjusted until the meter reads 40 ppm on the "X100" scale.

The OVA has a detection limit of 0.1 ppm in methane equivalents and a working range of 0 to 1,000 ppm. During daily field use, system checks are performed which involve calibration and maintenance of the pump systems, gases, and filters. Care is taken to check for and prevent clogging or leaks. Quad rings and the burner chamber are examined on a weekly basis. Routine biannual maintenance includes a thorough cleaning as well as a re-examination of the pump system for leaks and wear. Parts are replaced as necessary. Instrument operation is verified by calibrating and running the OVA for 4 to 6 hours. An instrument specific logbook is maintained with the OVA to document its use and maintenance.

20.4. 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.

To recalibrate conductance, remove the black plug revealing the adjustment potentiometer screw. Add standard solution to cup, discard and refill. Repeat procedure until the digital display indicates the same value twice in a row. Adjust the potentiometer until the digital display indicates the known value of conductance. To increase the digital display reading, turn the adjustment potentiometer screw counter-clockwise (clockwise to decrease).

To standardize the pH electrode and meter, place the pH electrode in the 7.0 buffer bottle. Adjust the "ZERO" potentiometer on the face of the tester so that the digital display indicates 7.00.

Then place the pH electrode in the 4.0 or 10.0 buffer bottle (depending on where you expect the actual measurement to be). Adjust the "SLOPE" potentiometer on the face of the tester so that the digital display indicates the value of the buffer chosen.

Note: There is interaction between the "ZERO" and "SLOPE" adjustments, so the procedure should be repeated several times.

Do not subject the pH electrode to freezing temperatures.

It is good practice to rinse the electrode in distilled water when going from one buffer to another. When not in use the cap should be kept on the electrode. Keeping the cotton in the cap moist will keep the electrode ready to use. Moisten the cotton frequently (once a week, usually).

20.5. 0_2/Explosimeter

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.

20.6. Nephelometer (Turbidity Meter)

The Series 95 nephelometer is calibrated before each use. Allow the instrument to warm up for approximately 2 hours. Using turbidity-free deionized water, zero the meter. Set the scale to 100, fill with a 40 NTU standard (AEPA-1 turbidity standard from Advanced Polymer Systems, Inc.), and insert into the instrument. Adjust the standardize control to give a readout of 200. Re-zero the instrument and repeat these steps with the scale set at 10 and 1 using 4.0 and 0.4 NTU standards, respectively. These standards are prepared by diluting aliquots of the 40 NTU standard.

20.7. S.E. International Radiation Monitor Model 4EC

This radiation monitor detects alpha, beta, gamma, and X-rays. The analog meter is scaled in CPM (counts per minute) or mR/hr (milli-Roentgens per hour), and the X1, X10, X100 switch extends the effective measurement range. This handheld unit is powered by a single 9-volt battery that offers up to 2,000 hours of operation.

21. 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 consist of trip, routine field, and rinsate blanks will be provided at a rate of one per 20 samples collected for each parameter group, or one per shipment, whichever is greater.

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. QC records will be retained and results reported with sample data.

21.1. Blank Samples

Blank samples are analyzed in order to assess possible contamination from the field and/or laboratory so that corrective measures may be taken, if necessary. Field samples are discussed in the following subsection:

21.2. 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 batch of water samples for volatile organic 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.

- **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.

21.3. Field Duplicates

Field duplicate samples consist of a set of two samples collected independently at a sampling location during a single sampling event. In some instances the field duplicate can be a blind duplicate, i.e., indistinguishable from other analytical samples so that personnel performing the analyses are not able to determine which samples are field duplicates. Field duplicates are designed to assess the consistency of the overall sampling and analytical system.

21.4. Quality Control Check Samples

Inorganic and organic control check samples are available from EPA free of charge and are used as a means of evaluating analytical techniques of the analyst. Control check samples are subjected to the entire sample procedure, including extraction, digestion, etc., as appropriate for the analytical method utilized.

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LaBella Associates, P.C.
300 State Street
Rochester, New York 14614

Appendix 5

ERI Survey Detailed Description and Map

GeoTrax Survey™ Technology Overview

Electrical resistivity measurements have been used since the 1830's to interpret the earth's subsurface. ERI works by imparting an electrical current into the ground at a constant rate, and then taking voltage measurements at one or more other locations along a straight survey line. Based on these data, the apparent resistivity of subsurface materials is calculated using Ohm's Law.

Similar to a single pixel in a digital photo, a single resistivity measurement does not yield significant information. However, modern ERI technology combined with current computer processing speeds, facilitate hundreds or thousands of resistivity measurements in a short timeframe. These measurements are performed along a survey alignment and are subsequently used to produce a two-dimensional (2-D) electrical image (analogous to a CAT-scan in the medical industry) of the subsurface that graphically illustrates the presence or absence of subsurface anomalies.

