Ithaca Falls Overlook
City of Ithaca Urban Renewal Agency
Tompkins County, New York

Environmental Restoration Project
ERP # E755018

Site Investigation Work Plan

April 2012

Barton & Loguidice

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1.0 Introduction

The City of Ithaca Urban Renewal Agency has been approved to receive funding to pursue an investigation of potential subsurface contamination under the Environmental Restoration Project Program (ERP: funded in part through the 1996 Environmental Bond Act) at the city-owned Ithaca Falls Overlook Site (hereafter referred to as "site"). The site is located at 125 Lake Street in the City of Ithaca (see Figure 1).

The project site is associated with the former Ithaca Gun Company, which has been subdivided by Fall Creek Redevelopment, LLC. In an agreement to redevelop the Ithaca Gun Factory property, the developer donated a portion of the property to the City of Ithaca, which will become the Ithaca Falls Overlook site. The City of Ithaca plans to develop this site into a community walkway and an overlook area that will provide a scenic view of the adjacent 120-foot falls and gorge. A publically accessible view of the falls has not been available to the public for over 100 years from this location. The City will maintain this area as a park.

The site, as depicted on Figure 2, consists of one parcel (Parcel A – "The Island"). The site includes an "Island", which is a section of the site separated from the remainder of the site by the former raceway and consisting of an open hillside and a former industrial section that contains concrete pads. The Island is located between the Fall Creek gorge and the raceway, which was part of the Ithaca gun factory's water power canal. The Island is immediately adjacent to, and provides dramatic views of, Ithaca Falls. The site also includes a narrow corridor west of the former Ithaca Gun main factory building, the Western Accessway, which provides frontage and access to Lake Street. The total site acreage is approximately 0.95 acres.

The site was historically part of the Ithaca Gun Company property, which was the location of the Fall Creek Hub and Spoke Factory prior to 1885. The Ithaca Gun Company operated from 1885 through 1986. The main operations included

manufacture of firearms and munitions, which largely took place off-site at the factory (adjacent Parcel B, an active Voluntary Cleanup Program (VCP) project). Secondary operations included-spray painting, drying gun stocks in ovens, firing ranges, plating, metal shops, and forging where lead was re-melted for polishing.

Prior studies and an active Voluntary Cleanup Project being conducted at Parcel B (main Ithaca Gun Plant) has indicated widespread lead contamination from the former Ithaca Gun Company operations. Historically, lead munitions were fired at the Island and raceway. Lead shot and lead contaminated soils have been identified on the Ithaca Falls Overlook parcel and on the adjacent off-site, City-owned properties (likely transported via erosion mechanisms from the site). Cleanup of the factory site (Parcel B) is being completed by Fall Creek Redevelopment, LLC and its partners under the New York State Department of Environmental Conservation Voluntary Cleanup Program. There is an additional adjacent 0.214-acre property owned by the developer that contains an iconic local landmark, the former factory smoke stack. The scope of this site investigation is focused on Parcel A, including the Island and Western Accessway connection to Lake Street.

The ERP program requires the preparation of a Site Investigation Work Plan (SIWP). For this project, the SIWP will document: Interim Remedial Measures (IRM) consisting of slope stabilization on the Island and hotspot removal of lead-contaminated soils on the Western Accessway; an investigation to determine the vertical and horizontal limits of soil and/or groundwater contamination on the site (Site Investigation); an ecological resources impact analysis and qualitative human health exposure analysis; and identification of remedial alternatives or potential additional site cleanup measures (Remedial Alternatives Report). The Site Investigation will be conducted in accordance with the 1997 NYSDEC Procedures Handbook for the "Brownfield Program," the 2010 NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, and the NYSDOH Guidance for Evaluating Soil Vapor in the State of New York. The investigation will concentrate on characterization of existing hydrogeologic

and environmental conditions to determine the presence and extent of surface and subsurface contamination. The results of the field activities will be used to evaluate the extent of contamination as well as potential exposure targets.

Section 5 of this document describes the specific tasks that are intended to assess the conditions at the site, as well as within off-site areas, if necessary. In the event that the findings of the Site Investigation identify conditions that are beyond the scope of this present work initiative, a supplemental Work Plan will be developed for NYSDEC approval to address additional evaluation tasks and associated data collection.

An evaluation of potential Remedial Alternatives will be prepared following completion of the Site Investigation. This evaluation will be based on identifying methods to prevent, minimize, or eliminate the presence and possible release of contaminants from the site. Within this general framework, emphasis will be placed on identifying technically feasible, cost-effective solutions that are environmentally sound.

Included as ancillary documents to this Work Plan are the Sampling and Analysis Plan (SAP - Appendix A); the Health and Safety Plan (HASP - Appendix B); and the Citizen Participation Plan (CPP - Appendix C), bound separately. The SAP comprises a quality management plan and a data management plan. The quality management plan specifies the procedures for performing the investigation, sampling, and a laboratory analysis presented in the Work Plan, and establishes quality control and assurance procedures to be used during the Site Investigation. The data management plan establishes document control for the Site Investigation including: data documentation materials and procedures, project file requirements, and reporting formats.

The HASP establishes procedures to provide for the health and safety of personnel performing the work and identifies the potential hazard(s) to which personnel may be exposed.

The CPP establishes the procedures for providing the public with the opportunity to be present at open informational meetings, review project documents, and comment on the project issues, findings, proposed remedial alternatives, and the final record of decision (ROD). The project has been enhanced by the inclusion of two Community Advisory Groups (CAGs): the Ithaca Gun CAG and the City of Ithaca's Citywide CAG. The Ithaca Gun CAG was formed in 2006 to address concerns related to both the demolition and remediation of the VCP project on Parcel B, partially funded by the Restore NY Communities program and the ERP project. The Citywide CAG was formed by the City in 2010 to enhance communication and promote better-informed decisions about environmentally contaminated sites throughout the City of Ithaca; the Citywide CAG meets monthly. To coordinate information sharing and public input, the Citywide CAG will invite the Ithaca Gun CAG to the Citywide CAG public input meetings. The CAG has merged with the greater Ithaca CAG, which is providing input to a number of environmental remediation projects in the greater Ithaca area. The CAG is intended to provide a communication forum through which a broad and diverse sample of community interests is represented. Additional detail regarding the CAG and its preliminary members is provided as part of the CPP.

2.0 Site Description and History

2.1 Site Description

The site is situated on a parcel approximately 0.95 acres in size, currently owned by the City of Ithaca. The site was historically a portion of the larger property used for production of firearms by the former Ithaca Gun Company from 1885 until 1986; prior to 1885, the factory was used to manufacture agricultural equipment. The former factory was located east of the ERP site on the adjacent Parcel B, which is being progressed as a VCP project.

The site, identified as Parcel A, includes both the Western Accessway and Island portions of the former Ithaca Gun Company property. The Western Accessway portion of the site abuts the former factory on the VCP parcel. This area, which slopes steeply to the west, connects the southern end of the ERP site at Lake Street to the former raceway and Island. The Accessway is intended to support the public thoroughfare to the Island area and the future Ithaca Falls Overlook. The Island, located north of the former factory structure across an old raceway, contains two concrete pads related to former structures and a shed. The Island is connected to the remainder of the ERP site by a bridge over the raceway.

2.2 Site History

The site and adjacent VCP site were historically used by the Ithaca Gun Company for the production of firearms. A 1919 photograph presented in the October 2001 Prescott Phase I Environmental Site Assessment (ESA) identified early use of the eastern concrete pad of the Island by the Ithaca Gun Company. The original Ithaca Gun Company structure was later known as the Barn. The

western concrete pad was identified as the remnants of “the Metal Building”, which was reportedly used as the gun finishing building.

No underground or aboveground fuel storage tanks were identified in previous investigations on the site. According to the 2001 Prescott Phase I ESA, various chemicals such as heavy metals, oils, and varnishes were used as part of manufacturing processes on the Island as well as at the historic Ithaca Gun Company factory; these processes include bluing of the gun barrels, case hardening of the steel used in the guns, various types of wood finishing for gun stocks, treatment of boiler water, and test firing of guns. Lead has been widely identified at the site and adjacent lands attributed to the test firing of manufactured guns and other metalworking processes.

Research into the history of the site was evaluated through a review of historic environmental reports on the former Ithaca Gun Company, particularly the 2001 Prescott Phase I ESA and the November 2001 Voluntary Cleanup Program Site Investigation Work Plan (VCP SIWP), which included a review of Sanborn Fire Insurance Maps and historic aerial photographs. The texts of these reports are available from the document repository at the Tompkins County Public Library.

Sanborn Maps from 1888, 1893, 1898, 1904, 1910, 1919, 1929, 1961, and 1971 were reviewed as part of both the 2001 Prescott Phase I ESA and the 2001 VCP SIWP. According to the report, the factory appears on the 1888 Map as the Ithaca Manufacturing Company (agricultural equipment). At the time that map was produced, there were three additional mills downstream on the raceway, including the Ithaca Falls Paper Mill, Ithaca Paper Company, and the Fall Creek Mills. The bridge over the raceway was in place on the subject property, and limited development of the site buildings was underway. There was one structure depicted on the Island to the east of the current structure remnants.

The subsequent maps show further development of the factory over the years. The factory is labeled the Ithaca Gun Company on the 1893 Map, and minimal commercial development is shown in the vicinity of the site. The two structures on the portion of the Island included in the ERP site are shown on the 1904 Map. The development surrounding the site appeared to be primarily residential. By the time the 1929 Map was produced, only one other mill remained along the raceway, a paper company, which was no longer shown on the 1971 Map. The resolution of the Sanborn Maps was insufficient to determine specific site features.

Aerial photographs from the Ithaca Engineering Department for 1962, 1976, 1991, and 1999 were reviewed as part of both the 2001 Prescott Phase I ESA and the 2001 VCP SIWP. An additional photograph from 1948 was obtained from the Ithaca Gun Historian for the 2001 Prescott Phase I ESA. The results of the aerial photography review are included in the table below:

Year	Description
1948	The original Ithaca Gun factory is shown just south of the raceway, with the metal building and barn shown on the Island portion of the site. The boiler house to the west of the site has not yet been constructed. The majority of development in the vicinity appears to be residential.
1962	The boiler stack has been relocated to the new boiler house northwest of the Western Accessway. Residential properties adjoining the site to the west are no longer visible and appear to be used for parking or storage.
1976	Several storage trailers are shown just off-site near the boiler house. Electrical transformers are visible north of the boiler house and on the roof of the main factory structure. Test firing shooting tubes are discernable on the top floor of the main factory structure. Approximately 300 55-gallon drums are located along the western edge of the factory, on the portion of the site known as the Western Accessway, and on the adjoining property where parking lots are located. These drums are assumed to have contained waste machine/gun oil, filings/grindings from mill operations, and possibly waste cyanide from the metal finishing operations. A storage building is located on the adjoining property to the west. The Island portion of the site is not visible in this photograph.
1991	The storage building on the adjoining property to the west has been removed, and the parking lots are visible and in use. Renovations to add office space to the southern end of the main factory structure are visible.
1999	The Ithaca Gun Company and adjacent ERP site appear much the same as it did when it closed. The development in the vicinity of the site appears to be primarily residential.

Various environmental investigations have taken place at the former Ithaca Gun Company property since its closure in 1986. The main factory building has been widely assessed and is currently the subject of a Voluntary Cleanup Program investigation; the former factory building was demolished as part of the VCP in 2009. However, limited studies have extended to the Western Accessway and Island portions of the former Ithaca Gun property.

In 1995, the NYSDEC observed lead shot on former Cornell University property northwest of the site in the gorge. From 1995 through 1998, Cornell University and NYSDEC sampled this area and found elevated levels of lead and other metals. Background samples indicated that elevated levels of metals were widespread throughout the Ithaca Falls area.

Limited polychlorinated biphenyls (PCBs) were also identified during the investigation and were attributed to leaking transformers on the current VCP site; the transformers and PCB-contaminated soil were removed by NYSEG in 2000. As the source of contamination and impacted soils were removed from the VCP site, PCBs are not expected to be identified during the Site Investigation.

In August 2000, the EPA Region II Response and Prevention Branch and NYSDEC began a Removal Assessment of portions of the Island and Western Accessway, the hillsides east of the VCP site on the Sigma Nu fraternity property, and within the gorge to the west, where lead shot and slag were observed on the surface soils and slope. Erosion of the western slope of the Island area was observed during the assessment. In the fall of 2000, the EPA conducted soil sampling along the raceway and southeastern bank of Fall Creek, as well as from the former Ithaca Gun property. The samples were field-screened for lead and arsenic using X-Ray Fluorescence (XRF) Spectroscopy; laboratory analysis confirmed the lead results but the arsenic testing was unusable. The subsurface samples, collected at a depth of 15 inches, contained

lead ranging from non-detect to 28,900 parts per million (ppm), and surface soil samples contained lead ranging from non-detect to 136,000 ppm. Surface water samples were also taken from the raceway and upgradient in Fall Creek; lead was detected in the samples collected from the raceway at concentrations ranging from 2.8 to 3.1 parts per billion (ppb), while the upgradient sample was non-detect for lead. Mercury was detected in both the raceway and upgradient samples. Additional sampling was conducted by the EPA in 2001 to delineate off-site impacts of lead.

In 2002, Earth Tech conducted demolition of the Metal Building and Barn from the Island and removed contaminated soil from the Island, raceway, and Western Accessway areas, as well as within the Gorge and other off-site areas, in accordance with the EPA Removal Assessment Integrated Assessment Plan prepared by Weston Solutions, Inc.

Removal activities also took place on the Ithaca Falls ERP site, particularly the Upper Island area and in the raceway. Soil in the raceway and on eastern portions of the Island was completely removed, clean topsoil was added in the non-raceway areas, and vegetation was established. In other portions of the Upper Island area, the soil was vacuumed and met the remedial threshold of 400 ppm. No work was conducted on the central portions of the Island where the concrete slabs are located, or on the steep slope proximal to the west side of the island; however, a tarp was placed over this steep area as a temporary erosion control measure.

Work was also conducted on the Western Accessway portion of the site; in this area, soil was removed to three feet in depth with an excavator and the slope was regraded, stabilized with erosion control mats, and vegetated. Test pits were installed in portions of the Western Accessway to approximately 8-10 feet below grade, and evidence of lead contamination was observed in these test

pits. Post-remedial sampling indicated that the southern-most portion of the Western Accessway (near the upper portion of the Lake Street parking lot) met the 400 ppm threshold for lead, while the area north of this area and south of the former boiler building exceeded the threshold with levels ranging from 1,000 ppm to 16,000 ppm.

Work was conducted in the Fall Creek gorge and on the lower island slopes between the Lake Street parking area and the base of the Western Island Slope. The gorge and plunge pool area west of the raceway were vacuumed to bedrock. No sampling was possible in the areas vacuumed to bedrock. Work was also conducted east of the adjoining VCP site; sampling results indicate that soil vacuuming reduced lead levels to below 400 ppm to the east of the VCP site and on the Sigma Nu property.

2.3 Contaminants of Concern

The historic gun manufacturing operations at the site and adjacent VCP site are the historic potential sources for remaining contamination at the site. The primary contaminant of concern is lead from test firing guns, dumping of spent shot, and other manufacturing processes such as forging. Volatile organic compounds (VOCs), including chlorinated solvents, were also identified during investigations on other portions of the Ithaca Gun Company property, particularly near the Western Accessway, and appear to be related to the historic storage of drums containing chemicals and oils.

3.0 Preliminary Risk Evaluation

The land use surrounding the site is mixed residential, public use property and light commercial. A parking lot adjoins the Western Accessway, and the former Ithaca Gun Factory VCP Property adjoins the site to the east. A natural area including the Fall Creek Gorge and Ithaca Falls is located north of the Island, and Lake Street adjoins the site to the south. Apartment buildings are located south of the site across Lake Street. The City of Ithaca is serviced by a public water supply.

The Site Investigation will include a characterization study to define the extent of surface and subsurface contamination. It will also include a further evaluation of groundwater, soil vapor, and contaminant pathways, including an analysis of hydrogeologic conditions present at the site. An environmental risk evaluation will be performed based upon the results and findings of the Site Investigation.

3.1 Relevant Guidance and Regulatory Criteria

Relevant Guidance and Regulatory Criteria (RGRC) to be utilized for this project include, but are not limited to: NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, May 2010 (DER-10), 6 NYCRR Part 375, NYSDEC T.O.G.S. 1.1.1, 6 NYCRR Part 703 and 10 NYCRR Part 5.

4.0 Project Objectives and Technical Approach

4.1 Project Objectives

The overall objective of this Site Investigation is to define the nature and extent of contamination on the Ithaca Falls Overlook property related to former site activities. The specific objectives of the Site Investigation include the following:

- Verification of the structural integrity of the bridge to the Island, which was constructed sometime prior to 1888;
- An interim remedial measure (IRM) for stabilization of the western bank of the Island to reduce migration of contaminants off-site into Fall Creek and onto City lands;
- An IRM for excavation and disposal of surface soil lead hotspots identified at the site as part of the Ithaca Gun VCP investigation;
- Thoroughly define the presence and extent of soil and groundwater contamination on-site (and potentially off-site);
- Characterize the site hydrogeologic conditions, including identification of depth to groundwater and flow direction, and the possible presence of preferential groundwater flow pathways;
- Evaluate conditions within wetlands, floodplains and sensitive environments (if any are present) within or adjacent to the site; and
- Assess potential impacts to the environment, wildlife, and human health.

4.2 Technical Approach

The following discussion presents the technical approach proposed to complete the project objectives outlined above. The technical approach has been structured to achieve these objectives in a progressive, deliberate, and cost-effective manner. At the completion of each project task, the existing data will be reviewed to determine if the limits of the suspected contamination have been adequately characterized, or if a subsequent task is required. It is possible that not all of the tasks described below will be required. Each of the specific components of the proposed technical approach is briefly discussed in the text below.

Initial tasks will involve the collection of background and site specific data for the purpose of scoping the subsequent tasks for this project. This information will be used to refine the scope of the subsurface investigation and the interim remedial activities. The subsurface investigation includes the installation of soil borings, soil vapor points, and bedrock monitoring wells. Sampling and analysis of surface soil, subsurface soil, soil vapor, and groundwater will be conducted as part of the investigation. Interim remedial measures will be performed to address potential “hotspot” contamination on the Western Accessway and to mitigate erosion and contaminant transport from the western portion of the Island.

Upon completion of site investigation activities, the data will be reviewed to determine the nature and extent of contamination on the site, and develop qualitative assessment of ecological and human health risks posed by the site. These results will be used to evaluate the need for subsequent remedial activities and perform an analysis of alternatives. The Site Investigation efforts and Remedial Alternatives Analysis will be presented in a Site Investigation/Remedial Alternatives Report (SI/RAR).

5.0 Site Investigation Tasks

In order to accomplish the objectives set forth in Section 4.1, the following task-by-task description is presented. These items are based on the technical approach previously provided in Section 4.2. It should be noted that these items are not necessarily presented in chronological order, as some tasks will occur concurrently or contain elements that occur before or after related tasks. Please refer to the timeline presented in Figure 8 for a general understanding of the temporal relationship of the tasks.

5.1 Task 1 - Site Survey and Preparation of Site Map

The site and immediately adjacent areas (roads, adjacent property borders, etc.) were surveyed to create a topographic base map of the property. This included surveying and locating the site buildings, utility poles, the street, manholes, subsurface utilities, and other distinguishing features present at the site. The survey was completed by T.G. Miller, PC in June 2008 as part of the prior site investigations (VCP project).

The survey data will be updated as necessary during the Site Investigation and will be used to develop a base Site Plan for the presentation of site data collected during the investigation (i.e., groundwater elevation contours, UST locations, extent of contaminated soil removal, and extent of groundwater contamination). The Site Plan will also be used to present the various remediation alternatives identified during preparation of the Site Investigation/ Remedial Alternatives Report. Site elevation data will be used in conjunction with boring logs to develop cross-sections through the site showing the configuration of subsurface geologic conditions, elevation of the water table, and vertical extent of soil and/or groundwater contamination.

5.2 Task 2 - Site Inspection, Review of Available Information, and Residential Well Survey

A site inspection team will visit the site for the purpose of field verification of the site boundaries and features. The information developed from this task will be used to refine the scope of the interim remedial measures (IRM). Data gathered during the site inspection will be used for future design of the hotspot removal and Island western slope stabilization IRMs.

A review of existing data available through the NYSDEC Region 7 offices, the City of Ithaca, and Tompkins County will be performed. In addition to the data obtained from these entities, the following resources will be used to collect local and regional data:

- NYSDEC Division of Water Resources
- NYS Geological Survey
- United States Geological Survey
- Sanborn Fire Insurance Atlases
- Identify and conduct interviews with employees associated with the previous business operations at the site (if they still reside within the local area).

It may be necessary, based on the information collected from the resources mentioned above, to revise aspects of the scope of work. Any necessary revisions will be proposed in writing and performed with NYSDEC's approval.

A residential well survey will be conducted within the upgradient and downgradient proximity of the site in order to identify the locations of any drinking

water supply wells. A file search of NYSDEC, NYSDOH, Tompkins County Health Department, and local records for all monitoring wells, domestic wells, and irrigation, industrial, and public supply wells within one half mile of the site boundary will be conducted. For each well identified, the following information will be collected if applicable and/or available:

i. Type of well

ii. Status (active, inactive, properly abandoned)

iii. Total depth, casing length

iv. Open bore hole or screened interval

v. Sample analyses, if available

vi. Well records or well logs available from NYSDEC, NYSDOH, Tompkins County Health Department or other local agency.

A listing of all sources referenced in performing the residential well survey including agencies that were unable to provide the requested information will be maintained. The results of the initial residential well survey will be used to evaluate if off-site receptors exist, and/or if the residential well survey will need to be expanded to include off-site sampling of private supply wells.

5.3 Task 3 - Community Relations

A Citizen Participation Plan (CPP) is included as Appendix C of this Work Plan. The CPP was prepared to assist the City of Ithaca with providing information about the project to the Community Advisory Group (CAG) and the general public. The elements of the CPP are as follows:

- Introduction to the Environmental Restoration Project (Municipal Brownfields Program)

- Basic site information
- Project description
- Identification of affected/interested public (contact list)
- Identification of regulatory contacts
- Identification of document repositories
- Specific citizen participation activities
- Identification of adjacent property owners

The CPP will establish responsibilities for project activities and provide the names and addresses of authorized representatives for response to public inquiries.

5.4 Task 4 - Structural Assessment of Bridge

Prior to beginning work at the site, the structural integrity of the bridge will be assessed. The bridge was constructed sometime prior to 1888 and was last inspected in March 2002 when a Level One Load Rating was conducted by Earth Tech. A new assessment will require a field inspection of the bridge and updates to the 2002 calculations. The structural assessment will identify potential restrictions that may be posted to contractors involved with the Site Investigation or IRMs.

5.5 Task 5 - Surface Soil/Subsurface Soil Investigation

5.5.1 *Wide Field Soil Survey*

A soil investigation is necessary to determine the nature and extent of surface/subsurface soil contamination remaining at the site. The initial investigation will include a wide field survey of both surface and

subsurface sample locations (where possible) to initially characterize the site and off-site conditions, followed by additional sampling as necessary to delineate areas of concern at the site. Samples will also be collected from upgradient (background) locations. The wide field survey will take place prior to the IRMs described in Task 6. Any visually stained soils will also be sampled in addition to the sample locations detailed below.

