Remedial Investigation/ Alternatives Analysis Report/ Interim Remedial Measures Work Plan

3807 Highland Avenue Site
Niagara Falls, New York
BCP Site No. 932145

December 2008 0170-001-102
Revised September 2009

Prepared For:

Globe Metallurgical, Inc.
And
Solsil, Inc.

Prepared By:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

2558 Hamburg Turnpike, Buffalo, New York | phone: (716) 856-0599 | fax: (716) 856-0583

WORK PLAN
FOR
REMEDIAL INVESTIGATION / ALTERNATIVES ANALYSIS REPORT / INTERIM REMEDIAL MEASURES (RI/AAR/IRM)

3807 HIGHLAND AVENUE SITE
NIAGARA FALLS, NEW YORK

December 2008 0170-001-102
Revised September 2009

Prepared for:

Globe Metallurgical, Inc.
and
Solsil, Inc.

RI /AAR / IRM WORK PLAN

3807 Highland Avenue Site
Niagara Falls, New York

Table of Contents

Table of Contents

RI /AAR / IRM WORK PLAN
3807 Highland Avenue Site
Niagara Falls, New York

Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

Globe Metallurgical, Inc. (Globe) and their co-applicant, Solsil, Inc. (Solsil) have elected to pursue cleanup and redevelopment of the Project Site, located at 3807 Highland Avenue in the City of Niagara Falls, New York (Site; see Figure 1) under the New York State Brownfield Cleanup Program (BCP), and has submitted a BCP application to the New York State Department of Environmental Conservation (NYSDEC). Globe and Solsil have been accepted into the BCP as Volunteers. Figure 2 shows the boundaries of the Site that is subject to the BCP.

This document presents the scope of work and implementation procedures for completion of Remedial Investigation/Alternatives Analysis Report / Interim Remedial Measures (RI/AAR/IRM) at the Site. Globe currently owns the property and plans to refurbish/redevelop the vacant factory buildings to manufacture metallurgical and chemical-grade silicon metal and silicon-based specialty alloys. Solsil plans to build a new facility on the western portion of the Site that will produce and develop high-purity silicon for use in photovoltaic solar cells.

The RI/AAR/IRM will be completed by Benchmark Environmental Engineering & Science, PLLC (Benchmark) on behalf of Globe and Solsil. The work will be completed in accordance with NYSDEC DER-10 guidelines (Ref. 1).

1.1 Background

The Site is located in an industrialized area of Niagara Falls and is surrounded by current or former industrial sites. The Site, measuring approximately 17-acres, is currently being re-furbished and has not been in operation since 2003. The Site was used for industrial manufacturing since at least 1913; most recently the Site was used to manufacture silicon metal and ferrosilicon metal.

1.2 Remedial Investigation Objectives

For sites entering the BCP at the point of investigation, NYSDEC requires completion of a RI. The primary objectives of the RI are to:

- Collect additional soil/fill and groundwater samples, under appropriate quality assurance/quality control criteria, to better delineate the nature and extent of contamination.

- Determine if the concentrations of constituents of concern in site soil, soil gas and/or groundwater pose potential unacceptable risks to human health and the environment.

- Provide the data needed to evaluate potential remedial measures (AAR) and determine appropriate actions to address potential significant risks.

1.3 IRM Objectives

Globe and Solsil, although co-located on the Project Site, have different redevelopment schedules. Redevelopment of the Globe portion of the Site is currently underway and Globe plans to restart operations prior to the end of their next fiscal year, which ends June 30, 2010. The redevelopment of the Solsil portion of the Site will occur subsequently. As such, in order for Globe and Solsil to realize the BCP tax credits that are due in accordance with the BCP they must secure a certificate of completion (COC) by June 30, 2010. In order to secure a COC prior to June 30, 2010, this work plan includes provisions for interim remedial measures (IRMs) to quickly mitigate risks to public health and the environment, if any, attributable to contamination at the Site. Globe and Solsil's intent is for the IRM to substantially or completely constitute the final NYSDEC-approved BCP remedy for the Site.

Immediately following the Remedial Investigation (RI) fieldwork, the RI data will be reviewed and an IRM will be completed for areas of the Site that require remediation. In general, IRM activities may include: removal of above ground storage tanks (ASTs), drums and containers; removal of underground storage tanks (USTs), if encountered; excavation and off-site disposal of visibly impacted surface soil, excavation and off-site disposal of petroleum-impacted subsurface soil, if encountered, implementation of a Soil/Fill Management Plan (SFMP) during redevelopment; mitigation of soil vapor impacts, if warranted; and, placement of a soil cover system (if required based on RI findings). This Work Plan includes anticipated IRM activities based on current information and may be modified, subject to NYSDEC approval, immediately after the RI fieldwork is completed.

Cleanup objectives employed during the IRM will be 6NYCRR Part 375 restricted-industrial soil cleanup objectives (SCOs). Details of anticipated IRM activities are included in Section 4.0

1.4 Project Organization and Responsibilities

Globe has applied to the New York State BCP as a non-responsible party (volunteer) per ECL§27-1405. Benchmark Environmental Engineering & Science, PLLC will manage the Brownfield cleanup activities on behalf of Globe. The NYSDEC Division of Environmental Remediation will monitor the activities to verify that the work is performed in accordance with the BCP, the approved RI/AAR/IRM Work Plan, and NYSDEC DER-10 guidance.

2.0 SITE DESCRIPTION

2.1 General

The 3807 Highland Avenue Site is a former manufacturing property located in a historically industrial area of Niagara Falls, New York. The Site is bounded by Highland Avenue to the west, College Avenue to the south, Maple Avenue to the north, and Hyde Park Boulevard to the east (northeastern portion). Properties adjacent to the Site include Schleifmittel-Treibacher (former General Abrasives) to the east, PreMax (former Chisholm-Ryder) to the west, and the former Hazorb/Niagara Vest/Union Carbide BCP site to the south.

2.2 Site Topography and Drainage

The Site is covered primarily by former industrial manufacturing buildings, with concrete and asphalt paved areas, former building foundations, and some overgrown vegetation areas. The northeast portion of the site is elevated, and covered in scrub vegetation and small trees. Precipitation (i.e., rain or melting snow) moves to on-site catch basins via overland flow. Surface and shallow groundwater flow are likely influenced by various cycles of development and filling, as well as utility lines and foundations.

2.3 Geology and Hydrogeology

2.3.1 Overburden

The U.S. Department of Agriculture Soil Conservation Service soil survey map of Erie County (Ref. 2) describes the general surficial soil type at the site as Canandaigua silt loam, with slopes ranging from 0 to 2%. The geology of the Site will be investigated as part of the RI activities.

2.3.2 Bedrock

The Niagara Falls region is underlain by Silurian and Devonian age stratified limestone, dolomite, and shale of marine origin (Ref. 3). The bedrock is virtually flat lying, with a gentle dip to the south of only about 30 to 40 feet per mile and exhibits only very gentle folding. The bedrock surface was deeply eroded by weathering and stream action

prior to glaciation and by glacial scour during glaciation. The carbonate rocks and the shale are nearly impermeable as homogeneous rock; however, due to regional tectonic stresses the bedrock is vertically and horizontally fractured, providing openings for the storage and transmission of groundwater. Fracture permeability is enhanced in limestone and, to a lesser extent, in dolomite by dissolution of the rock by groundwater. A similar enhancement of permeability is produced by dissolution of interbedded gypsum in some rock units. Regional hydrogeology is discussed in more detail later in this section.

The primary bedrock type that forms the bedrock surface in the northern part of the Lake Erie-Niagara River Basin is the fine- to coarse-grained Lockport Dolomite; a white or grey, magnesium-rich sedimentary rock resembling limestone, but harder and more resistant. The Lockport extends into New York for 200 miles from Niagara County to Herkimer County. The Lockport is the lowermost carbonate-rock unit in the region, which overlies the Rochester Shale, a black to gray carbonaceous shale with minor calcareous beds and limestone layers. Gypsum is also present as nodules along some bedding-plane surfaces in the Lockport. The maximum thickness of the Lockport is approximately 150 feet. Near the base of the Lockport, the formation is divided into the Decew Dolomite Member and the overlying Gasport Limestone Member.