Aestus, LLC's GeoTrax Survey™ technology was developed at Oklahoma State University and is based on conventional electrical resistivity imaging (ERI) techniques. However, we have vastly improved the technology and apply our proprietary data collection algorithms and software to achieve more comprehensive data collection, higher data quality, and ultimately increased image resolution, relative to conventional ERI technology. Aestus is now able to successfully image subsurface anomalies at sites on which competing technologies such as ground penetrating radar, conventional electrical resistivity techniques, and electromagnetic surveys either fail to perform or simply do not have sufficient resolution to achieve the project objective.

Continuous subsurface images based on high data density, eliminate the need for interpolation between data points such as soil borings or wells, and assists in confirming or redefining the site conceptual model. If a series of 2-D images are obtained from a project site, these data may be used to visualize the subsurface of project sites in 3-D or 4-D (i.e., 3-D perspective views changing over time).

Our GeoTrax Survey™ technology has been successfully used for a number of applications including locating residual pockets of LNAPLs/DNAPLs and extent of dissolved phase contamination at environmentally impacted sites. Independent third party testing of the results of Aestus' technology by the EPA's Ada, Oklahoma Laboratory, state environmental cleanup programs and numerous environmental consultants, have demonstrated the effectiveness of this technology.

Scope of Work Summary:

Aestus' scope of work for this project would be to conduct the GeoTrax Survey™ field work and follow up reporting as outlined below.

1. Mobilize personnel and equipment to the Site
2. Orient Aestus field team to Site
3. Conduct data acquisition via GeoTrax Survey™ work. For 5 of the 6 planned survey lines, the anticipated required electrode stake spacing is 1.0 meters which yields a survey line length of 180 feet and a total survey image depth of ~37 feet. One survey line will be slightly shorter due to spatial constraints at 0.85 meter electrode spacing which yields a survey line length of 153 feet and a total survey image depth of 30 feet. Each survey line will be setup for 3 to 5 hours at each survey location.
4. Review data collected
5. Prepare draft subsurface images in the field to confirm locations of remaining planned surveys
6. Locate survey lines via nearby wells or other benchmarks using our total station land surveying equipment (Note: no formal professional land survey grade data is provided as part of this scope of work)
7. Demobilize personnel and equipment from Site
8. Perform in depth proprietary data reduction
9. Prepare preliminary draft figures and submit to LaBella for review. Conduct web conference with LaBella personnel to discuss preliminary draft figures.
10. Prepare a draft letter report identifying surveys conducted, survey locations, and interpretation of survey results to LaBella. Aestus anticipates one draft letter report including subsurface images and interpretation
11. Following receipt of one comprehensive set of comments from LaBella, Aestus will incorporate comments as appropriate into report and submit as final version to LaBella.

Project Schedule:

Based on the scope of work outlined above, Aestus anticipates requiring 2 field survey days. This assumes completing approximately 3 survey lines per field day. Aestus will plan on two weeks after the field work is complete for data reduction and to submit draft preliminary figures. Aestus will plan on four to six weeks following receipt of requested site data from LaBella for senior level review, and to prepare and submit the draft report. The final report will be submitted approximately one to two weeks after receipt of comments from LaBella on the draft report.

Detailed Scope of Work Description:

Figure 1 shows the location and orientation (i.e., the red end of each survey line is equivalent to Electrode 1 and the blue end is equivalent to Electrode 56) of the GeoTrax Surveys™ planned for the Site and allows for other site features on the base map to be visible to the reader for reference.

Each GeoTrax Survey™ will be performed by installing 56 specialized 3/8-inch diameter stainless steel electrodes into the ground along a straight line. The spacing between each electrode is anticipated to be 2.0 meters which will yield a total survey line length of 360 feet and an image depth of 72 feet below ground surface. The spacing used on each line will be verified on-site to provide the appropriate depth of imaging and/or to conform to lateral space constraints due to buildings, busy streets, property lines, etc. and/or issues related to extremely thick concrete.

The electrodes will then be connected via specialized geophysical cables to Aestus' data acquisition field instruments. Electrical resistivity data from the subsurface will be collected at each survey location for a period of approximately 2.25 hours.

Aestus will drive metal bolts or brass survey markers with magnetic nails to denote the start and end points of interest along each survey line. A metal detector may be used to locate each GeoTrax Survey™ line when preparing for installation of confirmation borings/wells along one or more survey lines.

Topography correction data and x,y locations of Aestus survey line locations will be collected by Aestus personnel using our land survey equipment (i.e., Topcon total station unit with prism). These data will be used to assist Aestus in locating our surveys in plan view on the site base map and performing a topographic correction to our survey images which provides a further degree of accuracy. Aestus will not provide certified professional land surveyor grade data as part of this scope of work.