The site and off-site areas of interest have been divided into ten (10) sub-areas, as shown on Figure 4, including background samples from an off-site location. In each sub-area, a select number of surface (0-2 inches) and subsurface (2-10 inches) soil samples will be obtained and submitted for laboratory analysis. The ability to collect subsurface samples may be limited if bedrock is encountered within 2 inches of grade. With exception to VOCs, discrete grab samples will be composited for laboratory analysis in accordance with the Sampling and Analysis Plan (Appendix A). The composite samples will be comprised of five (5) grab samples randomly selected from each area based on the judgment of field personnel during screening and NYSDEC oversight. VOCs will be analyzed from one (1) of the randomly-selected grab samples utilized to comprise the associated composite sample. The sub-areas and approximate number of sample locations are defined as follows (composite samples will be analyzed for the full suite of parameters outlined in the SAP; grab samples will be limited to analysis of VOCs):

- Western Accessway (south of hotspot): 2 composite/2 VOC grab surface samples (0-2 inches); 2 composite/2 VOC grab subsurface samples (2-10 inches)
- IRM Hotspot: (see Pre-IRM Design Investigation below)

- Former Walkway: 1 composite/1 VOC grab surface sample (0-2 inches); 1 composite/1 VOC grab subsurface sample (2-10 inches)
- Western Raceway: 4 total lead surface samples (0-2 inches) (along the northern wall subject to ongoing erosion from the island slab); 2 composite/2 VOC grab surface (0-2 inches) samples (raceway bottom – surface soils on the rock); it is assumed that subsurface sample collection will not be conducted due to bedrock
- Eastern Raceway: 2 composite/2 VOC grab surface samples (0-2 inches) (raceway bottom – surface soils on the rock); it is assumed that subsurface sample collection will not be conducted due to bedrock
- Plunge Pool: 1 composite sample (sediment) and 1 VOC grab; sediment only, no surface soils present
- Island Beneath Slabs/Asphalt: 10 total lead grab samples and 2 composite samples collected within 6 inches below the slab; 2 VOC grab samples from same interval
- Western Island Slope: 10 total lead grab samples; 1 composite/1 VOC grab surface sample (0-2 inches); it is assumed that subsurface sample collection will not be conducted due to bedrock
- Off-Site Downslope Bench: 2 composite/2 VOC grab surface samples (0-2 inches); 2 composite/2 VOC grab subsurface samples (2-10 inches)

- Off-Site Background Samples: 2 composite/2 VOC grab surface samples (0-2 inches); 2 composite/2 VOC grab subsurface samples (2-10 inches)

Based on the sample sub-areas, a total of 28 grab surface samples will be selected for laboratory analysis of total lead using EPA Method 6010B. This total includes 24 soil samples and 4 QA/QC samples. An additional 23 samples will be gathered as composite samples from the sub-areas. These composite samples will be analyzed for chlorinated solvents using EPA Method 8260 plus MTBE, semi-volatile organic compounds (SVOCs) using EPA Method 8270 (Base/Neutrals), Target Analyte List (TAL) metals using EPA Method 6010B, PCBs using EPA Method 8082, pesticides using EPA Method 8081, and herbicides using EPA Method 8151. An additional 23 grab samples will be submitted for analysis of VOCs

Composite sampling with be conducted in accordance with procedures outlined in the Sampling and Analysis Plan, included as Appendix A. Total lead and composite surface soil samples will consist of soils obtained from 0-2 inches below grade. Subsurface samples, when available, will be collected from 2-10 inches. In certain areas cleaned to bedrock by EPA (particularly the raceway), samples will be limited to the surface soils scraped from rock. In areas addressed by the EPA remedial action where sampling is not anticipated, the depth of topsoil placed by EPA will be measured and recorded.

5.5.2 *Lead Partitioning Analysis*

While prior environmental investigations have identified the widespread presence of lead throughout the surface and subsurface soils at the site, these studies did not identify how the lead is partitioned in the

site soils. Prior sampling procedures indicate that fragments of lead (i.e., shot or slag) were likely included in the soil samples submitted for total lead analysis using EPA Method 6010B. Fragments of shot or slag subjected to acid digestion can liberate lead into the digestate, which may result in biased data.

Since the contaminant pathway analysis will need to evaluate risk associated with lead transport in the environment, it will be useful to understand how the lead is partitioned within the soils. A lead partitioning analysis will identify where the lead is located within the soil profile and whether it is sorbed to soil particles, providing information on whether lead is mobilized in soil dust, in the groundwater profile, or if it is limited to the coarser portions of the site soils, which are only subject to greater erosive forces. The site remedial design will require an understanding of the fate and transport of the lead at the site, in order to identify a reasonable and cost-effective solution that satisfies the ERP program criteria.

Partitioning surface soil samples will be collected from approximately three (3) locations, based on the results of the lead analysis obtained in the wide field survey in task 5.1. Each of these samples will be characterized using a sieve analysis to separate coarse materials (greater than 2.0 mm), sand (0.05-2.0 mm), and silt/clay (less than 0.05 mm). Composite samples of each sieve size will be submitted for analytical determination of total lead content. The goal of this partitioning analysis is to determine where the lead is situated within the soil profile and at which depths contamination is concentrated to adapt exposure assessments and remedial alternatives to the site conditions.

The results of the partitioning analysis will be used to inform the final soil sampling design and remedial analysis.

5.5.3 *Lead Hotspot Characterization*

Following the wide field survey sampling, it is anticipated that areas with elevated contaminant levels (outside the IRM hotspot area) will be identified for a second round of sampling. It is expected that an additional 28 soil samples (for a total of 24 soil samples which includes 4 QA/QC samples) will be selected for laboratory analysis of the contaminants of concern identified during the initial round of sampling. Based on prior investigations at the site and VCP site, it is anticipated that samples may be limited to analysis of total lead.

5.6 Task 6 – Interim Remedial Measures

Two Interim Remedial Measures (IRM) are initially proposed for the site. These include stabilization of the Island western slope, and remediation of the identified hot-spot areas of the Western Accessway. Future IRMs may be necessary based on the results of the site investigation, and will be described in a supplementary IRM work plan, if required.

The description of each IRM below is preliminary, and will be further described in an IRM-specific work plan to be submitted during the project. The IRM-specific work plan will include the design document package to enable remedial construction of the IRM work. The packages will include: overall work plan description and tasks for the IRM; remedial design plans & specifications including erosion and sediment controls; and public bid contract documents.

5.6.1 Island Western Slope Stabilization IRM

The purpose of this IRM is to stabilize the western and southern slopes of the Island. These slopes are located off the west Island slab, and beneath the south island slab, above the western downslope bench

and western raceway, respectively. The slopes have experienced considerable erosion and were identified as unstable during prior environmental investigations. These prior investigations concluded with the slope covered with tarps, which is not a viable long-term stabilization method.

The focus of the IRM, which will take place in 2012, will be to stabilize the slope to prevent further erosion and reduce contaminant migration off-site. The initial soil investigation, described in Task 5, will take place prior to slope stabilization in order to characterize this area. Stabilization will be achieved through the use of permanent turf reinforcement mats such as North American Green P550 mats or other mats as determined by the Engineer. These mats are generally stapled into underlying soil, so the mats may need to be anchored into rock instead. Installation of a sediment trap or other runoff capture device at the base of the slope will also be evaluated as part of the design process.

An additional task for this IRM is the repair to existing fencing in order to limit public access to the site. New security fencing will be installed along the public parking area with Fall Creek Gorge, and improvements will be made to existing fencing that runs from the gorge up the hillside towards the former boiler house. These fencing modifications will remove the primary route currently used by the public to access the site and may reduce public exposure to lead-contaminated soils during the site investigation and remedial activities. Additional warning signs will also be posted in the area.

The approximate area requiring slope stabilization is shown on Figure 3. Additional slope stabilization may be required on the Western Accessway following the IRM described below.

5.6.2 - Hotspot Removal IRM – Western Accessway

The purpose of the IRM is to remove source materials from the site that are identified during the site inspection and review of available information. Hotspots of lead-contaminated surface soils were identified by O'Brien and Gere on the Western Accessway portion of the site; this area was reported as 2,275 square feet and 3 feet in depth (approximately 380 tons) of contaminated soil in prior O'Brien and Gere remedial reports for the VCP site. While this hotspot of soil contamination was originally identified as part of the cleanup efforts for the VCP site, the City of Ithaca agreed to address this area during the ERP.

The review of the EPA Response Actions in this area indicates that the area may be larger than initially reported and may encompass an area up to 6,000 square feet with depths to 10 feet (3,300 tons). Therefore, a pre-IRM design investigation is proposed to characterize the hot spot area.

5.6.2.1 Pre-IRM Characterization

Prior to finalizing the IRM work plan and design documents, a site characterization will be conducted to identify the limits of impacted soils to be removed during the IRM work. Two distinct areas will be characterized: one is the area identified by OB&G for hotspot removal (near the old boiler house), the second area is south of the OB&G hotspot in the middle section of the Western Accessway slope, where EPA did not obtain clearance after removing the top 3 feet of soil.

A series of soil borings will be installed by Geoprobe along the top of slope and base of slope. A line of borings will also be attempted in the middle of slope. Due to the steep grade on the slope, the middle slope borings may revert to test pits with a long stick excavator. We will obtain discrete soil samples from depths of 4, 8, 12, and 16 feet (or until refusal) from borings spaced at 20-foot intervals along the northern axis. The purpose is to identify lead soil levels at depth and horizontally along the slope length to identify excavation limits. In the area addressed by EPA, samples will initially be collected at 4 and 8 feet of depth (below the depth of EPA soil removal), and the total lead analysis will be expedited. If above the EPA 400 ppm clearance criteria, we will return to this area for 12- and 16-foot samples. A total of 104 samples will be submitted for laboratory analysis of total lead using EPA Method 6010B.

The lead results will be used to define the remedial excavation limits for the IRM design.

5.6.2.2 IRM Soil Removal

The IRM will consist of excavation, staging, loading, transport and disposal of lead contaminated soils. Design documents, including erosion and sediment controls, will be included in the IRM work plan. It is likely that the excavated soils will be directly loaded for disposal; therefore, the soil samples from the pre-IRM waste characterization will be used for disposal profiling. The excavation area will be limed prior to backfill to limit mobilization of any remaining metals and backfilled with common fill (sampled in accordance with DER-10, as outlined in Appendix A,

the SAP), and the disturbed area will be stabilized with turf reinforcement mats, seeded, and mulched to provide permanent stabilization. The general areas of excavation are shown on Figure 3.

Approximately eight (8) confirmation soil samples will be taken following excavation and submitted for laboratory analysis of volatile organic compounds (VOCs) and chlorinated solvents using EPA Method 8260 plus MTBE, semi-volatile organic compounds (SVOCs) using EPA Method 8270 (Base/Neutrals), Target Analyte List (TAL) metals using EPA Method 6010B, PCBs using EPA Method 8082, pesticides using EPA Method 8081, and herbicides using EPA Method 8151.

5.7 Task 7 - Groundwater Investigation

Bedrock monitoring wells were installed during prior investigations at the adjacent VCP site and in the offsite Gun Hill Apartments parking lot. Two of these wells, Historic MW-3 and Historic MW-4, are located off-site, west of the Western Accessway. The third, historic MW-1 is located east of the VCP project site, and serves as an upgradient well for the site. Three (3) additional bedrock groundwater monitoring wells are proposed for this project (see Figure 5 for preliminary locations), as described below.

5.7.1 Bedrock Monitoring Well Installation

One monitoring well will be located adjacent to the western ERP site boundary of the Western Accessway, upgradient and located between existing MW-3 and MW-4. Two downgradient bedrock wells will be installed off-site, at the base of the Gun Hill slope, near Lake Street.

Monitoring wells are not proposed for the Island area of the site. The purpose of the off-site bedrock wells is to characterize bedrock groundwater quality at the limit of the historic industrial sites, prior to the boundary with the adjacent Fall Creek neighborhood.

The bedrock monitoring wells will be installed with the most appropriate drilling method for the specific geologic conditions. The drilling approach will involve sampling continuously with either a 2- or 3-inch split-spoon sampler and advancing the borehole with a hollow stem auger system until contact with the bedrock interface. Upon encountering bedrock, a tri-cone roller bit will be used to advance a rock socket into the bedrock for the installation of a permanent casing that will extend from the ground surface into the bedrock socket. It is anticipated that the rock socket will extend 4 to 5 feet into the upper weathered bedrock or until contact with competent bedrock. The casing will be tremie-grouted into the bedrock socket to create a seal, segregating the overburden and bedrock water-bearing zones. Once the grout has been allowed to cure for a minimum period of 24 hours, an NX-size rotary core barrel will be inserted down the center of the casing to obtain bedrock samples. Once representative bedrock core samples have been collected, the bedrock borehole will be reamed with a 3 ⅞-inch roller bit to provide sufficient room for the installation of the 2-inch PVC screen and backfill material within the bedrock. Alternatively, an HQ-size core barrel may be substituted, in which case the reaming step would not be required.

Packer pressure testing of the bedrock at 10-foot intervals will be performed prior to installation of the monitoring well. The lowermost 10 feet of the borehole will be tested using a single packer to isolate the lowermost 10 feet; subsequent intervals will be tested using dual packers to isolate 10-foot sections of the bedrock. The contractor will be

responsible for supplying all equipment and personnel required to conduct the packer tests. The results of the packer testing will be used in conjunction with data from the existing wells to select the most appropriate screen locations for the bedrock monitoring wells.

Bedrock monitoring wells will be completed with 2-inch Schedule 40 PVC riser and 10 feet of 0.010-inch continuous wire wrap PVC screen. All wells will be completed with an appropriately-sized sand pack, filter sand, choke sand, bentonite pellet seal, and cement-bentonite grout tremied to the surface. Upon completion, wells will be developed and equipped with 4-inch diameter locking steel protective casing and concrete surface seal. The concrete surface seal will be constructed using a pre-built form with 3-foot sides and will extend to a depth of at least 3 feet below ground surface. Using a trowel, the concrete will be sloped away from the protective casing to encourage surface drainage away from the well casing. A vent hole and drain hole will be drilled in the top and bottom of the protective casing, respectively and the annulus of the protective casing will be filled with gravel.

Monitoring well construction and installation will be observed by a B&L hydrogeologist. Construction will follow the general specifications as shown in Figure 6. The drilling contractor will have available on-site, prior to commencement of the drilling program, 2-inch diameter PVC threaded riser pipe and continuous slot well screens, including all fittings, bottom plugs, centralizers, caps, etc. In addition, the drilling contractor must have available all backfill materials necessary for well construction, including graded siliceous sand of various sizes for sand pack construction. The size of the sand used for the sand-pack materials will be appropriate for the slot size of the well screen. In addition, an approved concrete aggregate mixture will be used during the construction of the surface seal. The

specific types of monitoring well backfill materials are discussed in the SAP (Appendix A).

During the construction and installation of the monitoring wells, the B&L hydrogeologist's responsibilities will include, but not be limited to:

- Construction observation of the entire well assembly;
- Installation observation of the sand pack, fine sand pack, pelletized or granular bentonite seal and grout backfill placements;
- Performing measurements to verify that the placement of the well construction materials was in accordance with the specifications;
- Observation of the protective monitoring well cover installation and the concrete surface seal construction;
- Observation and monitoring of well development (where development is performed by the drilling contractor). Development methodology is presented in Appendix A;
- Labeling and marking water level the monitoring reference point on the protective cover and riser pipe, respectively; and
- Consultation with the on-site NYSDEC representative.

In-situ variable head hydraulic conductivity testing (slug testing) will be performed at each new monitoring well after sufficient development has been performed. Slug testing involves the removal of a bail of water or the displacement of water within the well by the insertion of a slug. Upon creating an elevated or depressed head, the water level within the monitoring well is measured electronically with a data logger and recorded

over the time it takes to achieve 90 percent recovery (relative to the initial static water level). It is assumed that the rate of inflow to the monitoring well screen, after inducing a hydraulic head differential, is proportional to the hydraulic conductivity (k) and the unrecovered head distance.

Water levels will be recorded on at least two occasions approximately two months apart at each of the new monitoring wells and available existing wells to determine the depth to groundwater and the configuration of the groundwater surface. Water level data will be used to develop groundwater contour maps and to identify the horizontal hydraulic gradient of the water table.

5.7.2 Bedrock Seep Collector Installation

Groundwater discharge emanating from bedding planes observed along a bedrock scarp adjacent to the former raceway on the north end of the property will be sampled in conjunction with the bedrock monitoring well network. A series of small-diameter, subhorizontal borings will be drilled into the bedrock face along bedding planes where groundwater seepage is visible. Borings will be installed using a hammer drill system to create a path of least resistance for groundwater to flow. Sterile polyethylene tubing with perforations/slots to serve as an intake screen will be wrapped with a VOC-compatible filer fabric and will be inserted into the borehole to create an artificial groundwater conduit and allow for the collection of a groundwater sample. If limited groundwater is available through one borehole it may be necessary to converge a network of tubing from several borings to a central manifold system where a groundwater sample can be collected.

Bedrock seep borings will be installed inline with and at a similar elevation to the screened interval of MW-4 through the use of a global positioning system.

5.7.3 Groundwater Sampling and Analysis

Upon completion of the monitoring well installation program, the new monitoring wells, existing MW-3 and MW-4 (assumes MW-4 is useable), and the bedrock seep will be sampled twice for laboratory analysis. The sampling events will be spaced at least 60 days apart. Monitoring wells will be purged prior to sampling in order to collect a representative sample of the formation groundwater. Purging will not be required for the seep location. Each well will be sampled using the following general methodology:

- Measure and record the static water level in each well, and calculate the volume of water in the well;
- Purge at least three times the volume of water in each well. For wells exhibiting extremely slow recovery rates, it may only be possible to remove the initial well volume before it is dry. Rapidly recovering wells can be purged using peristaltic or bladder pumps to purge the required well volumes;
- Collect groundwater samples using disposable bailers; and
- Ship or deliver samples to a NYSDOH ELAP/CLP certified laboratory using the appropriate chain-of-custody documentation.

The samples will be submitted for laboratory analysis of VOCs and chlorinated solvents (EPA Method 8260 plus MTBE), SVOCs (EPA

Method 8270), PCBs (EPA Method 8082) TAL metals (EPA Method 6010B), pesticides (EPA Method 8081) and herbicides (EPA Method 8151) to provide information on the current groundwater conditions during the Site Investigation.

All final investigation data utilized for cleanup goal/no further action decisions will be reported with a NYSDEC ASP/CLP Category B deliverables package. The data packages will be subjected to independent data validation following ASP/CLP procedures.

5.8 Task 8 – Soil Vapor Survey

Due to the presence of adjacent properties, a soil gas survey will be performed to determine if soil gas is being generated on-site and potentially migrating off-site. For cost estimation purposes, we have assumed that a total of four (4) soil vapor probe sampling points will be installed along the Western Accessway with the use of a Geoprobe drill rig. The four (4) collected soil gas samples plus one (1) duplicate sample (for a total of 5 samples) will be submitted for the laboratory analysis of VOCs using EPA Method TO-15. The preliminary locations of the proposed soil gas borings are depicted on Figure 7. The need to conduct the soil vapor survey, or to potentially expand its scope, will be evaluated as the results from prior tasks are made available.

Soil gas samples will be collected following purging of the sampling equipment and tubing. The atmosphere in the area where the probe intersects the ground surface will be enriched with a helium tracer gas. The tracer gas will be included in the list of target analytes reported by the laboratory. An outdoor air sample will also be collected to identify potential interferences from infiltration of outdoor air into the sampling apparatus while the soil vapor sample is being collected. All air and vapor samples will be collected in 400-cc Summa gas

canisters equipped with regulators set to collect the sample over a two-hour time period (approximately 3.33 cc/minute). The soil gas samples will be submitted for laboratory analysis of the site contaminants of concern by EPA Method TO-15. The results of the soil vapor survey sampling will be assessed against USEPA, OSHA, and NYSDOH reference concentrations for the contaminants of concern. If the soil vapor results warrant, additional vapor studies (i.e., sub-slab, indoor air monitoring, etc.) may be conducted. The scope of additional vapor investigations will be based upon NYSDOH review and approval.

5.9 Task 9 – Fish and Wildlife Resources Impact Analysis (FWRIA)

A resource characterization, including literature review and site visit by field ecologists, will be conducted to satisfy the requirements for a qualitative ecological exposure assessment. Part 1 of the FWRIA resource characterization will include the following steps:

- Identify all fish and wildlife resources based upon knowledge of the site and a search of NYSDEC records and/or other sources. If no resources are identified on the site, adjacent to or downgradient from the site and the lack of resources is not due to contamination, no further work is required for the FWRIA. Identified resources will be indicated on a site map.
- Describe the resources on the site and within one-quarter mile of the site. If resources are identified that may be affected by site-related contaminants beyond this radius, this information should also be provided.
- Identify contaminant migration pathways and any fish and wildlife exposure pathways.
- Identify contaminants of ecological concern.

- Based on the resources and pathways identified and the toxicity of the contaminants of ecological concern, draw conclusions regarding the actual or potential adverse impacts to fish and wildlife resources.

A report will be generated summarizing the findings of the FWRIA Part 1 investigation and will include mapping of identified resources, cover types, and drainage. Following completion of the FWRIA Part 1, the need for development of a FWRIA Part 2 Ecological Impact Assessment will be evaluated.

5.10 Task 10 – Qualitative Human Health Exposure Assessment

Data generated from the analysis of soil, groundwater, and soil vapor samples will be evaluated to identify areas of concern and chemicals of concern, evaluate actual or potential exposure pathways, characterize potentially exposed receptors, and identify how unacceptable exposures might be eliminated/mitigated. Observations of environmental impacts, public/private water supply sources, and routes of contaminant exposure will be incorporated into this assessment.

5.11 Task 11 – Data Validation

Laboratory samples collected for closure verification and/or IRM decision making will be sent for data validation as described in the SAP. The intention of this task is not to submit all site generated data for validation, but only those samples which are located in areas at the edges of contaminant plumes, and used for site closure or remedial decisions. A subset of approximately 20% of the laboratory samples will be sent for data validation.

5.12 Task 12 - Site Investigation/Remedial Alternatives Report

The Site Investigation/Remedial Alternatives Report (SI/RAR) will be prepared in accordance with the Municipal Assistance Environmental Restoration Project "Brownfields Program" Procedures Handbook, and will assemble information relative to the presence and extent of surficial and subsurface contaminants and will generally characterize the site environmental conditions. The report will be organized into sections providing background information on the project, specific data collection methodologies used during the site investigation, the findings of these activities and the relation of identified site contamination with observed hydrogeologic features and the potential risks to human health and the environment. The report will also include various appendices to present boring logs, monitoring well installation details, soil screening results, sample data, hydraulic conductivity test results, Data Usability Summary Report (DUSR), and laboratory data.

Based on the findings of the Site Investigation, a list of areas/media of concern will be established indicating the types of hazards and environmental problems associated with each media of concern. Using this list, potential remedial responses will be evaluated for each area/media of concern. Each response will be evaluated according to the extent that it will effectively remediate the problem area and its technical feasibility, benefit, and cost. Following this evaluation, a list of potential remedial alternatives will be developed using combinations of the remedial responses referred to above to address each specific area/media of concern. The resulting list of Remedial Alternatives will be evaluated for overall construction feasibility, operational and maintenance requirements and cost. Finally, a preferred remedial alternative will be selected from the above list, which appears to satisfy the remediation goals for the site considering future reuse and presents the most cost-effective solution.

5.13 Task 13 - Project Administration

This task includes a variety of miscellaneous tasks associated with the administration and day-to-day management of an ERP project. Included in this task are subcontractor coordination, assembly and submittal of reimbursement applications, development and implementation of the Disadvantaged Business Utilization Plan and associated quarterly reporting, and participation in public meetings.

6.0 Project Management Structure

6.1 Project Organization

Barton & Loguidice, P.C. (B&L), is the prime engineering contractor for the Ithaca Falls Overlook Environmental Restoration Project (ERP # E755018). B&L will report directly to the City of Ithaca for all services required on the project. With approval from the City, B&L will serve as direct liaison with the New York State Department of Environmental Conservation (NYSDEC) throughout the duration of the project.

The B&L Project Officer and Program Manager will be Scott D. Nostrand, P.E. Mr. Nostrand has the authority to commit resources and resolve potential project scheduling conflicts. Mr. Nostrand will have primary responsibility for oversight planning and implementation of the Environmental Restoration Project.

The Project Manager will be David R. Hanny. The Project Manager will be in charge of all field activities related to the Site Investigation program. The Project Manager will be responsible for scheduling and implementing the field activities, and will have primary contact with project subcontractors designated to perform drilling, surveying, and laboratory analysis as needed. The Project Manager will be the primary contact for all project-related communications with the City and NYSDEC. Mr. Hanny will also serve as the Quality Assurance Officer for this project. These responsibilities will include performing periodic field audits during the investigation (particularly sampling activities) and interfacing with the analytical laboratory to make requests, or resolve problems, in order to assure that the predetermined project objectives for data quality have been met; he will also evaluate the data packages and interface with the laboratory and the data validator.