2.3.3 Hydrogeology

The Site is located in the Erie-Niagara River Basin. In the Erie-Niagara Basin, the major areas of groundwater are within coarser overburden deposits and limestone and shale bedrock. The main sources of groundwater within the bedrock are fractures and solution cavities. Regional groundwater appears to flow south and west towards the Niagara River, although localized variation does occur. Localized shallow groundwater flow in overburden will be confirmed during the RI.

2.4 Climate

Western New York has a cold continental climate, with moisture from Lake Erie causing increased precipitation. Average annual precipitation is reportedly 40.5 inches and snowfall is 93.6 inches (Ref. 4) to the northern part of the watershed with over 150 inches per year falling on the southern portion of the watershed. Average monthly temperatures range from 24.5 degrees Fahrenheit in January to 70.8 degrees Fahrenheit in July (Ref. 4). The ground and lakes typically remain frozen from December to March. Winds are

generally from the southwest (240 degrees) with a mean velocity of 10 miles per hour (Buffalo Airport, 1999).

2.5 Population and Land Use

The City of Niagara Falls, encompassing 14 square miles, has a population of 55,593 persons (2000 U.S. Census Bureau), a decrease of 10.3% from the 1990 U.S. Census. The population density in the City is 3,955.7 people per square mile. The Site is located in Census Tract 202, in an area of the City zoned industrial/commercial/vacant/residential and has a population density that is 2,514 people per square mile.

Properties adjacent to the Site include several industrial, commercial and vacant properties. The surrounding land-use is a mixed use, including industrial, commercial, and vacant parcels.

2.6 Utilities and Groundwater Use

The subject property has access to major public and private utilities, including water (City of Niagara Falls Division of Water), sanitary and storm sewers (City of Niagara Falls), electric (National Grid), and natural gas (National Fuel Gas).

Groundwater at the Site is assigned Class "GA" by 6NYCRR Part 701.15. Currently, there are no deed restrictions on the use of groundwater at the Site; however, there are no known groundwater supply wells on the property. Regionally, groundwater in the area has not been developed for industrial, agriculture, or public supply purposes. Municipal potable water service is provided on-site and off-site. Currently, there are no known permanent groundwater monitoring wells on the Site.

2.7 Wetlands and Floodplains

Niagara County Intranet Mapping Service shows that there are no State or Federal wetlands or floodplains on the Site.

2.8 Previous Investigations

A summary of the investigations that have occurred at the Site are presented below.

2.8.1 September 2008– Phase I Environmental Site Assessment

In September 2008, Benchmark conducted a Phase I Environmental Site Assessment (ESA) at the Site. Benchmark identified several recognized environmental conditions (RECs) and recommended additional Site investigation.

2.8.2 September 2008 – Preliminary Site Investigation

In September 2008, Benchmark conducted a limited Preliminary Site Investigation at the Site. The limited investigation included soil borings to evaluate potential impacts associated with past heavy industrial operations, and to provide general characterization of the property. Surface, sub-surface and a historical stack soil/fill samples were collected. Based on the results of the investigation, Benchmark recommended that a BCP application be submitted to the NYSDEC.

2.9 Primary Constituents of Potential Concern (COPCs)

Based on findings to historic use of the Site, the Constituents of Potential Concern (COPCs) are presented below:

- ***Soil:*** Polycyclic aromatic hydrocarbons (PAHs), metals, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs).

3.0 REMEDIAL INVESTIGATION SCOPE OF WORK

The Remedial Investigation scope of work is focused on defining the nature and extent of contamination on-site, identifying the source of contamination, defining chemical constituent migration pathways, qualitatively assessing human health and ecological risks (if necessary), and obtaining data of sufficient quantity and quality to perform the alternatives analysis report.

Field team personnel will collect environmental samples in accordance with the rationale and protocols described in the Quality Assurance Project Plan (QAPP), provided under separate cover. USEPA and NYSDEC-approved sample collection and handling techniques will be used. Samples for chemical analysis will be analyzed in accordance with USEPA SW-846 methodology with an equivalent Category B deliverable package to meet the definitive-level data requirements. Analytical results will be evaluated by a third-party data validation expert in accordance with provisions described in the QAPP.

During intrusive RI activities, the New York State Department of Health (NYSDOH) Community Air Monitoring Plan and NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4031- Fugitive Dust Suppression and Particulate Monitoring Program will be followed. These documents are included in Attachment #1 of the Health and Safety Plan (HASP) in Appendix B.

3.1 Remedial Investigation Activities

The RI activities described in this section relate to the portion of the Site being redeveloped by Globe. An addendum to this Work Plan, provided under separate cover, discusses the RI activities that will be completed on the Solsil portion of the Site.

The RI activities will include completion of test pits using a backhoe or similar equipment, completion of soil borings using a direct-push drill rig, collection of sediment samples from within a smoke stack, installation of groundwater monitoring wells and sampling of various abandoned tanks and drums. If initial RI soil and groundwater data indicates that Site contaminants (i.e., VOCs) may cause a potential soil vapor intrusion concern in existing or planned Site structures, Globe will collect soil gas samples in the affected area(s). Surface and subsurface soil samples will be collected across the Site from

the test pits and/or soil borings. Groundwater samples will be collected from the newly installed monitoring wells. These activities are described in greater detail below.

3.1.1 Soil Investigation

3.1.1.1 Test Pit Excavations

Excavation of approximately 25 test pits across the property will allow for visual/olfactory/PID assessment of subsurface conditions and to obtain subsurface soil/fill samples for chemical characterization. Test pits will be pre-located to allow for clearance of sub-grade infrastructure and utilitiess. The number and location of test pits, particularly in the production areas of the site, may be modified to account for these subgrade features.

In general, test pits will be excavated using a mini-excavator from ground surface to approximately 6 to 8 feet below ground surface (fbgs), to the top of bedrock, or to the top of groundwater, whichever is encountered first. Test pit dimensions (i.e., depths and lengths) may vary depending on the vertical and horizontal extent of the soil/fill horizon, depth to groundwater, or encountered impacts (i.e., free-product, elevated PID readings, etc.). Test pit walls and excavated soil/fill will be examined by qualified Benchmark personnel and classified in accordance with the Unified Soil Classification System (USCS). Excavated soil/fill and the test pit atmosphere will be field screened for the presence of VOCs using a field PID as a procedure for ensuring the health and safety of personnel at the Site and to identify potentially impacted soil/fill samples for laboratory analysis. The methodology for field soil/fill screening using a PID is discussed below and in the QAPP, presented under separate cover. Field measurements and observations will be documented in the project notebook by the Benchmark field scientist.

Subsurface samples will be collected for analysis of USEPA Target Compound List (TCL) semi-volatile organic compounds (SVOCs) and Target Analytes List (TAL) metals. Additionally, at three test pit locations, subsurface samples will be analyzed for TCL volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), herbicides and pesticides for Site characterization purposes. However, no VOC samples will be analyzed in the absence of elevated PID reading (i.e., sustained readings greater than 5 ppm).

Soil/fill samples will be collected from the center of the excavator bucket using dedicated stainless steel sampling tools. Representative soil/fill samples will be placed in pre-cleaned laboratory supplied sample bottles, cooled to 4ºC in the field, and transported

under chain-of-custody command to Test America Laboratories, located in Amherst, New York, a New York State Department of Health (NYSDOH) ELAP-certified analytical laboratory. Please refer to Table 1 for a summary of the soil/fill sampling and analysis plan.

