WORK PLAN

Supplemental Site Investigation
415 Orchard Street

City of Rochester
Environmental Restoration Project
Site #E828123
415 Orchard Street and 354 Whitney Street
Monroe County, New York

Prepared For:

City of Rochester
Department of Environmental Services
Division of Environmental Quality
30 Church Street
Rochester, New York 14614

Prepared By:

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Suite 202
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May 2015

Project No: 4216-06

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ATTACHMENTS

1.0 Introduction

Lu Engineers has prepared this Supplemental Site Investigation (SSI) Work Plan for the City of Rochester Department of Environmental Services to assist the City with additional Site investigative activities at 415 Orchard Street. The proposed components of this SSI are based on the requirements of the New York State Department of Environmental Conservation (NYSDEC) 1996 Clean Water/Clean Air Bond Act Environmental Restoration Program (ERP) for the Orchard Whitney Site. As such, work related activities will follow the procedures established by the NYSDEC in DER-10 "Technical Guidance for Site Investigation and Remediation".

The work described herein is designed to generate a NYSDEC-approved Supplemental IRM Work Plan and Supplemental Site Investigation/Remedial Alternatives Analysis which will be used to select a remedy for the area within the former 415 Orchard Street building footprint. Ideally, remedial efforts will be completed as interim remedial measures (IRMs).

The purpose of the SSI will be to delineate the nature and extent of contamination beneath, and in the immediate vicinity of, the footprint of the former 415 Orchard Street building. The data generated by additional sampling and testing at the Site will be used to more completely define the horizontal and vertical extent and concentration of contaminants in the soil and groundwater on Site.

Once the extent of contamination and related information has been analyzed, potential environmental exposure pathways will be examined. The identification of significant Site characteristics, extent of contamination, and exposure pathways (if completed exposure pathways are indicated) will provide basis for developing remedial alternatives that are based on conceptual future uses.

Previously approved Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP), Community Air Monitoring Plan (CAMP) and Community Participation Plan (CPP), from the original July 2006 Remedial Investigation (RI) Work Plan and subsequent September 2007 Interim Remedial Measures (IRM) Work Plan, have been updated for the project-specific purposes of the SSI.

2.0 Site History and Description

Lu Engineers has performed previous Site Investigation (SI) and Interim Remedial Measures (IRMs) work, along with City of Rochester personnel, initiated in 2006 through present day where the demolition of 415 Orchard Street has recently commenced. Lu Engineers had previously reviewed records pertaining to the Site from local government offices and previous investigations at the Site provided by the City of Rochester. The findings of these previous reports are summarized below.

2.1 Site Location

The Orchard-Whitney site (Site) is located at 415 Orchard Street and 354 Whitney Street in the City of Rochester, New York (Figure 1). The Site has a combined area of 3.9 acres and is located near the intersection of Lyell Avenue and Broad Street. One multi-story structure of approximately 128,900 square feet, located on Whitney Street, was demolished in 2008. The demolition for the approximately 371,600 square feet multi-story structure located on Orchard Street was completed in 2015.

2.2 Site History

The Site has been used for various commercial and industrial uses since the early 1900s. From 1915 to 1922, the North East Electric Company operated on the Site. General Motors occupied the Site from 1930 to 1967. Industrial activities including the production of electrical equipment, heat treating, plating, coal storage, boiler operations, petroleum fuel storage and industrial wastewater treatment were performed on the Site.

After General Motors closed operations, other industrial operations took place at the Site including; metal finishing, synthetic foam production, printing, plastics manufacturing and warehousing. These operations took place at the Site until the early 1990s.

The City had previously offered the parcels at tax delinquent auctions; however, no viable developers had shown interest. Therefore City had acquired ownership of the Orchard and Whitney parcels through tax foreclosure proceedings in 2000 and 2005 respectively.

2.3 Previous Field Investigations

Since 2000, the Site has undergone a series of environmental investigations. These investigations include:

- December 2000: Phase I Environmental Site Assessment; 354 Whitney Street, 415 Orchard Street, and surrounding properties at 367, 370, and 406 Orchard Street.
- August 2003: Pre-demolition Asbestos Inspection of 354 Whitney Street Building 1A.
- August 2003: Pre-demolition Asbestos Inspection of 354 Whitney Street Building 2/2A/Brick Mill.
- 2005: Phase II Site Investigation completed by NYSDEC on the 354 Whitney Street parcel as part of a USEPA Targeted Brownfield Assessment.
- 2006-2007: Pre-demolition phase investigation and interim remedial measures (IRMs) completed by Lu Engineers.
- 2008-2009: Post-demolition Site-wide investigation completed by Lu Engineers.
- 2001-2012: Area of Concern (AOC) investigation and IRMs by Lu Engineers.

Previous investigations are thoroughly summarized in the 2014 Remedial Investigation Report.

2.4 Physical Setting

The Orchard/Whitney Site is located in the City of Rochester's North West Quadrant. Residential and commercial properties surround the Site.

Topography

The Orchard/Whitney Site is a 3.9-acre parcel formerly occupied by three structures (354 Whitney Street, 415 Orchard Street "Low-Rise", and 415 Orchard Street "High Rise"). All three structures were demolished as IRMs during previous, historic investigations.

The topography is gently sloping from the southwest to the northeast. The topographic relief of the Site is 525 feet above mean sea level. The Site is relatively flat with the exception of the property to the immediate south being a raised railroad bed, approximately 5-8 feet above ground surface. Other features of note are the former Erie Canal and the Genesee River Gorge approximately 4,400 ft to the east.

Surface Water

Surface water runoff at the Site is collected in the Monroe County Sewer System. There are no surface water bodies within one-half mile radius of the Site. There are no public/private drinking water supply wells within one-half mile of the Site.

Utilities run the length of Orchard and Whitney Streets; both of these include municipal sanitary and water utilities. Electric service is aboveground along Orchard and Whitney

Streets. Floor drains presumably discharged to the municipal sewer system, located along Orchard and Whitney Streets. Runoff from paved areas flow to private stormwater catch basins located in the eastern central portion of the Whitney Street Parcel as well as the northeastern and northwestern portions. Two municipal stormwater catch basins are located along Orchard Street and one municipal catch basin is located along Whitney Street.

Groundwater
Base on local topography, groundwater at the Site is most likely influenced by the former Erie Canal and the Genesee River Gorge. Overall groundwater flow in the uppermost water bearing zone is generally from the southwest to the northeast. Depth to groundwater in the uppermost water bearing zone ranged between 5.5 and 10 feet below ground surface Site-wide. Approximate maximum groundwater flow velocity has been calculated to be 1.46×10^{-6} feet/second (0.126 feet/day).

Geology
According to the New York State Museum Map of New York Finger Lakes Sheet, native soils beneath the Site consist mainly of lacustrine sands and silts; soils are underlain by Upper Silurian dolostones of the Lockport Group. Based on the most recent SI, bedrock depths were found to vary from a minimum of approximately 7 feet to a maximum depth of greater than 38 feet below grade.

Rock cores obtained during historic projects generally characterized the bedrock as hard, slightly weathered, massively bedded dolostone with few water-bearing fractures. Rock quality designations obtained from cores were generally found to be between 50 and 75%. Based on the characteristics of the bedrock at the Site, it was concluded that groundwater flow is through the saturated overburden and the bedrock/overburden interface.

Observations made during previous Site investigation activities indicated very little weathered bedrock and that the majority of bedrock fractures appeared to be within 2 to 3 feet of the bedrock surface. Higher permeability overburden was also observed in direct contact with the bedrock surface. The bedrock/overburden interface appeared to represent a zone of higher permeability with the potential to increase contaminant mobility.

Soils
According to the United States Department of Agriculture National Resource Conservation Service Soil Map of Monroe County, soil types mapped for the Site consist of Urban Land. Urban Land consist of areas that have been so altered or obscured by urban works and structures that identification of the soils is not feasible. This soil type is typical of highly developed areas of the City of Rochester.

Based on soil classifications of historic test pits and soil borings completed by Lu Engineers at the Site, observed soil conditions consist mainly of silt and sand underlain by widely varying thicknesses of glacial till and/or coarser grained materials resting on the bedrock surface. However, sample recovery of materials in direct contact with the bedrock surface was generally poor. Large amounts of fill materials including brick, ash, concrete and crushed stone are also present throughout the Site in widely ranging thicknesses.

Ecology

Little to no vegetation is present on the Site due to the presence of cover materials including: concrete, asphalt, former building foundations, and demolition debris. No significant wildlife habitat exists on the Site, except for potential avian nesting and resting Sites on building roofs and wires. Some nesting habitat and cover for avian species may be provided by the minimal vegetation on-Site. No endangered species were identified at the Site. The Fish and Wildlife Resources Impact Analysis Decision Key was completed for the Site as part of DER-10. Based on the findings of our investigation, it was determined that there is no off-site contamination emanating from the property and a Fish and Wildlife Resources Impact Analysis is not needed.

Land Use/Sensitive Receptors

The area surrounding the Site is mainly residential and commercial; some light industrial is also present, there is also a railroad bed to the immediate south. Edgerton Park is located approximately 0.7 miles to the north of the Site, Jones Square Park located approximately 0.5 miles to the northeast, and Sahlen Stadium is located approximately 0.5 miles to the southeast.

Facilities serving children in the vicinity of the project include:

- Bubbles Day Care – located 0.2 miles northwest;
- Notre Dame Learning Center – located approximately 0.3 miles northeast;
- Rochester City School #17, Elementary Level – located approximately 0.5 miles south;
- Rochester City Schools #30 and #54, Elementary Level – located approximately 0.5 miles northwest;
- Rochester City School #5, Elementary Level – located approximately 0.7 miles to the north; and
- Jefferson Secondary School – located approximately 0.7 miles to the north.

Facilities also serving the needs of elderly persons include: Jefferson High School and Edgerton Community Center.

A map showing the location of residences and other sensitive receptors is included as Figure 2.

2.5 Current Site Conditions

Currently the Site is vacant. The structures formerly located on the Whitney Street and Orchard Street parcels have been demolished and access to the former 415 Orchard Street building footprint is available for subsurface investigative purposes.

2.6 Conceptual Site Model

Historic Site contamination is related to a variety of industrial activities over a period of many years. A conceptual site model for the project is outlined in the table below.

Media	Known or Suspected Source of Contamination	Type of Compounds (General)	Contaminants of Potential Concern (Specific)	Primary or Secondary Source Release Mechanism	Migration Pathways	Potential Receptors
Soil	1) Paint Booths 2) Petroleum storage tanks 3) Plating operations 4) Waste oils 5) Wastewater	Metals, solvents, fuels, PCBs	Arsenic; Cadmium; Chromium; Lead; Mercury; Acetone; Ethylbenzene; Methylene Chloride; Toluene; Xylene: PCBs	Leaks and spills	Infiltration / percolation	Human: direct contact if excavation occurs in contaminated areas
Groundwater	Contaminated Soil (secondary source)	Metals, solvents, fuels	Cadmium; Chromium; Lead; Mercury; Benzene; Ethylbenzene; Isopropylbenzene; Napthalene; 1,2,4 TMB; 1,3,5 TMB; Xylene, PCBs	Infiltration or percolation from soils	Groundwater flow	Human or ecological receptors are not expected to be exposed
Air/Soil Vapor	1) Contaminated soil or groundwater under buildings	Solvents, fuels	BTEX	Volatilization of contaminated groundwater and/or soil	Migration into buildings	Human: Inhalation during investigation and cleanup
Building	1) Transformer oil 2) Fluorescent light capacitors 3) Building materials 4) Ash 5) Drains and Trenches 6) Manufacturing equipment	PCBs, Asbestos, waste oils	PCBs, Asbestos, waste oils	Leaks/Spills, disturbance of building materials	Dispersion by human activity	Human: direct contact with site workers/ visitors, inhalation

Previous environmental investigations have revealed that volatile organic compounds (VOCs), several metals, and semi-volatile organic compounds (SVOCs) have been detected in subsurface soils and groundwater above NYSDEC Soil Guidance Values on the Whitney Street parcel. Information on the Orchard Street parcel is limited. There are no local private wells in the area of the Site and the surrounding community is on public water and sewer service.

2.7 Technical Objectives

The goal of the SSI is to more completely delineate the nature and extent of contamination remaining at the Site and use the information to develop appropriate IRMs and select suitable remediation technologies.

Specific project objectives include:

- Characterization and quantification of remaining contamination sources beneath and in the immediate vicinity of the footprint of the former 415 Orchard Street building;
- Delineate:
    - contaminant concentrations,
    - media affected (soil and/or groundwater),
    - current and potential extent of contamination in groundwater (horizontal and vertical),
    - mobility, migration potential, and other significant routes;
- Identify potential routes of exposure and the populations and environmental receptors at risk;
- Perform an exposure assessment which qualitatively describes the extent to which the specific area's contaminants pose an unacceptable risk to the air, land, water, and/or public health; and
- Produce a NYSDEC-approved Supplemental IRM Work Plan to address the remaining contamination once the nature and extent has been determined.

To ensure that suitable and verifiable data results are obtained from the information collected at the Site, quality assurance procedures are detailed in the previously approved and subsequently revised project-specific Quality Assurance Project Plan (QAPP). The QAPP will further detail the activities in the SSI Work Plan and how they are designed to achieve data quality objectives.

3.0 Scope of Work

Test pit excavations, soil borings, groundwater well installation, soil boring and groundwater sampling will be used to evaluate the Site conditions beneath the footprint of the former 415 Orchard Street building. The investigation will include the following primary tasks:

- Completion of approximately nine (9) test pit excavations to further evaluate subsurface conditions beneath the former building slab;
- Installation of approximately five (5) soil borings in selected locations beneath the former building slab;
- Installation of four (4) new 2-inch groundwater monitoring wells;
- Groundwater sampling for RCRA Metals and EPA 8260 VOCs from the newly installed monitoring wells; and
- Sub-surface soil sampling for EPA 8260, RCRA Metals, and PCB analyses.

A detailed description of each work task is provided in the following sections. Proposed sampling locations are indicated on Figure 3.

3.1 Field Screening and Health and Safety Monitoring

A Site-specific Health and Safety Plan (HASP), Appendix B, was originally prepared and approved in 2006 and revised for the SSI in accordance with applicable general industry and construction standards of the Federal Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, as well as any other Federal, State or local applicable statutes or regulations. The HASP will be adhered to by all personnel involved in the investigation.

Monitoring of the work area and screening of soil and groundwater will be conducted throughout the duration of field activities to assure the safety of on-Site workers.

Air monitoring of the work areas will be conducted using the following (or equivalent) instrumentation:

- An aerosol particulate meter
- A PID equipped with a 10.2 eV lamp (or equivalent)

A written Community Air Monitoring Plan (CAMP) was originally prepared and approved in 2006 and revised for the SSI in accordance with the requirements of the Environmental Bond Act. This Plan will be followed during Site Investigation activities. The revised CAMP for Site work is attached as Appendix C.

Prior to beginning subsurface sampling and testing, the Underground Facilities Protective Organization (UFPO) will be contacted to determine the locations of underground utilities within the study area. It may be necessary to alter the proposed locations of the soil borings due to underground utilities. Any such modifications will be made at the discretion of the field team leader in consultation with the City of Rochester and NYSDEC staff as appropriate.