6.2 Project Schedule

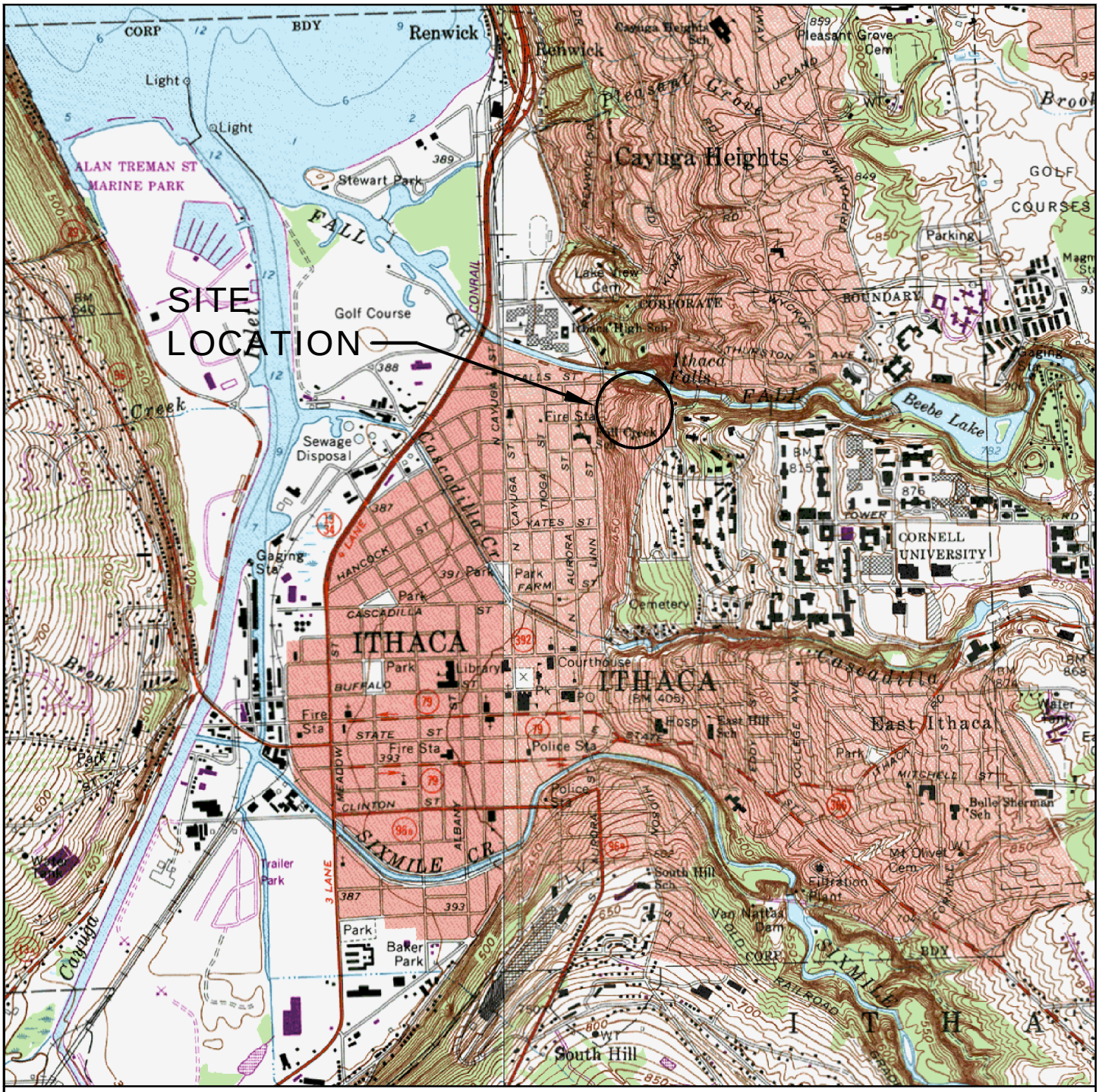
The project schedule for the Ithaca Falls Overlook Environmental Restoration Project is presented in Figure 8. The estimated duration of the project is 12 months. The schedule is based on preliminary assumptions concerning initiation and duration of field investigations, receipt of laboratory results, and NYSDEC review and comment periods.

6.3 Project Cost Estimate

A project cost estimate has been prepared and is presented in Figure 9. The cost estimate is based on conducting the tasks included in this work plan, in accordance with the procedures described and required by NYSDEC. The estimate is divided into Engineering, Subcontractor (Surveyor, Driller, IRM Contractor), and laboratory costs.

Figure 1

Site Location Map



SOURCE: ITHACA EAST & ITHACA WEST, NEW YORK U.S.G.S. QUADRANGLE MAPS, DATE 1979.

QUADRANGLE LOCATION

2000' 0 2000'

1"=2000'

N

Barton & Loguidice, P.C.

ITHACA URBAN RENEWAL AGENCY

ITHACA FALLS OVERLOOK ENVIRONMENTAL RESTORATION PROGRAM

SITE LOCATION PLAN

CITY OF ITHACA TOMPKINS COUNTY, NEW YORK

Date	Scale
OCTOBER, 2011	1" = 2000'

Figure Number 1

Project Number 1307.002.001

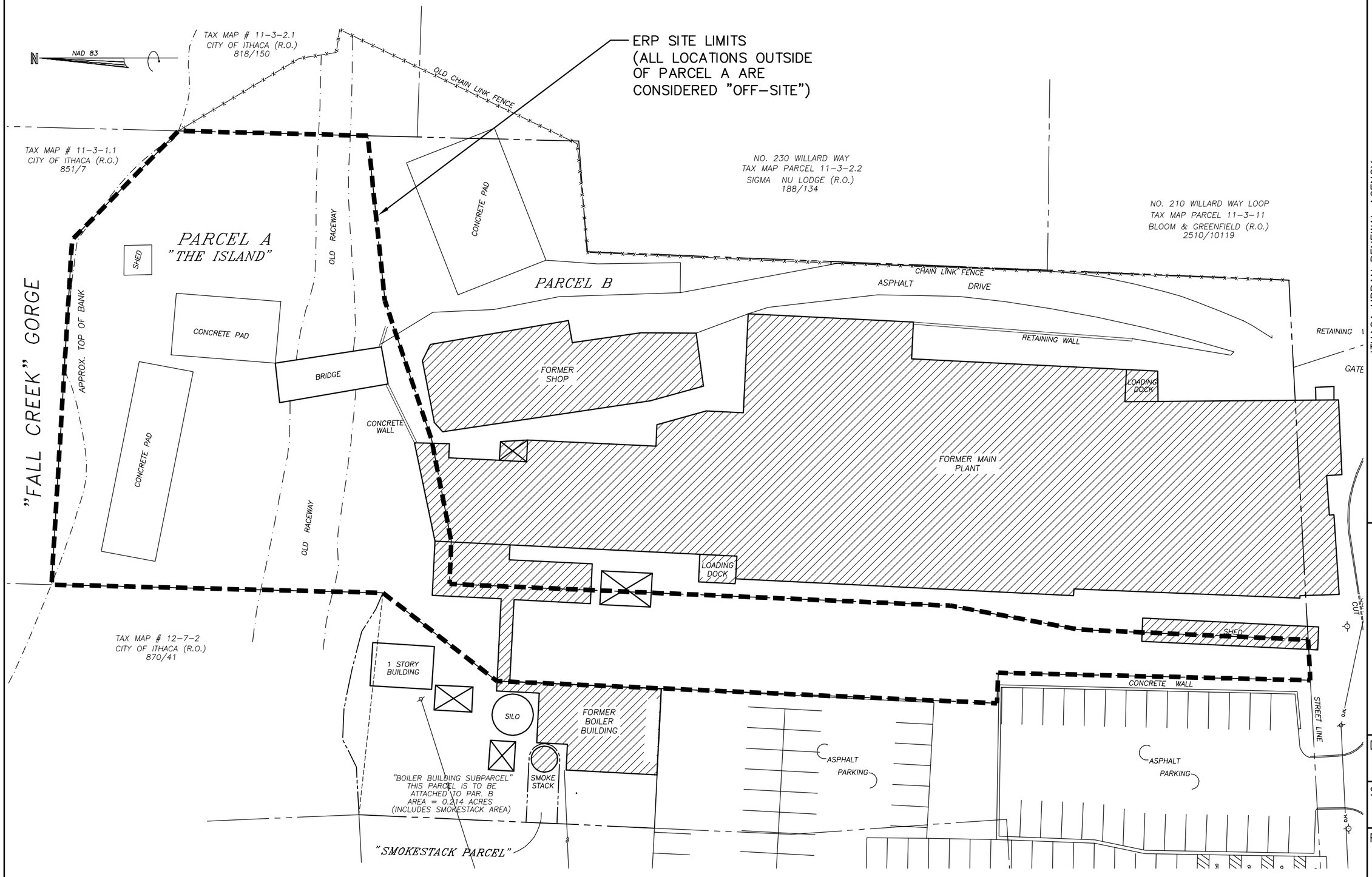
Plotted: Oct 26, 2011 - 4:17PM SYR By: jgs
I:\Shared\1300\1307002\1307002_ERP_FIG1.dwg

Figure 2

Site Plan

SITE PLAN

ITHACA URBAN RENEWAL AGENCY
ITHACA FALLS OVERLOOK
ENVIRONMENTAL RESTORATION PROGRAM
TOMPKINS COUNTY, NEW YORK
CITY OF ITHACA



NOTE:
BASEMAP TAKEN FROM A SURVEY MAP SHOWING LANDS OF FALL CREEK REDEVELOPMENT, LLC. PERFORMED BY T.G. MILLER P.C. ON 6/27/2008.

Barton & Loguidice, P.C.

Date
OCTOBER, 2011

Scale
1" = 40'

Figure Number
2

Project Number
1307.002.001

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Figure 3

Interim Remedial Measures

N

NAD 83

TAX MAP # 11-3-2.1
CITY OF ITHACA (R.O.)
818/150

OLD CHAIN LINK FENCE

ERP SITE LIMITS
(ALL LOCATIONS OUTSIDE OF PARCEL A ARE CONSIDERED "OFF-SITE")

TAX MAP # 11-3-1.1
CITY OF ITHACA (R.O.)
851/7

NO. 230 WILLARD WAY
TAX MAP PARCEL 11-3-2.2
SIGMA NU LODGE (R.O.)
188/134

"FALL CREEK" GORGE

APPROX. TOP OF BANK

PARCEL A
"THE ISLAND"

SHED

OLD RACEWAY

CONCRETE PAD

PARCEL B

CHAIN LINK FENCE

ASPHALT DRIVE

CONCRETE PAD

BRIDGE

FORMER SHOP

CONCRETE WALL

CONCRETE PAD

OLD RACEWAY

FORMER MAIN PLANT

LOADING DOCK

GATE

CURB CUT

TO CORNELL UNIVERSITY

LAKE STREET

CURB CUT

SHED

CONCRETE WALL

STREET LINE

TAX MAP # 12-7-2
CITY OF ITHACA (R.O.)
870/41

APPROXIMATE DIMENSIONS OF HOTSPOT EXCAVATION AREA:
35' X 65' X 3' DEEP

1 STORY BUILDING

SILO

FORMER BOILER BUILDING

APPROXIMATE DIMENSIONS OF SLOPE STABILIZATION AREA:
65' X 60'

"BOILER BUILDING SUBPARCEL"
THIS PARCEL IS TO BE ATTACHED TO PAR. B
AREA = 0.214 ACRES
(INCLUDES SMOKESTACK AREA)

SMOKE STACK

ASPHALT PARKING

ASPHALT PARKING

"SMOKESTACK PARCEL"

TAX MAP # 28-3-5
STATE STREET ASSOCIATES, L.P. II (R.O.)
P/O 640/807

CREEK RTE. 13

20' 0 20' 40'
1"=20'

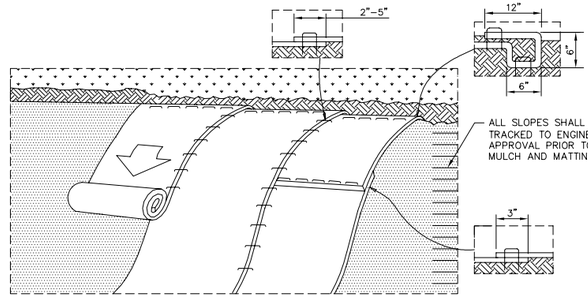
LEGEND

APPROXIMATE HOTSPOT EXCAVATION AREA

NOTES:

1. CONTRACTOR TO INSTALL PERMANENT TURF REINFORCEMENT MAT (SUCH AS NORTH AMERICAN GREEN P550) IN ACCORDANCE WITH THE SITE INVESTIGATION WORK PLAN, THE DETAIL SHOWN AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. CONTRACTOR TO REMOVE CONTAMINATED SOIL IDENTIFIED IN THE HOTSPOT EXCAVATION AREA FOR STAGING, SAMPLING AND DISPOSAL IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS.

SURVEY NOTE:
BASEMAP TAKEN FROM A SURVEY MAP SHOWING LANDS OF FALL CREEK REDEVELOPMENT, LLC. PERFORMED BY T.G. MILLER P.C. ON 6/27/2008.



NOTES:
1. PREPARE SOIL BEFORE INSTALLING TURF REINFORCEMENT MATS (TRM's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE TRM's IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF TRM's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE TRM's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF TRM's BACK OVER SEED AND COMPACTED SOIL. SECURE TRM's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE TRM's.
3. ROLL THE TRM's DOWN THE SLOPE. TRM's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL TRM's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE.
4. THE EDGES OF PARALLEL TRM's MUST BE STAPLED WITH APPROXIMATELY 4" OVERLAP.
5. CONSECUTIVE TRM's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE TRM's WIDTH.

TURF REINFORCEMENT MAT (TRM) DETAIL

NOT TO SCALE

COMPLETED CONSTRUCTION

Significant Construction Changes Are Shown

By _____ Date _____

Ck'd _____ Date _____

REVISIONS

ITHACA URBAN RENEWAL AGENCY
ITHACA FALLS OVERLOOK
ENVIRONMENTAL RESTORATION PROGRAM

INTERIM REMEDIAL MEASURES

TOMPKINS COUNTY, NEW YORK

CITY OF ITHACA

Barton & Loguidice, P.C.

Date
OCTOBER, 2011

Scale
1" = 20'

Sheet Number
3

File Number
1307.002.001

Plotted: Jan 03, 2012 - 2:08PM By: drc
I:\Shared\1300\1307002\1307002_ERP_FIG3.dwg

Checked by ____ Drawn by JGS Designed by DRH/LRH In charge of SDN

Figure 4

Preliminary Soil Sample Locations

PROPOSED SOIL SAMPLE LOCATIONS

ITHACA URBAN RENEWAL AGENCY
ITHACA FALLS OVERLOOK
ENVIRONMENTAL RESTORATION PROGRAM
CITY OF ITHACA
TOMPKINS COUNTY, NEW YORK

LEGEND

- EPA REMOVAL ACTION AREA CLEANED TO BELOW 400 ppm LEAD OR TO BEDROCK
- EPA REMOVAL ACTION AREA WITH LEAD LEVELS ABOVE 400 ppm

ERP SITE LIMITS (ALL LOCATIONS OUTSIDE OF PARCEL A ARE CONSIDERED "OFF-SITE")

N
NAD 83

TAX MAP # 11-3-2.1
CITY OF ITHACA (R.O.)
818/150

TAX MAP # 11-3-1.1
CITY OF ITHACA (R.O.)
851/7

NO. 230 WILLARD WAY
TAX MAP PARCEL 11-3-2.2
SIGMA NU LODGE (R.O.)
188/134

NO. 210 WILLARD WAY LOOP
TAX MAP PARCEL 11-3-11
BLOOM & GREENFIELD (R.O.)
2510/10119

"FALL CREEK" GORGE

APPROX. TOP OF BANK

ISLAND BENEATH SLABS

UPPER ISLAND

PARCEL A
"THE ISLAND"

SHED

EASTERN RACEWAY

OLD RACEWAY

OLD CHAIN LINK FENCE

CONCRETE PAD

CONCRETE PAD

CONCRETE PAD

ISLAND

BRIDGE

CONCRETE WALL

WESTERN RACEWAY

OLD RACEWAY

PARCEL B

CHAIN LINK FENCE

ASPHALT DRIVE

RETAINING WALL

RETAINING

GATE

FORMER SHOP

LOADING DOCK

FORMER MAIN PLANT

LOADING DOCK

FORMER WALKWAY

IRM HOTSPOT

SHED

WESTERN ACCESSWAY

CONCRETE WALL

STREET LINE

TAX MAP # 12-7-2
CITY OF ITHACA (R.O.)
870/41

OFF-SITE WESTERN ISLAND SLOPE

PLUNGE POOL

1 STORY BUILDING

SILO

FORMER BOILER BUILDING

"BOILER BUILDING SUBPARCEL"
THIS PARCEL IS TO BE ATTACHED TO PAR. B
AREA = 0.214 ACRES
(INCLUDES SMOKESTACK AREA)

SMOKE STACK

ASPHALT PARKING

ASPHALT PARKING

"SMOKESTACK PARCEL"

OFF-SITE DOWNSLOPE BENCH

NOTE:
BASEMAP TAKEN FROM A SURVEY MAP SHOWING LANDS OF FALL CREEK REDEVELOPMENT, LLC. PERFORMED BY T.G. MILLER P.C. ON 6/27/2008.

40' 0 40'
1"=40'

Barton & Loguidice, P.C.

Date
NOVEMBER, 2011

Scale
1" = 40'

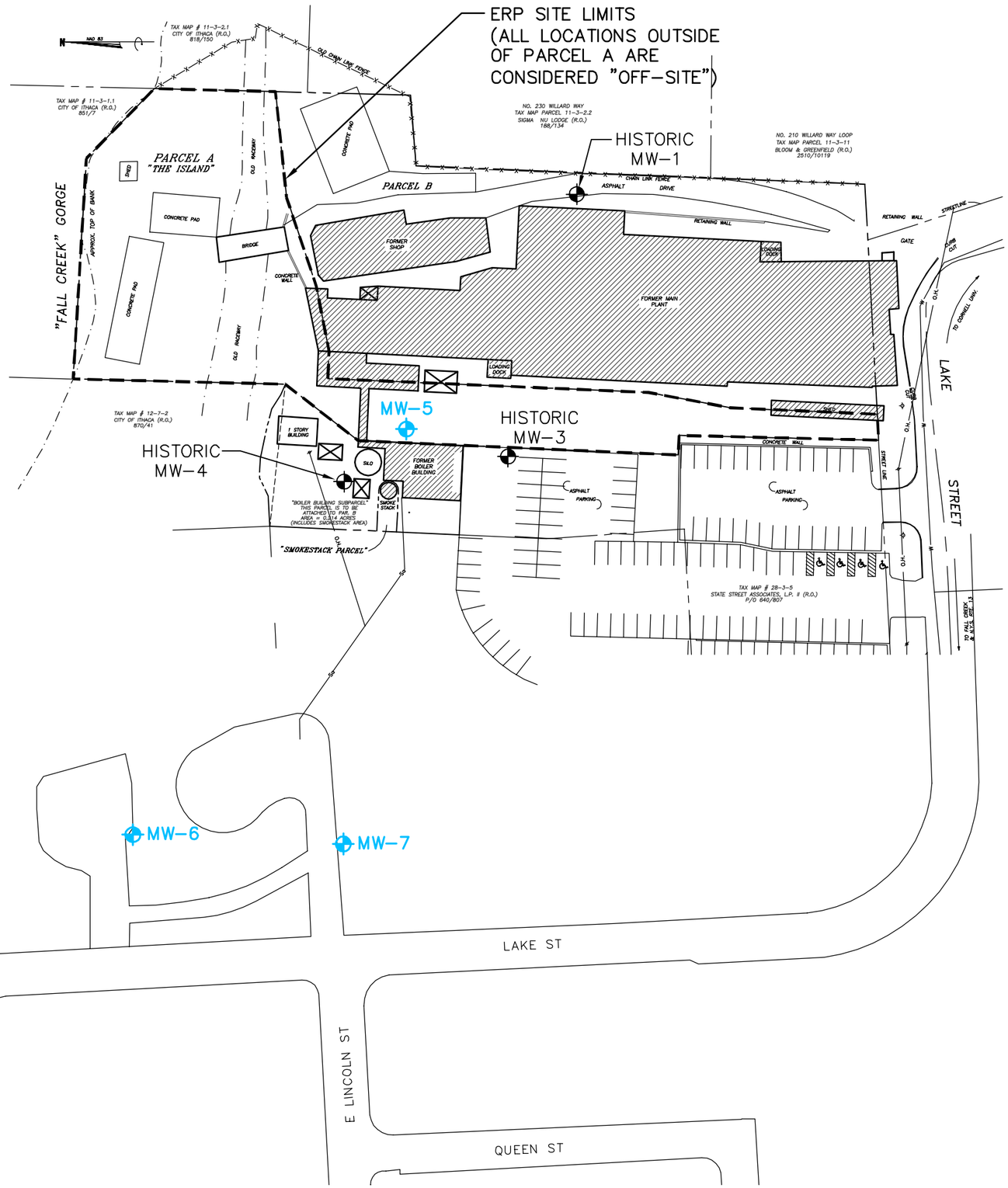
Figure Number
4

Project Number
1307.002.001

Plotted: Mar 19, 2012 - 9:31AM SYR By: jgs
I:\Shared\1300\1307002\1307002_ERP_FIG4-R2.dwg

Figure 5

Preliminary Groundwater Sample Locations



LEGEND

MW-# HISTORIC MONITORING WELL

MW-# PROPOSED MONITORING WELL

NOTE:
BASEMAP TAKEN FROM A SURVEY MAP SHOWING LANDS OF FALL CREEK REDEVELOPMENT, LLC. PERFORMED BY T.G. MILLER P.C. ON 6/27/2008.

80' 0 80'
1"=80'

PRELIMINARY GROUNDWATER SAMPLE LOCATIONS

ITHACA URBAN RENEWAL AGENCY
ITHACA FALLS OVERLOOK
ENVIRONMENTAL RESTORATION PROGRAM
CITY OF ITHACA TOMPKINS COUNTY, NEW YORK

Barton & Loguidice, P.C.

Date
MARCH, 2012

Scale
1" = 80'

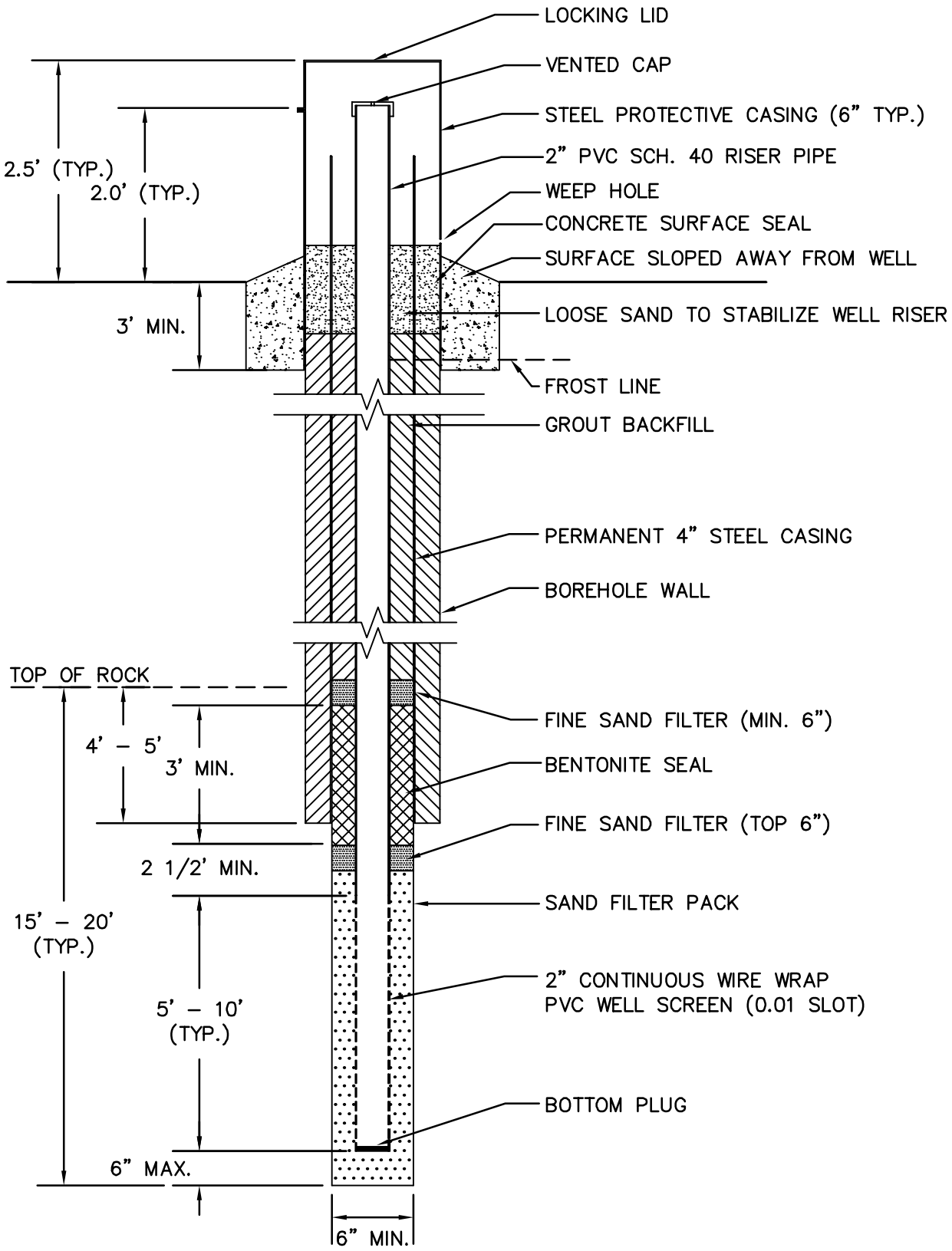
Figure Number
5

Project Number
1307.002.001

Plotted: Mar 23, 2012 - 10:53AM SYR By: jgs
I:\Shared\1300\1307002\1307002_ERP_FIG5_REV.dwg

Figure 6

Typical Monitoring Well Detail: Bedrock Well



Barton & Loguidice, P.C.