Aestus will also record detailed field notes that show a sketch of each survey and surrounding site features (e.g., monitoring wells, etc.) and the distance of these site features from our survey lines.

Data Collection

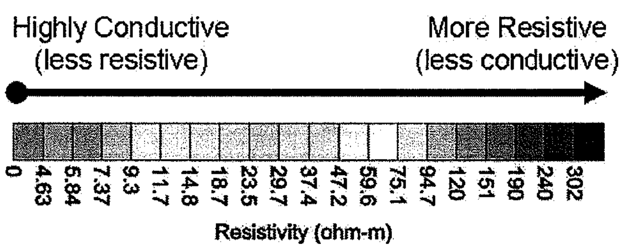
Once each survey line is laid out in the field, Aestus' specialized field computer will gather a significant amount of data related to the electrical properties of the subsurface. Aestus uses our proprietary techniques to collect significantly more and better quality data than other firms using similar looking equipment. These data will then be checked for quality and integrity and then partially processed in the field to obtain a high resolution draft subsurface image viewable by Aestus personnel and client representatives. Full data reduction and processing is performed in Aestus' offices as discussed in the following section.

Data Reduction

Following field data collection, Aestus will use our proprietary data post-processing techniques to develop a final electrical resistivity data set for each survey.

The raw data files collected in the field will be post processed, including a more thorough review of data quality and integrity. Data points not meeting Aestus' established statistical error criteria (i.e., typically less than 5 percent of the overall data set) are removed from the data set so that the resulting survey image is not skewed. A final image for each survey will be developed which contains a model of the electrical resistivity of the subsurface in units of ohm-meters. Changes in topography along the survey lines will be accounted for during this data processing work.

The final images will be developed by color contouring and plotting the resistivity data for each survey line using a consistent color scheme for all Site surveys to allow for evaluation of the results of all surveys on a comparative basis. In the case of the <u>generic</u> color scheme example below (i.e., not specific to the Site), the conductive (i.e., less resistive) areas of the subsurface are illustrated by purple and blue colors and the more resistive (i.e. less-conductive) areas of the subsurface are illustrated by yellow, orange, and red colors.



As part of our overall data quality control process, Aestus compiles resistivity data for an entire site and then <u>normalizes</u> the color scheme for all of the images across the site. This allows consistency in the color scheme so a reviewer can correlate the results from one survey to the results from another survey performed on the same site during the same timeframe.

<u>Summary of Data Interpretation Process</u>

The magnitude of subsurface electrical resistivity values will vary from site to site based on a number of factors, and is related to geology composition and to the chemistry of the groundwater and other fluids trapped in the pore spaces within the soil matrix and the presence or absence of buried debris and structures. For a typical site, fine materials such as clay and silt are generally less resistive (i.e., more conductive) while coarse sand and gravel are generally more resistive (i.e., less conductive). Should the soil (clay or sand) be dry, it will appear more resistive when dry and less resistive when wet.

Should a groundwater table exist in the area being surveyed, a distinct groundwater interface is often not seen in the survey images because of the gradual wetting of soils due to capillary action and/or because the resistivity of the ground water is often times similar to the resistivity of the soil matrix. Additionally the presence of contaminants within the pore matrix can overshadow (electrically) the presence of groundwater or degree of saturation. The presence of fractures in bedrock geology often appear as a vertically oriented anomaly and may be either conductive or resistive depending on what type of fluid (e.g., clean groundwater and/or unweathered/weathered contamination) is present within the fracture.

Should buried tanks or other man-made structures be present, they typically show up in our survey images as either low resistivity/highly conductive (metallic construction) or high resistivity/low conductivity (fiberglass, concrete or other construction). In areas where tanks or sumps have been removed or replaced, these areas may or may not present in our images as an anomaly depending on whether native or non-native fill soils were used as backfill. If contamination is present underneath former tanks and sump areas, it generally presents as described in the following paragraphs.

Subsurface areas impacted with light or dense non-aqueous liquids (LNAPLs or DNAPLs, respectively) typically present as more resistive anomalous zones relative to areas that contain only non-impacted soils and pore fluids. Based on our experience, areas containing NAPL impacted soils often present as a roughly spherical or lenticular blob shape (obloid) and will typically be identified in our survey images by more resistive values. Sometimes, the presence of this type of contamination can cause a less resistive (i.e., very conductive) anomaly or zone, particularly with weathered NAPL related contamination. Aestus believes the reason that weathered NAPL shows as conductive in our images is naturally occurring bioactivity in the subsurface in contaminated zones that alters the electrical properties of these materials. This phenomenon is documented in technical literature that Aestus can provide upon request.

GeoTrax Surveys™ often times can identify areas impacted by dissolved concentration impacts to the groundwater from a former or existing source of contamination. Sometimes dissolved phase impacts do not present as anomalies because lower levels of dissolved phase contamination cause relatively small changes in electrical properties of the subsurface and have the potential to be masked by changes in resistivity signatures of various soil types that may exist across a typical site.