3.2 Test Pit Excavations

Lu Engineers will complete a test pit excavation investigation to further evaluate subsurface conditions beneath the specified areas of the former 415 Orchard Street building. These areas are inferred to include the potential contamination originating from former underground petroleum storage tanks and handling on the west side of the building slab, former chemical storage location, former freight and personnel elevator shafts, areas of reported surface spills or staining, floor drains, sumps, trench drains and areas containing electrical equipment and hydraulic lifts. It is assumed for the purposes of this SSI that an approximate total of nine (9) test pit excavations will be required. Proposed test pit excavation areas are illustrated in Figure 3. Actual test pit excavation locations will be determined during field investigation activities and actual locations will be recorded via GPS location mapping.

Test pits will be excavated using a conventional backhoe or excavator with the capability to reach bedrock, approximately 10 to 15 feet below ground surface. Test pit depth will vary depending on location intent and characteristics observed, with some completed to bedrock. Excavated material will be returned to the appropriate test pit after field screening and sampling is complete. If encountered, grossly contaminated soil will be staged on 6-mil poly sheeting and characterized prior to off-Site removal or disposal methods are determined. At the end of each work day, the contaminated soil pile will be covered with additional 6-mil poly sheeting and properly secured to prevent potential off-Site migration. Depending on the quantity of contaminated soil encountered, containerization may be considered.

SSI-generated wastes will be staged on-Site for appropriate waste characterization and disposal. Waste containers will be appropriately labeled and secured. Waste manifests or bill of ladings will be used for off-Site shipments and included in the report.

Suspect areas that have been identified as possible sources of contamination will be addressed with test pit excavations as follows:

- Subsurface conditions associated with potential contaminant migration from the nine (9) former USTs located on the west side of 415 Orchard Street;
- Subsurface conditions associated with former elevator shaft locations in 415 Orchard Street;
- Subsurface conditions associated with former chemical storage in 415 Orchard Street; and

- Subsurface conditions associated with two floor drains formerly located in the demolished 415 Orchard Street building.

Soil samples will be collected from each test pit and field screened. Visual observations, characterization of subsurface materials, and field measurements of VOCs for initial determinations of contamination will be recorded. Headspace screening will be performed using a portable PID meter.

One discreet sample from each test pit will be submitted for analysis, for an estimated total of nine (9) samples (excluding quality control samples such as field duplicates and matrix spike/matrix spike duplicate samples). The sample exhibiting the highest apparent evidence of contamination from each test pit based on field screening will be submitted for laboratory analysis. If no VOCs are detected or if no evidence of other contamination is apparent, the sample submitted will be based on visual observations. The NYSDEC will be given the opportunity to review and approve submitted samples.

Samples submitted for laboratory analysis will be analyzed by the following methodologies based on known or suspected contaminants at each test pit location: USEPA Method 8260 (TCL VOCs), USEPA Method SW-846 (RCRA Metals), and USEPA Method 8082 (PCBs).

3.3 Background Soil Borings

An estimated five (5) soil borings will be advanced in the area within the former building’s footprint. It is estimated that borings will be advanced to approximately 15 feet below ground surface or until bedrock is reached. Subsurface soil samples will be collected continuously via split-spoon in accordance with ASTM Method D-1586 and characterized according to the Burmister Soil Classification System. Field headspace measurements of volatile organic compounds from soil split-spoon samples will be performed using a portable PID meter. It is anticipated that at least one soil sample will be collected from each location for laboratory analysis for constituents of concern (VOCs, RCRA Metals, and PCBs). A drilling log will be kept documenting soil characteristics, headspace concentrations, water table depth, sample recovery, blow counts and other pertinent information. Four (4) of the proposed five (5) boring locations are illustrated on Figure 3. The fifth soil boring location will be determined during field investigation activities and actual locations will be recorded via GPS location mapping.

3.4 Monitoring Well Installation

Monitoring wells will be located in areas of known former petroleum or chemical storage and handing, locations of reported surface spills or staining, floor drains, sumps or trench drains, areas containing electrical equipment or hydraulic lifts, and areas of concern identified or incompletely characterized during previous investigations and building demolition. It is anticipated that four (4) of the five (5) background soil boring locations will be drilled and developed into groundwater monitoring wells. Proposed monitoring well locations are depicted on Figure 3. Actual locations will be recorded via GPS location mapping post SSI activities.

Each well boring will be advanced using 4.25 ID hollow-stem augers. Continuous split spoon samples will be collected (ASTM Method D-1586) at each boring and characterized using the Unified Soil Classification System. Split-spoon samples will be logged by a geologist and recorded for reference. Field headspace measurements of volatile organic compounds from soil split-spoon samples will be performed using a portable PID meter. The samples will be collected using a standard 2-inch outer diameter (OD) split-spoon driven by a 140-pound drill rig hammer. Blow counts will be recorded for each split-spoon sample.

Based on known bedrock depths in the immediate vicinity of the Site, the depth to bedrock is estimated to range from 10 to 15 feet below ground surface. Upon reaching competent bedrock, the borehole will be advanced using rotary techniques and/or coring. Borings will be advanced approximately ten feet (10 ft) into bedrock where groundwater monitoring wells will be installed.

Groundwater monitoring wells will be constructed according to the following specifications: 10 feet of 2-inch Schedule 40 polyvinyl chloride (PVC) machine-slotted screen (0.010-inch slot) installed from the bottom of the boring up to 5 feet above the top of the water table to account for potential seasonal water level fluctuations. Two-inch ID Schedule 40 PVC riser casing will be used to complete the wells to grade. A sand filter pack composed of chemically inert, coarse-grained sand will be placed from the bottom of the boring to 1 to 2 feet above the top of the screen. A 2-foot thick bentonite seal will be placed above the sand, followed by Portland cement/5% bentonite grout to surface.

The wells will be completed flush-to-grade complete with locking, protective steel casings set in concrete drainage pads. Vented PVC well caps will be placed on each well upon completion. No glue will be used for completion of wells.

Drill cuttings and water generated during drilling will be handled in accordance will applicable protocols. The City will be responsible for proper staging and disposal of investigation-derived waste drums. Final disposal of soils and water will also be dependent on the results of the soil and groundwater analyses to be conducted during this investigation.

Split-spoons will be appropriately decontaminated prior to each use. Decontamination will involve these three steps:

1. Removal of visible debris;
2. Rinsing with an Alconox solution; and
3. A triple rinse with distilled water.

The drill rig and associated tooling will be decontaminated using steam-cleaning methods at a designated location. Decontamination residues will be collected in a decontamination pool lined with 6-mil polyethylene sheeting. Prior to completion of the project, decontamination wastes will be transferred into drums or a Site holding tank for appropriate staging and disposal as previously described. Alternatively, if no detectable VOCs are identified using a PID, water generated during the drilling and decontamination process will be discharged to the ground surface.

3.4.1 Monitoring Well Development

After construction of each well is complete, the well will be developed until pH, specific conductivity and temperature have stabilized and turbidity of the discharge is 50 Nephelometric turbidity units (NTU) or less. Field instrument measurement made during development will be recorded. The wells will initially be surged in order to draw sediments out of the sand pack and into the well for removal. If significant effort does not attain the proposed goal of 50 NTU, the well will be considered as developed if other parameters have stabilized. Development will occur no sooner than 48 hours after well installation. Development wastewater will also be stored in drums or a Site holding tank.

3.5 Groundwater Sampling

Prior to sampling, the water level at each well will be measured with reference to the casing elevation and recorded. The static volume of water will be determined for each location. At a minimum, three volumes will be purged from each well. Groundwater sampling will be conducted by means of dedicated disposable polyethylene bailers attached to new polyethylene twine. Field parameters including turbidity, pH, conductivity, dissolved oxygen and temperature will be measured periodically and recorded prior to collecting the samples. Once these parameters have stabilized (and at least 3 well volumes have been purged) the well will be sampled. Purging waste water will also be stored in drums or in a site holding tank pending appropriate disposal.

The wells will be sampled and analyzed for TCL volatiles, PCBs, and RCRA Metals following ASP 2000 (CLP) methods. If turbidity is greater than 50 NTU low-flow sampling methods will be utilized to sample the wells for heavy metals. Monitoring wells will be checked for the presence of free phase light non-aqueous phase liquids (LNAPL) or dense non-aqueous phase liquids (DNAPL). Once obtained, samples will be immediately labeled and placed on ice in a cooler in preparation for delivery to the contract laboratory.

At this time, it is anticipated that one complete groundwater sampling event will be performed as part of the supplemental investigation in order to establish baseline groundwater parameters, and to define the horizontal and vertical extent of groundwater contamination beneath the former building footprint.

Monitoring well locations will be instrument surveyed and the top of casing determined to 0.010 foot accuracy to mean sea level by Lu Engineers' survey department. GPS coordinates will be collected to determine each monitoring well location to 0.010 foot accuracy.

Groundwater depths, laboratory analytical data, site survey data and GPS data will be used to prepare a groundwater flow model illustrating depth to groundwater and local hydraulic gradient as well as to prepare contaminant concentration plume maps.

3.6 Sample Collection Summary

Samples will be obtained, handled and characterized in accordance with NYSDEC Analytical Services Protocol methods. Samples will be relinquished to an accredited and appropriately (NYSDEC ELAP CLP) certified analytical laboratory. Chain of custody requirements will be strictly adhered to for designated analyses.

The NYSDEC Division of Environmental Remediation *Guidance for the Development of Quality Assurance Plans and Data Usability Summary Reports* will be followed. Lu Engineers' Quality Assurance Officer for this project will be Susan Hilton. Robert Hutteman will be the Project Director and Greg Andrus will be the Project Manager for this project. Category B deliverables will be required for analytical reporting in order to provide the necessary documentation to be reviewed to evaluate the usability of the data and to provide calibration data needed to verify results, as necessary.

One duplicate sample will be obtained for each sample type. Also, one matrix spike (MS) and matrix spike duplicate (MSD) will be collected for samples of each media. One groundwater field blank and two groundwater trip blanks will be relinquished to the contract laboratory for the designated analyses. Samples duplicated will be selected at the discretion of the field team leader or geologist.

The table below identifies estimated samples and laboratory analytical procedures required to complete this project.

Summary of Sampling and Laboratory Analyses

Type	Location	Analyses	# Field Samples	Field Duplicate	MS/ MSD	Total
Subsurface Soils – Test Pit Excavations and Soil Borings	9 test excavations	TCL VOCs, RCRA Metals, PCBs	9	1	1/1	**12**
	5 soil borings	TCL VOCs, RCRA Metals, PCBs	5	1	1/1	**8**
	Equipment Blank	TCL VOCs, RCRA Metals, PCBs	2			**2**
Groundwater – New Monitoring Wells	Newly installed wells	TCL VOCs, RCRA Metals, PCBs	4	1	1/1	**7**
	Equipment Blank	TCL VOCs, RCRA Metals, PCBs	1			**1**
	Trip Blank	TCL VOCs	1			**1**
Total:						**31**

Note: Sample quantities are estimated. Additional samples may be required according to actual field, subsurface soil, and groundwater conditions as encountered during Supplemental Site Investigation work activities.

3.7 Citizens Participation Plan

A Citizens Participation Plan has been prepared in accordance with the requirements of the Environmental Bond Act and is included in Appendix F. Lu Engineers, at the request of the NYSDEC or the City, is prepared to provide support in preparation for public meetings.

4.0 Project Personnel

The personnel for this project are anticipated as follows:

Robert Hutteman, P.E.	Project Director
Greg Andrus, CHMM	Project Manager
Ariadna Cheremeteff	Field Team Leader/Geologist
Casey Bok	Field Technician
Laura Gregor	Field Technician
Subcontractors	
To be determined	Analytical Laboratory
To be determined	Test Excavations
To be determined	Soil Boring & Monitoring Well Installation
To be determined	Data Validation (as necessary)

Qualifications for Lu Engineers' personnel are included in Appendix D.

5.0 Completion Summary

Upon receipt and review of necessary data, a brief SSI completion summary memorandum will be provided to the City.

In lieu of a formal SSI report, an abbreviated Supplemental IRM Work Plan will be prepared to address the likely contamination remaining beneath the former building slab of 415 Orchard Street. The Supplemental IRM Work Plan will be developed to specify the extent of the IRMs needed to attain commercial use criteria in the affected areas of the Site.

6.0 Schedule

A detailed project schedule including anticipated field work and report submission is included in Appendix E. From the time of project start-up, it is our professional estimate that the project will take approximately six (6) months to complete, with the inclusion of IRM implementation. This timeframe takes program components of the ERP and associated NYSDEC review into consideration.

Figures

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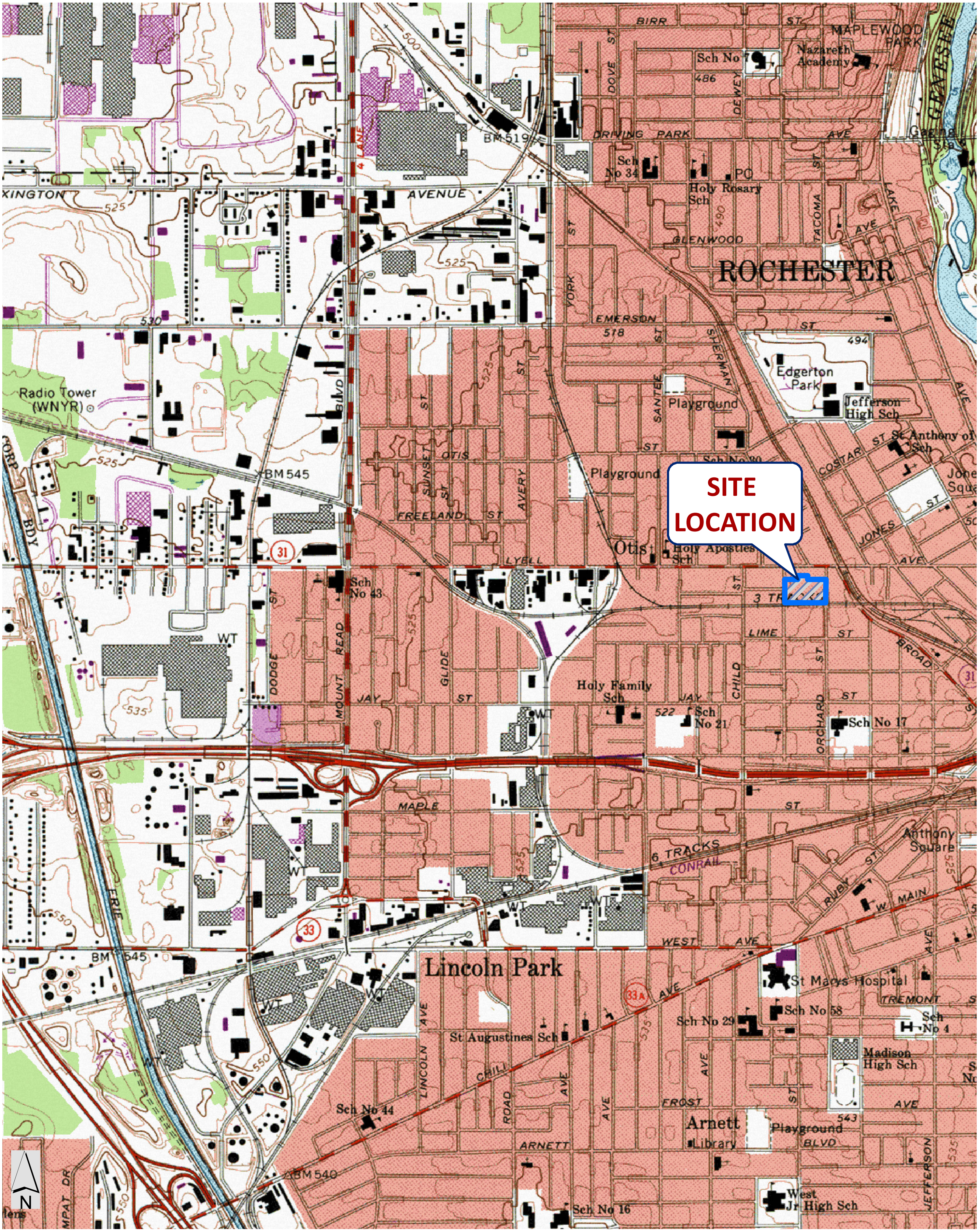

Lu Engineers

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FIGURE 1.
ORCHARD WHITNEY SITE LOCATION
ERP SITE #EB28123
ROCHESTER, NY

FLOUR CITY • FLOWER CITY • CITY OF ROCHESTER N.Y.