ITHACA URBAN RENEWAL AGENCY
ITHACA FALLS OVERLOOK
ENVIRONMENTAL RESTORATION PROGRAM

TYPICAL MONITORING WELL DETAIL BEDROCK WELL

CITY OF ITHACA TOMPKINS COUNTY, NEW YORK

Date	Scale
MARCH, 2012	NOT TO SCALE

Figure Number 6

Project Number 1307.002.001

Plotted: Mar 23, 2012 – 1:51PM SYR By: mj
I:\Shared\1300\1307002\1307002_BEDROCK_WELL_FIG6.dwg

Figure 7

Preliminary Soil Vapor Sample Locations

LEGEND

Ⓥ V-# PROPOSED SOIL VAPOR SAMPLE LOCATION

ERP SITE LIMITS (ALL LOCATIONS OUTSIDE OF PARCEL A ARE CONSIDERED "OFF-SITE")

N NAD 83

TAX MAP # 11-3-2.1
CITY OF ITHACA (R.O.)
818/150

TAX MAP # 11-3-1.1
CITY OF ITHACA (R.O.)
851/7

OLD CHAIN LINK FENCE

NO. 230 WILLARD WAY
TAX MAP PARCEL 11-3-2.2
SIGMA NU LODGE (R.O.)
188/134

NO. 210 WILLARD WAY LOOP
TAX MAP PARCEL 11-3-11
BLOOM & GREENFIELD (R.O.)
2510/10119

"FALL CREEK" GORGE

APPROX. TOP OF BANK

PARCEL A
"THE ISLAND"

PARCEL B

SHED

OLD RACEWAY

CONCRETE PAD

CONCRETE PAD

BRIDGE

CONCRETE PAD

CONCRETE WALL

CHAIN LINK FENCE

ASPHALT DRIVE

RETAINING WALL

RETAINING

GATE

FORMER SHOP

LOADING DOCK

FORMER MAIN PLANT

LOADING DOCK

SHED

TAX MAP # 12-7-2
CITY OF ITHACA (R.O.)
870/41

1 STORY BUILDING

Ⓥ V-1

Ⓥ V-2

Ⓥ V-3

V-4 Ⓥ

CONCRETE WALL

SILO

FORMER BOILER BUILDING

STREET LINE

ASPHALT PARKING

ASPHALT PARKING

"BOILER BUILDING SUBPARCEL"
THIS PARCEL IS TO BE ATTACHED TO PAR. B
AREA = 0.214 ACRES
(INCLUDES SMOKESTACK AREA)

SMOKE STACK

"SMOKESTACK PARCEL"

40' 0 40'
1"=40'

SURVEY NOTE:
BASEMAP TAKEN FROM A SURVEY MAP SHOWING LANDS OF FALL CREEK REDEVELOPMENT, LLC. PERFORMED BY T.G. MILLER P.C. ON 6/27/2008.

Plotted: Oct 25, 2011 - 11:52AM SYR By: jgs
I:\Shared\1300\1307002\1307002_ERP_FIG7.dwg

ITHACA URBAN RENEWAL AGENCY
ITHACA FALLS OVERLOOK
ENVIRONMENTAL RESTORATION PROGRAM

PRELIMINARY SOIL VAPOR SAMPLE LOCATIONS

CITY OF ITHACA TOMPKINS COUNTY, NEW YORK

Barton & Loguidice, P.C.

Date
OCTOBER, 2011

Scale
1" = 40'

Figure Number
7

Project Number
1307.002.001

Figure 8

Project Schedule

FIGURE 8
PROJECT SCHEDULE
Environmental Restoration Project
Ithaca Falls Overlook

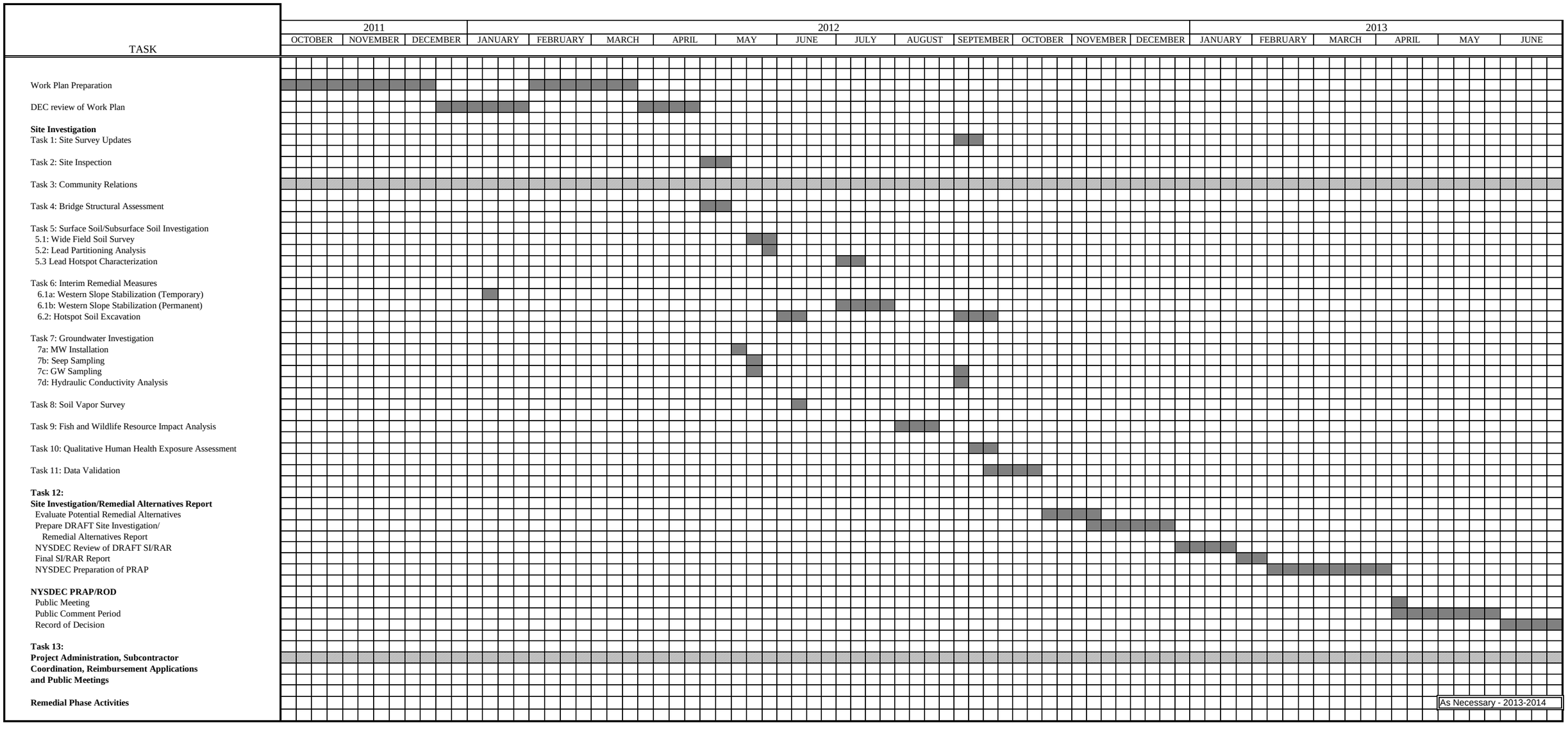


Figure 9

Project Cost Estimate

Project Cost Estimate
Environmental Restoration Project
Ithaca Falls Overlook

Task	Engineering[1]	Subcontractor	Remedial Contractor	Laboratory	Estimating Assumptions
Work Plan	$10,000	$0	$0	$0	
Interim Slope Repairs	$900	$0	$3,000	$0	Approximately 80% of this task is off-site
1. Site Survey and Base Map	$500	$5,000	$0	$0	
2. Review of Available Info	$12,000	$0	$0	$0	
Residential Well Survey	$1,800	$0	$0	$0	
3. Community Relations	$8,100	$0	$0	$0	
4. Structural Assessment of Bridge	$3,000	$0	$0	$0	
5. Surface Soil/Subsurface Soil Investigation					
5.1 Wide Field Survey	$10,200	$0	$0	$9,800	28 total lead and 15 composite samples (40% off-site)
5.2 Lead Partitioning Analysis	$7,200	$0	$0	$1,900	2 initial samples, 8 sieve samples, plus 4 QA/QC (50% off-site)
5.3 Lead Hotspot Characterization	$5,900	$0	$0	$1,600	28 additional total lead samples (50% off-site)
6. Interim Remedial Measures					
6.1a Western Slope Stabilization Design	$10,700	$0	$0	$0	
6.1b Western Slope Stabilization Construction	$10,100	$7,700	$27,500	$0	Approximately 80% off-site, includes on-site fencing repairs
6.2a Hotspot Removal Pre-Design Sampling	$3,700	$0	$0	$5,800	104 total lead samples on-site
6.2b Hotspot Removal Design	$9,000	$0	$0	$0	
6.2c Hotspot Removal Construction	$11,300	$0	$87,500	$4,400	500 tons of soil removed (non-hazardous, untreated disposal); 8 clearance soil samples on-site
7. Groundwater Investigation					
7a Bedrock Monitoring Well Installation	$6,000	$20,000	$0	$0	3 new monitoring wells (66% off-site)
7b Seep Sampling	$1,100	$0	$0	$1,700	3 seeps in bedrock on-site
7c Groundwater Sampling	$5,500	$0	$0	$5,500	2 rounds of sampling at 5 wells (80% off-site)
7d Hydraulic Conductivity Testing	$4,700	$0	$0	$0	5 wells (80% off-site)
8. Soil Vapor Survey	$4,200	$0	$0	$1,400	Installation of 4 soil vapor survey points on-site
9. Fish and Wildlife Resource Impact Analysis	$6,800	$0	$0	$0	
10. Qualitative Human Health Exposure Assess.	$700	$0	$0	$0	
11. Data Validation	$900	$6,100	$0	$0	Assumed 55 samples (subset of 25% of the total samples)
12. SIRAR	$15,500	$0	$0	$0	
13. MWBE Reporting/Reimbursement Packages	$10,300	$0	$0	$0	
Project/Subcontractor Administration	$5,600	$0	$0	$0	
Subtotal	$165,700	$38,800	$118,000	$32,100	
Project Subtotal	$354,600				
Contingency (10%)	$35,500				
Estimated Project Total	**$390,100**				
Off-Site Project Subtotal[2]	$77,000				
Off-Site Contingency (10%)[3]	$7,700				
Estimated State Share	$84,700				
Remaining On-Site Subtotal	$277,600				
Contingency (10%)	$27,800				
Estimated On-Site Total	$305,400				
Estimated City/Developer Share (10%)[3]	**$30,600**				

1 - Engineering fees based on direct salary costs, which include overhead and profit.
2 - Off-site expenses are eligible for 100% State reimbursement.
3 - Based on 10% of on-site investigation work and contingency.

Appendix A

Sampling and Analysis Plan (SAP)

Ithaca Falls Overlook
City of Ithaca Urban Renewal Agency
Tompkins County, New York

Environmental Restoration Project
ERP # E755018

Appendix A

Sampling and Analysis Plan

April 2012

Barton & Loguidice

City of Ithaca Urban Renewal Agency
Ithaca Falls Overlook

Environmental Restoration Project
ERP # E755018

Appendix A
Sampling and Analysis Plan

April 2012

Prepared for:

City of Ithaca Urban Renewal Agency
108 East Green Street
Ithaca, New York 14850

And

New York State Department of Environmental Conservation
Division of Environmental Remediation
Region 7
1679 Route 11
Kirkwood, NY 13795

Prepared by:

Barton & Loguidice, P.C.
Engineers, Environmental Scientists, Planners, Landscape Architects
290 Elwood Davis Road
P. O. Box 3107
Syracuse, New York 13220

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Section Page

Figures

Attachments

1.0 Introduction

This document presents the Sampling and Analysis Plan (SAP) for the Ithaca Falls Overlook Environmental Restoration Project to be undertaken by Barton & Loguidice, P.C. (B&L), on behalf of the City of Ithaca. The SAP defines the procedures to be followed during all field investigation activities.

The SAP contains five sections including this Introduction. Section 2 outlines the sampling objectives of the Site Investigation; Section 3 provides a description of the field investigation and sampling program, including sample designation, sample handling, and analytical requirements. Section 4 details the field investigation procedures. Finally, Section 5 outlines the field sampling and sample quality assurance/quality control mechanisms.

2.0 Sampling Objectives

2.1 Chemical Characterization

The historic gun manufacturing operations at the site are potential sources for remaining contamination. The primary contaminant of concern is widespread lead from test firing guns, dumping of spent shot, and other manufacturing processes such as forging. Volatile organic compounds (VOCs) were also identified during investigations on other portions Ithaca Gun Company property, particularly near the Western Accessway, and appear to be related to the historic storage of drums containing chemicals and oils.

The subsurface investigation includes the installation of soil borings, soil gas survey probes, and overburden monitoring wells to determine the nature and extent of contamination. Surface and subsurface soil, sediment (if applicable), soil gas, and groundwater media will be sampled and analyzed as part of the site investigation.

2.2 Data Quality Objectives

Data quality objectives (DQOs) are based on the concept that different data uses may require different levels of data quality. Data quality can be defined as the degree of uncertainty in the data with respect to precision, accuracy, and completeness. The five levels of data quality are:

- Screening (Level 1) - This provides the lowest level of data quality, but with the most rapid turnaround on results. It is often used for monitoring of health and safety conditions, preliminary comparison to Applicable or Relevant and Appropriate Requirements (ARARs), initial site characterization and location of areas designated for

higher levels of sampling and analyses, and for screening of bench-scale remediation tests. These data are typically generated on-site using real-time measuring devices and include total organic vapor concentrations from PID readings, Draeger tube measurements, pH, specific conductance, dissolved oxygen, airborne particulates and any other data obtained using direct-reading instruments.

- Field Analyses (Level 2) - This level provides rapid results in the field and is generally of better quality than Level 1 data. Analyses include mobile lab generated data and computer generated modeling of site data (i.e., geophysical data, hydraulic conductivity data).
- Engineering (Level 3) - These methods provide an intermediate level of data quality and are used for site characterization. Engineering analyses may include higher levels of mobile lab generated data or laboratory generated data using rapid turnaround methods. These types of methods provide useful site characterization data, but are generally considered for screening purposes since the results are generated without the benefit of full quality control documentation.
- Confirmational (Level 4) - This provides the highest level of data quality and is appropriate for use in risk assessments, engineering design and for cost evaluations. This level requires the analytical laboratory to be NYSDOH ELAP certified for ASP/CLP categories and to provide internal quality control documentation derived from such reporting protocols. Projects requiring the full ASP/CLP laboratory reporting will also be subject to independent third-party data validation or an internal Data Usability Summary Report (DUSR).

- Non-Standard (Level 5) - This refers to analyses by non-standard protocols, for example, when exacting detection limits or analysis of an unusual chemical compound is required. These analyses often require method development or adaptation. The level of data quality is usually similar to that of Level 4.

For this project, B&L will contract with a NYSDOH ELAP certified laboratory to generate Level 4 data, as previously described, for all soil, surface water, sediment and groundwater samples collected during the Site Investigations. Level 1 and 2 data will be generated in the field by B&L personnel (both periodically and on an as needed basis) to document health and safety monitoring, field characterization of sampling media, demonstration of the adequacy of monitoring well development efforts, and to provide rationale for construction of groundwater monitoring wells and termination of contaminated soil excavation activities.

3.0 Field Investigation

3.1 Field Investigation and Sampling Program

The objective of this task is to conduct the necessary field investigations to characterize the site and its actual or potential hazard to public health and the environment, and to identify both contaminant sources and receptors. The field investigation is designed to provide data of adequate technical content to support the development and evaluation of remedial alternatives as part of the Site Investigation/Remedial Alternatives Report. The objectives of the field investigation are to:

- Excavate and dispose of surface soil lead hotspots identified at the site as part of the Ithaca Gun VCP investigation;
- Thoroughly define the presence and extent of soil and groundwater contamination on-site (and potentially off-site);
- Characterize groundwater flow conditions and delineate the extent of groundwater contamination;
- Collect data to evaluate the potential risks that the site may pose to human health and the environment;
- Collect data to adequately evaluate potential remedial alternatives.

The field investigation at the site will include the following:

1. Site Survey and Preparation of Site Map
2. Site Inspection, Review of Available Information, and Residential Well Survey
3. Community Relations

4. Structural Assessment of Bridge
5. IRMs including Western Slope Stabilization and Hotspot Removal IRM
6. Surface Soil/Subsurface Soil Investigation
7. Lead Partitioning Analysis
8. Groundwater Investigation
9. Soil Vapor Survey
10. Fish and Wildlife Resources Impact Analysis
11. Qualitative Human Health Exposure Assessment
12. Data Validation
13. Site Investigation/Remedial Alternatives Report
14. Project Administration

The objectives and methodologies of these field activities are described in greater detail in the Work Plan and within subsequent sections of this Appendix.

3.2 Sample Designation

Samples will be designated using an alphanumeric code to identify the location and media sampled. Sampling media will be identified by a two-letter code, for example: SS (surface soil), SB (subsurface soil), LD (lead partitioning), SV (soil vapor), MW (monitoring well), SP (seep), etc. A number, beginning with 01 and increasing sequentially, will also identify each sample location. Composite samples will be designated with COMP; for example, SS-1COMP.

3.3 Sample Handling

3.3.1 Sample Container Requirements and Holding Times

Specific sample containers are required for each of the media types to be sampled, as well as the proposed analyses to be performed. Samples should be received by the laboratory within 48 hours of sample collection. In addition, there are specific holding time requirements for the type of analyses requested for each sample. These requirements are described below:

Sediment and Soils

EPA Method 8260 & MTBE (Volatile Organic Compounds) analysis requires samples to be collected in a 4-oz. glass container with a teflon-lined cap. The container must be completely filled with material to create a "zero head space" condition. The holding time is limited to 7 days. These samples do not require preservation.

EPA Method 8270 (Semi-volatile Organic Compounds) analysis requires samples to be collected in an 8-oz. glass container with a teflon-lined cap. The holding time is limited to 5 days for extraction and 40 days for analysis. These samples do not require preservatives.

EPA Method 8081 (Pesticides) analysis requires samples to be collected in a 1-liter amber glass container. The holding time is limited to 14 days for extraction and 40 days for analysis. These samples do not require preservatives.

EPA Method 8151 (Herbicides) analysis requires samples to be collected in a 1-liter amber glass container. The holding time is limited to 14 days for extraction and 40 days for analysis. These samples do not require preservatives.

EPA Method 6010B (Target Analyte List Metals) analysis requires samples to be collected in an 8-oz. glass container with a teflon-lined cap. The holding time is limited to 5 days from VTSR for extraction and 40 days for analysis. These samples do not require preservatives.

EPA Method 8080 (PCBs) analysis requires samples to be collected in an 8-oz. glass container with a teflon-lined cap. The holding time is limited to 5 days from VTSR for extraction and 40 days for analysis. These samples require storage at <4°C.

Groundwater

EPA Method 8260 & MTBE (Volatile Organic Compounds) analysis requires samples to be collected in two 40-ml. glass vials with a teflon-lined septum cap. The container must be completely filled with water to create a "zero head space" condition. The holding time is limited to 7 days for analysis.

EPA Method 8270 (Semi-volatile Organic Compounds) analysis requires samples to be collected in a 1-liter amber glass container with a teflon-lined cap. The holding time is limited to 5 days for extraction and 40 days for analysis. These samples do not require preservation.

EPA Method 8081 (Pesticides) analysis requires samples to be collected in a 1-liter amber glass container. The holding time is limited to 7 days for extraction and 40 days for analysis. These samples do not require preservatives.

EPA Method 8151 (Herbicides) analysis requires samples to be collected in a 1-liter amber glass container. The holding time is limited to 7 days for extraction and 40 days for analysis. These samples do not require preservatives.

EPA Method 6010B (Target Analyte List Metals) analysis requires samples to be collected in a 500-ml. plastic container. The holding time is limited to 6-months from VTSR. These samples require nitric acid (HNO_3) as a preservative.

EPA Method 8080 (PCBs) analysis requires samples to be collected in a 1-liter amber glass container with a teflon-lined cap. The holding time is limited to 5 days from VTSR for extraction and 40 days for analysis. These samples require storage at <4°C.

Soil Vapors

EPA Method TO-15 (Volatile Organic Compounds) analysis requires air samples to be collected in stainless steel SUMMA canisters with a minimum 400-cubic centimeter capacity. An EPA Method TO-15 detection limit of 1 ppbv and 1 ug/$m^{3\ will}$ be required for the laboratory analysis. The holding time is limited to 14 days and there are no preservation requirements for this analysis.

Sample Collection Container Summary Chart				
Matrix	**Bottle**	**Preservative**	**Analytical Method 1**	**Holding Time 2**
Soil & Sediments	4 oz. Glass w/Teflon-lined cap	< 4ºC	8260 & MTBE	10 days
	8 oz. Glass w/Teflon-lined cap	< 4ºC	8270	5 days for extraction 40 days for analysis
	8 oz Glass w/Teflon-lined cap	<4ºC	8081 & 8151	14 days for extraction 40 days for analysis
	8 oz. Glass w/Teflon-lined cap	None	6010B	6 months
	8 oz. Glass w/Teflon-lined cap	< 4ºC	8080	5 days for extraction 40 days for analysis
Ground Water/ Aqueous	2-40 ml. Glass Vials with teflon-lined septum	< 4ºC, HCl	8260 & MTBE	10 days
	1-liter amber glass with Teflon-lined cap	< 4ºC	8270	5 days for extraction 40 days for analysis
	1-liter amber glass with Teflon-lined cap	< 4ºC	8081 & 8151	7 days for extraction 40 days for analysis
	500-ml. plastic	HNO3	6010B	6 months
	1-liter amber glass with Teflon-lined cap	< 4ºC	8080	5 days for extraction 40 days for analysis
Soil Vapor	Summa Canister (400-cc minimum)	None	TO-15	14 days

1 – USEPA SW-846 Methods
2 – All holding times from Validated Time of Sample Receipt (VTSR)
3 – Sediment and water samples requiring off-site disposal will also be subject to TCLP analysis

3.3.2 Sample Packaging and Shipping

Samples will be packaged and shipped in accordance with the procedures outlined in Section 5.1 of this Appendix. Samples will be delivered to the laboratory within 48 hours of sample collection.

3.3.3 Quality Assurance/Quality Control Samples

The proposed analytical program includes the collection and analysis of QA/QC samples. Duplicate groundwater water samples will be collected to demonstrate the reproducibility of sampling techniques and laboratory analysis. Field blanks will also be taken during the sampling of sediments and soils, when dedicated sampling equipment is not used. Field blanks will not be required for groundwater since single use bailers will be used to collect these samples. A trip blank will also accompany each daily sample group delivered to the laboratory. The trip blank will consist of a pair of laboratory-prepared vials for VOC (i.e., EPA 8260 & MTBE) analysis only.

4.0 Field Investigation Procedures

4.1 Preparation for Field Entry

Prior to the initiation of field activities, the following tasks will be performed:

- Kick-off meeting with all involved personnel to review the scope of work to be performed and the Sampling and Analysis Plan;
- Review of the Health and Safety Plan by all on-site personnel;
- Operational checkout and pre-calibration of all equipment to be taken into the field;
- Location, flagging and labeling of all proposed soil probes and sampling locations;
- Identify and obtain clearance of all underground utilities associated with local utility companies and the site;
- Arrange access for drill rig at proposed drilling locations;
- Designate decontamination area and identify water and power sources; and
- Mobilization of equipment and personnel to site.