3.1.1.2 Soil Borings

In addition to the test pits, the soil/fill investigation will include completion of nine soil borings in the locations shown on Figure 3. Two soil borings will be completed within the footprint of the maintenance building located on the southern portion of the Site to assess concerns related to historic operations in that building. The other seven soil borings will be completed for Site characterization purposes and will be converted to groundwater monitoring wells as described in Section 3.1.3 below.

Soil/fill samples will be collected using dedicated stainless steel sampling tools. Representative soil/fill samples will be placed in pre-cleaned laboratory provided sample bottles, cooled to 4ºC in the field, and transported under chain-of-custody command to TestAmerica Laboratories, Inc. (TestAmerica), located in Amherst, New York, a New York State Department of Health (NYSDOH) ELAP-certified analytical laboratory. Soil/fill samples will be submitted for TCL VOCs, TCL SVOCs, TCL PCBs, and TAL Metals. However, no VOC samples will be analyzed in the absence of elevated PID reading (i.e., sustained readings greater than 5 ppm). Table 1 summarizes the soil/fill sampling and analysis plan. Figure 3 shows the test pit and soil boring locations.

3.1.1.3 Surface Soil/Fill Sampling

Collection of up to 12 additional surface soil/fill samples will facilitate evaluation of potential health risks to current Site receptors that may be exposed to soil/fill via direct contact, incidental ingestion, or inhalation of airborne particulates. For each surface soil/fill grab sample, a dedicated stainless steel hand trowel or stainless steel spoon will be used to collect a representative aliquot of soil. If an area is vegetated, then the surface soil sample will be collected from 0 to 2 inches below ground surface (bgs) following removal of the sod/vegetation. Representative samples will be described in the field by qualified Benchmark personnel using the USCS, scanned for total volatile organic vapors with a calibrated Photovac 2020 PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. Samples will be transferred to laboratory-supplied, pre-cleaned sample containers for analysis of TCL SVOCs, TAL metals and PCBs

using USEPA SW-846 methodology. If elevated PID readings (i.e., sustained readings greater than 5 ppm) are observed in any sample, that sample will also be analyzed for TCL VOCs.

3.1.2 Sediment Sampling

One sediment sample will be collected from the smoke stack located south of the former factory building (see Figure 3). A dedicated stainless steel hand trowel or stainless steel spoon will be used to collect a representative aliquot of sediment. The sample will be scanned for total volatile organic vapors with a calibrated Photovac 2020 PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. One grab sample will be transferred to laboratory-supplied, pre-cleaned sample containers for analysis of TCL SVOCs, TAL metals and PCBs using USEPA SW-846 methodology. If elevated PID readings (i.e., sustained readings greater than 5 ppm) are observed in the sediment sample, that sample will also be analyzed for TCL VOCs.

3.1.3 Drum/Container Sampling

If feasible, drums and other containers will be moved to a common staging area in a covered area of the building, preferably in a location that contains a competent concrete floor. Where several drums contain similar materials, composite samples will be collected across those drums/containers for representative analysis. The analytical protocol for drum sampling will largely be dictated by disposal facility requirements (the disposal facility has not yet been determined). In general, the solid materials will be analyzed for TCLP VOCs, TCLP SVOCs, TCLP metals, hazardous characterization (ignitability, reactivity, and pH), and total PCBs and liquid materials will be analyzed for TCL VOCs, TCL SVOCs, Resource Conservation and Recovery Act (RCRA) Metals, TCL PCBs, and ignitability.

3.1.4 Supplemental Groundwater Investigation

Seven groundwater monitoring wells will be installed on-site at the proposed locations shown on Figure 3. The new monitoring wells will provide groundwater elevation data as well as groundwater quality data. Monitoring well installation, well development, and groundwater sample collection are discussed in the following sections.

3.1.4.1 Monitoring Well Installation

Seven soil borings will be advanced to facilitate installation of seven groundwater-monitoring wells, as shown on Figure 3. A direct-push drill rig capable of advancing hollow-stem augers will be employed to install 2-inch inside diameter (ID) monitoring wells.

Each boring location will be advanced approximately 10 fbgs into native soils or a minimum of 5 feet below the first encountered groundwater, whichever is greater, using hollow stem auger drilling methods. If groundwater is not encountered within 15 fbgs, a monitoring well will not be installed at that location. Recovered soil samples will be described in the field by qualified Benchmark personnel using the USCS, scanned for total volatile organic vapors with a calibrated PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. Based on the field observations, one subsurface soil sample from each soil boring/monitoring well location will be collected for analysis of TCL SVOCs, TAL metals, and PCBs. All non-dedicated drilling tools and equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (e.g., Alconox).

Subsequent to boring completion, a 2-inch ID diameter flush-joint Schedule 40 PVC monitoring well will be installed at the boring locations. Each well will be constructed with a 10-foot flush-joint Schedule 40 PVC, 0.010-inch machine slotted well screen. Each well screen and attached riser will be placed at the bottom of each borehole and a silica sand filter pack (size #0) will be installed from the base of the well to a maximum of 2 feet above the top of the screen. A bentonite chip seal will then be installed and allowed to hydrate sufficiently to mitigate the potential for downhole grout contamination. Cement/bentonite grout will be installed to approximately 1 fbgs via pressure tremie-pipe procedures. The newly installed monitoring wells will be completed with keyed-alike locks, a lockable J-plug, and an 8-inch diameter steel flush mounted road box anchored within a 2-foot by 2-foot by 1-foot square concrete pad.

3.1.4.2 Well Development

Upon installation, but not within 24 hours, newly installed monitoring wells will be developed in accordance with Benchmark and NYSDEC protocols. Development of the monitoring wells will be accomplished with dedicated disposable polyethylene bailers via surge and purge methodology. Field parameters including pH, temperature, turbidity and specific conductance will be measured periodically (i.e., every well volume or as necessary)

during development. Field measurements will continue until they became relatively stable. Stability will be defined as variation between measurements of approximately 10 percent or less with no overall upward or downward trend in the measurements. A minimum of three well volumes will be evacuated from each monitoring well. Development water from the monitoring wells will be passed through a mobile granular-carbon treatment vessel, and discharged to ground.

3.1.4.3 Groundwater Sample Collection

Prior to sample collection, static water levels will be measured and recorded from all on-site monitoring wells. Following water level measurement, Benchmark personnel will purge and sample the monitoring wells using either a peristaltic pump with dedicated pump tubing following low-flow/minimal drawdown purge and sample collection procedures or using a dedicated polyethylene bailer. Prior to sample collection, groundwater will be evacuated from each well at a low-flow rate (typically less than 0.1 L/min). Field measurements for pH, specific conductance, temperature, turbidity, and water level as well as visual and olfactory field observations will be periodically recorded and monitored for stabilization. Purging will be considered complete when pH, specific conductivity and temperature stabilize and when turbidity measurements fall below 50 Nephelometric Turbidity Units (NTU), or become stable above 50 NTU. Stability is defined as variation between field measurements of 10 percent or less and no overall upward or downward trend in the measurements. Upon stabilization of field parameters, groundwater samples will be collected and analyzed as discussed below.

Upon arrival at each monitoring well, field personnel will visually inspect the monitoring well for defects and/or vandalism. Following location and inspection of each well, the static water level and total depth will be recorded and one standing well volume will be calculated.

Wells will be purged and sampled using a peristaltic pump and dedicated pump tubing following low-flow (minimal drawdown) purge and sample collection procedures in a manner similar to that described in the previous section. However, the pump will not require decontamination because all components are dedicated to each monitoring well.

Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductance, temperature, turbidity, dissolved oxygen and water level as well as visual and olfactory field observations will be recorded. All collected

groundwater samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4°C in the field, and transported under chain-of-custody command to TestAmerica for analysis.

3.1.4.4 Groundwater Sample Analyses

Groundwater samples will be analyzed for TCL plus NYSDEC STARS List VOCs, TCL SVOCs and TAL Metals in accordance with USEPA SW 846 methodology with equivalent NYSDEC Category B deliverables to allow for independent third-party data usability assessment.