DATE: MAY 2015	
SCALE: N/A	
DRAWN/CHECKED: CSB/GLA	
DATA SOURCE: ROCHESTER WEST QUAD. NEW YOR-MONROE COUNTY 7.5 MINUTES SERIES (TOPO) 1971: REVISED 1978	

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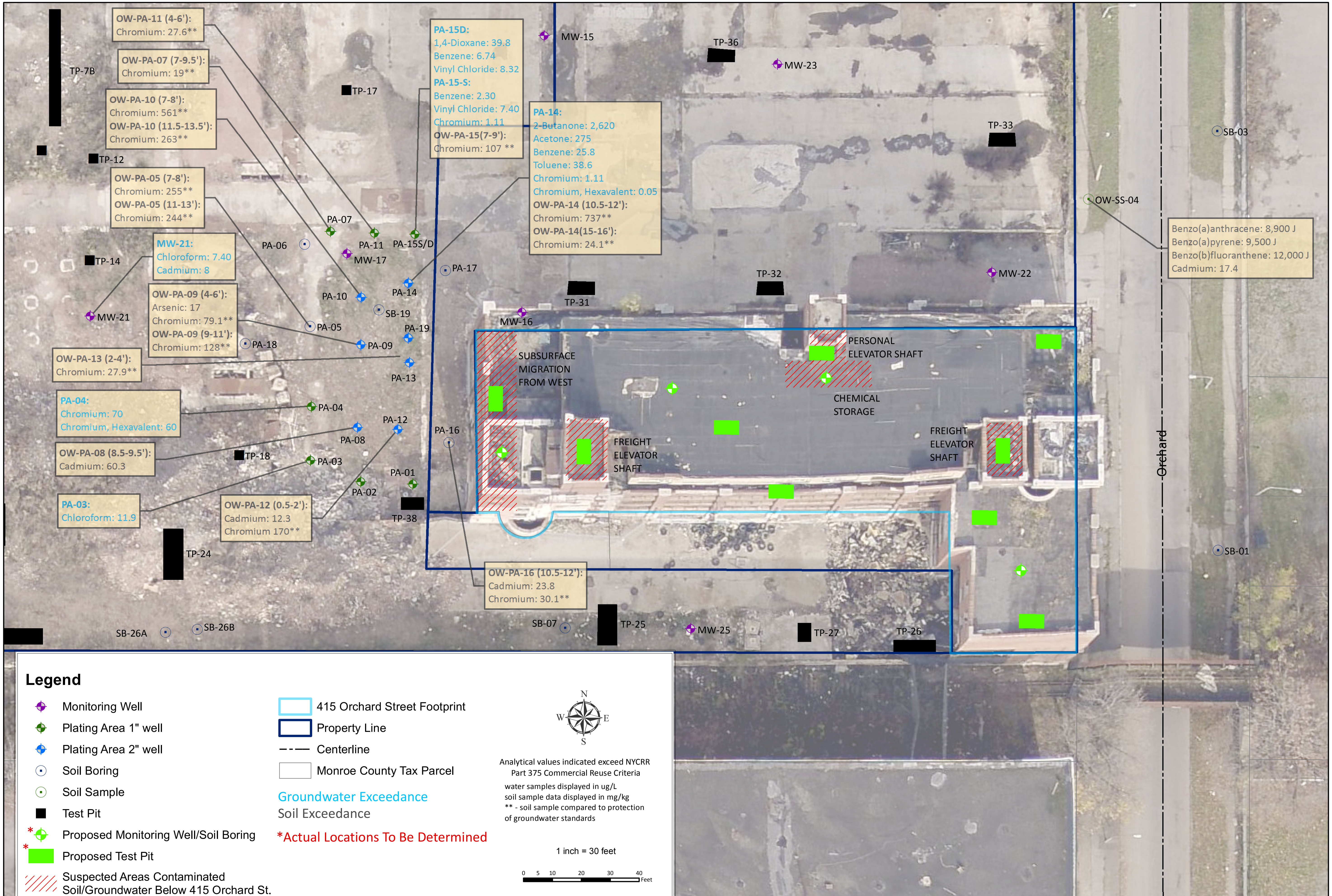
FIGURE 2.
SENSITIVE RECEPTORS

CITY OF ROCHESTER
SUPPLEMENTAL SITE INVESTIGATION
415 ORCHARD / 354 WHITNEY

DATE:	MAY 2015
SCALE:	NTS
DRAWN BY:	JRM
MAP SOURCE:	NYS GIS CLEARINGHOUSE – NY STATE STATEWIDE DIGITAL ORTHOIMAGERY PROGRAM, HIGH RESOLUTION IMAGERY 2012



DATE: MAY 2015
SCALE: AS NOTED
DRAWN/CHECKED: SMK/GLA
DATA SOURCE: PICTOMETRY

FLOWER CITY • FLOUR CITY • CITY OF ROCHESTER, N.Y.

FIGURE 3 - 415 ORCHARD STREET
PROPOSED SAMPLING LOCATION PLAN
ERP SITE #E828123
ROCHESTER, NY

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Appendix A – Quality Assurance Project Plan

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QUALITY ASSURANCE PROJECT PLAN

Supplemental Site Investigation
415 Orchard Street

City of Rochester
Environmental Restoration Project
415 Orchard Street and 354 Whitney Street
Monroe County, New York

Prepared For:

City of Rochester
Department of Environmental Services
Division of Environmental Quality
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Prepared By:

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May 2015

Project No: 4216-06

Table of Contents

1.0 Introduction

This Quality Assurance Project Plan (QAPP) was prepared as an integral part of the Supplemental Site Investigation Work Plan for the Orchard/Whitney Site and is subject to the review and approval by the New York State Department of Environmental Conservation (NYSDEC). The project work will be performed by Lu Engineers, or conducted under their discretion by NYSDEC-approved contractors. Project-specific descriptions can be found in the Supplemental Site Investigation Work Plan.

This QAPP presents the policies, organization, objectives, functional activities, and specific quality assurance (QA) and quality control (QC) activities that will be implemented by Lu Engineers for this project. This QAPP is designed to ensure that all technical data generated by Lu Engineers is accurate, representative, and will ultimately withstand judicial scrutiny.

All QA/QC procedures are implemented in accordance with applicable professional technical standards, NYSDEC and EPA requirements, government regulations and guidelines, and specific project goals and requirements. This QAPP is prepared in accordance with all NYSDEC and EPA QAPP guidance documents.

This QAPP incorporates the following activities:

- Sample Management and chain of custody;
- Document control;
- Laboratory quality control; and
- Review of project deliverables.

Analytical samples will be collected in the field utilizing standard operating procedures (SOPs) and sent to the contracted NYSDOH ELAP CLP-certified laboratory for analysis. Field data compilation, tabulation, and analysis will be checked for accuracy. Calculations and other post-field tasks will be reviewed by field personnel and the project manager.

Equipment used to take field measurements will be maintained and calibrated in accordance with established procedures. Records of calibration and maintenance will be kept by assigned personnel. Field testing and data acquisition will be performed in standard fashion following strict guidelines.

Document control procedures will be used to coordinate the distribution, coding, storage, retrieval, and review of all data collected during all sampling tasks. These include, but are not limited to, the sampling of soil/sediment, groundwater, and wastes.

In addition, the laboratory has developed SOPs for individual analytical methods and internal QC procedures. These documents are an important aspect of their QA program and are available for review upon request.

2.0 Project Objectives

The intent of this project is to further delineate the nature and extent of contamination at the Orchard/Whitney Site, specifically the area beneath the former 415 Orchard Street building. Sampling of soil and groundwater will be used to identify potential exposure pathways and evaluate the Site for future use. The identification of significant Site characteristics, extent of contamination, and exposure pathways (if completed exposure pathways are indicated) will provide the basis for developing remedial alternatives. The scope of work is described in the Supplemental Site Investigation Work Plan Section 3.0.

A complete project description, including Site history and background information, is given in Section 2.0 of the Supplemental Site Investigation Work Plan.

3.0 Project Organization and Responsibility

In accordance with Lu Engineers' quality assurance (QA) program, experienced senior technical staff will be assigned to the project QA/QC functions. The management structure provides for direct and constant operational responsibility, clear lines of authority, and the integration of QA activities. The various QA functions are explained below.

QA contacts include Lu Engineers project manager and Quality Assurance Officer. Qualifications of key personnel are included in Appendix D of the Supplemental Site Investigation Work Plan.

Upstate Laboratories, a NYSDOH ELAP-CLP certified laboratory, will provide analytical services for the project. A list of their certifications and accreditations is attached in Appendix D.

Project Director
The project director for this project will be Robert Hutteman, P.E. As project director, Mr. Hutteman will have overall responsibility for ensuring that the project meets client objectives and Lu Engineers' quality standards. In addition, the project director will be responsible for technical quality control and project oversight and will provide the project manager with access to upper management.

Project Manager
The project manager for this project will be Greg Andrus, CHMM. As project manager, he will be responsible for implementing the project and will have the authority to commit the resources necessary to meet project objectives and requirements. The project manager's primary function is to ensure that technical, financial, and scheduling objectives are achieved. The project manager will provide the major point of contact and control for matters concerning the project. The project manager will:

- Work directly with the NYSDEC Regional Office to complete and implement a work plan for the project;

- Define project objectives and schedule;
- Establish project policy and procedures to address the specific needs of the project as a whole, as well as the objectives of each task;
- Acquire and apply technical managerial resources as needed to ensure performance within budget and schedule constraints;
- Orient all staff concerning the project's special considerations;
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product;
- Review the work performed on each task to ensure its quality, responsiveness, and timeliness;
- Review and analyze overall task performance with respect to planned requirements and authorizations;
- Approve all external reports (deliverables) before their submission to the client;
- Ultimately be responsible for the preparation and quality of interim and final reports; and
- Represent the project team at meetings.

Quality Assurance Officer (QAO)

The QA officer is Susan Hilton, P.E. She will be responsible for maintaining QA for a specific program and the projects within that program. Specific functions and duties include:

- Providing an external and, thereby, independent QA function to the project;
- Responsibility for field and sampling audits conducted by qualified QA personnel;
- Coordinating with client personnel, Lu Engineers' project manager, laboratory management, and staff to ensure that QA objectives appropriate to the project are set and that personnel are aware of these objectives;
- Coordinating with project management and personnel to ensure that QC procedures appropriate to demonstrating data validity sufficient to meet QA objectives are developed and in place;
- Interfacing with the data validator (if necessary) and development of a project specific data usability report;
- Coordinating with QA personnel to ensure that QC procedures are followed and documented;
- Requiring and/or reviewing corrective actions taken in the event of QC failures;
- Reporting non-conformance with QC criteria or QA objectives, including an assessment of the impact on data quality or project objectives, to the project manager.

Technical Staff

The technical staff (team members) for this project will be drawn from Lu Engineers pool of resources. The technical team staff will be utilized to gather and analyze data and to prepare various task reports and support materials. All of the designated technical team members are experienced professionals who possess the degree of specialization, training and technical competence required to effectively and efficiently perform the required work.

Data Validation and QA Staff

If necessary, data validation and QA staff will include data validation chemists, QA auditors, and other technical specialists who remain independent of the laboratory and project management. The staff will independently validate analytical data to assess and summarize their accuracy, precision, and reliability and determine their usability. The staff will also perform audits and document the historical record of project activities, including any factors affecting data usability, such as data discrepancies and deviations from standard practices. The staff will act under the direction of the QA officer and project manager in accordance with specific project requirements. A third party data validation staff is to be determined.

4.0 Sampling Procedures

4.1 Sampling Design

The sampling for this project is designed to fully delineate the nature and extent of contamination remaining beneath the footprint of the former 415 Orchard Street building. Soil borings, test pit excavations, groundwater monitoring well installation, and soil and groundwater sampling will be used to evaluate Site conditions.

An estimated total of nine (9) test pit excavations are anticipated for the area beneath the former 415 Orchard Street building footprint in efforts to further evaluate of subsurface conditions. It is estimated that at minimum, one (1) sample be taken from each test pit location.

Five (5) proposed soil borings are planned for installation beneath the former 415 Orchard Street building footprint to establish local background concentrations for metals and PAHs. It is projected that four (4) of these boring locations will be converted to 2-inch diameter groundwater monitoring wells.

It is anticipated that at minimum, one (1) soil sample will be collected from each of the five (5) soil borings and at minimum one (1) groundwater sample will be collected from each of the four (4) newly installed monitoring wells.

Soil and groundwater samples will be analyzed for RCRA metals, EPA 8260 volatile organic compounds (VOCs), and PCBs using Contract Laboratory Protocol (CLP).

Continuous perimeter and work zone air monitoring for VOCs will also be conducted during all soil removal and staging activities using a PID to ensure health and safety of workers and the public.

A Site map showing proposed sample locations is provided as Figure 3.

4.2 QC Samples

Various types of field QC samples are used to check the cleanliness and effectiveness of field handling methods. 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 and document overall sampling and analytical precision. Rigorous documentation of all field QC samples in the site logbooks is mandatory.

- **Trip Blanks** are similar to 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. Trip blanks are prepared at the lab prior to the sampling event and shipped with the sample bottles. Trip blanks are prepared by adding organic-free water to a 40-ml VOA vial. One (1) trip blank will be used with every batch of water samples shipped for volatile organic analysis. Each trip blank will be transported to the sampling location, handled like a sample, and returned to the laboratory for analysis without being opened in the field.

- **Field Equipment/Rinsate Blanks** are blank samples 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. Rinsate blanks are prepared by passing analyte-free water over sampling equipment and analyzing the samples for all applicable parameters. If a sampling team is familiar with a particular site, its members 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. Rinsate blanks are not required if dedicated sampling equipment is used for sample collection.
- **Field Duplicates** consist of a set of two (2) samples collected independently at a sampling location during a single sampling event. Field duplicates can be sent to the laboratory so that they are indistinguishable from other analytical samples and personnel performing the analysis are not able to determine which of the samples are field duplicates. Field duplicates are designed to assess the consistency of the overall sampling and analytical system.

Field QC samples and the frequency of analysis for this project are summarized in Table 1 *Summary of Sampling and Laboratory Analysis* at the end of this QAPP and in Section 3.6 of the SSI Work Plan. It is noted that sample quantities are estimated. Additional samples may be required according to actual field, subsurface soil, and groundwater conditions as encountered during Supplemental Site Investigation work activities.