4.2 Decontamination Procedures

4.2.1 Decontamination of Sampling Equipment

All reusable sampling equipment (scoops, beakers, trowels, etc.) will be decontaminated prior to field entry and following each use. The decontamination procedures are outlined below:

1. Alconox detergent and potable water scrub;
2. Deionized water rinse;
3. Methanol rinse;
4. Deionized water rinse; and
5. Air dry

Following this decontamination procedure, equipment will be stored in airtight polyethylene wrap or bags for future on-site use. Whenever possible, pre-cleaned equipment will be used; however, if the need arises, equipment will be cleaned in the field according to the general procedures described above.

4.2.2 Decontamination of Drilling Equipment and Reusable Tools

All drilling and excavation equipment and reusable tools will be properly decontaminated prior to site use. The purpose of this activity is to ensure that all equipment utilized at the site is contaminant free; and as such, the introduction of contaminants into a test boring or monitoring well, or cross-contamination between borings or wells, will be eliminated.

A decontamination area will be constructed on-site to facilitate the steam cleaning of the drilling rig and equipment, and miscellaneous decontamination procedures (e.g., prior to sampling, during collection of field blank samples). Ideally, this area will be constructed on a gently sloping surface to aid in the collection of wash water used in the decontamination process. Polyethylene sheeting will be placed on the ground (overlapped, if necessary, in the downslope direction to avoid any loss of water between sheets) and bermed on three sides with timbers. The polyethylene will be draped over the timbers to provide lateral containment of the wash water. The height of the berms will be sufficient

to contain twice the volume of water to be generated during any decontamination event. The depth of water in the containment area will be monitored to ensure that the level remains below the midway mark of the downslope berm. All decontamination water will be placed in storage drums for subsequent disposal before the close of each workday.

A staging area will be designated on-site for the storage of well construction materials and clean drilling equipment and tools. All materials and decontaminated equipment will be placed on clean surfaces or stored on pallets, sawhorses, or plastic sheeting in the staging area.

Equipment Condition

1. All drilling and excavation equipment entering the site will be inspected for hydraulic fluid and oil leaks, and for general cleanliness. Leaking hoses, tanks, hydraulic lines, etc., will be replaced or repaired prior to entering the site.
2. All well casing and screens, and other construction materials must be new. Used materials will not be permitted for use during well construction.
3. All observations regarding the condition of equipment and materials entering or leaving the site will be recorded daily in a field book by the Site Operations Manager or Supervising Geologist.

Equipment Cleaning and Handling

Initial Cleaning

1. Following initial inspection, all drilling equipment and associated tools will be steam cleaned at the decontamination area. Typical tools and equipment to be cleaned include:

    - Drilling rods, bits
    - Augers (clips, pins and associated hardware)
    - Samplers (i.e., split-spoon, Denison, etc.)
    - Casing materials
    - Wrenches, hammers and miscellaneous hand tools
    - Mud tub/pan
    - Hoses, tanks
    - Cable clamps and other holding devices in direct contact with the drilling rods
    - Drill rig and undercarriage, wheel wells, chassis, and any other items that may come in contact with the work area

2. During the cleaning operation, equipment will be handled only with clean gloves. A new set of gloves will be utilized between successive cleanings for each location.

3. Cleaned materials will be protected from contamination during transport to the staging area by such means as the Site Operations Manager or Supervising Geologist deems necessary.

4. The Site Operations Manager or Supervising Geologist will document equipment decontamination.

On-Site Cleaning Between Borings

1. Following each boring or well installation, all drilling equipment (listed above under "initial cleaning") will be steam cleaned before moving to the next location.

4.3 Drilling Program

The drilling program will be conducted via direct push technology using Geoprobe® installations for subsurface soil sampling and via rotary drilling for monitoring well construction. The following drilling procedures will be utilized to complete the subsurface soil borings via Geoprobe®:

1. The boreholes will be advanced using direct push methods until the required depth is encountered.
2. Drilling will proceed in a manner to permit continuous sampling through the overburden materials until the required depth has been achieved.
3. Pertinent drilling and sampling information will be recorded in the field log by the Supervising Engineer/Geologist.

The following rotary drilling procedures will be utilized to complete the boring installations:

1. A minimum 10-inch diameter borehole will be advanced using 6.25-inch (inside diameter) hollow-stem augers with split-spoon sampling until contact with the bedrock interface.
2. A 5⅞ tricone roller bit will be used to create a 4-5 foot socket into the upper bedrock surface.

3. A 4-inch steel casing will be seated into the bedrock socket and grouted into place.
4. The grout will be allowed to cure for a minimum of 24 hours to create a competent seal between the overburden and bedrock units.
5. Coring shall use NX or HQ coring equipment and will advance continuously to the depth specified by the supervising geologist.
6. All NX or HQ coring shall be performed using rotary drilling methods using potable water as the drilling fluid.
7. Individual core runs will not exceed 10 feet in length.
8. Starting depth for every core run will be verified prior to core drilling by the supervising geologist.
9. Core samples will be collected, examined, and logged immediately upon retrieval and stored in specially designed wooden boxes.
10. Visual field classification of the rock core will include: lithology and texture, color, hardness, degree of weathering, bedding/joint/fracture spacing, striations, discontinuities, and local geologic formation name.
11. Rock Quality Designation (RQD) will be recorded for all core samples using USGS recommended procedures.
12. Each core box will be labeled with the project name, project number, boring location, depth interval, run number, recovery, RQD, the top and bottom of the run, and the date.
13. In addition to visual classification, the supervising geologist will record all observations during core drilling, including coring rate in minutes per foot, fluid gain or loss, drilling rig reactions, and types of casing and drilling fluid used.

14. The bedrock borehole shall be reamed using a 3 ⅞-inch tricone roller bit to provide adequate room for the installation of a 2-inch PVC well and backfill material. The tricone roller bit will only be necessary if NX coring methods are used since the HQ sampler will create an adequate borehole diameter for the installation of a 2-inch PVC well and backfill materials.

15. Packer testing will be conducted to determine zones of higher permeability in the deep bedrock, where placement of the well screen would better accommodate groundwater monitoring activities.

It is not anticipated that any of the well locations will require the installation of more than one groundwater monitoring well to characterize the hydrogeologic or environmental conditions. In the unlikely event, however, two or more wells are needed to fully characterize separate (vertically isolated) water bearing horizons, the deepest boring will be completed first to identify the vertical extent of contamination and to determine the screening depth of subsequent shallower monitoring wells. It may also be necessary to seal off upper contaminated horizons through the use of multiple casings, in which progressively smaller-diameter casings are telescoped through larger casings terminated at the depth of each encountered contaminant zone.

The following procedures will be used for the installation of the bedrock seep borings.

1. Each boring will be located using a global positioning system to assist in the proper vertical and horizontal placement with respect to the existing bedrock monitoring well MW-4.

2. Subhorizontal borings along the bedrock scarp will be installed using a hammer drill system.

3. Borings will be approximately 1/2- to 5/8-inches in diameter to allow for the installation of 3/8-inch sterile polyethylene tubing.

4. Polyethylene tubing will be perforated/slotted and wrapped with a VOC-compatible filter fabric to reduce the amount of fines entering the polyethylene tubing.

5. Several borings may be tied to a common manifold system to allow for sufficient water to collect a groundwater sample.

4.3.1 Soil Sampling and Screening

The following procedures will be performed during the Geoprobe drilling program to collect, characterize, and screen soil samples:

1. At each exploratory boring location, continuous samples will be taken through the overburden materials and the extent of contamination. Before each sample is taken, the supervising geologist will confirm the sample depth;

2. Soils will be classified in accordance with the Modified Burmeister Classification System. Field classification will include color, grain size, lithology, relative density, moisture content, soil texture and structure, relative permeability and common term of geologic unit;

3. PID readings will be recorded from each split-spoon as the samples are opened. The PID instrument measures airborne vapors that are detectable by photoionization. The PID will be equipped with an 11.7 electron volt (eV) ionization source, which will ionize any organic compound having an ionization potential below 11.7 eV. The ionized compounds are brought to an excited state from which their

relative concentration in ppm (parts per million) can be read. The types of organic compounds most likely to be encountered at the site have ionization potentials below that of the 11.7 eV ionization source. The PID instrument is not designed to identify individual compounds, but is meant to quantify the concentration of total ionizable compounds present in an airborne state. The PID will be calibrated each day in order to maintain a degree of accuracy and to record the daily drifting of the instrument between calibrations;

4. Samples for volatile organic compound analysis will be transferred directly, and as soon as possible, into appropriately sized and preserved soil sample containers. The remaining soil will be placed into appropriate sample containers for the analysis of semi-volatile organic compounds, TAL metals, PCBs, pesticides, and herbicides;

5. Follow record keeping and chain-of-custody procedures as detailed in Section 5.1 of this Appendix;

6. Soil samples not set aside for laboratory analysis will be placed in eight-ounce, wide-mouth, moisture-tight glass jars. The opening of the jar will be sealed with a foil liner and then a screw-on cap. Alternatively, these samples may be placed in Zip-Lock plastic bags and sealed;

7. Sample jars or bags will be labeled with the following information: project name, project number, location identification, sample depth interval, blow counts, and date. This information will also be recorded in the field log;

8. The organic vapor levels in the headspace above the soil sample in each jar or bag will be screened using a PID

(samples placed in jars should allow for a minimum 1-inch headspace for screening) once the samples have had an opportunity to release vapors from contaminants present in the soil matrix (typically one hour). The jar's cap will be gently removed, and the tip of the PID will be inserted through the foil liner, taking care not to drive the tip into the soil. The Supervising Geologist will record peak and steady PID readings in the field log. Upon completion of the PID screening the soil will be emptied from the jars and properly disposed; and

9. Soil samplers will be decontaminated between sample intervals using the procedures outlined below:

    - Detergent wash with alconox
    - Deionized water rinse
    - Isopropanol rinse
    - Deionized water rinse
    - Air dry
    - Final deionized water rinse
    - Air dry

4.3.2 Installation of Monitoring Wells

Bedrock monitoring well installation procedures are outlined below:

1. A six-inch thick sand pack will be placed at the bottom of the borehole for seating of the well into approximately 10 feet of competent bedrock.
2. Following initial backfilling, the well screen and riser section will be installed. The monitoring well will be constructed of

2-inch Schedule 40 PVC riser with a 10-foot length of continuous slot (0.010-inch) wire wrap PVC well screen.

3. A clean, coarse sand pack of appropriate size will be placed in the annular space between the well screen and the borehole to a minimum height of 2-feet above the top of the screen section. The sand pack shall not limit water flow into the well and should minimize the amount of fines entering the well (see Section 4.3.3). The well screens will be placed in accordance with Section 5.7 of the Work Plan.

4. A 6-inch thick, fine sand filter will be placed above the coarse sand pack (see Section 4.3.3).

5. A three-foot minimum bentonite seal will be placed above the fine sand filter and allowed to hydrate prior to adding grout to the borehole (see Section 4.3.3)..

6. An additional six-inch fine sand filter will be placed above the bentonite seal.

7. The remainder of the borehole will be grouted with a bentonite-cement mixture to a depth of 2-3 feet below the ground surface (see Section 4.3.3).

8. A concrete surface seal, no less than 3 feet by 3 feet and approximately 2-3 feet below ground surface will be constructed around the PVC riser.

9. A six-inch diameter locking, steel protective casing will be installed over the stickup portion of the PVC well riser and set into the concrete surface seal. Flush-mounted manholes will be used for wells installed within parking lot or other traffic areas.

10. The steel protective casing (or well manholes) will be clearly and permanently marked with the well identification number.

The depths described above may not be achievable due to subsurface constraints at the site. The monitoring well installations will adhere to these depths wherever possible.

4.3.3 Sand Pack, Bentonite Seal, and Cement Grout

Sand Pack

1. The sand pack will consist of uniformly graded, clean, inert sand, of suitable grain-size to minimize the amount of fine materials from entering the well. The fine sand filter layer above the sand pack will exhibit 100% by weight passing the No. 30 sieve, and less than 2% by weight passing the No. 200 sieve.
2. Samples of the coarse sand pack and fine sand filter materials will be provided to B&L in 8 oz. wide-mouth glass jars. Samples will be retained for a period of one year.

Bentonite Seal

1. Pure Wyoming sodium bentonite pellets or chips will be used for the bentonite seal. The size of the pellets or chips will be less than one-half the width of the annular space. An alternative method could be the use of a granular bentonite slurry, which would be installed by pressure grouting with tremie rods.

2. After the seal is installed, there will be a minimum 30-minute waiting period to allow for proper hydration of the bentonite materials before placement of the grout.

Cement-Bentonite Grout

1. Cement will be Portland Cement, Type I, in conformance with ASTM C150.
2. Bentonite will be a powdered Wyoming sodium bentonite.
3. Proportions of cement-bentonite grout mix will be approximately 94 pounds cement: 3-5 pounds bentonite: 7 gallons water.
4. The grout mix will be installed by pressure grouting through tremie rods.
5. The grouting will be complete when the grout mixture returns to the ground surface.

4.3.4 Boring Logs and Record Keeping

During the drilling of each borehole and installation of each monitoring well, an accurate log will be kept and will include the following information:

1. Date and time of construction, driller and helper's name, and B&L Supervising Geologist;
2. Drilling method used;
3. The reference point for all depth measurements (e.g., ground surface);
4. The depth to changes in the geologic formation(s);

5. The depth to the first water bearing zone;
6. The thickness of each stratum;
7. The description of the material comprising each stratum, including:
    - Depth and sample number;
    - Grain-size, as defined by the Modified Burmister System;
    - Color;
    - Degree of weathering, cementation and density;
    - Other physical characteristics.
8. The depth interval from which each formation sample was taken.
9. The depth at which borehole diameters (drill bit sizes) change, if applicable.
10. The depth to the static water level and changes in this level with borehole depth.
11. Total depth of completed boring (and well if not the same).
12. The depth and description of the well casing materials, screen and riser lengths, sand pack, bentonite seal, grout, and concrete surface seal.
13. The depth or location of any lost drilling materials or tools.
14. The amount of cement, bentonite and sand (number of bags) used for the installation of the well seals and sand pack.
15. Screen materials and design.
16. Casing and screen joint type.
17. Screen slot size and length.

18. Type of protective well casing and cap.

19. PID readings.

Figure A4-1 presents a sample boring log to be used during the drilling program.

A daily report will be prepared, giving a complete description of all formations encountered, number of feet drilled, number of hours on the job, standby or shutdown time, the water level in the boring/well at the beginning and end of each shift, water level at changes in formations, and other pertinent data.

4.4 Well Development

The purpose of well development is to remove fine materials from the area of the screen and prepare the monitoring well for future groundwater level measurement and sampling activities. This is achieved through various development methods until consistent water quality conditions are observed and recorded. These include stabilized (or nearly so) temperature, pH, specific conductance, and turbidity measurements. Well development will be performed using the following outlined field procedures.

4.4.1 Well Development Procedures

1. Inspect locking casing and surface concrete seal for integrity.

2. Open the well.

3. Measure the static water level from the top of the well casing and then the well bottom depth; calculate the volume of water in the well from the formula:

   $V = \pi R^2 H$

   Where: V = volume (ft3)
   R = inside well radius (ft)
   H = length of water column (ft)
   π = ~3.14

4. Lower a pre-cleaned or disposable bailer connected to a new solid braid nylon rope to the bottom of the well.

5. Bail the well until all fines are removed from the well and there is no solid sediment on the well bottom.

6. Continue bailing or install a well pumping system to complete well development. Pumps should be equipped with a backflow prevention valve.

7. If a pumping system is used, activate the pump; record the time and flow rate.

8. At 15-minute intervals during development, record temperature, pH, specific conductance and turbidity using calibrated instruments.

9. The pump will be periodically raised and lowered throughout the water column to ensure the screened interval is completely developed.

10. If low yield and slow recovery do not permit continuous pumping, the well will be periodically pumped or bailed.

11. Development will be considered complete when the following conditions have been achieved for three successive measurement intervals:

- Temperature and specific conductance are within 10% of the previous readings.
- pH is within 0.3 units.
- Turbidity has reached 50 NTU's or lower. In the event that 50 NTU's cannot be achieved because of the nature of the formation, the NYSDEC will be notified and alternative criteria will be mutually agreed upon (e.g., purging to continue until NTU readings have stabilized to within ±10% of previous readings).

12. When the preceding conditions have been met, remove the pump, measure the water level, and secure and lock the well.

13. Record all pertinent information in the field log.

4.5 In-Situ Hydraulic Conductivity Testing

In-situ variable hydraulic conductivity testing will be performed within each completed monitoring well after sufficient development work has been accomplished. Also known as the slug or bail test, this method involves either the removal of a bail of water or the displacement of water within the well by the insertion of a slug. Upon creating an elevated or depressed head, the water level in the well is measured and recorded periodically over the recovery time.

The underlying assumption in the analysis of these tests is that the rate of inflow to the well, after inducing a hydraulic head difference, is a function of the hydraulic conductivity (k) and the unrecovered head distance. The analytical method, typically relying on graphical solution techniques (time vs. head or head ratio), rearranges the flow equation to solve for parameter k. For unconfined groundwater conditions, the Hvorslev and Bouwer-Rice methods will be used.

Details of these methods are given in the publications by Hvorslev (1951), Cedergren (1977), and by Bouwer & Rice (1976) and Bouwer (1989), respectively. For confined groundwater conditions, if any are encountered, the Cooper-Bredehoeft-Papadopulos method will be used (Cooper et al. 1967; Papadopulos et al. 1973).

It is important to observe whether the static water level recorded prior to starting the variable head test occurs within the screened interval of the well. If so, the use of the slug test (falling head) is inappropriate due to drainage into the vadose zone above the water table. A bail test (rising head) is preferred in such circumstances.

Depending on the rate of recovery, the water levels are recorded during the test either with an electronic probe and/or tape equipped with a sounding "popper," or with an immersed pressure transducer connected to an automatic data logger. The latter is appropriate for rapid recovery conditions, since considerable data are recorded during the first few seconds and minutes of the test, with greater accuracy than is possible using the manual observation method.

4.5.1 Slug Test Procedure

Slug tests will be conducted in the following manner:

1. Slug testing will be performed at each monitoring well through the removal of a bail of water or the displacement of water within the well through the insertion of a slug.
2. Upon creating an elevated or depressed head, the water level within the monitoring well will be measured using an electronic data logging system (pressure transducer).

3. The amount of time required for the well to achieve 90 percent recovery (relative to the initial static water level in the well) will be recorded through the data logger.

4. If possible, several trials will be conducted at each well location to generate a representative hydraulic conductivity.

5. Test results from each monitoring well will be analyzed in accordance with approved methods to determine hydraulic conductivity values.

6. All testing equipment including the slug, pressure transducer, and pressure transducer cable will be properly decontaminated prior to insertion down each well location.

4.6 Groundwater Sampling

4.6.1 Monitoring Well and Seep Sampling Procedure

The primary objective of field personnel in obtaining groundwater samples is to collect and preserve representative samples, and adhere to proper chain-of-custody procedures in their prompt shipment to the certified laboratory for analysis within the specified holding times. Upgradient monitoring wells will be sampled before downgradient wells in the following manner:

1. Monitoring wells will be purged prior to sampling using disposable bailers or properly decontaminated pumping equipment. A minimum of three well volumes will be purged where possible. For wells that bail dry, purging will consist of complete evacuation. Specific Conductance, pH, Eh, temperature and turbidity will be monitored during purging to confirm stable water quality conditions. Stable conditions

are previously defined in Section 4.4.1. Purging will not be required for the seep samples since water is anticipated to be free flowing from each individual boring or through a manifold system.

2. Following adequate recovery (within 80% of static levels), obtain sample with a disposable bailer suspended on new, solid-braid nylon rope. Transfer sample directly from the bailer to the parameter-specific sample container labeled appropriately (sample ID Number and preservative), and place in coolers with ice or ice packs. Fill sample bottles in the following order: VOCs then SVOCs. Bottles will be filled directly from the polyethylene tubing for the seep samples.

3. Calibrate all field chemistry equipment every day.

4. Follow record keeping and chain-of-custody procedures as detailed in Section 5.1.

5. Replace all well caps, and lock protective well cover. Tubing inserted into the bedrock seep(s) will be left in place for subsequent sampling rounds.6. At the end of the sampling day, the coolers will be taped shut with the custodian's initials placed on the tape at the points of entry. Samples will be delivered to the laboratory by field personnel upon departure from the site. Alternatively, an express carrier may be used to deliver the samples to the laboratory.

4.7 Surface and Subsurface Soil Sampling

Surface soil samples will be collected from depths of 0-2 inches; subsurface samples will be collected from 2-10 inches below grade. Samples will be examined by the on-site representative and will be logged as described in the Sampling and Analysis Plan in Appendix A.

Using a photoionization detector (PID), each soil sample taken during the sampling program will be screened for total volatile organic vapors. Upon sample retrieval, the Engineer/Geologist will screen the sample directly with a PID. The process will involve placing the soil sample in a sealable bag, then inserting the PID probe in the bag. Measurements will be recorded to identify the peak concentration and the sustained vapor concentration. Both measurements will be recorded in parts per million (ppm) from the direct readout on the instrument. All measurements will be recorded in the field log along with the ambient temperature for future reference regarding determination of well screen intervals, analytical soil sample selection, and definition of the vertical extent of groundwater and soil contamination.

A disposal stainless steel scoop will be used to extract the surface soil in the following manner:

1. Grass, stones, and other materials at the ground surface will be removed. Scoop surface soil from the upper ten inches of material.
2. Place the sample into the parameter-specific sample container, label appropriately (sample ID number and preservative) and store in coolers with ice or ice packs as soon as possible.
3. Follow record keeping and chain-of-custody procedures as detailed in Section 5.1 of this Appendix.

4. Screen sample with a PID using the procedures described above.

5. Use a new disposable scoop for each sample. Alternatively, thoroughly decontaminate sampling scoop using the procedures outlined in Section 4.2.1 of this Appendix.

6. At the end of the sampling day, the coolers will be taped shut with the custodian's initials placed on the tape at the points of entry. Samples will be delivered to the laboratory by field personnel upon departure from the site.

4.7.1 Sample Selection Method

Due to the widespread presence of lead contamination, the goal of the wide field soil survey is to assess as much of the site as possible. However, there is insufficient soil depth for sampling on portions of the site where bedrock is shallow. In order to cover a wide field, each sub-area identified in the Site Investigation Work Plan shall be assessed to determine whether bedrock may be a confounding variable in that area. If soil depths are insufficient in portions of the sub-area, subsurface sampling will not be conducted.

In addition to discrete samples, composite samples have also been identified as part of the wide field soil survey. Composite samples will be taken from 5 discrete samples within the associated sub-area at the site, described in Section 5.5.1 of the Site Investigation Work Plan. The discrete locations will be selected from each area based on judgmental screening conducted by field personnel and NYSDEC oversight. However, as composite sampling should not be conducted for VOCs, a grab sample will be taken from one of the composite sample locations and analyzed for VOCs. The locations of the VOC sample will be recorded in the field log.

4.8 Lead Partitioning

In order to determine how the lead is partitioned in the site soils, a lead portioning analysis will be used to identify where the lead is located within the soil profile and whether it is sorbed to soil particles. Prior sampling procedures indicate that fragments of lead (i.e., shot or slag) were likely included in the soil samples submitted for total lead analysis, so every effort will be made not to include large fragments of lead in the samples. The partitioning analysis will be conducted as follows:

1. Collect a surface soil (0-2 inches) and subsurface soil (2-15 inches) sample from each location.
2. Use a sieve analysis to separate coarse materials (greater than 2.0 mm), sand (0.05-2.0 mm), and silt/clay (less than 0.05 mm).
3. Assemble composite samples of each sieve size to be submitted for analytical determination of total lead content.

4.9 Backfill Sampling

In order to verify that backfill brought onto the site complies with the requirements of DER-10 and 6 NYCRR 375-6.7(d), analysis of backfill must be completed for each source of backfill materials. Samples must be submitted for laboratory analysis of VOCs (discrete sample) and SVOCs, metals, PCBs, and pesticides/herbicides (composite sample). Samples must not exceed the allowable constituent levels in Appendix 5 of DER-10, which is derived from the soil cleanup object (SCO) tables in 6 NYCRR 375-6.8. Documentation of the source of the fill must be provided to the NYSDEC Project Manager prior to its use on the site.

A minimum of one sample must be analyzed from each new source, and the required number of samples is outlined in the following table:

Recommended Number of Soil Samples for Soil Imported To/Exported From a Site			
Contaminant Soil Quantity (cubic yards)	**VOCs Discrete Samples**	**SVOCs, Inorganics, PCBs, Pesticides/ Herbicides Composite Samples**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1000	7	2	
>1000	Add an additional 2 VOC and 1 composite samples for each additional 1000 cubic yards, or consult with NYSDEC Project Manager		

The NYSDEC Project Manager may modify the number of required samples from the table above once a trend of compliance has been established or after an evaluate of the site being remediated and the source of the material.