3.1.5 Soil Vapor Assessment

If initial RI soil and groundwater data indicates that VOCs may cause a soil vapor concern, Globe will complete a vapor intrusion investigation for buildings in the affected area(s). To evaluate the potential vapor intrusion into a Site building, one sub-slab vapor sample, one indoor air sample and one ambient air (i.e., background) sample will be collected. The sampling will be completed in general conformance with the New York State Department of Health (NYSDOH) Soil Vapor Intrusion Guidance (October 2006).

At the sub-slab sample location, Benchmark personnel will drill an approximate 3/4-inch diameter hole through the concrete floor (est. 4-6 inches thick) using a hand-held drill. Approximately 6 inches of soil will then be drilled from beneath the hole. An appropriately sized silicone stopper fitted with a ¼-inch hollow Teflon tube will then be inserted into the core hole and sealed using modeling clay. A real time helium tracer gas will be used to confirm the integrity of the probe seal prior to formal sample collection. Once the seal is determined to be adequate, a Summa canister fitted with an 8-hour regulator will be attached to the opposite end of the Teflon tubing. Three volumes will be purged from the sampling line before initiating Summa canister sampling. Purging will be performed with a vacuum pump or syringe.

Concurrent with the sub-slab and indoor air samples, one outdoor field-located air sample will be collected from a ground level location upwind of the properties, as determined on the day of sub-slab and indoor air sampling activities.

All Summa canister valves will remain closed until the sub-slab boring is complete, purged, and all of the canisters are in their respective positions. The valves will then be opened for the 8-hour collection period. Following sample collection, the Summa canisters

will be shipped to an NYSDOH-approved laboratory for analysis of USEPA TCL VOCs in accordance with USEPA Method TO-15.

3.1.6 Field Specific Quality Assurance/Quality Control Sampling

In addition to the soil/fill and groundwater samples described above, field-specific quality assurance/quality control (QA/QC) samples will be collected and analyzed to ensure the reliability of the generated data as described in the QAPP (provided under separate cover) and to support the required third-party data usability assessment effort. Site-specific QA/QC samples will include matrix spikes, matrix spike duplicates, blind duplicates, and trip blanks.

3.2 Investigation-Derived Waste Management

During installation of the monitoring wells, excess soil cuttings will be stockpiled on-site and covered with plastic or containerized in 55-gallon drums, and sampled to determine if they can be utilized on-site or require treatment or off-site disposal. However, if soil data collected from a boring location does not exceed on-Site re-use criteria shown in Table 2, the soil cuttings from that location can be redeposited on the Site surface. Groundwater from well development and purging will be passed through a mobile granular-carbon treatment vessel and discharged to ground.

Drums, if used, will be labeled with regard to contents, origin, and date of generation using a paint stick marker on two sides and the top of each drum. The drums will be staged on-site pending soil analyses and remedial measures assessment.

3.3 Site Mapping

A Site map will be developed during the field investigation. All sample points and relevant Site features will be located on the map. Benchmark will employ a Trimble GeoXT handheld GPS unit to identify the locations of all soil borings and newly installed wells relative to State planar grid coordinates. Monitoring well elevations will be measured by Benchmark's surveyor. An isopotential map showing the general direction of groundwater flow will be prepared based on water level measurements relative to USGS vertical datum. Maps will be provided with the RI report.

4.0 INTERIM REMEDIAL MEASURES

Immediately following the Remedial Investigation fieldwork, an IRM will be completed to immediately address environmental concerns and to expedite the remedial and overall project schedule. This Work Plan includes anticipated IRM activities based on current information and may be modified, subject to NYSDEC approval, after the RI fieldwork is completed. The IRM may address some or all of the following Site conditions as more fully defined in the RI:

- Excavation and off-site disposal of stained surface soils, if encountered
- Removal and off-site disposal of impacted sediments
- Removal and off-site disposal of drums and other containers
- Removal of USTs, if encountered
- Excavation and off-site disposal of petroleum-impacted subsurface soil/fill in the area of historic USTs, if encountered
- Implementation of a SFMP during redevelopment
- Placement of a soil cover system
- Soil vapor intrusion mitigation

4.1 Excavation and Disposal of Stained Surface Soils

In general, surface soil with evidence of staining will be excavated to remove visually impacted material, and either placed in roll-off containers or placed on and covered with polyethylene sheeting, and sampled to determine proper off-site disposal. The stockpiled material will be managed to prevent infiltration of precipitation and wind erosion. The stockpiled impacted material will be characterized per the requirements of a permitted disposal facility. Stockpiled impacted material will not remain on-site for more than 90 days. Upon obtaining an approved waste profile, the impacted material will be transported and disposed of off-site.

4.2 Removal of Impacted Sediments

The sediment within the Globe smoke stack will be sampled as described in Section 3.1.2 during the RI. If the sediment contains elevated concentrations of contaminants (i.e., above Part 375 Restricted-Industrial SCOs, the sediment will be sampled for toxicity characteristics via toxicity characteristic leaching procedure (TCLP) testing. Upon obtaining an approved waste profile, the impacted material will be transported and disposed of at a commercial solid waste or hazardous waste disposal facility.

4.3 Removal and Off-Site Disposal of Drums and Other Containers

The contents of ASTs and other containers will be characterized during the IRM. Upon reviewing the waste characterization results of containers' contents, waste profiles for the various waste streams will be generated and off-Site transportation and disposal of these containers will be arranged. If any of the containers are compromised and in poor condition, after removal of the containers, any residual contents present on the surface of the floors beneath the containers will be placed into drums and transported off-Site for proper disposal.

4.4 Removal of USTs

If USTs are encountered during RI/IRM activities, the USTs will be removed in accordance with NYSDEC DER-10 guidance. Handling of impacted soil surrounding the UST(s), if encountered, is described in Section 4.5 below.

4.5 Excavation and Off-Site Disposal of Subsurface Soil/Fill

If impacted soil/fill is encountered in the area of former USTs, or other subsurface areas of the Site identified during completion of test pits, soil borings or surface sampling, the soil/fill will be excavated and staged on-Site for characterization. Impacted soil/fill is defined herein as soil/fill with obvious visible impact, petroleum odors, and/or elevated PID readings (i.e., sustained readings >5ppm). In general, excavation of impacted soil/fill will continue vertically and/or laterally until visually impacted soil/fill is removed and post excavation samples will be collected. Post excavation sampling is discussed below.

Visually impacted soil/fill and/or soil/fill with olfactory evidence of contamination encountered during excavation will either be placed in roll-off containers or be placed on and covered with polyethylene sheeting, and sampled to determine proper off-site disposal.

The stockpiled material will be managed to prevent infiltration of precipitation and wind erosion. The stockpiled impacted material will be characterized per the requirements of a permitted disposal facility. Stockpiled impacted material will not remain on-site for more than 90 days. Upon obtaining an approved waste profile, the impacted material will be transported and disposed of at a commercial solid waste or hazardous waste disposal facility.

4.5.1 Verification Sampling

Verification sampling will be performed on the sidewalls and bottom of the excavation after lateral excavation limits have been achieved and visibly impacted soil/fill has been removed. In general, one sidewall sample will be collected for each 30 linear feet of excavation sidewall and one bottom sample of the excavation will be collected for each 900 square feet of excavation bottom. The samples will be collected by retrieving a discrete sample from across the excavation face. The backhoe bucket will be used to assist in sample collection and avoid the need for confined space entry.