4.3 Decontamination Procedures

All decontamination will be performed in accordance with NYSDEC-approved procedures. Sampling methods and equipment have been chosen to minimize decontamination requirements and prevent the possibility of cross-contamination. All drilling equipment will be decontaminated prior to drilling, after drilling each boring/monitoring well, and after the completion of all drilling. Special attention will be given to the drilling assembly, augers, split-spoons, and PVC casing. Split-spoons will be decontaminated prior to and following each use.

Split-spoons and other non-disposable sampling equipment, and stainless steel spoons will be decontaminated using the following procedure:

- Initially cleaning equipment of all foreign matter;
- Scrubbing equipment with brushes in Alconox® solution;
- Rinsing equipment with distilled water; and
- Rinsing equipment with 10% nitric acid (when sampling for metals only);

- Triple-rinsing equipment with distilled water; and
- Allowing equipment to air dry.

All drill cuttings and water generated during drilling boring and monitoring well installation will remain on-Site. All waters generated by decontamination or by developing, purging, or pumping the monitoring wells will be stored in drums or an on-Site holding tank.

A temporary decontamination pool will be established in a secure area on Site using 6-mil polyethylene sheeting. The drill rig and associated tooling will be decontaminated using steam-cleaning methods at the designated location. Fluids generated during decontamination will be collected in the plastic-lined pool. All decontamination wastes will be transferred into drums or an on-Site holding tank for appropriate staging and disposal. The City will be responsible for proper staging and disposal of all investigation-derived wastes. Final disposal of soils and water will be dependent on the results of the soil and groundwater analyses to be conducted during this investigation.

4.4 Sampling Methods

This section describes the sampling procedures to be utilized for each environmental medium that will be collected and analyzed in accordance with the SSI Work Plan and Tables 1 and 5.1 of this plan. All sampling procedures described are consistent with United States Environmental Protection Agency (USEPA) sampling procedures as described in SW-846, third edition and the NYSDEC Analytical Services Protocols (ASP), or equivalent.

4.4.4 Test Pit Investigations

Test pits will be excavated to bedrock, but not into groundwater, using a backhoe. All materials removed from the pit will be returned and the pit will be completely filled before the backhoe leaves the Site. A PID will be used to continuously monitor gases exiting the test pits during excavation and sampling operations.

Prior to initiating excavation activities and between test pits, the backhoe will be cleaned and decontaminated according to procedures outlined in Section 4.3.

Soil samples will be obtained according to the Site work plan using a stainless steel spoon or trowel. Samples can be collected from the walls of the test pit or from the backhoe bucket if appropriate. Soil samples will be placed in 8-ounce wide-mouth glass jars.

The sample exhibiting the highest levels of contamination from each test pit based on field screening will be submitted for laboratory analysis. One discreet sample from each test pit will be submitted.

A log of the test pit will be maintained similar to a borehole log, indicating such information as distinctive soil horizons, soil texture, color, groundwater, PID and OVA readings, and location of soil samples.

4.4.5 Subsurface Soil Samples

All soil samples will be screened for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID). Screening will be performed by placing a representative soil sample into a Ziploc® (or equivalent) plastic bag, sealing the bag, and then allowing the sample to volatilize for at least 15 minutes. The concentration of VOCs will then be measured by inserting the tip of the PID or equivalent device into the sample's headspace and taking a reading. VOC measurements will be entered on the boring log. All soil borings will be constructed into monitoring wells.

The field geologist will also evaluate soil samples for the presence of staining or other unusual observations. Samples noted to have these characteristics may require analysis even though no PID readings may have been observed.

4.4.6 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 as modified by NYSDEC-specific request.

Well Installation
Prior to initiating drilling activities, the drilling rig, augers, rods, split spoons, pertinent equipment, well pipe and screens will be steam cleaned. These activities will be performed in a designated 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.

Samples will be collected continuously in 2-foot intervals as the augers are advanced. The sampler will be decontaminated between sampling locations. Decontamination will be accomplished by disassembling the split spoons, removing gross debris, washing the parts in an Alconox solution, and rinsing with distilled water. Each soil sample will be described at the time it is retrieved, and a subsurface log will be produced by an on-site geologist based upon visual examination and other field observations. Sample descriptions will be based on either the Unified or Burmister Soil Classification System.

Upon reaching competent bedrock, the borehole will be advanced using rotary drilling techniques and coring. All borings will be advanced ten feet (10 ft.) into bedrock where the groundwater monitoring wells will be installed.

Drilling fluids, other than water from a NYSDEC-approved source, will not be allowed without special consideration and agreement from NYSDEC. The use of lubricants is also not allowed unless approved by the NYSDEC representative. During the drilling, a portable VOC monitor, and an O_2/explosimeter will be used to monitor the gases exiting the hole.

Well Casing (Riser)

The well riser shall consist of 2- or 3-inch diameter, threaded flush-joint polyvinyl chloride (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.

Well Screen

Generally, wells will be constructed with 10-foot machine-slotted screens, unless otherwise specified in the work plan or dictated by field conditions (i.e., screens of less than 10-ft in length may be used, depending on the characteristics of the well). 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 glues 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.

Artificial Sand Pack

Granular backfill will be chemically and texturally clean inert, siliceous, and of appropriate grain size for the screen slot size and the host environment. The well screen and riser casing will be installed, and the sand pack placed around the screen and casing to a depth approximately two (2) feet above the top of the well screen.

Bentonite Seal

A minimum 2-ft thick seal of bentonite pellets/chips and water slurry 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.

Grout Mixture

Upon completion of the bentonite seal, the well will be grouted with a non-shrinking cement grout 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.

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 vented cap shall be installed to prevent material from entering the well. The PVC well riser shall be flush mount or surrounded by a steel casing rising 24 to 36 inches above ground level and set into a concrete pad. The steel casing shall be provided with a cap and lock. A concrete pad, sloped away from the well, shall be constructed around the well casing at ground level. The steel protective casing shall be painted with permanent high-visibility paint. The ground immediately around the top of the well shall be sloped away from the well. There shall be an opening in the protective casing wall at the top of the cement pad to allow for internal drainage.

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.

Surveying
Coordinates and elevations will be established by a New York State licensed land surveyor for each boring, monitoring well, sampling location, and other key contour points. A map of each will be prepared for inclusion into the final report for the Site.

Elevations (0.01’) will be established for the ground surface at each boring, monitoring well, sampling location, the top of each monitoring well casing (T.C), and at least one other permanent object (i.e., property corner markers, corners of buildings, bridges, etc.) in the vicinity of the borings and wells. Elevations will be relative to a regional, local, or project specific datum. USGS benchmarks will be used if within ½ mile of the Site being surveyed and will take precedence over the use of a project specific datum.

Unsurveyed data, (i.e., approximate Site and property boundaries), developed through the use of current tax maps and initial Site visits, also will be shown on the survey map. The location and extent of filled areas, buried tanks and drums, other items pertinent to Site usage will be indicated on the survey maps based on the best available data.

Well Development
After completion of the well, but not sooner than 48 hours after grouting is completed, development will be accomplished using air surging, surge blocking, pumping, or bailing. The air-lift surge method may be supplemented with a bottom-filling bailer if a well has an extremely low yield. No dispersing agents, acids, disinfectants, or other additives will be used during development nor be 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 the 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 properly contained and treated as waste until the results of chemical analysis of samples are obtained.

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. If, after two hours, substantial improvement has been noted through the development process but the goal of 50 NTUs has not been met, an additional one to two hours may be authorized to achieve the 50 NTU goal.

Geologic Logging and Sampling
At each well location, the boring will be advanced through overburden using a drill rig and hollow-stem auger, and soils will be visually inspected for stains and monitored with a PID and OVA. Soil samples will be collected continuously over the entire depth of the well. The sampling device will be decontaminated according to procedures outlined in Section 4.3.

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, and will be classified in accordance with Unified Soil Classification System (ISCS) specifications, and logged. Samples will be stored in glass jars until they are needed for testing or the project is complete.

Information regarding analytical requirements for soil borings can be found in the Supplemental Site Investigation Work Plan.

Monitoring well borings will be installed to a depth determined through the examination of boring logs and water levels encountered as well as on-Site discussions and agreement between the NYSDEC representative and Lu Engineers' field team leader. All significant discrepancies between the prepared work plan and actual Site conditions will be noted and countersigned by both parties in the project's on-Site logbook.

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 to the saturated zone encountered. If necessary, the borehole will be advanced to water or abandoned.

Drilling logs will be prepared by an experienced geologist who will be present during all drilling operations. One copy of each field boring log, well construction log and groundwater data will be submitted as part of the report. 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;
- 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.

Groundwater Sampling Procedures
Static water levels will be measured to within 0.01 foot prior to purging and sampling. Purging and sampling of each well will be accomplished using pre-cleaned dedicated PVC bailers on new polypropylene line. All wells will be purged a minimum of three (3) volumes of water standing in the casing or to dryness. Temperature, pH, conductivity, and turbidity will be measured and recorded during purging.

After purging, the turbidity of each well will be measured. If the well water exhibits turbidity above the 50 NTU limit, sampling of the well water for metals only will be delayed for 24 hours. Sample volumes for all other parameters will be collected immediately following purging, with the volatile sample collected first. Upon returning to the well, the turbidity will be remeasured and recorded. No additional purging will be performed.

Groundwater samples will be collected according to the following procedures.

- 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 QA/QC samples will be analyzed as specified in the Work Plan. One complete round of groundwater sampling will be performed as part of the Supplemental Site investigation.

4.5 Sample Documentation

4.5.1 Logbooks

All field activities will be documented in a field logbook. This logbook will provide a record of activities conducted at the Site. All entries will be signed and dated at the end of each day of fieldwork. The field logbook will include the following: date and time of all entries; names of all personnel on Site; weather conditions (temperature, precipitation, etc.); location of activity; and description of activity.

In addition, Lu Engineers will complete the following standard field forms as necessary:

- Test boring/probing log
- Groundwater elevations, development, sampling and conductivity logs
- Field sampling record

- Chain of custody for all analytical laboratory sampling.

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 it. The correction must be initialed and dated. Most corrected errors will require a footnote explaining the correction.

4.5.2 Sample Identification

All containers of samples collected by Lu Engineers from the project will be identified using a format identified in the field on a label affixed to the sample container (labels are to be covered with Mylar tape). Generally, the format will include two letters identifying the Site (OW – Orchard Whitney), two letters identifying the type of sample (GW – Groundwater), two numbers identifying a sample location, 2-4 additional numbers identifying a sample depth if appropriate, additional letters identifying special parameters (MS/MSD – Matrix Spike/Matrix Spike Duplicate).

Each sample will be labeled 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 sample number, the date of the collection, analysis required, and pH and preservation, if appropriate.

The laboratory sample number will appear on a barcode label affixed to each sample, extract, or digestate.

4.6 Field Instrumentation

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to manufacturer’s guidelines and recommendations. Operation, calibration, and maintenance will be performed by personnel properly trained in these procedures. Documentation of calibration information will be maintained in the appropriate log book or reference file and will be available upon request. Instruments will be calibrated before each use.

5.0 Sample Handling and Custody

This section describes procedures for sample handling and chain-of-custody to be followed by Lu Engineers' sampling personnel and the analytical laboratory. The purpose of these procedures is to ensure that the integrity of the samples is maintained during their collection, transportation, storage, and analysis. All chain-of-custody requirements comply with SOPs indicated in EPA sample-handling protocol.

Sample identification documents will 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 labels, custody seals, chain-of-custody records, and laboratory sample log-in and tracking forms.

The primary objective of the chain-of-custody procedures is to provide an accurate written record that can be used to trace the possession and handling of a sample from the moment of its collection through it 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.

5.1 Sample Containers and Preservation

For sampling performed by Lu Engineers, prewashed sample containers obtained from a reliable supplier will be provided by the analytical laboratory. All containers provided by the laboratory are pre-cleaned (Level 1), with certificates of analysis available for each bottle type. Certifications of Analysis provided by the vendor are kept on file by the laboratory.

All samples will be stored on ice pending delivery to the laboratory. In addition, all water samples for volatile analysis will be preserved with HCl to a pH of less than 2.0. All water samples for metals analysis will be preserved by adding concentrated nitric acid until the sample pH is lowered to 2.0 standard units or less. Sample pH will be checked in the field using indicator paper. A list of preservatives and holding times for each type of analysis is included in the following Table.

Table 5.1
Sample Preservation and Holding Times

Sample Matrix	Analysis	Container Type and Size	Preservation	Holding Time
Soil	VOC	2-4 oz. wide mouth glass jar with Teflon-lined cap	Cool to 4°C; minimize headspace	14 days
	Metals	glass	Cool to 4°C	6 months
	PCBs	2-4 oz. glass jar with Teflon-lined cap	Cool to 4°C	14 days
Groundwater	VOC	3 - 40-ml.glass vial with Teflon-lined cap	Cool to 4°C; minimize headspace	7 days, unpreserved 14 days, preserved
	Metals	40-ml. polyethylene or glass	HNO_3 to a pH <2	6 months
	PCBs	2 - ½ L Amber Jugs	Cool to 4°C	7 days

* Holding times are based on verified time of sample receipt

Sample preservation will be verified at the lab just prior to extraction, digestion, and/or analysis and the pH will be recorded in the extraction/digestion logbook. The pH may be checked upon arrival, if desired. If the samples are improperly preserved, a QA/QC discrepancy form will be submitted to the lab manager and QA coordinator for appropriate follow-up action (i.e., evaluation of the data during the data validation process and, if necessary, additional instruction of personnel regarding proper procedures).

5.2 Field Custody Procedures

- Sample bottles must be obtained pre-cleaned from the laboratory or directly from an approved retail source. All containers will be prepared in a manner consistent with the NYSDEC ASP 1991 bottle-washing procedures. 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.
- All containers will have assigned lot numbers to ensure traceability through the supplier.
- As few persons as possible should handle samples.
- The sample collector is personally responsible for the care and custody of samples collected until the samples are transferred to another person or dispatched properly under chain-of-custody rules.
- The sample collector will record sample data in the field notebook.
- The project manager will determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required.

5.2.1 Custody Seals

Custody seals are preprinted adhesive-backed seals with security slots designed to break if the seals are disturbed. A custody seal is placed over the cap of individual sample bottles by the sampling technician. Sample shipping containers (coolers, cardboard boxed, etc., as appropriate) are sealed in as many places as necessary to ensure security. Seals must be signed and dated before use. Strapping tape should be placed around the lid to ensure that seals are not accidentally broken during shipment and in a manner that allows easy removal by laboratory personnel. On receipt at the laboratory, the custodian must check (and certify, by completing logbook entries) that seals on boxes and bottles are intact.

5.2.2 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 custody record.

5.3 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 Regulations, 49 CFR 171 through 177.

5.3.1 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 bottle should never be completely filled except for VOA bottles. At a minimum, a 10% void space should be left in the bottle to allow for expansion. The sample volume level should be marked with a grease pencil or by placing the top of the label at the appropriate sample height.
- All sample bottles must be sealed around the neck or the jar lid with clear tape. Any custody seals should be affixed prior to sealing the bottle.
- All sample bottles shall be placed in plastic Ziploc® bags to minimize contact with inert packing material, unless foam inserts are used.