Materials other than soil, such as gravel, rock, or stone consisting of virgin material from a permitted mine or quarry, may be imported without chemical testing, provided it contains less than 10% by weight material which would pass through a size 80 sieve.

4.10 Soil Vapor Sampling

Soil vapor sampling installations will consist of temporary probes. A surface seal will be installed to prevent the infiltration of outdoor air into the sampling probe, and a helium tracer gas will be used to ensure the integrity of the surface seal. Soil vapor samples will be collected in the following manner:

1. One to three implant volumes (i.e., the combined volume of the sample probe and tube) must be purged prior to the collection of the sample.
2. Flow rates for purging and collection shall not exceed 0.2 liters per minute to minimize outdoor air filtration during sampling.
3. Summa® sampling canisters will be used and must be certified clean by the laboratory.
4. The size of the sampling container must be sufficient to achieve the minimum reporting limits.
5. A tracer gas will be used to verify that infiltration of outdoor air does not occur during sampling.

The following local conditions must be documented during sampling, as they may influence the interpretation of the results:

1. Use of volatile chemicals in normal operations by nearby commercial or industrial facilities.
2. Direction and estimated distance of neighboring commercial or industrial facilities.
3. Location of outdoor air sampling or monitoring sites.

4. Weather condition information, including precipitation, temperature, wind speed, wind direction, and barometric pressure at the time of sampling, as well as temperature and precipitation within the past 24 to 48 hours, will be obtained from a local weather station.
5. Odors, readings from field instruments, and other pertinent information.

Sample log sheets shall contain the following information:

1. Sample identification.
2. Date and time of sample collection.
3. Sampling depth.
4. Identity of sampling personnel.
5. Sampling methods and devices.
6. Soil vapor purge volumes.
7. Volume of soil vapor extracted.
8. If canisters are used, vacuum of canister before and after samples collected.
9. Apparent moisture content (dry, moist, saturated) of the sampling zone.
10. Chain-of-custody protocols.

4.11 Water Level Monitoring

In order to determine the horizontal hydraulic gradient(s) exhibited by the water table surface and potential routes of contaminant migration, water level measurements will be made at each newly installed well and available existing wells using the following procedures:

1. After noting the general conditions of the well (surface seal, lock, etc.), the bottom of the well will be sounded by lowering a decontaminated, weighted probe into the well.
2. Well bottom conditions will be noted (silty, blockages, etc.). The distance from the base of the screen to the top of the casing will be recorded to the nearest 1/100th of a foot.
3. The static water level will be measured and noted by sounding with an electronic tape or "popper" to the nearest 1/100th of a foot.
4. The water level readings will always be taken from a marked point on the well casing.
5. Other measurements to be taken are:
   - Stickup of well casing from ground surface or surface seal.
   - Depth to bottom of well from the top of the riser.
6. The date and time will be recorded for these measurements. Also, any pertinent weather conditions will be noted (i.e., significant recent precipitation or drought conditions).
7. Upon completion, the wells will be secured, and all downhole equipment will be decontaminated with alconox and deionized water.
8. As practicable, all water levels should be collected on the same day.

5.0 Quality Assurance/Quality Control

5.1 Record Keeping and Chain-of-Custody Documentation

The sampler's field records will contain sufficient information such that someone else can reconstruct the sampling situation without reliance on the sampler's memory. Entries in the field records will include, at a minimum, the following:

- Site name and location
- Project number
- Name and affiliation of Project Manager and sampler involved
- Sampling point name and description
- Type of sample container(s) used
- Preservative(s) used
- Well purging procedures and equipment
- Well-specific data including water level, depth and volume purged
- Sample collection procedure and equipment
- Date and time of collection
- Sample identification number(s)
- Laboratory's sample identification number(s)
- References such as maps or photographs of the sampling site, if available
- Field observations
- Pertinent weather factors such as temperature, wind direction and precipitation
- Any field measurements made, including pH, Eh, temperature, turbidity and dissolved oxygen

The field sampling data sheet is presented as Figure A5-1.

Chain-of-custody records for all samples will be maintained. A sample will be considered to be "in custody" of any individual if said sample is either in direct view of or otherwise directly controlled by that individual. Storage of samples during custody will be accomplished according to established preservation techniques, in appropriately sealed and numbered containers. Chain-of-custody will be accomplished when the samples are directly transferred from one individual to the next, with the first individual witnessing the signature of the recipient on the chain-of-custody record.

The chain-of-custody records will contain the following information:

- Respective sample numbers of the laboratory and B&L, if available
- Signature of the collector
- Date and time of collection
- Sample type (e.g., groundwater, sediment)
- Identification of well or sampling point
- Number of containers
- Parameter requested for analysis
- Signature of person(s) involved in the chain of possession
- Description of sample bottles and their condition
- Problems associated with sample collection (i.e., breakage, preservatives missing), if any

A sample chain-of-custody form is presented as Figure A5-2.

All samples will be placed in a cooler on ice. If samples are to be hand delivered, no further measures are required. If samples are to be shipped via common carrier (e.g. Federal Express) bottle lids and labels are to be covered with clear tape, each sample bottle will be placed in a Ziploc plastic bag and individually wrapped in bubble wrap. Ice is to be double bagged. The cooler

drain and seams will be sealed with duct tape. The cooler will be sealed with strapping tape and custody seals shall be place on the front and back of the cooler lid.

5.2 Field Sample QA/QC Procedures

5.2.1 Field and Trip Blanks

To monitor the integrity of field sampling and equipment cleaning techniques, the following field quality assurance/quality control (QA/QC) procedures will be adhered to for this effort.

A field blank will be prepared on-site each day that surface water, sediment and soil samples are collected with non-dedicated or non-disposable sampling equipment. If more than one matrix is being sampled in a given day, field blanks will be prepared for each matrix. A trip blank for water samples and/or soil samples to be analyzed for VOCs will accompany sample containers through all phases of the sampling event to ensure proper bottle preparation and laboratory integrity. Trip blank and field blank samples will receive identical handling procedures as on-site samples.

Field and trip blanks are used as control or external QA/QC samples to detect contamination that may be introduced in the field (either atmospheric or from sampling equipment), in transit to or from the sampling site, or in the bottle preparation, sample login, or sample storage stages within the laboratory. The blanks will also show any contamination that may occur during the analytical process.

Trip blanks are samples of analyte-free water, prepared at the same location and time as the preparation of bottles that are to be used

for sampling. They remain with the sample bottles while in transit to the site, during sampling, and during the return trip to the laboratory. At no time during these procedures are they to be opened. Upon return to the laboratory, they are analyzed as if they were another sample, receiving the same QA/QC procedures as ordinary field samples. If these samples are accidentally opened, it will be noted on the chain-of-custody.

Field blanks are prepared in the field (at the sampling site) using empty bottles and analyte-free water supplied separately (prepared at the same time and place as the bottles used in the sampling). The preferred procedure for collection of field blanks for non-dedicated sampling equipment is to first decontaminate the sampling device (e.g., scoop, beaker), and then pour the analyte-free water over the device and collect the runoff into the empty bottles supplied with the sample bottles.

Field and trip blanks are not part of the laboratory QA/QC procedures. The latter, used to detect contamination during analytical steps, are only included as part of the laboratory service and assess the validity of the laboratory analytical procedures. Field and trip blanks are required as part of QA/QC procedures for the overall sampling and analytical program.

Duplicate samples will be collected at a frequency of one for every twenty samples from each matrix. If less than twenty samples are collected from any matrix, then at least one duplicate will be collected from that matrix. Duplicate samples are analyzed to check the sample collection and handling process relative to the uniformity of the samples.

Matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a frequency of one for every twenty samples for each sample

matrix. If less than twenty samples are collected from any matrix, then at least one MS/MSD will be collected from that matrix. The purpose of these samples is to evaluate the effect of the sample matrix on the analytical results.

5.3 Field Instrument Calibration

The on-site personnel are responsible for assuring that a master calibration/maintenance log will be maintained for each measuring device. Each log will include at least the following information where applicable:

- Name of device and/or instrument calibrated
- Device/instrument serial and/or ID number
- Frequency of calibration
- Date of calibration
- Results of calibration
- Name of person performing the calibration
- Identification of the calibration gas for PID
- Buffer solutions (pH meter)

5.4 Sample Analysis QA/QC Procedures

5.4.1 Overview

The purpose of the laboratory QA/QC program is to establish and maintain laboratory practices that will ensure the scientific reliability and comparability of the data generated in support of the project.

Quality assurance (QA) is the system for ensuring that all information, data, and resulting decisions compiled under an investigation

are technically sound, statistically valid, and properly documented. Quality control (QC) is the mechanism through which quality assurance achieves its goals. Quality control programs define the frequency and methods of checks, audits, and reviews necessary to identify problems and dictate corrective action, thus high quality data.

The laboratory QA/QC program will outline the purpose, policies, organizations, and operations established to support the chemical analyses.

The laboratory QA/QC procedures will be submitted as part of the laboratory selection process. The QA/QC document submitted by the laboratory will be appended to this document as Attachment A. The laboratory selected will be certified under the NYSDOH ELAP program.

5.4.2 Laboratory Selection Criteria

A laboratory will be selected that is qualified to perform the work required for the site. Examples of selection criteria are as follows:

1. Capabilities (facilities, personnel, instrumentation):
    a. previous use
    b. certification
    c. references (recommendations by other users of the laboratory)
2. Services:
    a. turnaround time
    b. completeness of reports
    c. compliance with holding times

3. QA/QC Programs – All laboratories must have a detailed written QA/QC program meeting the minimum requirements of the NYS Department of Environmental Conservation and the NYS Department of Health, and must be NYSDOH ELAP CLP certified for all analyses being performed.

4. Approvals – All laboratories used will be approved by B&L prior to the analysis of samples. The selected analytical laboratory will be committed to providing analytical services for groundwater, soil, sediment and surface water that are commensurate with the required protocols and current state-of-the-art analytical procedures, laboratory practices and instrumentation.

5.4.3 Data Validator Selection Criteria

A third-party independent data validator will be selected based on the required qualification presented in Attachment A, and must meet Department requirements for performing data validation.

Figures

Barton & Loguidice, P.C.

Engineers • Environmental Scientists • Planners • Landscape Architects

SUBSURFACE INVESTIGATION LOG

BORING NO. _____

B&L Project No. 1307.002.001

Project: Ithaca Falls Overlook ERP

Client: City of Ithaca

Project Location: 125 Lake Street, Ithaca, New York

Drill Rig:	Location Description:
Casing	
Soil Sampler:	Start Date: Finish Date:
Sample Hammer Wt. -- inches	Contractor:
Rock Sampler:	Driller:
Other:	B&L:

Depth	Sample Type	Recovery (ft)	PID (ppm) Initial	PID (ppm) Headspace	Visual Staining	Odor	Moisture Content	Material Description: Soil Classification	Drilling Details/ Well Completion
								Ground Surface	
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
End of Boring at:									

Notes:

Barton & Loguidice, P.C.
Consulting Engineers

FIELD SAMPLING DATA SHEET

SITE: Ithaca Falls Overlook ERP **SAMPLE LOCATION:** _____

CLIENT: City of Ithaca **JOB #:** 1307.002.001

Weather Conditions: _____ Temp: _____

SAMPLE TYPE: Groundwater ☐ Surface Water ☐ Other (specify):_____
Sediment ☐ Leachate ☐ _____

WATER LEVEL DATA

Static Water Level (feet)*:	
Measured Well Depth (feet)*:	
Well Casing Diameter (inches):	
Volume in Well Casing (gallons):	

*depth from measuring point

Measuring Point: Top of Riser ☐
Other (specify):
Measured by:
Time: Date:

PURGING METHOD

Equipment: Bailer ☐ Submersible Pump ☐ Air Lift System ☐
Bladder Pump ☐ Foot Valve ☐ Peristaltic Pump ☐
Dedicated ☐ *Non-dedicated* ☐

Volume of Water Purged (gallons):

Did well purge dry? No ☐ Yes ☐
Did well recover? No ☐ Yes ☐ Recovery time:

SAMPLING METHOD

Equipment: Bailer ☐ Submersible Pump ☐ Air Lift System ☐
Bladder Pump ☐ Foot Valve ☐ Peristaltic Pump ☐
Dedicated ☐ *Non-dedicated* ☐

Sampled by: Time: Date:

SAMPLING DATA

Sample Appearance
Color: Sediment:
Odor:

Field Measured Parameters

pH (Standard Units)		Sp. Conductivity (umhos/cm)	
Temperature (F)		ORP	
Turbidity (NTUs)			

Samples Collected (Number/Type):

Samples Delivered to: _____ Time:_____ Date:_____

COMMENTS:

Barton & Loguidice, P.C.
Consulting Engineers

CHAIN OF CUSTODY RECORD

Client:	Client Project/Project Name:																			Special Turnaround Time:
Client Contact:	Telephone Number (Area Code)/Fax Number:																			
Site Location (city/state):																				
Sample Location:	Date	Time	Matrix	Grab. or Comp	Internal Use Only		No. of Containers	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)			Remarks

Parameter and Method	Sample bottle:	Type	Size	Pres.	Sampled by: (Please Print)		Company:	
1)								
2)								
3)					Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
4)								
5)					Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
6)								
7)					Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
8)								
9)					Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)
10)								

Note: The numbered columns above cross-reference with the numbered columns in the upper right-hand corner.

Attachment A

Data Validation Scope of Work

Attachment A
Data Validation Scope of Work – NYSDEC RI/FS Program

Data validation is the systematic process by which the data quality is determined with respect to data quality criteria that are defined in project and laboratory quality control programs and in the referenced analytical methods. The data validation process consists of an assessment of the acceptability or validity of project data with respect to stated project goals and requirements for data usability. Ideally, data validation establishes the data quality in terms of project data quality objectives. Data validation consists of data editing, screening, checking, auditing, certification, review, and interpretation. The purpose of data validation is to define and document analytical data quality and determine if the data quality is sufficient for the intended use(s) of the data. In accordance with DEC requirements, all project data must be of known and acceptable quality. Data validation is performed to establish the data quality for all data which are to be considered when making project decisions. Laboratories will be required to submit results which are supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of the data.

Qualifications of a Data Validator

In order to ensure an acceptable level of performance, the following qualifications and requirements are established for all consultants/contractors functioning as data validators. These qualifications and requirements shall apply whether the consultant/contractor is: a) retained directly through contracts executed by the State; b) retained as a subcontractor to a consultant functioning under contracts executed by the State; or c) retained by a responsible party functioning under the guidance and direction of an order on consent. Consultant/Contractor functioning as a data validator shall be independent of the laboratory generating the data.

The Consultant/Contractor functioning as a data validator shall provide evidence that all staff members involved in the data validation process have: a) a bachelor's degree in chemistry or natural sciences with a minimum of 20 hours in chemistry; and b) one (1) year experience in the implementation and application of the protocols used in generating the data for which they are responsible. The successful completion of the EPA Data Validation Training course may be substituted for the analytical experience requirement. In addition, these same staff members must have a minimum of one (1) year experience evaluating CLP data packages for contract protocol compliance.

Specific Tasks to be Completed by the Data Validator

Evaluated Completeness of Laboratory Data Package

The data validator shall review the data package to determine completeness. A complete data package will consist of the following components:

- All sample chain-of-custody forms;
- The case narrative(s) including all sample analysis summary forms;[1]
- Quality Assurance/Quality Control summaries including all supporting documentation;
- All relevant calibration data including all supporting documentation;
- Instrument and method performance data;
- Documentation showing the laboratory's ability to attain the contract specified method detection limits for all target analytes in all required matrices;
- All data report forms including examples of the calculations used in determining final concentrations; and
- All raw data used in the identification and quantification of the contract specified target compounds.

All deficiencies in the requirement for completeness shall be reported to the consultant immediately. The laboratory shall be contacted by the consultants Quality Assurance Officer and shall be given ten calendar days to produce the documentation necessary to remove the deficiencies.

Compliance of Data Packages with Work Plan

The validator shall review the submitted data package to determine compliance with those portions of the Work Plan that pertain to the generation of laboratory data. Compliance is defined by the following criteria:

- The data package is complete as defined above;

[1] These forms appear as an addendum to the NYSDEC CLP forms package and will be required for all data submissions regardless of the protocol requested.

- The data has been generated and reported in a manner consistent with the requirements of the Quality Assurance Program Plan and the laboratory subcontract;

- All protocol required AQ/AC criteria have been met;

- All instrument tune and calibration requirements have been met for the time frame during which the analyses were completed;

- All protocol required initial and continuing calibration data is present and documented;

- All data reporting forms are complete for all samples submitted. This will include all requisite flags, all sample dilution/concentration factors and all pre-measurement sample cleanup procedures; and

- All problems encountered during the analytical process have been reported in the case narrative along with any and all actions taken by the laboratory to correct these problems.

The data validation task requires that the validator conduct a detailed comparison of the reported data with raw data submitted as part of the supporting documentation package. It is the responsibility of the validator to determine that the reported data can be completely substantiated by applying protocol defined procedures for the identification and quantification of the individual analytes. To assist the validator in this determination, the following documents are recommended; however, the EPA Functional Guidelines will be used for format only. The specific requirements noted in the project Work Plan are prerequisite, for example holding times or special analytical project needs, to those noted in the Functional Guidelines.

- The particular protocol(s) under which the data was generated (e.g., NYSDEC Contract Laboratory Protocol; EPA SW-846; EPA Series 500 Protocols).

- Data validation guidance documents such as:

  - "Functional Guidelines for Evaluation of Inorganic Data" (published by EPA Region 2);

  - "Functional Guidelines for Evaluation of Organic Analyses," Technical Directive Document No. HQ-8410-01 (published by EPA); and

- "Functional Guidelines for Evaluating Pesticides/PCB's Analyses" Technical Directive Document No. HQ-8410-01 (published by EPA).

Note: *These documents undergo periodic revision. It is assumed that the selected data validator will have access to the most current applicable documents and guidelines.*

Reporting

The validator shall submit a final report covering the results of the data review process. This report shall be submitted to the Project Manager or his designee and shall include the following:

- A general assessment of the data package as determined by the degree to which the package is complete and complies with the protocols set forth in the Work Plan;
- A detailed description of any and all deviations from the required protocols. These descriptions must include references to the portions of the protocols involved in the alleged deviations;
- Any and all failures in the validator's attempt to reconcile the reported data with the raw data from which it was derived. Specific references must be included. Telephone logs should be included in the validation report.
- Detailed assessment by the validator of the degree to which the data has been compromised by any deviations from protocol, QA/QC breakdowns, lack of analytical control, etc., that occurred during the analytical process'
- The report shall include, as an attachment, a copy of the laboratory's case narrative, including the DEC required sample and analysis summary sheets;
- The report shall include an overall appraisal of the data package; and
- The validation report shall include a chart presented in a spreadsheet format, consisting of site name, sample numbers, data submitted to laboratory, year of CLP or analytical protocol used, matrix, fractions analyzed (e.g., volatiles, semi-volatiles, Pest/PCB, metals, CN). Space should be provided for a reference to the NYSDEC CLP when non-compliancy is involved and a column for an explanation of such violation.

Appendix B

Health and Safety Plan (HASP)

Ithaca Falls Overlook
City of Ithaca Urban Renewal Agency
Tompkins County, New York

Environmental Restoration Project
ERP # E755018

Appendix B

Health and Safety Plan

April 2012

Barton & Loguidice

City of Ithaca Urban Renewal Agency
Ithaca Falls Overlook

Environmental Restoration Project
ERP # E755018

Appendix B
Health and Safety Plan

April 2012

Prepared for:

City of Ithaca Urban Renewal Agency
108 East Green Street
Ithaca, New York 14850

And

New York State Department of Environmental Conservation
Division of Environmental Remediation
Region 7
1679 Route 11
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Prepared by:

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Syracuse, New York 13220

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1.0 General Information

1.1 Introduction

This Health and Safety Plan (HASP) addresses those activities associated with the performance of the Site Investigation Work Plan for the Environmental Restoration Project (ERP) at the Ithaca Falls Overlook Property in the City of Ithaca, New York. This plan was prepared in accordance with 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*.

The purpose of this Health and Safety Plan for the Ithaca Falls Overlook ERP Site is to provide specific guidelines and establish procedures for the protection of personnel during the field investigation and site remediation activities. The Plan is based on the site information available at this time and anticipated conditions to be encountered during the different phases of work. This Plan is subject to modification as data are collected and evaluated.

All personnel conducting activities on-site must comply with all applicable Federal and State rules and regulations regarding safe work practices. Personnel conducting field activities must also be familiar with the procedures, requirements and provisions of this Plan. In the event of conflicting Plans and requirements, personnel must implement those safety practices that afford the highest level of protection.

This HASP is not intended to be used by any subcontractors, but it may be used as the basis for contractors to prepare their own plans. This HASP may not address the specific health and safety needs or requirements of subcontractors and should be viewed as the minimum requirement.

2.0 Project Information

2.1 Site Description

The Ithaca Falls Overlook site is located at 125 Lake Street in the City of Ithaca, New York. The property was formerly part of the lands owned by the Ithaca Gun Company, and was subdivided from the primary site and deeded to the City as part of the present re-development initiative of the Ithaca Gun Company factory site. The site includes a narrow section of land located adjacent to the western edge of the former Ithaca gun factory site, extending from Lake Street to the former mill raceway (Western Accessway). The site also includes the primary overlook site encompassing the former mill raceway and bridge, and the "Island" site. The Island is a section of the former factory that is separated from the primary factory site by a former mill raceway (mini-gorge), and is bounded to the north by the walls of Fall Creek Gorge, and to the west by a steep slope. This former factory annex area is currently vacant and contains remnant building foundation pads and a retaining wall. Portions of the Island provide dramatic views of, Ithaca Falls. The post-brownfield project goal is to allow development of the Island as a public viewing overlook of the Ithaca Falls.

Former operations at the Ithaca Gun factory site include manufacture of firearms and munitions. Secondary operations included-spray painting, drying gun stocks in ovens, firing ranges, plating, metal shops, and forging where the lead was re-melted for polishing. The Island site appears primarily to have been utilized for storage and possibly finishing operations.

The historic gun manufacturing operations at the site are potential sources for remaining contamination. The primary contaminant of concern is lead from test firing guns, dumping of spent shot, and other manufacturing processes such as forging. Volatile organic compounds (VOCs) were also identified during

investigations on other portions Ithaca Gun Company property, particularly near the Western Accessway, and appear to be related to the historic storage of drums containing chemicals and oils. The Island site has been the subject of a remedial response conducted by EPA. This action resulted in the removal of hot spot contamination of soil by vacuuming. Due to this action and the subsequent natural erosion at the site, the remaining levels of lead, and current areas of concern remain uncharacterized.

2.2 Comprehensive Work Plan

The Comprehensive Work Plan for the site is outlined in the Site Investigation Work Plan prepared by Barton & Loguidice.

2.3 Scope of Work

The overall object of the Site Investigation is to define the nature and extent of contamination on the property related to former site activities. Surface and subsurface soil, soil gas, and groundwater media will be sampled as part of the site investigation.

2.4 Organization Structure

Barton & Loguidice:

Program Manager – Scott D. Nostrand, P.E.

Project Manager – David R. Hanny

Field Personnel – Matthew S. Strodel, Darik M. Jordan, Brian J. McGrath, David R. Canfield

City of Ithaca:

Project Contact: Nels Bohn, Directory of Community Development, Ithaca Urban Renewal Agency

The Project Manager is responsible for the day-to-day activities of the project and for coordinating between office and field personnel. The Project Manager will oversee the Site Investigation activities. The Project Manager will also serve as the Site Safety and Health Coordinator (SSHC). The SSHC will establish operating standards and coordinate overall project safety and health activities for the site. The SSHC will review project plans and revisions to determine that safety and health procedures are maintained throughout the project. Specifically the responsibilities of the SSHC include:

a. Aiding the selection of protective clothing and equipment.

b. Periodically inspecting protective clothing and equipment.

c. Maintaining proper storage of protective clothing and equipment.

d. Monitoring the workers for signs of heat stress, cold stress, and fatigue.

e. Monitoring on-site hazards and conditions.

f. Conducting periodic surveillance to evaluate effectiveness of Site-specific Health and Safety Plan.

g. Having knowledge of emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.

h. Posting the directions to the hospital and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.

i. Notifying, when necessary, local public emergency officials.

j. Coordinating emergency medical care.

Field personnel will assist with responsibilities of the SSHC when the Project Manager is not on-site. The Project Manager will be responsible for ensuring that the field personnel are familiar with the contents of this plan and the roles of the SSHC.