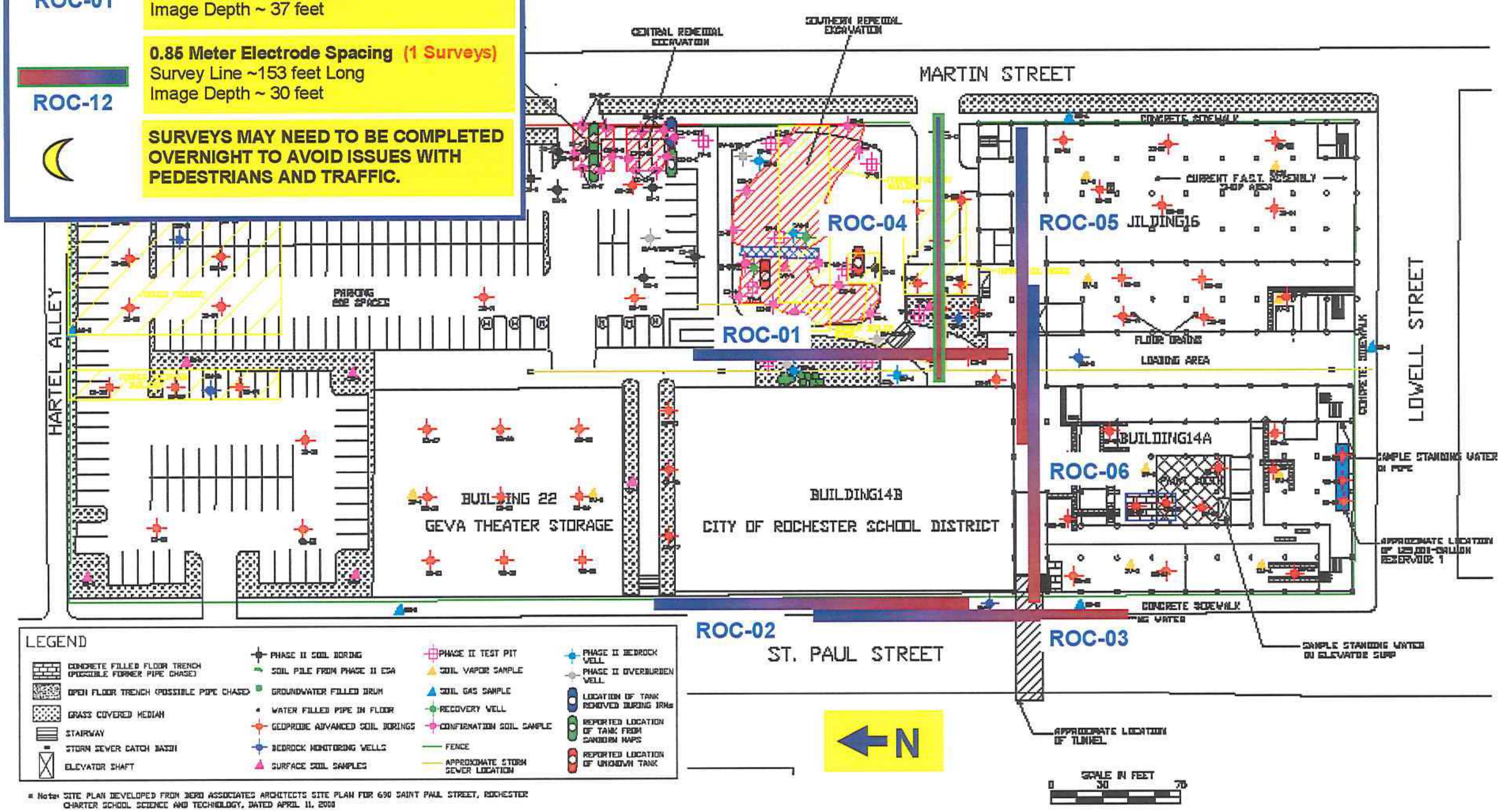
As discussed during the proposal phase of this project, Aestus' survey results do not immediately identify the composition of anomalies which may be caused by variations in geology and/or moisture content (or other factors) in addition to the presence of subsurface contamination. Final data interpretation is greatly enhanced by calibrating or benchmarking the GeoTrax Survey™ electrical resistivity images against existing site data and/or follow-up confirmation boring data. This process lends much greater understanding of the subsurface and the survey images. Ideally, confirmation work is performed as soon as possible following the survey work such that minimal time is allowed for potential contaminant migration that may cause changed conditions in the surveyed areas.