Verification sampling analytical protocols will be determined based on the constituents of concern in the former tank/excavation areas as follows:

- Gasoline tank areas: TCL plus STARS List VOCs, TAL metals
- Diesel and fuel oil tank areas: TCL plus STARS List VOCs, TCL SVOCs, TAL metals, PCBs
- Other impacted areas: TCL VOCs, TCL SVOCs, TAL metals, TCL PCBs (as appropriate based on RI data)

All samples will be transported under chain-of-custody to a New York State Department of Health (NYSDOH) ELAP-certified analytical laboratory and analyzed in accordance with USEPA Methodology with an equivalent Category B deliverables package to facilitate data evaluation by a third-party validation expert. Two-business day turnaround will be requested for the analytical results to minimize the time that the excavation(s) remains open.

4.5.2 Excavation Backfill

After the excavation is complete, the resulting excavation will be backfilled with non-impacted site soil or clean imported fill material that meets the requirements of Table 2. Backfill material will be placed into the excavation and compacted with the

excavator/backhoe bucket in 2-foot lifts to match the existing grade of the Site and minimize settling. Alternatively, Globe's redevelopment plans may require that select backfill be placed in accordance with certain geotechnical requirements (e.g., 95% of a standard Proctor test).

4.6 Soil Cover System

The proposed site redevelopment plan, which includes renovation of the majority of existing building(s) as well as resurfacing of existing driveways and paved areas, will inherently provide for impervious cover over the majority of the Site by asphalt or reinforced concrete parking, drives, walks, building floors and foundations. Remaining property will be enhanced with landscaping and/or lawn area.

Areas of the Site with visually impacted surface soil/fill will be excavated and the impacted materials transported off-site for proper disposal as discussed above. If RI sampling results indicate that COPCs are present above restricted-industrial SCOs from areas of the Site that will not include asphalt or concrete cover, or building foundations, as part of the Site redevelopment (i.e., landscaped and/or lawn areas), Globe and Solsil will evaluate whether placement of a soil cover system is a feasible engineering control to protect human health and the environment. Specifically, the RI data will be reviewed and discussed with the NYSDEC to determine if a soil cover system is a necessary or appropriate component of the IRM or subsequently during Solsil development activities in accordance with the Site Management Plan as a condition of occupancy. If RI data indicates that a soil cover system is not necessary, this task will not be implemented. If RI data indicates that a soil cover system may be necessary on a portion of the Site, the location of the cover system will be determined upon evaluation of the existing data, discussions with the NYSDEC and the final Site layout (locations of drives, walks, buildings, etc.). If a soil cover system is implemented, it will be comprised of:

- In vegetated areas, a minimum of 12 inches of clean imported backfill, with the uppermost approximate four inches comprised of top soil capable of sustaining plant growth. Non-grassed areas (e.g., landscape shrubs/beds) will be covered with chip mulch to mitigate erosion around plantings.

- Non-vegetated areas (i.e., buildings, roadways, parking lots) will be covered by an asphalt paving system or concrete.

Imported backfill and cover soil must originate from a reputable supplier/source having no evidence of disposal or releases of hazardous substances, hazardous, toxic or radioactive wastes, or petroleum. The imported backfill and topsoil will meet the criteria identified on Table 2.

5.0 IRM SUPPORT DOCUMENTS

5.1 Soil/Fill Management Plan (SFMP)

The purpose of the Soil/Fill Management Plan (SFMP) is to protect both the environment and human health during redevelopment and post-development maintenance activities of the Site, subsequent to completion of Brownfield cleanup activities. The SFMP will be modified/expanded as appropriate based on the results of the RI. The SFMP is included in Appendix A.

While an assessment of surface and subsurface soil/fill and groundwater at the Site will be performed during the RI, subsurface information is never 100 percent complete or accurate, especially on a large Site with a long and diverse manufacturing history. As such, it is not unreasonable to anticipate the possibility that some quantity of subsurface soil/fill contamination may be encountered after completion of the Brownfields cleanup. In particular, soil/fill contamination may be encountered during post-development activities such as utility maintenance.

Compliance with the SFMP is required to properly manage subsurface soil contamination. The SFMP was developed and incorporated into this Work Plan with the express purpose of addressing unknown subsurface contamination if and when encountered. The SFMP also facilitates the transfer of responsibilities with property ownership, which is why the SFMP is a separate, stand alone document.

This SFMP provides protocols for the proper handling of Site soil/fill during development activities, including:

- Excavation, grading, sampling and handling of site soils.
- Acceptability of soils/fill from off-site sources for backfill or subgrade fill.
- Erosion and dust control measures.
- Access controls.
- Health and safety procedures for subsurface construction work and the protection of the surrounding community.
- Acceptability and placement of final soil and vegetative cover.

5.2 Site-Wide Health and Safety Plan (HASP)

A Health and Safety Plan (HASP) has been prepared in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 for the 3807 Highland Avenue BCP Site. The HASP will be enforced in accordance with the requirements of 29 CFR 1910.120 and will cover all on-site investigation and IRM activities. Benchmark's HASP is provided for informational purposes in Appendix B. Benchmark's subcontractors working at the Site will be required to develop a HASP as or more stringent than Benchmark's HASP. Health and safety activities will be monitored throughout the RI and IRM. A member of the field team will be designated to serve as the on-site Health and Safety Officer throughout the field program. This person will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the field investigation.

The HASP also includes a contingency plan that addresses potential site-specific emergencies, and a Community Air Monitoring Plan (CAMP) that describes required particulate and vapor monitoring to protect the neighboring community during intrusive site investigation/remediation activities. The HASP and CAMP will be modified/expanded as appropriate if significant site invasive activities are performed, such as those associated with a remedial alternative involving soil/fill excavation. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDOH's Generic Community Air Monitoring Plan (dated June 20, 2000) and NYSDEC Technical Assistance and Guidance Memorandum (TAGM) 4031: Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites.

5.3 Citizen Participation Plan

In accordance with NYSDEC's Brownfield Cleanup Program guidance, a Citizen Participation Plan (CP Plan) is required for the Site. The CP Plan, included as Appendix C, meets the requirements of Attachment 2 of the NYSDEC Technical Administrative Guidance Memorandum (TAGM) DER-97-4058 and NYSDEC's Draft DER-10 guidance.

Benchmark and the NYSDEC will coordinate and lead community relations throughout the course of the project. The NYSDEC, with input from Benchmark and Globe/Solsil, will issue project fact sheets to keep the public informed of IRM activities.

6.0 QUALITY ASSURANCE/QUALITY CONTROL PROTOCOLS

A Quality Assurance Project Plan (QAPP) has been prepared as a stand-alone document for the RI activities. The QAPP dictates implementation of the investigation tasks delineated in this Work Plan. A Sampling and Analysis Plan (SAP) identifying methods for sample collection, decontamination, handling, and shipping, is provided as Section 4.0 to the QAPP. The RI project management methods, organizational structure, and schedule are also included in the QAPP.

The QAPP will assure the accuracy and precision of data collection during the Site characterization and data interpretation periods. The QAPP identifies procedures for sample collection to mitigate the potential for cross-contamination, as well as analytical requirements necessary to allow for independent data validation. The QAPP has been prepared in accordance with USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations (Ref. 6); the EPA Region II CERCLA Quality Assurance Manual (Ref. 7), and NYSDEC's December 2002 draft DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 1).

7.0 REPORTING AND SCHEDULE

Upon completion of the fieldwork, a comprehensive report will be completed summarizing the tasks completed as described below.

7.1 Remedial Investigation Reporting

The RI (section of the RI/AAR/IRM) report will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 1).

- Introduction and background.
- A description of the site and the investigation areas.
- A description of the field procedures and methods used during the RI.
- A discussion of the nature and rationale for any significant variances from the scope of work described in this RI Work Plan.
- The data obtained during the RI and historical data considered by Benchmark to be of useable quality. This will include geochemical data, field measurements, etc.
- The results of an assessment of the achievement of RI acceptance/performance criteria as specified in the QAPP.
- Comparative criteria that may be used to calculate cleanup levels during the alternatives analysis report (AAR) process, such as NYSDEC Soil Cleanup Objectives and other pertinent regulatory standards or criteria.
- A discussion of contaminant fate and transport. This will provide a description of the hydrologic parameters of the Site, and an evaluation of the lateral and vertical movement of groundwater.
- Conclusions regarding the extent and character of environmental impact in the media being investigated.
- The conclusions of the qualitative human health and environmental risk assessments, including any recommendations for more detailed assessments, if applicable.
- Supporting materials for RI data. These will include boring logs, monitoring well construction diagrams, laboratory analytical reports, and similar information.