3.0 Health and Safety Risk Analysis

Table B-1 breaks down the hazard types that may be encountered for the site activities.

Table B-1
Site Investigation Activity Hazard Evaluation

Activity	Hazard Type					
	Mechanical	**Electrical**	**Chemical**	**Physical**	**Biological**	**Temperature**
Initial Site Inspection	Accidental injury from sampling equipment	Exposed cords and broken lights	Accidental inhalation, ingestion, skin absorption or eye contact with contaminants	Cuts from broken glass, slips, trips and fall hazards. Working on steep slopes.	Bees and wasps. Poisonous plants	Heat Stress Frost Bite
Boring/Well Installation, Testing and Monitoring	Accidental injury from drilling rig or soil boring equipment	Buried power lines	Accidental inhalation, ingestions, skin absorption or eye contact with contaminants	Strains from carrying heavy objects, slips, trips and fall hazards. Working on steep slopes. Excessive noise.	Bees and wasps. Poisonous plants	Heat Stress Frost Bite
Source Area Excavation and Slope Stabilization	Accidental injury from excavation equipment.	Buried power lines	Accidental inhalation, ingestions, skin absorption or eye contact with contaminants	Collapse of excavation structure. Puncture from buried objects/nails. Excessive noise. Fall hazards. Working on steep slopes. Falling objects.	Bees and wasps. Poisonous plants	Heat Stress Frost Bite
Surface Soil Sampling	None Anticipated	None Anticipated	Accidental inhalation ingestion, skin absorption or eye contact with contaminants	Trip and fall hazards. Working on steep slopes.	Bees and wasps. Poisonous plants	Heat Stress Frost Bite
Soil Vapor Sampling	Accidental injury from soil boring equipment	Buried power lines	Accidental inhalation, ingestions, skin absorption or eye contact with contaminants	Strains from carrying heavy objects, slips, trips and fall hazards. Excessive noise.	Bees and wasps. Poisonous plants	Heat Stress Frost Bite
Well Sampling	None Anticipated	Generators and power cords	Accidental inhalation, ingestion, skin absorption or eye contact with contaminants	Strains from lifting. Fall hazards.	Bees and wasps. Poisonous plants	Heat Stress Frost Bite

3.1 Chemical Hazards

The contaminants that have been detected at the site are listed in table B-2 on the following page.

3.2 Physical Hazards

Physical hazards associated with the site are:

1. *Slip, Trip, and Fall During All Activities (Uneven Terrain):* Hazardous waste sites contain numerous potential safety hazards such as: holes, ditches, drums, boards, nails, broken glass, slippery surfaces, steep grades, and uneven terrains. The site is in close proximity to the raceway, gorge, and various steep slopes. The work itself may be a potential safety hazard. Site personnel should constantly look out for potential safety hazards and should immediately inform the SSHC of any new hazards.

   A portion of the work during the surface soil investigation will be conducted on the western slope of the Island and within the raceway. At a minimum, two employees will be on site at all times, and employees working on steep slopes shall wear personal fall arrest systems in compliance with the OSHA Fall Protection Standard, 29 CFR 1926, Subpart M. Employees will be trained to use personal fall arrest systems prior to use.

2. *Moving Parts of Heavy Equipment:* Heavy equipment poses dangers though moving parts. Where feasible, access to moving parts will be guarded and equipment will be equipped with backup alarms.

Table B-2
Assessment of Chemicals of Potential Concern

Chemical Name	PEL/TLV	Other Pertinent Limits (Specify)	Warning Properties – Odor Threshold	Potential Exposure Pathways	Acute Health Effects	Chronic Health Effects
Decontamination Materials:						
Isopropyl Alcohol (for decontamination, if necessary)	400 ppm/ 400 ppm	STEL = 500 ppm IDLH = 2000 ppm	Colorless liquid with the odor of rubbing alcohol	Inhalation, Absorption, Ingestion, Contact	Eye, skin & respiratory irritation; headache, drowsiness, dizziness, dry cracking skin	Dermatitis
2.0 Methanol (for decontamination, if necessary)	200 ppm/ 200 ppm	IDLH = 6000	Colorless liquid with a pungent odor – 141 ppm	Inhalation, Absorption, Ingestion, Contact	Irritation of eyes, skin, respiratory system, headache, drowsiness, dizziness, vertigo, light-headedness, nausea, vomiting, visual disturbances	Optic nerve damage, dermatitis, damage to respiratory system and GI tract
VOCs:						
3.0 Benzene	1 ppm/ 0.5 ppm	STEL=5 ppm IDLH=500 ppm	Colorless to light yellow liquid with an aromatic odor – 8.65 ppm	Inhalation, Absorption, Ingestion, Contact	Eye, skin, nose & respiratory irritation; nausea, headache, staggered gait, fatigue, anorexia, weakness, exhaustion	Carcinogen, dermatitis, bone marrow depression, damage to the eyes, respiratory system. CNS
Ethylbenzene	100 ppm/ 100 ppm	STEL = 125 ppm IDLH = 800 ppm	Colorless liquid with an aromatic odor	Inhalation, Absorption, Ingestion, Contact	Eye, skin & respiratory irritation; CNS effects; headache	Dermatitis; CNS effects;
Methyl ethyl ketone (MEK, 2-butanone)	200 ppm/ 200 ppm	IDLH = 3000 ppm	Colorless liquid with a moderately sharp, fragrant, mint-or acetone-like odor	Inhalation, Absorption, Ingestion, Contact	Eye, skin & respiratory irritation; depression; CNS effects	Eyes; respiratory system; dermatitis; CNS; liver and kidneys
Tetrachloroethene	100 ppm/ 25 ppm	C=200 ppm STEL (5 min)=300 ppm IDLH=100 ppm	Colorless to pale yellow liquid with a pungent, chloroform-like odor	Inhalation, Absorption, Ingestion, Contact	Irritation of eyes, nose, throat; nausea; flushing of face and neck; vertigo, dizziness, inchohence; headache, somnolence; skin erythema	Liver damage. Target organs: eyes, skin, respiratory system, liver, kidneys, CNS.
Toluene	200 ppm/ 50 ppm	C=300 ppm STEL=150 ppm IDLH=500 ppm	Colorless liquid with a sweet, pungent, benzene-like odor	Inhalation, Absorption, Ingestion, Contact	Eye, skin & respiratory irritation; confusion, dizziness, headache	CNS effects; liver, kidney damage; dermatitis

Table B-2
Assessment of Chemicals of Potential Concern

Chemical Name	PEL/TLV	Other Pertinent Limits (Specify)	Warning Properties – Odor Threshold	Potential Exposure Pathways	Acute Health Effects	Chronic Health Effects
Total Xylenes	100 ppm/ 100 ppm	STEL = 150 ppm IDLH = 900 ppm	Colorless liquid with an aromatic odor	Inhalation, Absorption, Ingestion, Contact	Eye, skin & respiratory irritation; dizziness, drowsiness, nausea, vomiting, headache, abdominal pain	Dermatitis; CNS effects; liver/kidney damage; blood
SVOCs:						
Dibenzofuran	Not available	Not available	White crystalline solid	Inhalation, Absorption, Ingestion, Contact	No information is available on the acute effects of dibenzofuran in humans or animals.	No information is available on the chronic effects of dibenzofuran in humans or animals.
4-Methyl phenol (p-cresol)	5 ppm/ 5 ppm	IDLH=250 ppm	Crystalline solid with a sweet, tarry odor (Note: liquid above 95 degree F	Inhalation, Absorption, Ingestion, Contact	Eye, skin, mucous membrane irritation; CNS effects: confusion, depression, respiratory failure; dyspnea, irregular rapid respiration, weak pulse; eye and skin burns; dermatitis.	Lung, liver, kidney, pancreas damage.
Naphthalene (and 2-methyl naphthalene)	10 ppm/ 10 ppm	IDLH=250 ppm	Colorless to brown solid with an odor of mothballs.	Inhalation, Absorption, Ingestion, Contact	Eye irritation; headache, confusion, excitement, malaise; nausea, vomiting, abdominal pain; irritated blalder; profuse sweating; jaundice, hematuria, hemoglobinuria, renal shutdown; dermatitis; optical neuritis, corneal damage.	Target organs: eyes, skin, blood, liver, kidneys, CNS.
PCBs	PEL=1 mg/m3 (42%) PEL=0.5 mg/m3 (54%) TLV=0.5 mg/m3	IDLH=5 mg/m^3	Mild hydrocarbon odor	Inhalation, Absorption, Ingestion, Contact	Eye irritation, acne, jaundice, dark urine.	Carcinogen; liver damage; reproductive effects.
TAL Metals:						
Aluminum	15 mg/m^3/ 10 mg/m^3	STEL=20 mg/m^3	Odorless, silvery-white, soft, ductile, metallic solid or powder.	Inhalation, Absorption, Ingestion, Contact	Eye and respiratory tract irritation.	Lung and CNS damage.

Table B-2
Assessment of Chemicals of Potential Concern

Chemical Name	PEL/TLV	Other Pertinent Limits (Specify)	Warning Properties – Odor Threshold	Potential Exposure Pathways	Acute Health Effects	Chronic Health Effects
Antimony	0.5 mg/m^3/ 0.5 mg/m^3	IDLH=50 mg/m^3	Silver-white, lustrous, hard, brittle solid; scale-like crystals; or a dark-gray, lustrous powder.	Inhalation, Absorption, Ingestion, Contact	Eye, skin, and respiratory tract irritation; cough, dizziness; headache; nausea; vomiting; diarrhea; stomach cramps.	Damage to eyes, skin, respiratory system, cardiovascular system; insomnia; anorexia; loss of sense of smell.
Arsenic	0.5 mg/m^3/ 0.01 mg/m^3	IDLH=5 mg/m^3	Silver-gray or tin-white, brittle, odorless solid.	Inhalation, Absorption, Ingestion, Contact	Ulceration of nasal septum, gastrointestinal disturbances, peripheral neuropathy.	Carcinogenic, damage to liver, kidneys, skin, lungs, and lymphatic system.
Barium	0.5 mg/m^3/ 0.5 mg/m^3	IDLH=50 mg/m^3	Soft, silvery solid; oxidizes easily in air.	Inhalation, Absorption, Ingestion, Contact	Irritation of eyes, skin, and upper respiratory system; abdominal cramps, diarrhea; vomiting; severe muscle weakness; cardiac arrhythmia; unconsciousness; respiratory arrest.	Eye, skin, respiratory system, cardiac, and CNS damage; gastrointestinal effects.
Beryllium	0.002 mg/m^3 / 0.002 mg/m^3	IDLH=4 mg/m^3	Gray-white, brittle solid.	Inhalation, Absorption, Contact	Irritation of the eyes and skin, high to extreme acute toxicity.	Berylliosis: anorexia, weight loss, weakness, chest pain, cough, cyanosis, pulmonary insufficiency; dermatitis; lung disease.
Cadmium	0.1 mg/m^3 / 0.01 mg/m^3	IDLH=9 mg/m^3	Blue-tinged silver-white, lustrous, odorless solid.	Inhalation, Ingestion	Respiratory tract irritation and high acute toxicity.	Kidney, liver, lung, bone, blood, immune system, and CNS damage.
Calcium	Not available	Not available	Semi-soft, gray, odorless solid.	Inhalation, Ingestion, Absorption, Contact	Tissue damage of eyes and skin, irritation of respiratory tract, lung damage, unconsciousness, death.	Severe lung and mucous membrane damage, dermatitis.
Chromium	1 mg/m^3 / 0.5 mg/m^3	IDLH =250 mg/m^3	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid.	Inhalation, Ingestion, Contact	Irritation of eyes and skin.	Lung fibrosis (histologic).
Cobalt	0.1 mg/m^3 / 0.02 mg/m^3	IDLH=20 mg/m^3	Silvery, bluish-white, odorless, magnetic metal. Fume and dust is odorless and black.	Inhalation, Absorption, Ingestion, Contact	Irritation of the eyes and skin, respiratory distress, nausea, vomiting, diarrhea, and a sensation of hotness.	Dermatitis, lung disease, polycythemia, hyperplasia of the bone marrow and thyroid gland, pericardial effusion, and pancreatic damage.

Table B-2
Assessment of Chemicals of Potential Concern

Chemical Name	PEL/TLV	Other Pertinent Limits (Specify)	Warning Properties – Odor Threshold	Potential Exposure Pathways	Acute Health Effects	Chronic Health Effects
Copper	1 mg/m^3/ 1 mg/m^3	IDLH=100 mg/m^3	Reddish, lustrous, malleable, odorless solid.	Inhalation, Ingestion, Contact	Eye, nose, pharynx irritation; nasal perforation; metallic taste; dermatitis.	Target organs: Eyes, skin, respiratory system, liver, kidneys (increased risk with Wilson's disease).
Iron	10 mg/m^3/ 5 mg/m^3	IDLH=2500 mg/m^3	Silver to gray odorless solid, sometimes with a thin layer of reddish dust.	Inhalation, Ingestion, Contact	Irritation of the respiratory tract, gastrointestinal tract, and eyes. Liver damage and death possible with extreme ingestion.	Siderosis (lung damage), cardiac damage.
Lead	0.05 mg/m^3 / 0.05 mg/m^3	IDLH=100 mg/m^3	A heavy, gray ductile, soft solid	Inhalation, Absorption, Ingestion, Contact	Weakness, lassitude, insomnia, facial pallor	Encephalopathy, kidney disease, hypotension.
Magnesium	15 mg/m^3/ 10 mg/m^3	IDLH=750 mg/m^3	Odorless, silver-white solid.	Inhalation, Contact	Irritation of eyes and skin; metal fume fever, with chills, fever, coughing, nausea, vomiting, weakness.	Lung damage.
Manganese	5 mg/m^3/ 0.1 mg/m^3	IDLH=500 mg/m^3	Silvery, lustrous, brittle, odorless solid.	Inhalation, Ingestion	Irritation of skin.	Respiratory system, CNS, blood, kidney damage.
Mercury	0.1 mg/m^3 (C)/ 0.025 mg/m^3	IDLH = 10 mg/m^3	Silver-white, odorless, heavy liquid	Inhalation, Absorption, Ingestion, Contact	Irritation of eyes; cough, chest pain, dyspnea, bronchial pneuitis; tremor, insomnia, irritability, indecision, headache, fatigue, weakness; stomatitis, salivation.	Gastrointestinal disturbances, anorexia, proteinuria. Target organs include eyes, skin, respiratory system, central nervous system, and kidneys.
Nickel	1 mg/m^3/ 1.5 mg/m^3	IDLH=10 mg/m^3	Silver-white, hard, malleable solid or powder. Odorless.	Inhalation, Absorption, Ingestion, Contact	Irritation of the skin and respiratory tract.	Sensitization leading to contact dermatitis. Human carcinogen (lung and nasal)
Potassium	Not available	Not available	Soft, odorless, silvery-white solid.	Inhalation, Absorption, Ingestion, Contact	Irritation of the skin, eyes, respiratory tract, and gastrointestinal tract.	Damage to the blood, heart, liver, kidneys, lungs, and upper respiratory tract.

Table B-2
Assessment of Chemicals of Potential Concern

Chemical Name	PEL/TLV	Other Pertinent Limits (Specify)	Warning Properties – Odor Threshold	Potential Exposure Pathways	Acute Health Effects	Chronic Health Effects
Selenium	0.2 mg/m^3 / 0.2 mg/m^3	IDLH = 1 mg/m^3	Amorphous or crystalline, red to gray solid.	Inhalation, Ingestion, Contact	Eye, skin, nose, throat irritation; visual disturbances; headache, chills, fever; dyspnea, bronchitis; metallic taste, garlic breath, gastrointestinal disturbances; dermatitis; eye and skin burns.	Target organs include eyes, skin, respiratory system, liver, kidneys, blood, and spleen.
Silver	0.01 mg/m^3 / 0.1 mg/m^3	IDLH=10 mg/m^3	Silvery-white, lustrous, odorless solid.	Inhalation, Absorption, Ingestion, Contact	Irritation of the eyes, skin, gastrointestinal tract, and respiratory tract; metal fume fever.	Skin pigmentation and organ accumulation
Sodium	Not available	Not available	Light, soft, silvery, odorless solid.	Absorption, Ingestion, Contact	Irritation and inflammation of the eyes and skin.	Damage to mucous membranes and upper respiratory tract.
Thallium	0.1 mg/m^3 / 0.1 mg/m^3	IDLH=15 mg/m^3	Bluish-white, lead-like solid	Inhalation, Absorption, Ingestion, Contact	Irritation of the skin, eyes, and mucous membranes; headache; pulmonary edema; discoloration and loss of hair; albuminuria; lymphocytosis; gastrointestinal hemorrhage; nausea; vomiting.	Damage to the CNS including hallucinations, convulsions, and coma; respiratory failure; damage to the heart and kidneys; paralysis.
Vanadium	0.1 mg/m^3/ 0.05 mg/m^3	IDLH=35 mg/m^3	Soft, ductile, odorless, grayish-white solid.	Inhalation, Absorption, Ingestion, Contact	Irritation of the skin, eyes, and respiratory tract; nausea, vomiting, and greenish discoloration of the tongue; CNS effects like headache, dizziness, and tremors.	Damage to the kidneys and blood; respiratory effects like bronchitis and shortness of breath; asthma-like allergy may develop
4.0 Zinc	5 mg/m^3/ 2 mg/m^3	IDLH = 500 mg/m^3	Bluish-gray, lustrous, odorless solid.	Inhalation, Ingestion, Contact	Irritation of the eyes and skin; metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough, weakness; metallic taste; headache; blurred vision; vomiting; tightness in chest, dyspnea, rales, decreased pulmonary function.	Respiratory system effects such as lung damage and bronchitis. Suspected carcinogen.

Table B-2
Assessment of Chemicals of Potential Concern

Chemical Name	PEL/TLV	Other Pertinent Limits (Specify)	Warning Properties – Odor Threshold	Potential Exposure Pathways	Acute Health Effects	Chronic Health Effects
5.0 Cyanide	5 mg/m^3/ 5 mg/m^3 (C)	IDLH=25 mg/m^3	White powder with a faint bitter, almond-like odor.	Inhalation, Absorption, Ingestion, Contact	Irritation of the eyes, skin, and respiratory tract; chest tightness; shortness of breath; enlargement of the thyroid; paralysis; asphyxia; death.	CNS effects like demyelination and ataxia, hypertonia; lesions of the optic nerve; Leber's optic atrophy; goiters; depressed thyroid function.

PEL = OSHA Permissible Exposure Limit; represents the maximum allowable 8-hour time-weighted average (TWA) exposure concentration.
TLV = ACGIH Threshold Limit Value; represents the maximum recommended 8-hour TWA exposure concentration.
STEL = OSHA Short-term Exposure Limit; represents the maximum allowable 15-minute TWA exposure concentration.
C = OSHA Ceiling Limit; represents the maximum exposure concentration above which an employee shall not be exposed during any period without respiratory protection.
IDLH = Immediately Dangerous to Life and Health; represents the exposure likely to cause death or immediate delayed permanent adverse health effects or prevent escape from such an environment

3. *Noise from Heavy Equipment:* Work around large equipment often creates excess noise. Engineering controls and personal protective equipment will be used to protect employees' hearing.

4. *Electrical Hazards:* As in all site work, overhead power lines, electrical wires and cables, site electrical equipment, and lightning also pose a potential hazard to site workers. Site personnel should constantly look out for potential safety hazards and should immediately inform the SSHC of any new hazards.

5. *Biological Hazards (insects, poison ivy, etc.):* Other biological hazards that may be present at hazardous waste sites include poisonous plants, insects, and animals. PPE can reduce the potential for exposure. The SSHC can assist in determining the correct PPE for the hazard present.

3.3 Heat and Cold Stress

Workers will be routinely observed by the SSHC for symptoms of heat stress or cold exposure, as dictated by the weather conditions and work being conducted. Heat stress and cold exposure can be avoided by periodic, regular rest breaks.

Heat stress may be a potential hazard for personnel wearing PPE, particularly working in hot and humid conditions. Workers should take regular rest breaks within a shaded area, removing their PPE, and drink electrolyte replacing liquids and/or water. The SSHC is responsible for scheduling the amount of time each individual can work under the existing site conditions, and how often and how long they will break. Workers will be required to take their breaks in the clean zone after going through the decontamination area, or they may undergo partial decontamination and rest in a clean area within the decontamination area.

Personnel working in cold conditions will be required to wear warm, dry clothing. Workers must be aware of their extremities during cold conditions, particularly their face, ears, fingers, and toes, in order to avoid frostbite. If at any point should a worker feel numbness or tingling sensation in their extremities, they should return to the clean zone and to a warm area.

3.4 Confined Space Entry

It is not anticipated that Barton & Loguidice (B&L) employees will enter confined spaces. If B&L employees do enter confined spaces, then the employees will conduct all permit required confined space entry in compliance with a permit space program meeting the requirements of the Occupational Safety and Health Administration (OSHA) regulation 1910.146.

The Contractor may be required to enter confined spaces for tank cleaning purposes. Coordination with the Project Manager shall be made prior to any entry of a permit required confined space. The Contractor must conduct all permit required confined space entry in compliance with a permit space program meeting the requirements of the Occupational Safety and Health Administration (OSHA) regulation 1910.146.

Excavations do pose a potential confined space entry area. When an excavation becomes a confined space entry area (greater than 4 feet deep), then permit-required confined space entry procedures will be followed should the excavation need to be entered. In addition, air monitoring for oxygen deficiency, LEL, and organic vapors will be performed should the excavation be greater than 4 feet deep. Attempts will be made to collect samples from the excavation without entering the excavation (i.e., from excavator bucket, sampling rods, etc.).

4.0 Medical Surveillance Program

4.1 General

OSHA in 29 CFR 1910.120, the Hazardous Waste Operations regulations and in 1910.134, the Respiratory Protection regulations, requires medical examinations. The examination may include the OSHA required Medical Questionnaire, Respirator Suitability Form, a Medical Examination, Audiology Test, Pulmonary Function Test, and testing for complete blood count and chemistry profile.

These medical examinations and procedures are performed by or under the supervision of a licensed physician. The medical monitoring is provided to workers free of cost, without loss of pay and at a reasonable time and place. In addition, the need to implement a more comprehensive medical surveillance program will be re-evaluated after any apparent over-exposure incident.

Employees who wear, or may wear, respiratory protection will be provided respirators as regulated by 29 CFR 1910.134 before performing designated duties. Prior to issuance of a respirator, a medical professional must have medically certified the individual's ability to wear respiratory protection. Where the medical requirements of 29 CFR 1910.120 overlap those of 29 CFR 1910.134, the more stringent of the two will be enforced. It is not anticipated the respirator use will be required at the site.

Although the site is not classified as a hazardous waste site, employees who work during field activities will be subject to the medical surveillance program for lead monitoring. A baseline lead test will be conducted prior to field activities and at the conclusion of the Site Investigation.

4.2 Frequency

1. *Baseline Examinations:* Individuals who are assigned temporarily or permanently to fieldwork at hazardous waste sites or the use of a respirator will receive a baseline examination prior to job assignment.
2. *Periodic Examinations:* Individuals who are assigned temporarily or permanently to fieldwork at hazardous waste sites or the use of a respirator will receive periodic examinations as required.
3. *Termination Examinations:* Field employees permanently leaving the company whom were in the medical surveillance program will receive an exit examination.
4. *Possible Exposure Examinations:* As soon as possible upon notification by an employee that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that employee has been injured or exposed above the permissible exposure limits in an emergency situation, that employee will be required to receive medical attention.

4.3 Examination Results

A letter must be received from the attending physician stating the parameters of the examination and whether or not the individual is able to work with or without restriction. This letter will be filed in the employee's file and a copy distributed to the employee. The examining physician makes a report to B&L of any medical condition that would place B&L employees at increased risk when wearing a respirator of other personal protective equipment. B&L maintains the medical records of personnel, as regulated by 29 CFR 1910.120 and 29 CFR 1910.1020, where applicable.

5.0 Training Program

5.1 Hazardous Waste Operations Health and Safety Training

Employees who are assigned to perform duties on hazardous waste sites will receive the OSHA initial 40-hour health and safety training prior to on-site activities, in accordance with 29 CFR 1910.120 (e). In addition, such personnel provide documentation of having received three (3) days of supervised field experience applicable to this site, or receive three (3) days of supervised field experience at this site. Applicable employees will receive yearly 8-hour refresher courses. On-site managers and supervisors who are directly responsible for or who supervise workers engaged in hazardous waste operations receive, in addition to the appropriate level of worker HAZWOPER training described above, 8 (eight) additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

Although the site is not classified as a hazardous waste site, employees who work during field activities may be required to attend HAZWOPER initial and refresher training.