- Foam inserts should be used as inert packing material when shipping low hazard water samples via a common carrier to the laboratory.
- Low-hazard environmental samples are to be cooled. “Blue ice” or some other artificial icing material, or ice placed in plastic bags, may be used. Ice will not be used as a substitute for packing material.
- A duplicate custody record must be placed in a plastic bag and taped to the inside of the cooler lid. Custody seals are affixed to the sample cooler.
- The cooler will be labeled as containing a hazardous material if it contains medium or high-hazard samples. Labeling requirements differ depending on the type of material being shipped; the majority of soil samples may be shipped as a class “9” hazardous material with the proper shipping name “OTHER REGULATED SUBSTANCES (ENVIRONMENTAL SAMPLES).”
- A hazardous material shipping manifest will be completed for each cooler of medium to high-hazard samples and affixed to the lid of the cooler.
- Low-hazard environmental samples do not require a hazardous material shipping manifest. The words “LABORATORY SAMPLES” should be printed on the top of the cooler for low-hazard samples.
- Samples packaged and shipped as limited-quantity radioactive material must comply with DOT and shipper regulations for package contamination limits, surface exposure rate, and air bill completion.

5.3.2 Shipping Containers

Environmental samples will be properly packaged and labeled for transport and dispatched for analysis to the appropriate subcontracted laboratory for geotechnical analyses. A separate chain-of-custody record must be prepared for each container. The following requirements for marking and labeling of shipping containers will be observed:

- 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; and
- After a container has been closed, two 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 them.

Field personnel will make timely arrangements for transportation of samples to the laboratory. When custody is relinquished to a shipper, field personnel will telephone the laboratory 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.

5.3.3 Shipping Procedures

- 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 record. This record documents sample custody transfer.
- Samples must be dispatched to the laboratory for analysis with a separate chain-of-custody record accompanying each shipment. 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.
- All shipments must be accompanied by the chain-of-custody record identifying their contents. The original record accompanies the shipment, and the yellow copy is retained by the Site team leader.
- 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 bills of lading are retained as part of the permanent documentation.
- Samples must be shipped to the analytical laboratory within 24 to 48 hours from the time of collection.

5.4 Laboratory Custody Procedures

The designated sample custodian at the laboratory will be responsible for maintaining the chain-of-custody for samples received at the lab. Among other things, the custodian must adhere to the following basic requirements:

- When the sample arrives at the lab, the custodian will complete a Cooler Receipt & Preservation Form for each cooler/package container.
- Upon receipt, the coolers are examined for the presence and condition of custody seals, locks, shipping papers, etc. Shipping labels are removed and placed on scrap paper and added to the receiving paper work. The custodian then completes the chain-of-custody record by signing and recording the date and time the package is opened.
- Acceptance criteria for cooler temperature is 0-6^{o}C. If a cooler exhibits a temperature outside this range, the anomalies are noted on the Cooler Receipt & Preservation Form.
- The custodian will then unload the samples from the cooler(s)/container(s), assign an identification number to each sample container, and affix a barcode label to each sample container for logging in and out of the LIMS system.

Adherence to this procedure will ensure that all samples can be referenced in the computer tracking system. All sample control and chain-of-custody procedures applicable to the analytical laboratory are presented in laboratory SOPs available for review.

6.0 Analytical Methods

All laboratory analyses will be performed by Upstate Laboratories, an accredited and appropriately (NYSDEC ELAP CLP) certified analytical laboratory. Inorganic, general analytical and organic methods to be performed by the laboratory for this project are listed in Table 1 of this QAPP.

6.1 Analytical Capabilities

The analytical laboratory is fully equipped for analysis of all types of water, air, and soil samples for chemical contaminants, bacteriological quality, and general characterization. Proven and approved analytical techniques are used, backed up by a rigorous system of QC and QA checks to ensure reliable and defensible data. All laboratory work is performed in accordance with guidelines established by EPA, the New York State Department of Health (NYSDOH), and the National Institute of Occupational Safety and Health (NIOSH), if applicable.

Organic analysis is accomplished by gas chromatography (GC), high performance liquid chromatography (HPLC), and or GC/mass spectrometry (MS). Liquid, soil, and air samples are analyzed routinely for pesticides, polychlorinated biphenyls (PCBs), volatile organics, extractable organics, and other groups of compounds, as necessary. The laboratory uses two types of instruments for analysis of metals in various matrices: AAS and ICP.

Laboratory procedures to be utilized for sample preparation and analysis are referenced in the NYSDEC Analytical Services Protocol.

Method Detection Limits
Method detection limits are determined according to procedures outlined in 40 CFR Part 136, Appendix B or EPA Contract Laboratory Protocol. General analytical detection limits are usually determined by the lowest point on the curve. Detection limits are determined at least annually for all appropriate analytical methods. A listing of the laboratory’s method detection limits is available upon request.

6.2 Quality Control Samples

Laboratory QC consists of analysis of laboratory blanks, duplicates, spikes, standards, and QC check samples as appropriate to the methodology. These laboratory QC samples are described below.

6.2.1 Laboratory Blanks

Three types of laboratory blanks, one or more of which will be utilized depending on the analysis are described below:

- Method blanks consist of analyte-free water and are subjected to every step of the analytical procedure to determine possible contamination.

- Reagent blanks are similar to method blanks but incorporate only one of the preparation reagents in the analysis. When a method blank indicates significant contamination, one or more reagent blanks are analyzed to determine the source.
- Calibration blanks consist of pure reagent matrix and are used to zero an instrument's response, thus establishing the baseline.

6.2.2 Calibration Standards

A calibration standard may be prepared in the laboratory by dissolving a known amount of a pure compound in an appropriate matrix. The final concentration calculated from the known quantities is the true value of the standard. The results obtained from these standards are used to generate a standard curve and thereby quantitate the compound in the environmental sample. A minimum of three calibration standards will be used to generate a standard curve for all analyses.

6.2.3 Reference Standard

A reference standard is prepared in the same manner as a calibration standard but from a different source. Reference standards may be obtained from the EPA. The final concentration calculated from the known quantities is the "true" value of the standard. The important difference in a reference standard is that it is not carried through the same process used for the environmental samples, but is analyzed without digestion or extraction. A reference standard result is used to validate an existing concentration calibration standard file or calibration curve.

6.2.4 Spike Sample

A sample spike is prepared by adding to an environmental sample (before extraction or digestion) a known amount of pure compound of the same type that is to be assayed for in the environmental sample. Spikes are added at one to 10 times the expected sample concentration or approximately 10 times the method detection limit. These spikes simulate the background and interferences found in the actual samples, and the calculated percent recovery of the spike is taken as a measure of the accuracy of the total analytical method.

A blank spike is the same as a spike sample except the spike is added to analyte-free water. The blank spike is used to determine whether the sample preparation and analysis are under control.

6.2.5 Surrogate Standard

A surrogate is prepared by adding a known amount of pure compound to the environmental sample; the compound selected is not one expected to be found in the sample, but is similar in nature to the compound of interest. Surrogate compounds are added to the sample prior to extraction or digestion. Surrogate spike concentrations indicate the percent recovery of the analytes and, therefore, the efficiency of the methodology.

6.2.6 Internal Standard

Internal standards are similar to surrogate standards in chemical composition but are used to quantify the concentration of analytes sampled based on the relative response factor. Internal standards are added to the environmental sample just prior to instrumental analysis.

6.2.7 Laboratory Duplicate or Matrix Spike Duplicate

Laboratory duplicates are aliquots of the same sample that are split prior to analysis and treated exactly the same throughout the analytical method. Spikes and duplicates for the batch are normally aliquots of the same sample. For organics, spikes are added at approximately 10 times the method detection limit. The RPD between the values of the matrix spike and matrix spike duplicate for organics or between the original and the duplicate for inorganics is taken as a measure of the precision of the analytical method.

In general, the tolerance limit for RPDs between laboratory duplicates should not exceed 20% for validation in homogeneous samples.

6.2.8 Check Standard/Samples

Inorganic and organic check standards or samples are prepared with reference standards or are available from the EPA. They are used as a means of evaluating analytical techniques of the analyst. Check standards or samples are subjected to the entire sample procedure, including extraction, digestion, etc., as appropriate for the analytical method utilized. The check standard or sample can provide information on the accuracy of the analytical method independent of various sample matrices.

6.3 Laboratory Instrumentation

Laboratory capabilities will be demonstrated initially for instrument and reagent/ standards performance as well as accuracy and precision of analytical methodology. A discussion of reagent/standard procedures and brief descriptions of calibration procedures for major instrument types follow.

All standards are obtained directly from EPA or through a reliable commercial supplier with a proven record for quality standards. All commercially supplied standards will be traceable to EPA or NIST reference standards and appropriate documentation will be obtained from the supplier. In cases where documentation is not available, the laboratory will analyze the standard and compare the results to a known EPA-supplied or previous NIST-traceable standard.

All sections of the laboratory will have SOP for standard and reagent procedures to document specific standard receipt, documentation, and preparation activities. In general, the individual SOPs incorporate the following items:

- Documentation and labeling of date received, lot number, date opened, and expiration date;
- Documentation of traceability;
- Preparation, storage, and labeling of stock and working solutions; and
- Establishing and documenting expiration dates and disposal of unusable standards.

Each laboratory instrument will be labeled clearly with a unique identifier that relates to all laboratory calibration documentation. Laboratory SOPs and calibration procedures are detailed in the laboratory's Quality Assurance Manual, available upon request.

7.0 Data Reporting and Validation

7.1 Deliverables

Once the contract laboratory has provided all analytical data and hydrogeologic information has been evaluated, Lu Engineers will develop a report on the findings of the investigation and remedial measures. The report will be prepared as indicated by the following outline:

1.0 SUMMARY OF FIELD ACTIVITIES
2.0 CONTAMINATION EVALUATION
  2.1 Findings
  2.2 Data Evaluation
  2.3 Regulatory Review
  2.4 Exposure Pathways
3.0 CONCLUSIONS AND RECOMMENDATIONS

The report will carefully document all findings of the investigation and will be supplemented with photographic documentation, subsurface soil logs, cross sections, and study area plans indicating groundwater flow direction and sub aerial contaminant distribution.

7.1.1 Category B Data Package

All analytical data will be reported by the laboratory with NYSDEC ASP Category B deliverables. The Category B data package includes:

1. A detailed summary of the report contents and any quality control outliers or corrective actions taken.
2. Chain of Custody documentation
3. Sample Information including: date collected, date extracted, date analyzed, and analytical methods.
4. Data (including raw data) for:
   - samples
   - laboratory duplicates
   - method blanks
   - spikes and spike duplicates
   - surrogate recoveries
   - internal standard recoveries
   - calibrations
   - any other applicable QC data
5. Method detection limits and/or instrument detection limits
6. Run logs, standard preparation logs, and sample preparation logs
7. Percent solids (where applicable).

7.1.2 Quality Assurance Reports

For the laboratory, a general QA report summarizing problems encountered throughout the laboratory effort, including sample custody, analyses, and reporting, is provided to Lu Engineers' project QA management by the QA coordinator. This report identifies areas of concern and possible resolutions in an effort to ensure data quality.

Upon completion of a project sampling effort, analytical and QC data will be included in a comprehensive report that summarizes the work and provides a data evaluation. A discussion of the validity of the results in the context of QA/QC procedures will be made, as well as a summation of all QA/QC activity.

Serious analytical or sampling problems will be reported to NYSDEC. Time and type of corrective action, if needed, will depend on the severity of the problem and relative overall project importance. Corrective actions may include altering procedures in the field, conducting an audit, or modifying laboratory protocol. All corrective actions will be implemented after notification and approval of NYSDEC.

In addition to the laboratory report narrative, QA data validation reports that include any contractual requirements will also be provided to NYSDEC. These QA reports will be submitted with the analytical data, on a monthly basis, or at the conclusion of the project.

7.2 Data Validation and Usability

Prior to the submission of the report to NYSDEC, all data will be evaluated for precision, accuracy, and completeness.

QA/QC requirements from both methodology and company protocols will be strictly adhered to during sampling and analytical work. All data generated will be reviewed by comparing and interpreting results from instrumental responses, retention time, determination of percent recovery of spiked samples or blanks, and reproducibility of duplicate sample results. All calculations and data manipulations are included in the appropriate methodology references. Control charts and calibration curves will be used to review the data and identify outlying results.

7.2.1 Data Validation

If necessary, a third-party validator will be responsible for an independent review of all analytical work performed under the NYSDEC ASP-CLP protocol. The functions will be to assess and summarize the quality and reliability of the data for the purpose of determining its usability and to document for the historical record of each Site any factors affecting data usability, such as discrepancies, poor laboratory practices, and Site locations that are difficult to analyze. The data validator will be responsible for determining completeness and compliance. Lu Engineers' QA officer will be responsible for determining data usability and overseeing the work of the data validator.

Information available to the data validator and the QA officer for performance of these functions include the NYSDEC ASP Category B data package, information from the sampling team regarding field conditions and field QA samples, chain-of-custody and shipping forms. The data package is designed to provide all necessary documentation to verify compliance with NYSDEC ASP CLP protocol and the accuracy and reliability of the reported results.

The laboratory will deliver the data package to the project QA coordinator for processing prior to submission to the data validator. The project QA coordinator will review the report for immediate problems, summarize the data for in-house use, and process the work order for the third-party data-validation subcontract within five working days.

In order to effectively review the data package, the data validator will obtain a general overview of each case. This includes the exact number of samples, their assigned numbers, and their matrix. The data validator will deliver the data validation report within 30 days of receipt of the data package.

If a problem arises between the data validator and the laboratory, the data validator must submit written questions to the laboratory. The laboratory will be required to respond in writing within 10 working days to correct any deficiencies. If the data validator does not receive a written response from the laboratory within the specified time period, the data in question shall be considered noncompliant.

Sampling locations will be obtained from the sampling records, such as the chain-of-custody forms. This information is necessary for preparation of the data summary, evaluation of adherence to sample holding times, discussion of matrix problems, and discussion of contaminants detected in the samples.

The following is a brief outline of the data validation process:

- Compilation of all samples with the dates of sampling, laboratory receipt, and analysis;
- Compilation of all QC samples, such as field blanks, field duplicates, MS/MSD samples, laboratory blanks, and laboratory replicates;
- Review of chain-of-custody documents for completeness and correctness;
- Review of laboratory analytical procedure and instrument performance criteria;
- Qualification of data outside acceptable QC criteria ranges;
- Preparation of a memorandum summarizing any problems encountered and the potential effects on data usability;
- Preparation of a data summary, including validated results, with sample matrix, location, and identification; and
- Tabulation of field duplicates, laboratory replicate, and blank results.

Copies of all data validation and usability reports, as well as all data summary packages, will be provided to the NYSDEC project manager. In addition, copies of all analytical raw data will be provided to NYSDEC upon request.

7.2.2 Data Usability

A Data Usability Summary Report (DUSR) will be provided after review and evaluation of the analytical data package. The DUSR will contain required elements listed in Appendix 2B of *DER-10 Technical Guidance for Site Investigation and Remediation*.

The DUSR will include a description of the samples and analytical procedures used. Any data deficiencies, protocol deviations, or quality control problems will be discussed as to their effect on data results. The report will also include any suggestions for resampling or reanalysis.