Proposed GeoTrax Survey™ Locations and Designations

Electrode 1 — Electrode 56 ROC-01	**1.0 Meter Electrode Spacing (5 Surveys)** Survey Line ~180 feet Long Image Depth ~ 37 feet
ROC-12	**0.85 Meter Electrode Spacing (1 Surveys)** Survey Line ~153 feet Long Image Depth ~ 30 feet
	SURVEYS MAY NEED TO BE COMPLETED OVERNIGHT TO AVOID ISSUES WITH PEDESTRIANS AND TRAFFIC.

NOTE:

1. Final GeoTrax Survey™ alignments and lengths to be determined in field by Aestus in consultation with client; survey locations/lengths may need to be adjusted based on obstacles/restrictions at site.



Reference: Base map provided by LaBella Associates, P.C. for use by Aestus, LLC.

Aestus, LLC 1.888.GEO.TRAX www.aestusllc.com	4177 Route 2 Troy, NY 12180	Scale: See Scale Bar	**Proposed Locations of GeoTrax Surveys™** **Former Bausch and Lomb Site** **690 Saint Paul Street** **Rochester, New York** **DRAFT**	**OPTION 3**
	2605 Dotsero Court Loveland, CO 80538	Drawn By: MAS		Prepared for LABELLA Associates, P.C.
		Approved By: SWM		FIGURE 3
	1624 W. University Ave. Stillwater, OK 74074	Date: 04-15-09		
		Project No.: 9-106-00		

LABELLA

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300 State Street
Rochester, New York 14614

Appendix 6
Health & Safety Plan

LABELLA
Associates, P.C.

Engineering
Architecture
Environmental

Site Health and Safety Plan

Location:

690 Saint Paul Street
Rochester, New York 14605

Prepared For:

Genesee Valley Real Estate Company
First Federal Plaza
28 East Main Street, Suite 500
Rochester, New York 14614

LaBella Project No. 208492

March 2009

Site Health and Safety Plan

Location:

690 Saint Paul Street
Rochester, New York 14605

Prepared For:

Genesee Valley Real Estate Company
First Federal Plaza
28 East Main Street, Suite 500
Rochester, New York 14614

LaBella Project No. 208492

March 2009

LaBella Associates, P.C.
300 State Street
Rochester, New York 14614

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SITE HEALTH AND SAFETY PLAN

Project Title:	690 Saint Paul Street Brownfield Cleanup Program
Project Number:	209280
Project Location (Site):	690 Saint Paul Street, Rochester, New York 14605-1742
Environmental Director:	Gregory Senecal, CHMM
Project Manager:	Dan Noll, P.E.
Plan Review Date:	______________________
Plan Approval Date:	______________________
Plan Approved By:	______________________ Mr. Richard Rote, CIH
Site Safety Supervisor:	Evan Dumrese
Site Contact:	To Be Determined
Safety Director:	Rick Rote, CIH
Proposed Date(s) of Field Activities:	To Be Determined
Site Conditions:	Slightly sloping, encompassing approximately 4.73 acres
Site Environmental Information Provided By:	Prior Environmental Reports by LaBella Associates, P.C., dated February 2008.
Air Monitoring Provided By:	LaBella Associates, P.C.
Site Control Provided By:	Contractor(s)

EMERGENCY CONTACTS

	Name	Phone Number
Ambulance:	As Per Emergency Service	911
Hospital Emergency:	Rochester General Hospital	585-922-4000
Poison Control Center:	Finger Lakes Poison Control	585-273-4621
Police (local, state):	Monroe County Sheriff	911
Fire Department:	Rochester Fire Department	911
Site Contact:	Chris Gullace	Cell: 585-330-7173
Agency Contact:	NYSDEC – Frank Sowers, P.E. NYSDOH – Debby McNaughton Finger Lakes Poison Control MCDOH – Joseph Albert	585-226-5357 585-423-8067 1-800-222-1222 585-753-5904
Environmental Director:	Greg Senecal, CHMM	Direct: 585-295-6243 Cell: 585-752-6480 Home: 585-323-2142
Project Manager:	Dan Noll, P.E.	Direct: 585-295-611 Cell: 585-301-8458
Site Safety Supervisor:	Evan Dumrese	Direct: 585-295-6643 Cell: 607-227-0838
Safety Director	Rick Rote, CIH	Direct: 585-295-6241