In addition, Benchmark will require third-party data review by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results. The DUSR will follow NYSDEC format per the NYSDEC's September 1997 DUSR guidelines and draft DER-10 guidance. The DUSR and any necessary qualifications to the data will be appended to the RI report.

7.2 IRM Reporting

A Benchmark Engineer or Scientist, and/or other qualified representative of Globe/Solsil, will be on-site on a full-time basis to document the IRM activities. Such documentation will include, at minimum, daily reports of IRM activities, community air monitoring results, photographs and sketches.

7.2.1 Construction Monitoring

Standard daily reporting procedures will include preparation of a daily report and, when appropriate, problem identification and corrective measures reports. Appendix D contains sample project documentation forms. Information that may be included on the daily report form includes:

- Processes and locations of construction under way.
- Equipment and personnel working in the area, including subcontractors.
- Number and type of truckloads of soil/fill removed from the site.
- A description of off-site materials received.
- Approximate verification sampling locations (sketches) and sample designations.

The completed reports will be available on-Site and will be submitted to the NYSDEC as part of the Final Engineering Report. The NYSDEC will be promptly notified of problems requiring modifications to this Work Plan prior to proceeding or completion of the construction item.

Photo documentation of the IRM activities will be prepared by the Engineer or Scientist throughout the duration of the project as necessary to convey typical work activities and whenever changed conditions or special circumstances arise.

7.2.2 IRM Construction Closeout

Details of the IRM construction will be included in the RI/AAR/IRM report submitted to the NYSDEC. At a minimum, the IRM section of the report will include:

- A Site or area planimetric map showing the parcel(s) remediated, including significant site features.
- A Site map showing the lateral limits of any excavations.
- A survey showing the area of the soil cover system, if any.
- Tabular summaries of unit quantities including: volume of soil/fill excavated; disposition of excavated soil/fill; and, volume/type/source of backfill.
- Tabular summaries of unit quantities including: number of ASTs, drums and other containers removed; and, estimated volume of materials removed from ASTs, drums and other containers.
- Planimetric map showing location of all verification and other sampling locations with sample identification labels/codes.
- Tabular comparison of verification and other sample analytical results to SCOs. An explanation shall be provided for all results exceeding acceptance criteria.
- Documentation on the disposition of impacted soil/sediment/liquid removed from the Site.
- Copies of daily inspection reports and, if applicable, problem identification and corrective measure reports.
- Photo documentation of IRM activities.
- Text describing the IRM activities performed; a description of any deviations from the Work Plan and associated corrective measures taken; and other pertinent information necessary to document that the Site activities were carried out in accordance with this Work Plan.

7.3 Alternatives Analysis Report

An alternatives analysis report (AAR) will be developed to provide a forum for evaluating and selecting a recommended remedial approach. A list of remedial action objectives will be developed based on findings of the RI and the requirement for the selected remedial measures to be protective of human health and the environment under the proposed future use scenario. Proposed soil cleanup objectives (SCOs) for the property will also be presented based on the proposed future use of the Site. SCOs will be based on

published standards, criteria, and guidance (SCGs) and other NYSDEC and NYSDOH-accepted values.

Based on the remedial action objectives and SCOs, volumes and areas of media potentially requiring remediation will be calculated. General response actions will then be delineated to address each of the Site problem areas. These response actions will form the foundation for the development and screening of applicable remedial alternatives against the following criteria as described in 6NYCRR 375-1.10:

- Overall Protection of Human Health and the Environment
- Compliance with Standards, Criteria, & Guidance (SCGs)
- Long-term Effectiveness & Permanence
- Reduction of Toxicity, Mobility, or Volume
- Short-term Effectiveness
- Implementability
- Cost

In addition, the criteria of community acceptance will be considered based on public comments on the AAR and proposed remedial action. Following the screening of alternatives, a comparative analysis will be performed against the above criteria. The comparative analysis will allow for better understanding of the relative advantages and disadvantages of each of the alternatives, and will facilitate identification of a recommended remedial approach.

7.4 Project Schedule

A tentative project schedule for the major tasks to be performed in support of the RI/AAR/IRM is presented in Figure 4.

8.0 REFERENCES

1. New York State Department of Environmental Conservation. *Draft DER-10; Technical Guidance for Site Investigation and Remediation.* December 2002.

2. United States Department of Agriculture (USDA), Soil Conservation Service. *Soil Survey of Erie County, New York.* 1972.

3. Bradford B. Van Diver. *Roadside Geology of New York.* 1985.

4. National Oceanic & Atmospheric Administration (NOAA) Satellites and Information. Data Tables through 2000.

5. Benchmark Environmental Engineering & Science, PLLC. *Phase I Environmental Site Assessment Report. 3807 Highland Avenue, Niagara Falls, NY.* September 2008.

6. Benchmark Environmental Engineering & Science, PLLC. *Preliminary Site Investigation – Letter Report. 3807 Highland Avenue, Niagara Falls, NY.* September 2008.

7. U.S. Environmental Protection Agency. *Requirements for Quality Assurance Project Plans for Environmental Data Operations (EPA QA/R-5).* October 1998.

8. U.S. Environmental Protection Agency, Region II. *CERCLA Quality Assurance Manual, Revision I.* October 1989.

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

SAMPLING AND ANALYTICAL PROGRAM

REMEDIAL INVESTIGATION/INTERIM REMEDIAL MEASURES
3807 Highland Avenue Site
Niagara Falls, New York

Matrix/Area	Parameter[1]	No. Samples	Estimated Number of QC Samples					Total
			Trip Blank[2]	Matrix Spike[3]	Matrix Spike Duplicate[3]	Equipment Blank[4]	Blind Duplicate[3]	
REMEDIAL INVESTIGATION								
Test Pits- Subsurface Soil/Fill[5]	TCL + STARS VOCs	3		1	1		1	6
	TCL SVOCs	25		2	2		2	31
	TAL Metals	25		2	2		2	31
	PCBs	3		2	2		2	9
	Pesticides	3		1	1		1	6
	Herbicides	3		1	1		1	6
Soil Borings- Subsurface Soil/Fill[6]	TCL + STARS VOCs	9		1	1		1	12
	TCL SVOCs	9		1	1		1	12
	TAL Metals	9		1	1		1	12
	PCBs	9		1	1		1	12
Surface Soil/Fill	TCL SVOCs	12		1	1		1	15
	TAL Metals	12		1	1		1	15
	PCBs	12		1	1		1	15
Sediment Sampling	TCL SVOCs	1						1
	TAL Metals	1						1
	PCBs	1						1
Drum Characterization Sampling[7] (solids)	TCLP VOCs	TBD						0
	TCLP Metals	TBD						0
	Total PCBs	TBD						0
	Hazardous Characterisitcs							
	Ignitability	TBD						0
	Reactivity	TBD						0
	Corrosivity	TBD						0
Drum/Tank Characterization Sampling[7] (liquids)	Flashpoint	TBD						0
	Total PCBs	TBD						0
	RCRA Metals	TBD						0
	TCL VOCs	TBD						0
	TCL SVOCs	TBD						0
Groundwater[8]	TCL + STARS VOCs	7	1	1	1		1	11
	TCL SVOCs	7		1	1		1	10
	TAL Metals	7		1	1		1	10
	Field Parameters[9]	7						7
INTERIM REMEDIAL MEASURES								
Post-Excavation Samples[7]	TCL + STARS VOCs	TBD	1	1	1		1	4
	TCL SVOCs	TBD		1	1		1	3
	TAL Metals	TBD		1	1		1	3
	PCBs	TBD		1	1		1	3
Soil Characterization Sampling[7]	TCLP VOCs	TBD						0
	TCLP SVOCs	TBD						0
	TCLP Metals	TBD						0
	Total PCBs	TBD						0
	Hazardous Characterisitcs							
	Ignitability	TBD						0
	Reactivity	TBD						0
	Corrosivity	TBD						0