TABLE 1
SAMPLING AND ANALYSIS SUMMARY

Sample Type	Sample Location	Analytical Parameter	Analytical Method	Reporting Level	# Field Samples	Field Duplicates	Blanks		MS/MSD	Total
							Equip	Trip		
Subsurface Soils – Test Pit Excavations and Soil Borings	9 test pit excavations	TCL VOC RCRA Metals PCBs	8260 6020 8082	Category B (Level IV)	**9**	**1**	**1**		**1/1**	**13**
	5 soil borings (for monitoring wells)	TCL VOC RCRA Metals PCBs	8260 6020 8082		**5**	**1**	**1**		**1/1**	**9**
Groundwater – New Monitoring Wells	4 newly installed wells	TCL VOC TAL Metals PCBs	8260 6020 8082		**4**	**1**	**1**	**1**	**1/1**	**9**

Note: Sample quantities are estimated. Additional samples may be required according to actual field, subsurface soil, and groundwater conditions as encountered during Supplemental Site Investigation work activities.

Appendix B – Site Specific Health & Safety Plan

HEALTH AND SAFETY PLAN

Supplemental Site Investigation Work Plan
415 Orchard Street

City of Rochester
Environmental Restoration Project
415 Orchard Street and 354 Whitney Street
Monroe County, New York

Prepared For:

City of Rochester
Department of Environmental Services
Division of Environmental Quality
30 Church Street
Rochester, New York 14614

Prepared By:

Lu Engineers
ENVIRONMENTAL • TRANSPORTATION • CIVIL

Lu Engineers
175 Sully's Trail
Suite 202
Pittsford, New York 14534

May 2015

Project No. 4216-06

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LU ENGINEERS
SITE SAFETY PLAN

A. GENERAL INFORMATION

Project Title: Orchard/Whitney Site
City of Rochester
Environmental Restoration
Supplemental Site Investigation

Lu Project No. 4216-06

Project Manager: Gregory L. Andrus, CHMM

Project Director: Robert Hutteman, P.E.

Location: 415 Orchard Street
City of Rochester, Monroe County, New York

Prepared by: Ariadna Cheremeteff

Date Prepared: May 2015
Date Revised: ____________

Approved by: ____________ Date Approved: ____________

Site Safety Officer Review: Susan Hilton Date Reviewed: ____________

Scope/Objective of Work: Remedial Investigation of Site. The following tasks will be included:

- Task 1: Test Pit Excavations
- Task 2: Soil Borings
- Task 3: Subsurface Soil Sampling
- Task 4: Well Installations
- Task 5: Groundwater Sampling

Proposed Date of Field Activities: July 2015

Background Information: [ ] Complete [X]* Preliminary (limited analytical data)
* Background information provided by NYSDEC and City of Rochester

Overall Chemical Hazard: [ ] Serious [X] Moderate
[ ] Low [ ] Unknown

Overall Physical Hazard: [ ] Serious [X] Moderate
[ ]Low [ ] Unknown

B. SITE/WASTE CHARACTERISTICS

Waste Type(s):

[X] Liquid [X] Solid [X] Sludge [ ] Gas/Vapor

Characteristic(s):

[ ] Flammable/Ignitable [X] Volatile [ ] Corrosive [ ] Acutely Toxic
[ ] Explosive (moderate) [ ] Reactive [X] Carcinogen [ ] Radioactive

Other: ______________________________

Physical Hazards:

[X] Overhead [ ] Confined Space [ ] Below Grade [X] Trip/Fall
[X] Puncture [X] Burn [X] Cut [X] Splash
[X] Noise [X] Other: Heat Stress

Site History/Description and Unusual Features:

The Site has been used for various commercial and industrial uses since the early 1900s. From 1915 to 1922, the North East Electric Company operated on the Site. General Motors occupied the Site from 1930 to 1967. Industrial activities including the production of electrical equipment, heat treating, plating, coal storage, boiler operations, petroleum fuel storage and industrial wastewater treatment were performed on the Site.

After General Motors closed operations, other industrial operations took place at the Site including; metal finishing, synthetic foam production, printing, plastics manufacturing and warehousing. These operations took place at the Site until the early 1990s.

The Orchard/Whitney Site (Site) is located at 415 Orchard Street and 354 Whitney Street in the City of Rochester, New York (Figure 1). The Site has a combined area of 3.9 acres and is located near the intersection of Lyell Avenue and Broad Street. One multi-story structure of approximately 128,900 square feet, formerly located on Whitney Street, and was demolished in 2008. There was also one multi-story structure of approximately 371,600 square feet formerly located on Orchard Street and was demolished in 2015.

Previous environmental investigations have revealed that volatile organic compounds (VOCs), several metals, and semi-volatile organic compounds (SVOCs) have been detected in subsurface soils and groundwater above NYSDEC Soil Guidance Values on the Whitney Street parcel. Information on the Orchard Street parcel is limited. There are no local private wells in the area of the Site and the surrounding community is on public water and sewer service.

Locations of Chemicals/Wastes: Soil, sediment, surface water and/or groundwater.

Estimated Volume of Chemicals/Wastes: Unknown.

Site Currently in Operation: [ ] Yes [X] No [ ] Not Applicable

C. HAZARD EVALUATION

PHYSICAL HAZARD EVALUATION:		
TASK	**HAZARD(S)**	**HAZARD PREVENTION**
Task 1 - 5	Contact with or inhalation of contaminants, potentially in high concentration in sampling media and/or fire and explosion.	To minimize exposure to chemical contaminants, a thorough review of suspected contaminants should be completed and implementation of an adequate protection program. Under-ground vaults to be ventilated during inspections. Field safety equipment will be used to minimize hazards.
Task 1, 2, & 4	Standard Drilling Rig Hazards	Wear hard hat, keep back from drilling operations, only driller and helper are to be in “drilling zone”
Task 1 - 5	Drum opening/sampling	Proper protective equipment, drum opening techniques, equipment and the use of remote sampling when possible.
Task 1 - 4	Overhead Hazards/ Falling Objects	**See Appendix B**
Task 1 - 5	Back strain and muscle fatigue, ergonomic stress due to lifting.	Use proper lifting techniques and limit load to prevent back strain.
Task 1 - 5	Heat stress/ cold stress exposure.	Implement heat stress management techniques such as shifting work hours, increasing fluid intake, and monitoring employees**. See Appendix A.**
Task 1 - 5	Slip/ tripping/ fall.	Observe terrain and drilling equipment while walking to minimize slips and falls. Steel-toed boots provide additional support and stability. Use adequate lighting. Inspect Site and mark existing hazards.
Task 1 - 5	Medical Waste (Sharps)	Carefully observe terrain while walking and any on-Site materials before handling. Gloves should be worn for any contact with on-Site materials.
Task 1 - 5	Noise	**See Appendix B**
Task 1 - 5	Native wildlife presents the possibility of insect bites and associated diseases.	Avoid wildlife when possible.
Task 1 - 5	Sunburn.	Apply sunscreen, wear appropriate clothing.
Task 1, 2, & 4	Utility Lines.	**See Appendix B**
Task 1 - 5	Weather Extremes.	Establish Site-specific contingencies for severe weather situations. Discontinue work in severe weather.

Physical Hazard Evaluation: Basic health and safety protection (steel-toed boots, work clothes, and safety glasses or goggles) will be worn by all personnel at all times. Any allergies should be reported to the Site Safety Officer prior to the start of the project.

D. SITE SAFETY WORK PLAN

Site Control: Site perimeter is fenced and gated, though continued evidence of vandalism suggests Site is not fully secure.

Perimeter Identified?	**[Y]**	**Site Secured?**	**[N]**
Work Areas Designated?	**[Y]**	**Zone(s) of contamination identified?**	**[N]**

Anticipated Level of Protection (cross-reference task numbers in Section C):

	A	B	C	D
Task 1-5			Available	X

All Site work will be performed at Level D (steel-toed boots, work clothes, eye protection, gloves and hard hats) unless monitoring indicates otherwise. Gloves will be worn if contact with Site soil, sediment or water is anticipated, due to concerns of PCB contamination. Level C will be available, and used when indicated by PID of 1 ppm or greater above ambient air.

See Appendices A, B and C for specific Site safety requirements.

Air Monitoring:
Lu Engineers will conduct air monitoring during the intrusive investigations. If action levels are exceeded during intrusive investigation, appropriate precautions will be taken.

Action Levels:
PID readings of 1 to 5 ppm above background at breathing zone and sustained for 1 minute, Action: Upgrade to Level C protection, continuous air monitoring.

PID readings of 5 to 300 ppm above background at breathing zone and sustained for 1 minute, Action: Upgrade to Level B protection, continuous air monitoring.

PID readings of >300 ppm above background at breathing zone and sustained for 1 minute, Action: Stop work, evacuate work zone and evaluate with continuous air monitoring.

O_2 readings must remain between 19.5% and 22.0%. Explosivity must be above 10% LEL. The area must be evacuated and ignition sources eliminated if levels are not within their standard. These atmosphere factors will be measured at a position that would give the earliest indication of a hazardous condition forming not at the breathing zone. Appropriate actions, initially evacuation of the immediate work area, will be taken if established action levels area exceeded.

If particulate levels exceed a level of 2.5 times background (upwind levels subtracted from downwind concentration) or a level of 150 mcg/m^3, dust control measures will be initiated and the dust generating activity suspended until levels decrease below the action level. Perimeter monitoring will be conducted if the action level is obtained at the work area.

All air monitoring results as well as wind direction and speed (estimates) will be documented in the Site specific log book.

Decontamination Solutions and Procedures for Equipment, Sampling Gear, etc.:
Disposable sampling equipment will be used where possible. If decon is necessary, distilled or deionized water and alconox will be used. A 10% nitric acid rinse will be added if metals sampling is to be conducted.

Personnel Decon Protocol:
Personal protective clothing will be removed in a manner that will minimize the potential of contaminant to skin contact. Visible contamination will be removed from protective clothing prior to the individual doffing the articles. Soap, water and paper towels will be available for all personnel and will be used before eating, drinking or leaving the Site. Personnel will shower upon return to home or hotel. Disposable PPE will be double-bagged and disposed of as non-hazardous waste unless PCBs are detected. If PCBs are detected, the PPE will be disposed of accordingly.

Decontamination Solution Monitoring Procedures, if Applicable:
All decontamination procedures will take place in a well ventilated area. Decontamination solutions will be collected and sampled for proper disposal.

Special Site Equipment, Facilities or Procedures
(Sanitary Facilities and Lighting Must Meet 29CFR 1910.120):
All personnel will be required to maintain the Buddy System at all times. A portable toilet and potable water will be available on Site. All parties will be required to attend an on-Site briefing, which will identify the roles of each organization’s personnel and will integrate emergency procedures for all Site participants.

Site Entry Procedures and Special Considerations:
Any confined spaces will be marked and access restricted. All overhead hazards should be marked, tripping/floor hazards should be marked and barricaded if necessary, other sharp edges, drop offs, flooded areas or hazardous debris appropriately identified. Electrical hazards should be identified if power is activated. Ventilation will be provided, to the extent necessary, to reduce hazardous atmospheres.

Entry to the Site should be limited through the Whitney Street gate. The gate should be closed and locked when not in use both when personnel are on or off-Site in order to restrict unauthorized individuals. The Buddy System should be employed at all times on-Site and entering and exiting the Site, along with the work zone areas.

Work Limitations (time of day, weather conditions, etc.) and Heat/Cold Stress Requirements:
All work will be completed during daylights hours. Severe inclement weather may be cause to suspend outdoor activities. Heat stress protocol will dictate work/rest regimen. Heavy equipment will not be used during electrical storms.

General Spill Control, if Applicable:
Absorbent material will be available to control spills during the collection of liquid samples (e.g. USTs, drums, floor drains, and sumps).

Investigation Derived Material (i.e., Expendables, Decon Waste, Cuttings) Disposal:
Investigation derived waste soils and water will be collected in drums and/or an on-Site tank and stored securely on-Site prior to being sampled for disposal. Expendables such as disposable sampling equipment, gloves and towels, will be bagged for disposal. Expendables that have contacted PCB-containing oils will be bagged separately and labeled for appropriate disposal.

Sampling Handling Procedures Including Protective Wear:
Samples collected from drums, sumps, USTs and floor drains will be handled with neoprene outer gloves prior to decontamination. At minimum nitrile surgical gloves will be worn while handling all other samples during labeling, documentation and packaging.

Team Member*	Responsibility
Greg Andrus	Field Team Leader
Greg Andrus	Site Safety Officer
Ari Cheremeteff	Team Member
Casey Bok	Team Member
Laura Gregor	Team Member

* All entries into the work zone require "Buddy System" use. All Lu Engineers' field staff participate in a medical monitoring program and have completed applicable training per 29CFR 1910.120. Respiratory protection program meets requirements of 29CFR 1910.134.

E. EMERGENCY INFORMATION

LOCAL RESOURCES

Ambulance:	911
Hospital Emergency Room:	Strong Memorial Hospital (585) 275-4551
	601 Elmwood Avenue, Rochester, New York
Poison Control Center:	911
Police (include local, county sheriff, state):	911
Fire Department:	911
Airport:	N/A
Laboratory:	TBD
UPS/Federal Express:	N/A

SITE RESOURCES

Site Emergency Evaluation Alarm Method:	Sound vehicle horn.
Water Supply Source:	Gallons of water will be available in vehicles.
Telephone Location, Number:	None available
Cellular Phone, if Available:	TBD
Radio:	TBD
Other:	TBD

EMERGENCY CONTACTS

1.	Fire/Police:	911
2.	Lu Engineers, Safety Director:	(585) 385-7417, Ext. 215 (office)
3.	Lu Engineers, Greg Andrus:	(585) 385-7417, Ext. 215 (office)

EMERGENCY ROUTES

Note: Field team must know route(s) prior to start of work.

Directions from the Site to Strong Memorial Hospital (map on following page):
Turn right onto Whitney Street. Take a right onto Lyell Avenue. Turn right onto Broad Street (1 mile). Stay straight to go onto Ford Street. Turn slight right onto South Plymouth Avenue NY-383 (1.6 miles). Turn left on Elmwood Avenue, the hospital is at 601 Elmwood Avenue.

On-Site Assembly Area: At site entry point at Whitney Street Gate.

Off-Site Assembly Area: The intersection of Whitney Street and Lyell Avenue.

Emergency egress routes to get off-Site: N/A.

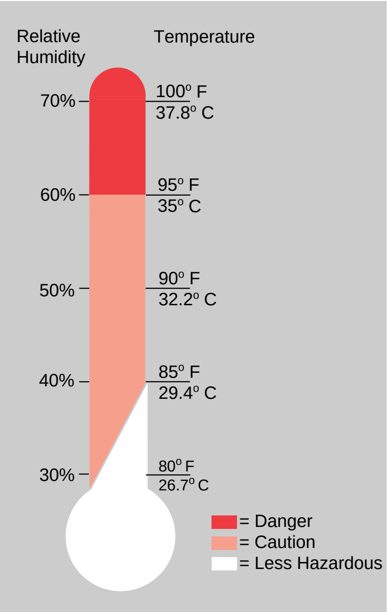
APPENDIX A

HEAT STRESS EXPOSURE

THE HEAT EQUATION

HIGH TEMPERATURE + HIGH HUMIDITY + PHYSICAL WORK = HEAT ILLNESS

When the body is unable to cool itself through sweating, **serious** heat illnesses may occur. The most severe heat-induced illnesses are **heat exhaustion** and **heat stroke**. If actions are not taken to treat heat exhaustion, the illness could progress to heat stroke and possible **death**.