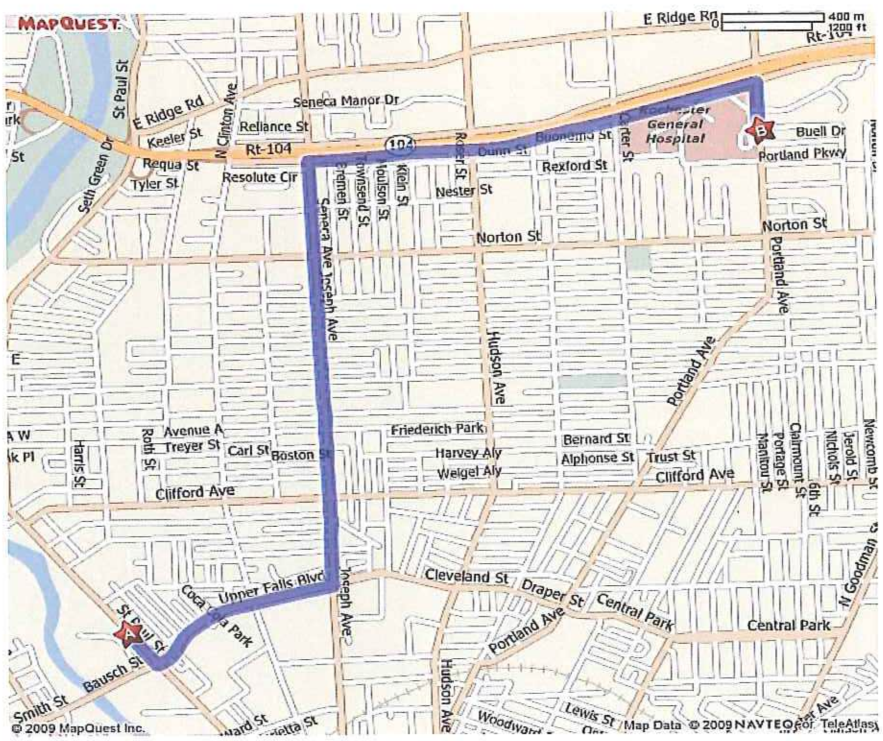
MAP AND DIRECTIONS TO THE MEDICAL FACILITY - ROCHESTER GENERAL HOSPITAL

Total Time: 8 minutes
Total Distance: 3.50 miles

Start: 690 Saint Paul St, Rochester, NY 14605-1742

START	1: Start out going SOUTHEAST on ST PAUL ST toward LOWELL ST.	0.1 mi
	2: Turn LEFT onto UPPER FALLS BLVD.	0.6 mi
	3: Turn LEFT onto JOSEPH AVE.	1.1 mi
	4: JOSEPH AVE becomes SENECA AVE.	0.3 mi
	5: Turn RIGHT onto RT-104.	1.2 mi
	6: Turn RIGHT onto PORTLAND AVE/CR-114.	0.2 mi
END	7: End at 1425 Portland Ave Rochester, NY 14621-3001	

End: 1425 Portland Ave, Rochester, NY 14621-3001



LABELLA

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 Remedial Investigation (RI) at the Site located at 690 Saint Paul Street in the City of Rochester, Monroe County, New York. This HASP only reflects the policies of LaBella Associates P.C. The requirements of this HASP are applicable to all approved LaBella personnel at the work site. This document's project specifications and the Community Air Monitoring Plan (CAMP) are to be consulted for guidance in preventing and quickly abating any threat to human safety or the environment. The provisions of the HASP 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 and remediation activities
- Environmental Monitoring
- Collection of samples
- Management of excavated soil and fill.

4.0 Work Area Access and Site Control

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

5.0 Potential Health and Safety Hazards

This section lists some potential health and safety hazards that project personnel may encounter at the project site and some actions to be implemented by approved personnel to control and reduce the associated risk to health and safety. This is not intended to be a complete listing of any and all potential health and safety hazards. New or different hazards may be encountered as site environmental and site work conditions change. The suggested actions to be taken under this plan are not to be substituted for good judgment on the part of project personnel. At all times, the Site Safety Officer has responsibility for site safety and his 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. Excavations that require working within the excavation will require air monitoring in the breathing zone (refer to Section 9.0).

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

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

Personnel should exercise caution near all excavations at the site as it is expected that excavation sidewalls will be unstable.

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

5.4 *Injury Due to Exposure of Chemical Hazards*

Potential Hazards:
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 or benzene readings of 1.0 ppm are encountered personnel should upgrade personal protective equipment to Level C (refer to Section 8.0) and an Exclusion Zone should be established around the work area to limit and monitor access to this area (refer to Section 6.0).

5.5 *Injuries Due to Extreme Hot or Cold Weather Conditions*

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

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

6.0 Work Zones

In the event that conditions warrant establishing various work zones (i.e., based on hazards - Section 5.4), 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 procedure listed below. Air monitoring instruments will be calibrated and maintained in accordance with the manufacturer's specifications.

The Air Monitor will utilize a photoionization Detector (PID) to screen the ambient air in the work areas (excavation, soil staging, and soil grading areas) for total Volatile Organic Compounds (VOCs), a DustTrak tm Model 8520 aerosol monitor or equivalent for measuring particulates, and a Ludlum 2241 Digital Survey Meter with 44-9 Pancake Probe (Ludlum) for measuring radioactivity. Work area ambient air will generally be monitored in the work area and downwind of the work area. Air monitoring of the work areas and downwind of the work areas will be performed at least every 60 minutes or more often using a PID, the DustTrak meter, and the Ludlum meter.