Notes:
1. Analyses will be performed via USEPA SW-846 methodology w/ equivalent Category B deliverables package.
2. Trip blanks will be submitted to the laboratory each day aqueous volatile organic samples are collected.
3. Blind duplicate and MS/MSD samples will be collected at a frequency of 1 per 20 samples collected.
4. Dedicated sampling equipment will be used for groundwater and soil/fill sample collection.
5. Twenty-five test-pits will be excavated and one sub-surface soil/fill sample will be collected from each test-pit. Only 3 sample locations require sampling for VOCs, PCBs, pesticides and herbicides.
6. Nine soil borings will be completed and one sub-surface soil/fill sample will be collected from each soil boring.
7. TBD= to be determined. Number of samples will be determined in the field.
8. Groundwater samples will not be collected if groundwater is not encountered within 15 ft. below ground surface.
9. Groundwater field parameters include dissolved oxygen, pH, conductance, turbidity and temperature.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

CRITERIA FOR USE OF OFF-SITE SOIL

3807 Highland Avenue Site
Niagara Falls, New York

Parameter	Allowable Concentration of Imported Soil/Fill
Volatile Organic Compounds (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,2-Dichloroethene(cis)	0.25
1,2-Dichloroethene(trans)	0.19
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
Acetone	0.05
Benzene	0.06
Butylbenzene	12
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethylbenzene	1
Hexachlorobenzene	3.2
Methyl ethyl ketone	0.12
Methyl tert-butyl ether	0.93
Methylene chloride	0.05
Propylbenzene-n	3.9
Sec-Butylbenzene	11
Tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
Trichloroethene	0.47

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

CRITERIA FOR USE OF OFF-SITE SOIL

3807 Highland Avenue Site
Niagara Falls, New York

Parameter	Allowable Concentration of Imported Soil/Fill
Volatile Organic Compounds (mg/kg)	
Trimethylbenzene-1,2,4	3.6
Trimethylbenzene-1,3,5	8.4
Vinyl chloride	0.02
Xylene (mixed)	1.6
Semi-Volatile Organic Compounds (mg/kg)	
Acenaphthene	98
Acenaphthylene	107
Anthracene	500
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1.7
Benzo(g,h,i)perylene	500
Benzo(k)fluoranthene	1.7
Chrysene	1
Dibenz(a,h)anthracene	0.56
Fluoranthene	500
Fluorene	386
Indeno(1,2,3-cd)pyrene	5.6
m-Cresol(s)	0.33
Naphthalene	12
o-Cresol(s)	0.33
p-Cresol(s)	0.33
Pentachlorophenol	0.8
Phenanthrene	500
Phenol	0.33
Pyrene	500

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

CRITERIA FOR USE OF OFF-SITE SOIL

3807 Highland Avenue Site
Niagara Falls, New York

Parameter	Allowable Concentration of Imported Soil/Fill
Metals (mg/kg)	
Arsenic	16
Barium	400
Beryllium	47
Cadmium	7.5
Chromium, Hexavalent[1]	19
Chromium, Trivalent[1]	1500
Copper	270
Cyanide	27
Lead	450
Manganese	2000
Mercury (total)	0.73
Nickel	130
Selenium	4
Silver	8.3
Zinc	2480
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	17
4,4'-DDT	47
4,4'-DDD	14
Aldrin	0.19
Alpha-BHC	0.02
Beta-BHC	0.09
Chlordane (alpha)	2.9
Delta-BHC	0.25
Dibenzofuran	210
Dieldrin	0.1
Endosulfan I	102

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

CRITERIA FOR USE OF OFF-SITE SOIL

3807 Highland Avenue Site
Niagara Falls, New York

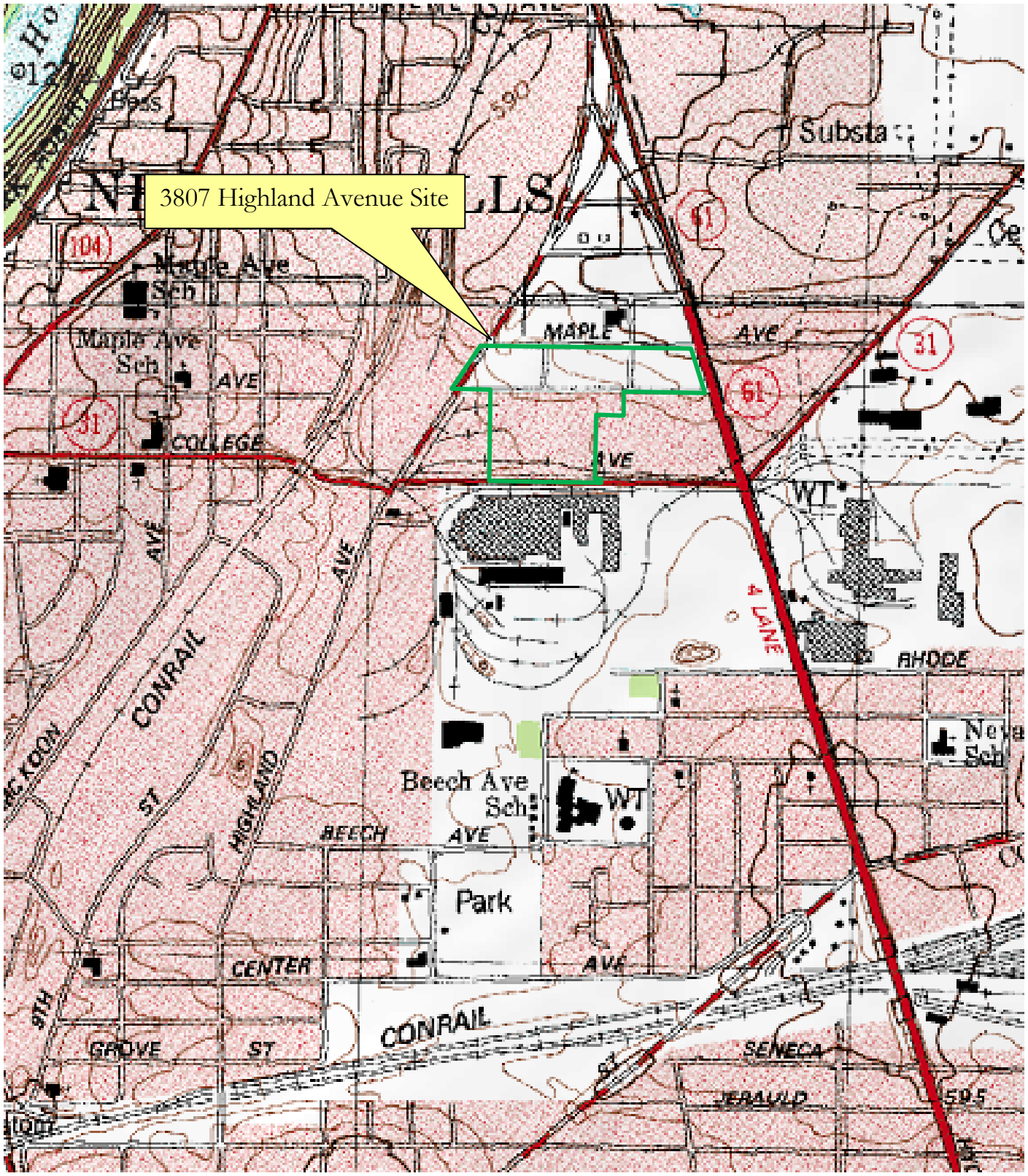
Parameter	Allowable Concentration of Imported Soil/Fill
PCBs/Pesticides (mg/kg)	
Endosulfan II	102
Endosulfan sulfate	200
Endrin	0.06
Heptachlor	0.38
Lindane	0.1
Polychlorinated biphenyls	1

Notes:

1. The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.

FIGURES

FIGURE 1



BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0170-001-102

DATE: OCTOBER 2008

DRAFTED BY: NTM

SITE LOCATION AND VICINITY MAP

RI / AAR / IRM WORK PLAN

3807 HIGHLAND AVENUE SITE

NIAGARA FALLS, NEW YORK

PREPARED FOR

GLOBE METALLURGICAL, INC.