U.S. Department of Labor
Occupational Safety and Health Administration
OSHA 3154
1998

HEAT EXHAUSTION

What Happens to the Body:

HEADACHES, DIZZINESS/LIGHT HEADEDNESS, WEAKNESS, MOOD CHANGES (irritable, or confused/can't think straight), FEELING SICK TO YOUR STOMACH, VOMITING/THROWING UP, DECREASED and DARK COLORED URINE, FAINTING/PASSING OUT, and PALE CLAMMY SKIN.

What Should Be Done:

- Move the person to a cool shaded area to rest. Don't leave the person alone. If the person is dizzy or light headed, lay them on their back and raise their legs about 6-8 inches. If the person is sick to their stomach lay them on their side.
- Loosen and remove any heavy clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if they are not feeling sick to their stomach.
- Try to cool the person by fanning them. Cool the skin with a cool spray mist of water or wet cloth.
- If the person does not feel better in a few minutes call for emergency help (Ambulance or Call 911).

(If heat exhaustion is not treated, the illness may advance to heat stroke.)

HEAT STROKE—A MEDICAL EMERGENCY

What Happens to the Body:

DRY PALE SKIN (no sweating), HOT RED SKIN (looks like a sunburn), MOOD CHANGES (irritable, confused/not making any sense), SEIZURES/FITS, and COLLAPSE/PASSED OUT (will not respond).

What Should Be Done:

- Call for emergency help (Ambulance or Call 911).
- Move the person to a cool shaded area. Don't leave the person alone. Lay them on their back and if the person is having seizures/fits remove any objects close to them so they won't strike against them. If the person is sick to their stomach lay them on their side.
- Remove any heavy and outer clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if they are alert enough to drink anything and not feeling sick to their stomach.
- Try to cool the person by fanning them. Cool the skin with a cool spray mist of water, wet cloth, or wet sheet.
- If ice is available, place ice packs under the arm pits and groin area.

How to Protect Workers

- Learn the signs and symptoms of heat-induced illnesses and what to do to help the worker.
- Train the workforce about heat-induced illnesses.
- Perform the heaviest work in the coolest part of the day.
- Slowly build up tolerance to the heat and the work activity (usually takes up to 2 weeks).
- Use the buddy system (work in pairs).
- Drink plenty of cool water (one small cup every 15-20 minutes)
- Wear light, loose-fitting, breathable (like cotton) clothing.
- Take frequent short breaks in cool shaded areas (allow your body to cool down).
- Avoid eating large meals before working in hot environments.
- Avoid caffeine and alcoholic beverages (these beverages make the body lose water and increase the risk for heat illnesses).

Workers Are at Increased Risk When

- They take certain medication (check with your doctor, nurse, or pharmacy and ask if any medicines you are taking affect you when working in hot environments).
- They have had a heat-induced illness in the past.
- They wear personal protective equipment (like respirators or suits).

APPENDIX B

ADDITIONAL POTENTIAL PHYSICAL AND CHEMICAL HAZARDS

ADDITIONAL POTENTIAL PHYSICAL AND CHEMICAL HAZARDS	
POTENTIAL PHYSICAL HAZARDS	**CONTROL METHODS**
Overhead Hazards/Falling Objects	Overhead hazards will be identified prior to each task (i.e., inspecting drill rig mast, building structure). Hard hats will be required for each task that poses an overhead hazard.
Contact with Utilities	Prior to initiating Site activities, all utilities will be located by the appropriate utility company and will be marked and/or barricaded to minimize the potential of accidental contact. A minimum distance of 25 feet between the derrick and overhead power lines must be maintained at all times.
Noise Exposure	Areas of potentially high sound pressure levels (>85 dBA) will be restricted to authorized personnel only. Engineering controls will be used to the extent possible. Hearing protection will be made available to all workers on-Site. Exposure to time-weighted average levels in excess of 85 dBA is not anticipated.
POTENTIAL CHEMICAL HAZARDS	**GENERAL CONTROL METHODS**
Contaminant Inhalation	Direct reading instruments will be used to monitor airborne contaminants. Established Lu Engineers' action levels will limit exposure to safe levels. Respiratory protection will be used as appropriate.
Contaminant Ingestion	Standard safety procedures such as restricting eating, drinking, and smoking to the support zone and utilizing proper personal decontamination procedures will minimize ingestion as a potential route of exposure.
Dermal Contaminant Contact	The proper selection and use of personal protective clothing and decontamination procedures will minimize dermal contaminant contact.
Potential contact with lower concentration waste and naturally occurring contaminants (i.e., methane)	Dermal contact with contaminants will be minimized by proper use of the following PPE: • Tyvex coveralls • Neoprene gloves • Booties (latex) or over-boots.

APPENDIX C

HAZARD EVALUATION SHEETS / MSDS

CHEMICAL HAZARD EVALUATION										
Task Number	Compound	Exposure Limits (TWA)			Dermal Hazard (Y/N)	Route(s) of Exposure	Acute Symptoms	Odor Threshold/ Description	FID/PID	
		PEL	REL	TLV					Relative Response	Ioniz. Poten. (eV)
1 - 5	Aroclor 1254 Polychlorinated biphenyl (PCB)*	0.5 sk mg/m^3	---	0.5 sk mg/m^3	Y	Abs, Inh, Ing	Irritation to eyes and skin; dermatitis, liver damage	Mild hydrocarbon odor	---	---
1 - 5	Aroclor 1242 Polychlorinated biphenyl (PCB)*	1.0 sk mg/m^3	---	1.0 sk mg/m^3	Y	Abs, Inh, Ing	Irritation to eyes and skin; dermatitis, liver damage	Mild hydrocarbon odor	---	---
1 - 5	Aroclor 1260 Polychlorinated biphenyl (PCB)*	0.5 sk mg/m^3	---	0.5 sk mg/m^3	Y	Abs, Inh, Ing	Irritation to eyes and skin; dermatitis, liver damage	---	---	---
1 - 5	Benzene*	1 ppm	---	10 ppm	Y	Inh, Abs, Ing, Con	Irritation to eyes, skin, nose, respiratory system; headache, nausea, dizziness, drowsiness, unconsciousness, harmful, fatal if aspirated into lungs	Colorless to light yellow liquid, sweet aromatic odor	0.5	9.25
1 - 5	Ethylbenzene	100 ppm	---	100 ppm	Y	Inh, Ing, Con	Irritation to eyes, skin, mucous membranes; dermatitis, narcosis, , trouble breathing, paralysis, headache, nausea, headache, dizziness, coma	Colorless liquid, aromatic odor	0.5	8.77

CHEMICAL HAZARD EVALUATION										
		Exposure Limits (TWA)							FID/PID	
Task Number	Compound	PEL	REL	TLV	Dermal Hazard (Y/N)	Route(s) of Exposure	Acute Symptoms	Odor Threshold/ Description	Relative Response	Ioniz. Poten. (eV)
1 - 5	Mercury	0.1 sk mg/m^3 ceiling	0.1 mg/m^3 ceiling 0.05 mg/m^3 ceiling	0.025 sk mg/m^3	Y	Inh, Abs, Ing, Con	Severe respiratory tract damage, sore throat, coughing, pain, tightness in chest, breathing difficulties, headache, muscle weakness, anorexia, GI disturbances, ringing in ear, liver changes fever, bronchitis, pneumonitis, burning in mouth, abdominal pain, vomiting, corrosive ulceration, bloody diarrhea, weak & rapid pulse, paleness, exhaustion, tremors, collapse, thirst, burns and irritates skin, eyes, blurred vision, pain in eyes	Silver-white, heavy, odorless liquid metal	---	N/A
1 - 5	Trichloroethene*(TCE)	100 ppm (per 6/97 NIOSH Pocket Guide)			Y	Inh, Abs, Ing, Con	Irritation to eyes, skin, mucous membranes and GI, headache, vertigo, fatigue, giddiness, tremors, vomiting, nausea, may burn skin, visual disturbance, paresthesia, cardiac arrhythmias	Colorless liquid, sometimes dyed blue, chloroform odor	---	9.45

CHEMICAL HAZARD EVALUATION

Task Number	Compound	Exposure Limits (TWA)			Dermal Hazard (Y/N)	Route(s) of Exposure	Acute Symptoms	Odor Threshold/ Description	FID/PID	
		PEL	REL	TLV					Relative Response	Ioniz. Poten. (eV)
1 - 5	Toluene	200 ppm	---	50 ppm	Y	Inh, Abs, Ing, Con	Irritation to eyes, skin, nose; upper respiratory tract, fatigue, weak, confusion, dizziness, headache, drowsiness, abdominal spasms, dilated pupils, euphoria	Colorless liquid, sweet pungent, benzene like odor	0.5	8.82
1 - 5	Xylene(s)	100 ppm	---	100 ppm	Y	Inh, Ing, Abs, Con	Irritation to eyes, nose, throat, skin; nausea, vomiting, headache, ringing in ears, severe breathing difficulties (that may be delayed in onset), substernal pain, coughing hoarseness, dizziness, excited, burning in mouth, stomach, dermatitis (removes oils from skin), corneal burns	Colorless liquid, aromatic odor (solid below 56 F	.5	8.44

KEY:

PEL = Permissible Exposure Limit
REL = Recommended Exposure Limit
--- = Information not available
TLV = Threshold Limit Value(ACGIH)

Inh = Inhalation
Ing = Ingestion
mg/m^3 = Milligrams per cubic meter
* = Chemical is a known or suspected carcinogen

Abs = Skin Absorption
Con = Skin and/or eye Contact
ppm = Parts per million
sk = Skin notation

APPENDIX D

EQUIPMENT CHECKLIST

EQUIPMENT CHECKLIST

PROTECTIVE GEAR			
LEVEL A	**N/A**	**LEVEL B**	**N/A**
SCBA		SCBA	
SPARE AIR TANKS		SPARE AIR TANKS	
ENCAPSULATING SUITE (Type)		PROTECTIVE COVERALL (Type)	
SURGICAL GLOVES		RAIN SUIT	
NEOPRENE SAFETY BOOTS		BUTYL APRON	
BOOTIES		SURGICAL GLOVES	
GLOVES (Type)		GLOVES (Type)	
OUTER WORK GLOVES		OUTER WORK GLOVES	
HARD HAT		NEOPRENE SAFETY BOOTS	
CASCADE SYSTEM		BOOTIES	
5-MINUTE COOLING VEST		HARD HAT WITH FACE SHIELD	
		CASCADE SYSTEM	
		MANIFOLD SYSTEM	
LEVEL C		**LEVEL D**	
ULTRA-TWIN RESPIRATOR	X	ULTRA-TWIN RESPIRATOR (available)	X
POWER AIR PURIFYING RESPIRATOR		CARTRIDGES (Type GMC-H)(available)	X
CARTRIDGES (Type GMC-H)	X	5-MINUTE ESCAPE MASK (available)	
5-MINUTE ESCAPE MASK		PROTECTIVE COVERALL (Type Tyvek/Saranax)	X
PROTECTIVE COVERALL (Type Tyvek/Saranax)	X	RAIN SUIT (available)	X
RAIN SUIT		NEOPRENE SAFETY BOOTS	
BUTYL APRON		BOOTIES (available)	X
SURGICAL GLOVES	X	NITRILE	
GLOVES (Type: Nitrite/Neoprene)	X	HARD HAT WITH FACE SHIELD (available)	X
OUTER WORK GLOVES		SAFETY GLASSES	X
NEOPRENE SAFETY BOOTS		GLOVES (Type: Surgical)	X
HARD HAT WITH FACE SHIELD	X	WORK GLOVES (Type: Neoprene/Nitrile)(available)	X
BOOTIES	X	SAFETY BOOTS	X
HARD HAT		BLAZE ORANGE VEST	X

EQUIPMENT CHECKLIST

INSTRUMENTATION	NO.	**FIRST AID EQUIPMENT**	NO.
OVA		FIRST AID KIT	X
THERMAL DESORBER		OXYGEN ADMINISTRATOR	
O_2/EXPLOSIMETER W/CAL.KIT (Drilling)	X	STRETCHER	
PHOTOVAC TIP		PORTABLE EYE WASH	
PID	X	BLOOD PRESSURE MONITOR	
MAGNETOMETER		FIRE EXTINGUISHER	X
PIPE LOCATOR			
WEATHER STATION		**DECON EQUIPMENT**	
DRAEGER PUMP, TUBES ( )		WASH TUBS	
BRUNTON COMPASS		BUCKETS	X
MONITOX CYANIDE		SCRUB BRUSHES	X
HEAT STRESS MONITOR		PRESSURIZED SPRAYER	
NOISE EQUIPMENT		DETERGENT (Type: Alconox) = TSP	X
PERSONAL SAMPLING PUMPS		SOLVENT (HEXANE)	
MINI-RAM (Particulates) (Drilling)	X	PLASTIC SHEETING	X
		TARPS AND POLES	
		TRASH BAGS	X
RADIATION EQUIPMENT		TRASH CANS	
DOCUMENTATION FORMS		MASKING TAPE	
PORTABLE RATEMETER		DUCT TAPE	X
SCALER/RATEMETER		PAPER TOWELS	X
NaI Probe		FACE MASK	
ZnS Probe		FACE MASK SANITIZER	
GM Pancake Probe		FOLDING CHAIRS	
GM Side Window Probe		STEP LADDERS	
MICRO R METER		DISTILLED WATER	X
ION CHAMBER			
ALERT DOSIMETER			
MINI-RAD			

EQUIPMENT CHECKLIST

SAMPLING EQUIPMENT	NO.	MISCELLANEOUS (cont.)	NO.
4-OZ BOTTLES	X	BUNG WRENCH	X
1 LITER AMBER BOTTLES	X	SOIL AUGER	X
VOA BOTTLES	X	PICK	
SOIL SAMPLING (CORING) TOOL	X	SHOVEL	X
SOIL VAPOR PROBE		CATALYTIC HEATER	
THIEVING RODS WITH BULBS	X	PROPANE GAS	
SPOONS	X	BANNER TAPE	X
GENERAL TOOL KIT	X	SURVEYING METER STICK	X
FILTER PAPER		CHAINING PINS AND RING	
PERSONAL SAMPLING PUMP SUPPLIES		TABLES	
4-OZ JARS	X	WEATHER RADIO	
		BINOCULARS	
VAN EQUIPMENT		MEGAPHONE	
TOOL KIT		PORTABLE RADIOS (4)	X
HYDRAULIC JACK		CELL PHONE	X
LUG WRENCH		CAMERA	X
TOW CHAIN		HEARING PROTECTION	X
VAN CHECK OUT			
GAS		**SHIPPING EQUIPMENT**	
OIL		COOLERS	X
ANTIFREEZE		PAINT CANS WITH LIDS, 7 CMIPS EACH	
BATTERY		VERMICULITE	
WINDSHIELD WASH		SHIPPING LABELS	X
TIRE PRESSURE		DOT LABELS: “DANGER”, “UP”;	
		“INSIDE CONTAINER COMPLIES...”;	
MISCELLANEOUS		“HAZARD GROUP”	
PITCHER PUMP		STRAPPING TAPE	X
SURVEYOR’S TAPE	X	BOTTLE LABELS	X
100 FIBERGLASS TAPE	X	BAGGIES	X
300 NYLON ROPE		CUSTODY SEALS	X
NYLON STRING	X	CHAIN-OF-CUSTODY FORMS	X
SURVEYING FLAGS	X	FEDERAL EXPRESS FORMS	X
FILM		CLEAR PACKING TAPE	X
WHEEL BARROW			

Appendix C – Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

Supplemental Site Investigation

City of Rochester
Environmental Restoration Project
415 Orchard Street and 354 Whitney Street
Monroe County, New York

Prepared For:

City of Rochester
Department of Environmental Services
Division of Environmental Quality
30 Church Street
Rochester, New York 14614

Prepared By:

Lu Engineers
175 Sully's Trail
Suite 202
Pittsford, New York 14534

May 2015

Project No: 4216-06

Table of Contents

1.0 Introduction

This Community Air Monitoring Plan (CAMP) has been prepared by Lu Engineers on behalf of the City of Rochester. This CAMP addresses potential volatile organic compound (VOC) and particulate air quality issues which may arise during planned Supplemental Site Investigation (SSI) activities at the Orchard/Whitney Site located at 415 Orchard Street and 354 Whitney Street, Rochester, New York.