If sustained PID readings of greater than 25 ppm are recorded in the breathing zone, then either personnel are to leave the work area until satisfactory readings are obtained or approved personnel may re-enter the work areas wearing at a minimum a ½ face respirator with organic vapor cartridges for an 8-hour duration (i.e., upgrade to Level C PPE). Organic vapor cartridges are to be changed after each 8-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 100 $\mu g/m^3$ (0.1 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 100 $\mu g/m^3$ (0.1 mg/m^3), which may be accomplished by the construction manager implementing dust control or suppression measures.

If radioactivity readings on the Ludlum exceed greater than 20% above the upper range of the Site background readings within the work zone, or at the downwind locations, then personnel are to don PPE consisting of gloves, work boots and Tyvek to handle samples. In addition, regulatory agencies will be consulted to determine appropriate actions for conducting further investigations at the Site. In the event that the Ludlum readings are sustained, in the work area, at levels above 20% of Site background for a 5 minute period, work will be stopped immediately until radioactivity levels drop below 20% above Site background.

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 Safety Officer.

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

11.0 Medical Surveillance

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

12.0 Employee Training

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

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

Table 1
Exposure Limits and Recognition Qualities

Compound	PEL-TWA (ppm)(b)(d)	TLV-TWA (ppm)(c)(d)	STEL (ppm)(b)	LEL (%)(e)	UEL (%)(f)	IDLH (ppm)(g)(d)	Odor	Odor Threshold (ppm)	Ionization Potential
Acetone	750	500	NA	2.15	13.2	20,000	Sweet	4.58	9.69
Anthracene	.2	.2	NA	NA	NA	NA	Faint aromatic	NA	NA
Benzene	1	0.5	5	1.3	7.9	3000	Pleasant	8.65	9.24
Benzo (a) pyrene (coal tar pitch volatiles)	0.2	0.1	NA	NA	NA	700	NA	NA	NA
Benzo (a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (b) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo (k) Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	10.88
Carbon Disulfide	20	1	NA	1.3	50	500	Odorless or strong garlic type	.096	10.07
Chlorobenzene	75	10	NA	1.3	9.6	2,400	Faint almond	0.741	9.07
Chloroform	50	2	NA	NA	NA	1,000	ethereal odor	11.7	11.42
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethylene	200	200	NA	9.7	12.8	400	Acrid	NA	9.65
1,2-Dichlorobenzene	50	25	NA	2.2	9.2		Pleasant		9.07
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
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
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	Almond		NA
Cadmium	0.2	0.5	NA	NA	NA				NA
Chromium	1	0.5	NA	NA	NA				NA
Lead	0.05	0.15	NA	NA	NA	700			NA
Mercury	0.05	0.05	NA	NA	NA	28	Odorless		NA
Selenium	0.2	0.02	NA	NA	NA	Unknown			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.