5.2 Additional Training

As site activities change, supplemental training will be provided to employees to address changes in identified hazards, risks, operations procedures, emergency response, site control, and personal protective equipment. Specialty training will be provided as determined by task and responsibility.

Site specific training will be provided to each employee and will be reviewed at safety briefings. Specialized training will be provided as dictated by the nature of site activities. Specialized training will be provided for activities such as the handling of unidentified substances. Employees involved in these types of

activities will be given off-site instruction regarding the potential hazards involved with such activities and the appropriate health and safety procedures to be followed. Off-site instruction is meant to include any areas where employees will not be exposed to site hazards.

5.3 Other Required Training

Other training that may be required by workers that is in addition to required training described above is detailed below:

- Hazard communication, in accordance with 29 CFR 1910.1200
- Respirator use, in accordance with 29 CFR 1910.134
- Hearing conservation, in accordance with 29 CFR 1910.95
- Working safely around heavy equipment
- Heat and cold stress prevention
- Confined space entry, in accordance with 289 CFR 1910.146

5.4 Pre-Entry Briefing

A site-specific briefing is provided to all individuals, including site visitors, who enter this site beyond the site entry point. For visitors, the site-specific briefing provides information about site hazards, the site lay-out including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

The SSHC will brief personnel as to the potential hazards likely to be encountered. Topics will include:

- Availability of this HASP.
- General site hazards and specific hazards in the work areas including those attributable to the chemicals present.
- Selection, use, testing and care of the body, eye, hand and foot protection being worn, with the limitations of each.
- Decontamination procedures for personnel, their personal protective equipment and other equipment used on the site.
- Emergency response procedures and requirements.
- Emergency alarm systems and other forms of notification, and evacuation routes to be followed.
- Methods to obtain emergency assistance and medical attention.

5.5 Training Records

This site maintains written certification of the successful completion of applicable training requirements for each worker. Training records are maintained up-to-date and are retained onsite. Written certificates have been given to each person so certified. Additionally, an employee sign off sheet indicating that each worker has reviewed a copy of this HASP and understands its contents is stored at the same location.

6.0 Health and Safety Field Implementation

6.1 Personal Protective Equipment Requirements

Level D protection will be worn for initial entry on-site. Modified Level D protection will be used for sampling and decontamination activities. All personnel will upgrade the level of personal protection to Level C based upon sustained (five (5) minutes or more) air monitoring action levels. The requirements for personal protective equipment are outlined in table B-3.

Table B-3
Personal Protective Equipment (PPE) Requirements

Job Tasks	Level of Protection	PPE						
		Suit	Gloves	Feet	Head	Eye	Ear	Respirator
All on-site	D	Std.	Work	Steel	HH	Glasses/Goggles	Plugs/ Muffs	N/A
Sampling	Modified D	Std.	Neoprene or Nitrile	Steel + Booties	HH	Glasses/Goggles	Plugs/ Muffs	N/A
Decon	Modified D	Std.	Butyl or Viton	Steel + Booties	HH	Goggles	Plugs/ Muffs	N/A
All on-site (Upgrade)	C	PE Tyvek	Neoprene or Nitrile	Steel + Booties	HH	N/A	Plugs/ Muffs	Full APR w/OV& N100

Personal Protective Equipment

SUIT:
Std = Standard Work Clothes
PE Tyvek = Polyethylene-coated Tyvek

FEET:
Steel = Steel-toe Boots
Booties = PVC or Latex Booties

HEAD:
HH = Hard Hat

EYE:
Glasses = Safety Glasses w/side shields
Goggles = Safety Goggles

Personal Protective Equipment

EAR:
Plugs = Ear Plugs
Muffs = Ear Muffs

RESPIRATOR:
APR = Air-purifying respirator
Full APR = Full-face APR
OV = Organic vapor cartridge
N100 = N100 particulate filters

6.2 Air Monitoring Procedures

The Project Manager or designee will conduct air monitoring in accordance with the New York State Department of Health (NYSDOH) Community Air Monitoring Plan. Direct reading instruments will be calibrated in accordance with manufacturer's requirements and the results of the calibration will be documented.

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

Continuous monitoring will be required for all subsurface intrusive activities performed during the remedial investigation**.** Subsurface intrusive activities include soil excavation and handling. The CAMP will be limited to heavy equipment operation and intrusive activities such as soil excavation and handling and the western Island slope stabilization. The CAMP is not proposed for minimal disturbances such as soil sampling or well installation.

VOCs will be monitored during intrusive site activities at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous

basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds five (5) parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below five (5) ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of five (5) ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below five (5) ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings will be recorded and available for New York State Department of Environmental Conservation (NYSDEC) and NYSDOH personnel to review. Instantaneous readings, if any, used for decision making purposes will also be recorded.

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques if downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and if no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume if dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and available for NYSDEC and NYSDOH personnel to review.

Table B-4
Monitoring Protocols and Contaminant Action Levels

Contaminant/ Atmospheric Condition	Monitoring Equipment	Monitoring Protocol	Breathing Zone* Action Level Concentrations	
			Monitored Level For Mandatory Respirator Use**	Monitored Level For Mandatory Work Stoppages***
VOCs	Photoionization detector (PID) with an 11.7 eV lamp	Continuous monitoring for all ground-intrusive activities with equipment capable of calculating 15-minute running average concentrations.	5 ppm above background for 15-minute running average	5 ppm above background (15-minute running average) temporary, 25 ppm for mandatory shutdown
Particulates	MiniRam or Dusttrak or equivalent	Continuous monitoring for all ground-intrusive activities with equipment capable of calculating 15-minute running average concentrations.		150 ug/m^3 at fence line (institute engineering controls to control dust at 100 ug/m^3)

*Monitoring performed in the breathing zone for sustained readings of 5 minutes or more. Monitor source first; if the source is near or above the action level concentration, monitor in the breathing zone.
**Monitored levels will require the use of approved respiratory protection specified in table B-3.
***Consult the Project Manager.

6.3 Decontamination Procedures

Depending on the specific job task, decontamination may include personnel themselves, tools, and/or heavy equipment. The specified levels of protection for a task (A, B, C, or D) does not itself define the extent of personal protection or equipment decontamination. For instance, Level C without dermal hazards will require less decontamination than Level C with dermal hazards. Heavy equipment will always require decontamination to prevent cross-contamination. The following sections summarize general decontamination protocols.

6.3.1 Heavy Equipment

Heavy equipment will be decontaminated prior to personnel decontamination. Heavy equipment will have their drilling rods, augers and/or buckets steam cleaned after use, preferably at locations near the

individual drilling/excavation operations. Containment systems will be set-up for collection of decon fluids and materials. Berms and wind barriers will be set up, if appropriate.

Vehicles that become contaminated with suspect soil will be cleaned prior to leaving the site. The wheel wells, tires, sides of vehicles, etc. will be high-pressure washed at a location to be determined by the SSHC.

6.3.2 Personnel

In general, decontamination involves scrubbing with a non-phosphate soap/water solution followed by clean water rinses. Disposable items will be disposed of in a dry container.

Reusable protection will be washed with soap and clean potable water and air-dried prior to storage. Dirt, oil, grease or other foreign materials that are visible will be removed from surfaces. Scrubbing with a brush may be required to remove materials that adhere to the surfaces. Certain parts of contaminated respirators, such as harness assemblies and leather or cloth components, are difficult to decontaminate. If grossly contaminated, they may be discarded. Rubber components can be soaked in soap and water and scrubbed with a brush.

The following decontamination protocol will be used, as appropriate to the level of PPE being used:

- Drop hand tools and equipment in the designated decontamination area.
- Either wash outer rubber boots or dispose of booties.
- Rinse outer boots.

- Wash and rinse outer gloves.
- Remove outer boots and gloves, dispose gloves if necessary.
- Replace cartridges if required.
- Remove and dispose Tyvek coverall.
- Remove respirator, dispose cartridges as required.
- Personnel should wash their respirator at the end of each workday.

6.3.3 Decontamination Wastes

Decontamination wash and rinse waters will be collected and disposed of according to the applicable regulatory guidelines.

- Spent decontamination solutions may be required to be drummed and disposed of as hazardous waste and/or solvent solutions may be required to be segregated from water rinses.
- Decontamination shall be performed in a manner that minimizes the amount of waste generated.

7.0 Site Operating Procedures

The following is a list of the general guidelines required for the Site Investigation of the Ithaca Falls Overlook ERP. These guidelines follow the established guidelines of the Barton & Loguidice Corporate Health and Safety Program:

All field investigation activities must be coordinated through the Project Manager.

At least two (2) persons must be present who are in constant communication with each other during any activity conducted on-site in which a potential exists for exposure to hazardous materials, accident or injury. At least two (2) persons must also be present during all demolition or excavation activities.

Samples obtained from areas known or suspected to contain contaminated substances or materials must be handled with appropriate personal protection equipment.

All equipment used to conduct the Site Investigation must be properly decontaminated and maintained in good working order. Equipment must be inspected for signs of defects and/or contamination before and after each use.

Eating, drinking, chewing gum, and smoking are prohibited within the Site Activity Zone and the Decontamination Zone.

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated will result in the evacuation of the activity zone until a complete evaluation of the hazard can be performed.

7.1 Daily Operating Procedures

The following are the daily operating procedures that are to be followed by all on-site personnel:

- Hold Tailgate Safety Meetings prior to work start and as needed thereafter (suggest daily; however, minimum of weekly).
- Use monitoring instruments and follow designated protocol and contaminant action levels.
- Use PPE as specified.
- Use hearing protection if noise levels exceed 85 dBA and around heavy equipment.
- Remain upwind of operations and airborne contaminants, if possible.
- Establish a work/rest regimen when ambient temperatures and protective clothing create potential thermal hazards.
- Eating, drinking, applying cosmetics and smoking is prohibited in work areas.
- Refer to the SSHC for specific safety concerns for each individual site task.
- On-site personnel are encouraged to be alert of their own physical condition, as well as their co-workers.
- **All accidents, no matter how minor,** must be immediately reported to the SSHC.

7.2 Site Control

The purpose of site control is to minimize the exposure of site workers to potential contamination, protect the public from the site's hazards, and prevent vandalism. The degree of site control necessary depends on site characteristics and the surrounding community. At this time, access is restricted to the site by fencing. During the field activities, Barton & Loguidice (B&L) and the City are requesting that personnel, subcontractors and visitors report to the on-site B&L supervisor prior to entering the work area.

During IRM activities at the site, particular attention will be placed on the condition of the site regarding three (3) main work zone areas:

Activity Zone

This zone applies to the immediate work area and includes all materials, equipment, vehicles and personnel involved in the site activity. For example, during the installation of a monitoring well, the activity zone will encompass the borehole, drilling rig, monitoring well construction materials and equipment, sampling equipment, decontamination supplies, and drilling/well inspection personnel. Site control measures will include flagging the perimeter of the activity zone to clearly mark the limits of work and to warn passers-by and visitors of the site activity. In addition, the Site Supervisor will maintain communication with City personnel as the location of this zone (and the type of work being performed) changes throughout the project.

The required level of PPE in the activity zone can vary according to job assignment. This will allow a flexible, effective, and less costly operation, while still maintaining a high degree of safety.

This area will be limited to authorized personnel from B&L, regulatory agencies, and contractors/subcontractors to the City. Personnel entering this area will be required to comply with their own HASP that is at least as stringent as this HASP.

Material and Equipment Storage Zone

This zone exhibits the least amount of activity, and as a result, will require the least security. An appropriate area will be designated on-site for the storage of all equipment and supplies to be used throughout the site investigation. The area is to be kept clean and orderly at all times and free from loose equipment, tools, materials or supplies which may compromise the safety of site workers, City personnel or the public. Construction materials and equipment will be covered with plastic at the end of each workday. Any spills or breakages occurring in this area will be immediately attended to before the Site work continues.

Decontamination Zone

In order to prevent incidental contact with contaminants on investigation equipment or in the wash water, all activities within the decontamination area will be completed before subsequent site work or any other activity begins. This includes:

- Complete removal of contaminants on all equipment used during the preceding phase of the investigation;
- Placement of the waste wash water and sediment in sealed drums;
- Storage of the drums in a secure and out-of-the-way place for future disposal;
- Proper labeling of drum contents;

- Cleanup (if necessary) of area outside of decontamination area; and
- Storage of all decontamination equipment, site investigation equipment, and materials in the Materials and Equipment Storage Zone.

Support Zone

The support zone is the location of the administrative and other support functions needed to keep the operations in the activity and decontamination zone running smoothly. Any function that need not or cannot be performed in a hazardous atmosphere is performed here. Personnel may wear normal work clothes within this zone. Any potentially contaminated clothing, equipment and samples must remain in the decontamination zone until decontaminated. All emergency telephone numbers, change for the telephone (if necessary), evacuation route maps, and vehicle keys should be kept in the support zone.

The SSHC will establish decontamination system and decontamination procedures appropriate to the site and the work that will prevent potentially hazardous materials from leaving the site. All personnel exiting the activity zone will be decontaminated prior to entering the support zone. The decontamination procedures will be reviewed at each daily safety briefing.

Personal hygiene facilities meeting at least the minimum requirements of 29 CFR Part 1910.120 will be provided nearby.

Upon completion of the day's activities, heavy machinery and equipment will be stored securely within the site, or at a location selected by the SSHC.

7.3 Buddy System

Most activities in a contaminated or otherwise hazardous area should be conducted with a partner who is able to:

- Provide his or her partner with assistance.
- Observe his or her partner for signs of chemical or heat exposure.
- Periodically check the integrity of his or her partner's protective clothing.
- Notify the SSHC if emergency help is needed.

7.4 Engineering Controls

Engineering controls and work practices are primarily for limiting exposure through application of engineered barriers. They will be applied to this project when and where they are practicable. The following engineering controls may be applied on this project: water spray, covering of materials, site preparation to facilitate operations and remove obvious physical hazards, and warning alarms/devices.

8.0 Emergency Response Procedures

8.1 Pre-Emergency Planning

Planning for emergencies is a crucial part of emergency response. The SSHC is responsible for training all employees in potential site hazards and the emergency response procedures.

8.2 Personnel Roles

The SSHC is responsible for responding to, or coordinating the response of, off-site personnel to emergencies. In the event of an emergency, the SSHC will direct all notification, response and follow-up actions. Contacts with outside response personnel (hospital, fire department, etc.) will be done at the direction of the SSHC.

Prior to the start of work on the site, the SSHC will:

1. Notify emergency contacts, and/or health care facilities of the potentially hazardous activities and potential wastes that may develop as a result of the activities performed on-site;
2. Confirm that the following safety equipment is available: eyewash and safety shower station, first aid supplies, air horn, and fire extinguishers;
3. Have a working knowledge of the safety equipment available; and
4. Confirm a map detailing the most direct route to the hospital is prominently posted with the emergency telephone numbers.

Employees who will respond to emergencies involving hazardous materials will be trained in how to respond to such emergencies.

The SSHC will check daily to see that the following safety equipment is available at the site: eyewash station, first aid supplies, and fire extinguisher.

The SSHC will be responsible for directing notification, response and follow-up actions and for contacting outside response personnel (ambulance, fire department or others) prior to and during an emergency. Upon notification of an exposure incident, the SSHC will call the Hospital and fire and police emergency response personnel for recommended medical diagnosis, treatment, if necessary, and transportation to the hospital.

The SSHC must conduct an investigation of the incident as soon as possible. The SSHC will determine whether and at what levels exposure actually occurred, the cause of such exposure, and the means to prevent similar incidents from occurring. The resulting report must be accurate, objective, complete and signed and dated.

8.3 Safe Distances and Places of Refuge

In case of an emergency, the parking area will serve as the immediate place of refuge. Personnel in the exclusion zone should evacuate through the decontamination zone to the refuge location, both for their own personal safety and to prevent hampering response/rescue efforts. Following an evacuation, the SSHC will account for on-site personnel. If evacuation from the work site is necessary, the project vehicles will be used to transport on-site personnel to a place of refuge.

8.4 Emergency Communications

There will be a cellular telephone located in the Project Manager's vehicle for emergency use. There will be air horns, walkie-talkies, and/or other audible emergency signals located within the exclusion zone and decontamination area to

signal others of an emergency. The SSHC should brief all personnel of audible emergency signals being used during the site activities prior to starting the work. Site personnel to inform others of emergencies will use the following hand signals:

- Hand gripping throat - out of air, cannot breathe.
- Grip partner's wrist or both hands around waist - leave area immediately.
- Hands on top of head - need assistance.
- Thumbs up - everything's OK, or I understand.
- Thumbs down – No.

8.5 Emergency Procedures

The nature of work at a contaminated or potentially contaminated work site makes emergencies a continual possibility. Although emergencies are unlikely and occur infrequently, a contingency plan is required to assure timely and appropriate response actions. The contingency plan is reviewed at tailgate safety meetings.

8.5.1 Incident Procedures

If an emergency incident occurs, the following actions will be taken:

1. Size-up the situation based upon available information.
2. Notify the SSHC.
3. Only respond to an emergency if personnel are sufficiently trained and properly equipped.

4. As appropriate, evacuate site personnel and notify emergency response agencies, e.g., police, fire, etc.
5. As necessary, request assistance from outside sources and/or allocate personnel and equipment resources for the response.
6. Consult the posted emergency telephone list and contact key project personnel.
7. Prepare an incident report.

All site personnel should be aware of the location of fire fighting equipment. Personnel shall only extinguish minor fires. Large fires will require contacting the local fire department and allowing them to handle the fire. The local fire department will be contacted prior to initiating site activities to inform them of the potential hazardous materials that could be encountered in an emergency.

8.5.2 Medical Emergencies

In the event of an accident or injury, workers will immediately implement emergency decontamination and isolation measures to assist those who have been injured or exposed and to protect others from the hazards. Upon notification of an exposure incident, the SSHC will contact the emergency response personnel who can provide medical diagnosis and treatment. If necessary, immediate medical care will be provided by trained personnel competent in first aid procedures. Trained personnel competent in such matters will only provide other on-site medical and/or first aid response to an injury or illness.

If an individual is transported to a hospital or doctor, a copy of this HASP will accompany the individual.

The SSHC will be notified when an accident or incident occurs and will respond according to the seriousness of the incident. The SSHC will investigate facility/site conditions to determine whether and at what levels exposure actually occurred, the cause of such exposure and the means to be taken to prevent the incident from recurring.

The SSHC and the exposed individual will complete an exposure-incident investigation. The SSHC will prepare a signed and dated report documenting the investigation. The SSHC and the exposed individual will also complete an exposure-incident reporting form. The form will be filed with the employee's medical and safety records to serve as documentation of the incident and the actions taken.

Emergency first aid may include taking care of minor scrapes to performing CPR. All site personnel should be familiar with the location of the site first aid kits. The site safety officer should be trained in first aid and CPR. Contacting hospital and/or emergency agencies shall be made on a case by case basis depending on the severity of the injury. If an off site emergency agency is contacted, all the details relating to the injury should be relayed to that agency. All site injuries should be documented. The following actions should be taken if someone requires first aid:

1. Survey the scene to determine if it is safe to reach the injured person.
2. Ask the injured person what happened. If the person is unconscious, look for signs as to what may have occurred.
3. See if there are others injured.

4. Reassure the victim. Contact others for help; tell them to call the appropriate emergency agency.

5. If it is safe to move the victim, return them back to the field office.

Only trained personnel should perform CPR or rescue breathing on an unconscious victim.

Personnel who experience heat stress or frost bite should be attended to in the following manner:

Heat Stress - Symptoms include cool, pale and moist skin, heavy sweating, headache, and nausea. This person should be removed from the hot environment immediately, and allowed to lie on their back. Apply cold packs or make sure they are in an air-conditioned room. Give them plenty of water and/or electrolyte replacing fluids. Should a victim experience heat stroke (high body temperature, red skin) the body must be cooled down quickly and receive medical attention immediately. Persons experiencing heat stress or heat stroke should be attended to until the situation has been remedied.

Frostbite - Symptoms include slightly flushed skin that becomes white, pain at extremities in early stages. Get a victim experiencing frostbite to a warm area and put the frostbitten parts in warm (100-105 F) water. Loosely bandage injured parts after soaking. Under conditions of cold temperatures and high winds, there is the potential for workers experiencing hypothermia. Signs of hypothermia include: shivering, dizziness, numbness, confusion, or drowsiness. Warm up this person's body with dry clothes and a blanket, if

available. Call the appropriate emergency agency or take this person to the hospital.

8.6 Emergency Routes

Should an emergency signal be sounded, on-site personnel should immediately stop what they are doing, and return to the decontamination area. Personnel in the decontamination area and the support zone should evaluate the emergency and contact the appropriate off site emergency personnel. Once on site personnel return to the decontamination area, there will be someone there to direct them as to what to do. It is imperative that the SSHC or designated alternate account for all site personnel. The SSHC should direct all personnel to the nearest safe refuge.

The hospital route is included as attachment 1.

If the emergency event threatens the surrounding community, it is important that the local police and fire departments be contacted immediately regarding the potential danger.

8.7 Spill Control

A major spill is not anticipated at the site. Should a spill of any type occur, the employee should report it immediately to the SSHC, who will make arrangements for the proper clean up of the spill. These arrangements will include diking and ditching, as necessary, as well as the use of absorbents such as vermiculite or speedy dry. The emergency response personnel will be contacted immediately by SSHC in the event that on-site materials can not immediately contain the spill.

8.8 Personal Protective and Emergency Equipment

There will be suitable equipment on site for small emergency events such as additional PPE, fire extinguishers, first aid kits, and eye wash stations. In the event of a major emergency event, off site personnel will be contacted immediately.

8.9 Decontamination Procedures

The extent of emergency decontamination depends on the severity of the injury or illness and the nature of the contamination. Minimum decontamination will consist of detergent washing, rinsing, and removal of contaminated outer clothing and equipment. If time does not permit the completion of all of these actions, it is acceptable to remove the contaminated clothing without washing it. If the situation is such that the contaminated clothing cannot be removed, the person should be given required first aid treatment, and then wrapped in plastic or a blanket prior to transport to medical care. If heat stress is a factor in the victim's illness/injury, the outer protective garment will be removed immediately.

8.10 Evacuation Routes

Unless otherwise directed, evacuation will be made through the decon area to the parking area for a head count.

8.11 Response Critique

Should an incident on-site occur, the SSHC will analyze the response efforts in order to continually improve on-site conditions and procedures. The SSHC must complete follow-up activities before on-site work is resumed following an emergency. Used emergency equipment must be recharged, refilled or replaced. Government agencies must be notified as required in their regulations.

Attachment 1

Hospital Route

Attachment 1

Hospital Route

From: Ithaca Falls Overlook ERP, 125 Lake Street, Ithaca, NY

To: Cayuga Medical Center (101 Dates Drive, Ithaca, NY)

1.	Go SOUTHEAST on Lake Street	0.1 Miles
2.	Continue STRAIGHT onto University Avenue	0.1 Miles
3.	Turn RIGHT onto Stewart Avenue	0.7 Miles
4.	Turn RIGHT onto E. Martin Luther King Jr. Street/E. State Street	0.2 Miles
5.	Slight RIGHT onto Seneca Way	1.0 Miles
6.	Slight RIGHT onto W. Martin Luther King Jr. Street/W. State Street	0.1 Miles
7.	Continue onto Hector Street	0.6 Miles
8.	Turn RIGHT onto Vinegar Hill	427 Feet
9.	Turn LEFT onto NY-96N/Cliff Street	1.7 Miles
10.	Turn RIGHT onto Dates Drive Hospital is located at 101 Dates Drive, Ithaca, NY	

(This should be posted in several conspicuous locations at the site.)

EMERGENCY CONTACTS
(To be posted)

Contact	Person or Agency	Phone Number
City Representative	Nels Bohn Ithaca Urban Renewal Agency	(607) 724-6559
NYSDEC Region 7 Project Manager	Gary Priscott	(607) 775-2545
Law Enforcement	(C) Ithaca PD	911 (607) 272-3245 (non-emergency)
Fire Department	(C) Ithaca FD	911 (607) 272-1234 (non-emergency)
Confined Space Rescue (Fire Department)	(C) Ithaca FD	911 (607) 272-1234 (non-emergency)
Ambulance	(C) Ithaca FD	911 (607) 272-1234 (non-emergency)
Hospital - Emergency	Cayuga Medical Center	(607) 274-4680
B&L Project Manager	David R. Hanny	(585) 953-6670
B&L Project Manager/Site Safety Officer	David R. Hanny	(585) 953-6670
B&L Officer-in-Charge	Scott D. Nostrand, P.E.	(315) 457-5200

Appendix C

Citizen Participation Plan (CPP)
[Bound Separately]