The investigation activities planned during the portion of the project covered by this CAMP include test pit excavations, soil borings, groundwater monitoring well installations, and groundwater sampling.

Based on previous studies completed at the Site and the Site's history, the primary chemicals of concern at the subject site are various volatile organic compounds (VOCs) and metals. Disturbance of soils and/or groundwater could result in volatilization of the organic compounds and fugitive dust releases to the ambient air creating possible nuisance or health threats to the neighborhood.

This CAMP details real-time monitoring activities to be carried out during the remedial investigation activities, to minimize the potential for neighborhood exposure to airborne hazards resulting from fugitive emissions during field work.

Air monitoring and response actions for VOCs and particulates are included in this CAMP. VOC and particulate monitoring of the work areas will also be conducted as part of the Health and Safety Plan (HASP) that will be implemented during Remedial Investigation activities by Lu Engineers. The following monitoring, response levels and actions are adapted from DER-10 NYSDOH Generic Community Air Monitoring Plan.

2.0 Methodology

The Remedial Investigation activities at the Site will consist primarily of test pit excavations, soil borings, groundwater well installations, and groundwater sampling. The following programs will be implemented to monitor and, if necessary, control the potential migration of fugitive VOCs and particulates on the property.

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 newly installed wells. Periodic monitoring during sampling may reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location.

2.1 Perimeter Monitoring

For each day of intrusive field work, a wind sock or flag will be used to monitor wind direction in the area of the work zone. Based upon the daily wind direction, two temporary monitoring points will be identified, one upwind and one downwind of the work area, at the perimeter of the site or field work location.

VOC monitoring will be done with a photoionization detector (PID-MiniRAE Model 2000 or its equivalent) fitted with a 10.6 eV lamp. Prior to the commencement of field work each day, background measurements of VOC concentrations will be logged at the upwind and downwind locations with the drill rig engine and any other gas/diesel engines operation on Site. Thereafter, readings will be recorded at approximate 15-minute intervals. These readings will be used to observe the difference between upwind and downwind VOC levels. If at any time, the downwind VOC levels exceed upwind levels (adjusted for engine exhaust) by 5 ppm (sustained), the work will be temporarily halted. The Contractor will then be required to implement the means necessary to control VOCs and explosive gases, similar to those discussed in Section 2.3.

Monitoring for explosivity using an explosive gas meter will be routinely conducted during site activities as a precautionary measure to ensure site personnel are not subjected to any dangerous conditions.

Particulate monitoring will be done with a real time particulate meter (Mini Ram) capable of monitoring particulate matter less than 10 microns in size (PM-10). Prior to the commencement of field work each day, background measurements of particulate levels will be logged at the upwind and downwind locations. Thereafter, readings and visual observations will be recorded at approximate 15-minute intervals. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed.

Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided 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.

2.2 Work Area Monitoring

In addition to perimeter monitoring, monitoring for VOCs, particulates and explosive gases will be carried out continuously within the work area to monitor personal exposures and to compare work area readings with downwind and upwind readings. The first readings of the day will be obtained prior to the commencement of work to obtain daily background readings. Readings will be logged along with the perimeter measurements. Specific monitoring procedures to be used in the work zone can be found in the Health and Safety Plan (HASP) prepared for this site.

2.3 Minor Vapor Emissions Response Plan

If the ambient air concentration of total organic vapors exceeds 5 ppm (sustained) above the background at the perimeter of the work area, activities will be halted and monitoring continued.

If the total organic vapor level decreases below 5 ppm above background, work activities can resume, with emphasis given to observing spikes in levels. If the total organic vapor levels are greater than 5 ppm over background but less that 25 ppm over background at the perimeter of the work area, activities can resume provided the organic level 200 ft. downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over the background. (The locations of structures in the subject neighborhood may not allow the 200 ft. buffer zone to be used).

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to evaluate if the vapor emission levels exceed those specified in Section 2.4, Major Vapor Emission Response Plan.

2.4 Major Vapor Emission Response Plan

If total organic vapor levels greater than 5 ppm over background are identified 200 ft. downwind from the work area or half the distance to the nearest residential or commercial structure, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, total organic vapor levels greater than 5 ppm above background persist 200 ft. downwind or half the distance to the nearest residential or commercial structure, then the air quality must be monitored within 20 ft. of the perimeter of the nearest residential or commercial structure (20-foot zone).

If efforts to abate the emission source area are unsuccessful and if the organic vapor levels continue to persist at or near 5 ppm above background for more than 30 minutes in the 20-foot zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect.

The Major Vapor Emission Response Plan shall also be immediately placed into effect if organic vapor levels are greater than 10 ppm above background at the 20-foot zone.

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan will be contacted.
2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation. Evacuation or neighborhood notification plans can be discussed at that time.
3. Air monitoring will be conducted at 30-minute intervals within the 20-foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

3.0 Record Keeping and Quality Control

For the duration of the field activities, a monitoring log book will be kept to record calibration, operational notes and monitoring readings. All readings must be recorded and available for State review. Instantaneous readings, if any, used for decision purposes should also be recorded. The results of the Community Air Monitoring Program will be incorporated by Lu Engineers into required reports.

Instrumentation will be calibrated and/or operationally checked, either daily or at intervals recommended by the manufacturer. Only approved calibration gases will be used. All operators will have been trained in the proper use, maintenance, limitation, and interpretation of results of the monitoring equipment.

Appendix D – Qualifications

Mr. Andrus started his career as a Field Geologist in 1987 and joined Lu Engineers in 1993 as a Geologist and Environmental Engineer. His areas of expertise include hazardous materials management, remedial investigations, site remediation, petrochemical/bulk storage, geology and hydrogeology. Projects have ranged from large industrial clients and federal facilities to small commercial and retail facilities. He has presented at the Joint Services Environmental Management Conference, the National Brownfield Conference and the National Air and Waste Management Association.

Project Experience

Orchard Whitney Brownfield ERP, Rochester NY

- Project Manager
  - Provided environmental services for the Orchard Whitney Brownfield site for the City of Rochester under the NYSDEC Environmental Restoration Program.
  - Included extensive hazardous materials inspections, sampling and testing programs, Remedial Investigation/Interim Remedial Measures, Geophysical Investigation, contaminated soil and groundwater remediation.
  - Currently completing an eight-year remedial program and designing a demolition program for the remaining large industrial building on the site.

Andrews Street Brownfield ERP, Rochester, NY

- Project Manager
  - Preparation of USEPA QAPP and remedial workplan.
  - Removal of areas of petroleum and chlorinated solvent contamination and environmental conditions that are considered to have the greatest potential for human exposure and migration.
  - Prepared construction completion report for remedial phase of the project.

62-64 Scio Street Brownfield Site, City of Rochester, NY

- Project Manager
  - Remedial investigation and cleanup of petroleum and related contamination in highly developed urban setting.
  - Remedial design and implementation including bulk removal, use of direct oxygen injection for groundwater remediation and mitigation of subsurface vapor migration into adjacent commercial buildings.

Rome Research Site Environmental Term Contract USAF, Rome, NY

- Program Manager
  - Served five consecutive multi-year, multi-million dollar IDIQ contracts to provide civil and environmental engineering services to the AFRL/RRS at the former Griffiss Air Force Base.
  - Conducted numerous environmental and civil engineering assignments including wetland delineations, multiple BRAC site investigations and cleanups, decommissioning of wells, archaeological surveys, UST and disposal area closures, design of backflow preventers, on-call environmental sampling services, demolition and hazmat assessment asbestos surveys and wastewater sampling.

Churchville Ford Site Town of Churchville, NY

- Project Manager
  - Identified nature and extent of chlorinated solvent contamination.
  - Completed the remedial site design.
  - Performed hydro-geologic and engineering review.
  - Designed in-situ remedial approach for site closure.

Related Projects

Former Bero Site Remediation, Waterloo, New York
Town of Clarkson Brownfield Investigation Cleanup, Clarkson, New York
Edgemere Drive Bridge at Round Pond Outlet, Greece, New York
Nichol Inn Site, Steuben County, New York
Wilcox Press Brownfield Site, Dansville, New York

Lu Engineers
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(585) 385-7417—phone
(585) 385-3741—fax
www.luengineers.com

Education

B.S., Geology 1987
Washington & Lee University

Hydrogeology, Graduate Level Studies
SUNY Brockport,

Certifications

Certified Hazardous Materials Manager (CHMM)

OSHA 40–Hour Training and Refresher Courses

ACHMM Fingers Lakes Chapter Former President

Air Waste
New York Council on Problem, Gambling

Ari Cheremeteff, Environmental Scientist

Ms. Cheremeteff began her professional career in 2005 and joined Lu Engineers in 2014. As a Project Scientist with Lu Engineers, she performs a variety of scientific tasks including preparing, developing, and writing reports; investigative studies, evaluations, audits, assessments, and permitting activities; and analyses. Ms. Cheremeteff completes field assignments which involve sampling/testing and the operation and maintenance of sampling/testing equipment.

Project Experience

<u>Rome Research Site Environmental Term Contract USAF, Rome, NY</u>

♦ Environmental Scientist

- Provides environmental sampling and monitoring for the AFRL/RRS at the former Griffiss Air Force Base under an ongoing IDIQ term contract.
- Provides environmental sampling and monitoring as part of the Environmental Assessment and Environmental Baseline Survey.

<u>Industrial Client, Quarterly Groundwater Sampling, RCRA Part B Post Closure Care Permit Field Activities, Groundwater Treatment System Monitoring</u>

♦ Project Scientist

- Responsible for conducting quarterly State Pollutant Discharge Elimination System (SPDES) groundwater activities for a groundwater treatment system as well as a private residence associated with the site.
- Conducted quarterly investigations and generated associated draft summary reports.
- Conducted monthly hydraulic conductivity monitoring and SPDES groundwater sampling events for both on and offsite groundwater monitoring wells.
- Responsible for performing weekly inspection of groundwater treatment system and conducting post closure care inspections.

<u>City of Rochester, Remedial Investigation/ Remedial Design and Corrective Action Plan</u>

♦ Project Scientist

- Implemented a site-wide Community Air Monitoring Plan during source removal activities at a former gasoline service station/automobile repair site.
- Provided construction oversight assistance during the excavation and offsite disposal of approximately 5,000 tons of petroleum-impacted soil and provided oversight assistance for the installation of an oxygen injection system.

<u>City of Rochester, Remedial Investigation/ Alternatives Analysis Project</u>

♦ Project Scientist

- Assisted in conducting a site-wide utility survey at a former manufacturing facility.
- Assisted in the preparation of a Remedial Investigation/ Alternatives Analysis Work Plan.
- Provided oversight for the installation and development of seven groundwater wells.
- Conducted soil and groundwater sampling programs.

<u>Monroe County Water Authority, Denise Reservoir, Sampling and Drum Removal</u>

♦ Project Scientist

- Provided technical support for soil sampling associated with the leakage of two drums found during security improvements at the Reservoir.
- Interpreted data from soil sample laboratory results.
- Performed site supervision during placement of the drums and contaminated soil into disposal containers and during removal of waste containers by hazardous waste transporter and prepared drum removal report.

<u>Norampac Industries, Inc., SPDES Permit Application Support, Niagara Falls, NY</u>

♦ Project Engineer

- Provided engineering support in pursuit of a permit for the discharge of pretreated processing paper/pulp mill wastewater into the Niagara River via a single storm sewer outfall.
- Assisted in preparing the application of a SPDES permit submitted to NYSDEC.

Lu Engineers

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Education

BS/2006/Environmental Management & Technology; RIT

AS/2001/Liberal Arts; MCC

Affiliations

Air and Waste Management Association (AWMA)

National Brownfield Association (NBA), New York Chapter

Special Training

OSHA 40-hr Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

Certified New York State Asbestos Inspector

Casey Bok, GIS/Environmental Specialist Lu Engineers

Casey began his professional career in 2012 and started at Lu Engineers in 2014. As a GIS/Environmental Specialist with Lu Engineers, he provides mapping for all investigative, and remedial reports for all departments with Lu Engineers. This includes the collection, organization, design, and preparation of GIS data. In addition, Casey provides field assignments that include sampling and testing of soil, groundwater and air.

Project Experience

Rome Research Site Environmental Term Contract USAF, Rome, NY

- ♦ GIS/Environmental Scientist
    - Provides environmental sampling and monitoring for the AFRL/RRS at the former Griffiss Air Force Base under an ongoing IDIQ term contract.
    - Provides environmental sampling and monitoring as part of the Environmental Assessment and Environmental Baseline Survey.

City of Rochester, Rochester, NY

- ♦ GIS/Environmental Scientist
    - Provides mapping for ongoing ground water monitoring on Scio St site.
    - Provided monitoring and reporting of air sampling for floor removal project at GANTT community center.
    - Provided site plans for Community Garden Pilot Plan,

Macdonald Engineering, Former Labelon Site, Canandaigua, NY

- ♦ GIS/Environmental Scientist
    - Provides mapping for ground water levels, groundwater contaminants, soil contaminants, and general site mapping for the Remedial Investigation Feasibility Study.
    - Provides sampling of monitoring wells for Remedial Investigation Feasibility Study

Former Ogilvie site, Watertown, NY

- ♦ GIS/Environmental Scientist
    - Provided mapping of GPS collected data, as well as groundwater contours.

Petroleum Distributor, Rochester, NY

- ♦ GIS/Environmental Scientist
    - Provided monitoring of the decommissioning of a well, and the drilling of the replacement well.
    - Provided diagrams of monitoring wells for project report.

AD Longwell. Pittsford, NY

- ♦ GIS/Environmental Scientist
    - Provides quarterly groundwater sampling on landfill.
    - Creates groundwater contour maps for quarterly reporting.

Honeoye Falls Fire Dept.

- ♦ GIS Scientist
    - Created a Fire Map Book used in Honeoye Falls Fire Departments firetrucks.

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Education

BS/2012/Geography: Earth Systems Science; University at Buffalo

Special Training

OSHA 40-hr Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

Appendix E – Estimated Project Schedule

Supplemental Site Investigation Work Plan
Estimated Schedule

Orchard-Whitney Site

415 Orchard Street and 354 Whitney Street

Rochester, New York

	Week						
Task/Milestone	13-Jul-15	20-Jul-15	27-Jul-15	3-Aug-15	10-Aug-15	17-Aug-15	24-Aug-15
Supplemental Site Investigation Activities:							
Test Pit Excavation/Subsurface Soil Sampling							
Soil Boring Installation/Subsurface Soil Sampling							
Monitoring Well Installation/Groundwater Sampling							
Analytical Results							
Investigation Findings Summary Report/IRM Work Plan Prep.							
Agency Review and Approval							
Interim Remedial Measures Implementation							