LABELLA

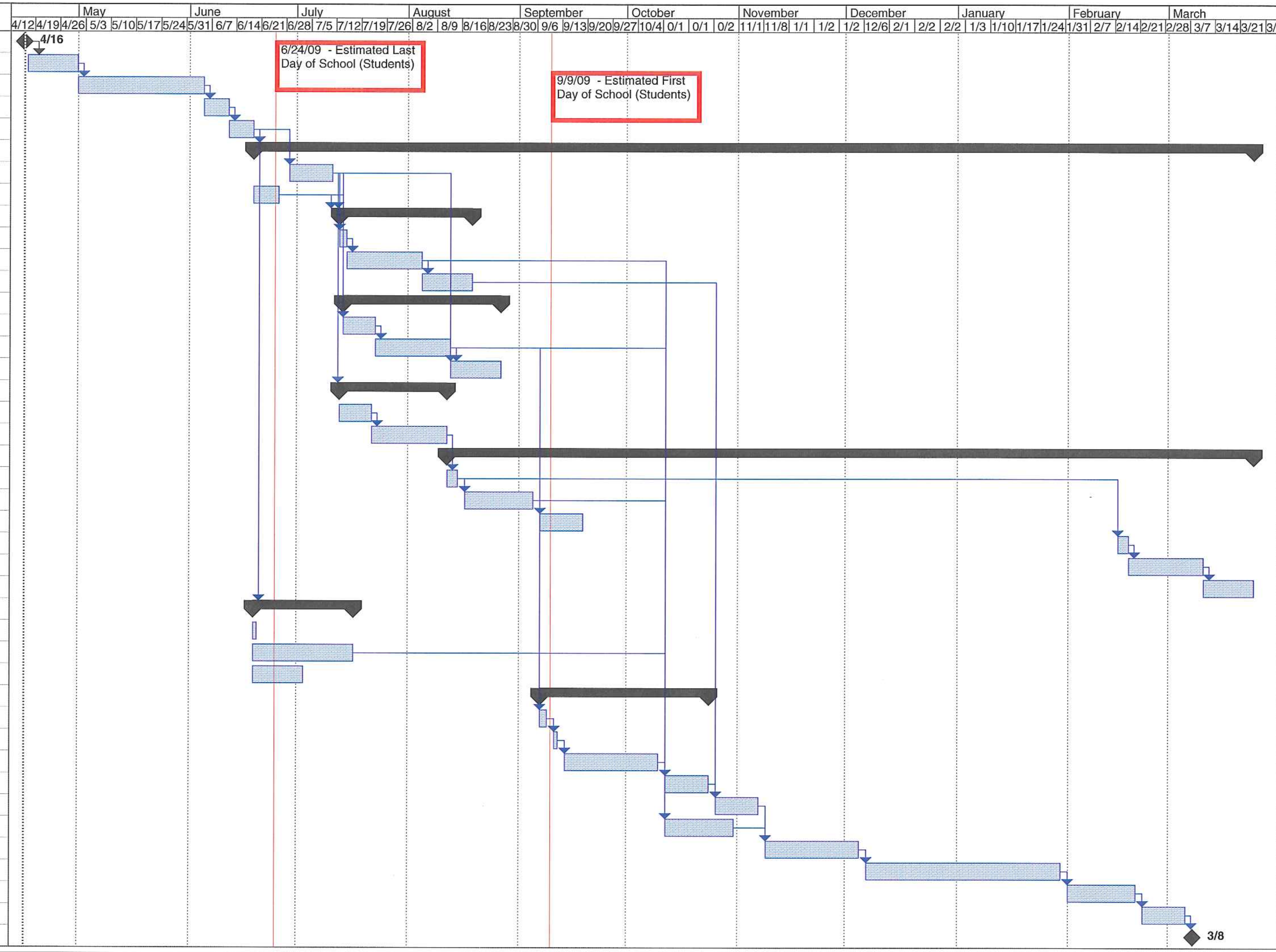
LaBella Associates, P.C.
300 State Street
Rochester, New York 14614

Appendix 7

Anticipated Project Schedule

690 St. Paul Street
Brownfield Cleanup Program
Estimated Remedial Investigation Schedule

ID	Task Name
1	Submit BCP Application and RI Work Plan
2	DEC Completeness Review and Public Notice Submittals
3	Public/DEC Review of Application & Work Plan (30 Calender Days)
4	Revisions to RI Work Plan
5	Formal DEC Approval of RI Work Plan
6	**Implement RI Fieldwork**
7	Subsurface Imaging Surveys
8	Contactor Coordination
9	**Test Pitting Program**
10	Test Pit Fieldwork
11	Test Pit Laboratory Testing
12	Test Pit Data Reduction and Interim Reporting to NYSDEC
13	**Geoprobe Soil Boring Program**
14	Test Boring Fieldwork
15	Test Boring Laboratory Testing
16	Test Boring Data Reduction and Interim Reporting to NYSDEC
17	**Groundwater Monitoring Well Installations**
18	Well Installation Fieldwork
19	Well Development
20	**Groundwater Sampling**
21	1st Round Sampling Fieldwork
22	1st Round Laboratory Testing
23	1st Round Data Reduction and Interim Reporting to NYSDEC
24	2nd Round Sampling Fieldwork
25	2nd Round Laboratory Testing
26	2nd Round Data Reduction and Addendum Reporting to NYSDEC
27	**Surface Soil Sampling Program**
28	Surface Soil Sampling Fieldwork
29	Surface Soil Laboratory Testing
30	Surface Soil Data Reduction and Interim Reporting
31	**Soil Vapor Intrusion (incl. Geoprobe® Screen Point 15)**
32	Soil Vapor Intrusion Sampling Point Installations Fieldwork
33	Soil Vapor Intrusion Sampling Fieldwork
34	Soil Vapor Intrusion Laboratory Testing
35	Soil Vapor Intrusion Data Reduction and Interim Reporting
36	Qualitative Exposure Assessment
37	Data Usability Summary Report
38	Remedial Investigation Report
39	Public/DEC Review of RI Report (30 Calender Days)
40	Revisions to RI Report
41	Formal DEC Approval of RI Report
42	Begin Remedial Alternatives Analysis



**** Schedule may vary based on response times from regulatory agencies and field conditions.**

Task	Milestone	Rolled Up Task	Rolled Up Progress
Progress	Summary	Rolled Up Milestone	Split
External Tasks	Group By Summary		
Project Summary	Deadline		

[File Name and Path]