BCP PROPERTY BOUNDARY

SOLSIL AREA

NOT TO SCALE

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0170-001-102

DATE: AUGUST 2009

DRAFTED BY: NTM

SITE PLAN

RI / AAR / IRM WORK PLAN

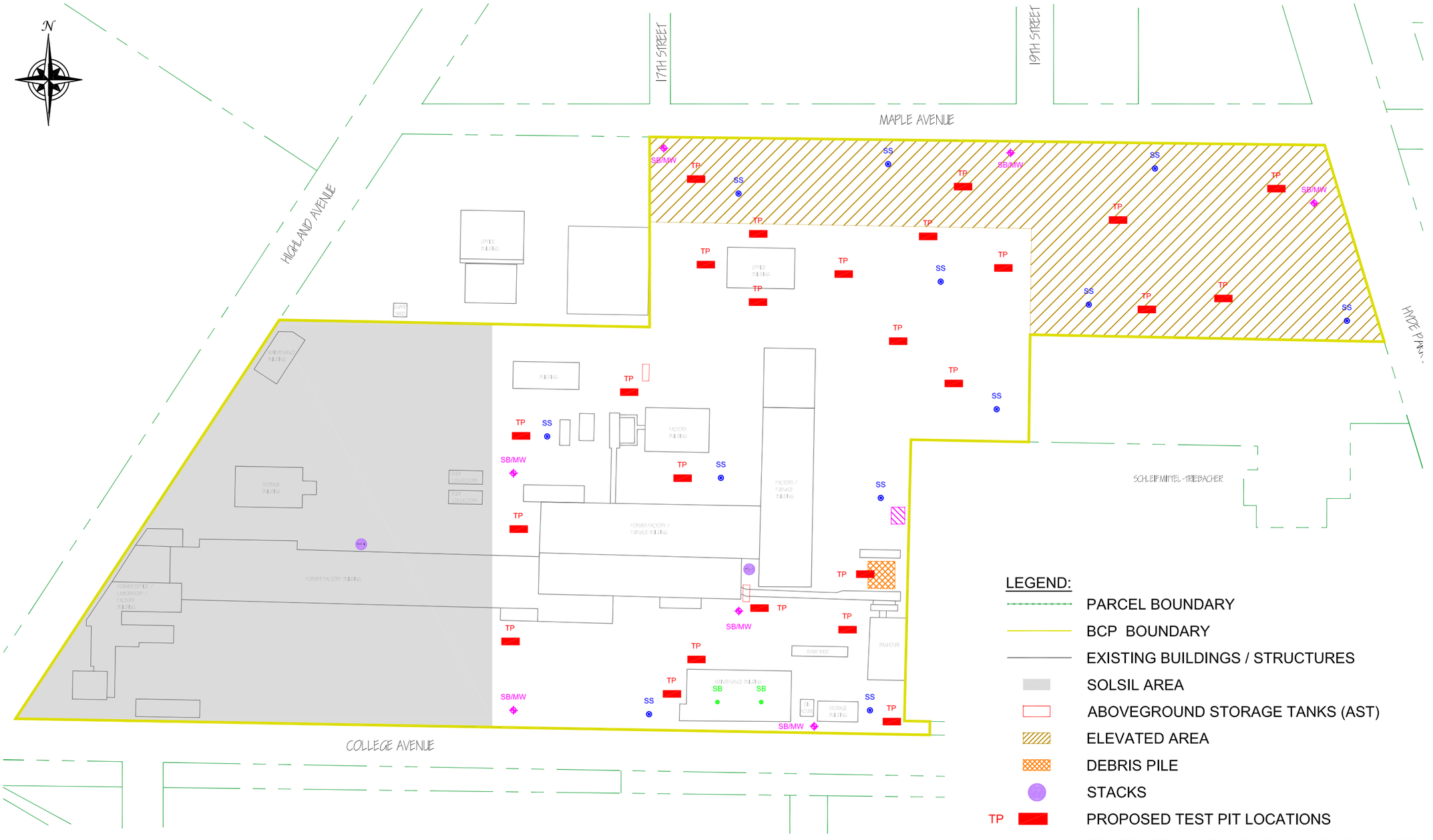
3807 HIGHLAND AVENUE SITE

NIAGARA FALLS, NEW YORK

PREPARED FOR

GLOBE METALLURGICAL, INC.

FIGURE 2



LEGEND:

- PARCEL BOUNDARY
- BCP BOUNDARY
- EXISTING BUILDINGS / STRUCTURES
- SOLSIL AREA
- ABOVEGROUND STORAGE TANKS (AST)
- ELEVATED AREA
- DEBRIS PILE
- STACKS
- TP — PROPOSED TEST PIT LOCATIONS
- SS — PROPOSED SURFACE SOIL SAMPLE LOCATION
- SB/MW — PROPOSED SOIL BORING / MONITORING WELL LOCATIONS
- SB — PROPOSED SOIL BORING LOCATION

DATE: AUGUST 2009
DRAFTED BY: NTM

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0170-001-102

PROPOSED SAMPLING LOCATIONS

RI / AAR / IRM WORK PLAN
3807 HIGHLAND AVENUE SITE
NIAGARA FALLS, NEW YORK
PREPARED FOR
GLOBE METALLURGICAL, INC.

FIGURE 3

APPENDIX A

SOIL-FILL MANAGEMENT PLAN

SOIL/FILL MANAGEMENT PLAN

3807 HIGHLAND AVENUE SITE
NIAGARA FALLS, NEW YORK

December 2008 0170-001-102
Revised September 2009

Prepared for:

Globe Metallurgical, Inc.

and

Solsil, Inc.

SOIL/FILL MANAGEMENT PLAN

3807 Highland Avenue Site

Table of Contents

SOIL/FILL MANAGEMENT PLAN
3807 Highland Avenue Site

Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Background and History

The Site is located in an industrialized area of Niagara Falls and is surrounded by current or former industrial sites. The Site, measuring approximately 17-acres, is currently being re-furbished and has not been in operation since 2003. The Site was used for industrial manufacturing since at least 1913; most recently the Site was used to manufacture silicon metal and ferrosilicon metal.

The Site is bounded by Highland Avenue to the west, College Avenue to the south, Maple Avenue to the north, and Hyde Park Boulevard to the east (northeastern portion). Properties adjacent to the Site include several industrial properties, including Schleifmittel-Treibacher (former General Abrasives) to the east, PreMax (former Chisholm-Ryder) to the west and the former Hazorb/Niagara Vest/Union Carbide Brownfield Cleanup Program (BCP) site to the south.

1.2 Previous Environmental Investigations

A summary of the investigations that have occurred at the Site are presented below.

1.2.1 September 2008– Phase I Environmental Site Assessment

In September 2008, Benchmark conducted a Phase I Environmental Site Assessment (ESA) at the Site. Benchmark identified several recognized environmental conditions (RECs) and recommended additional Site investigation.

1.2.2 September 2008 – Preliminary Site Investigation

In September 2008, Benchmark conducted a limited Preliminary Site Investigation at the Site. The limited investigation included soil borings to evaluate potential impacts associated with past heavy industrial operations, and to provide general characterization of the property. Surface, sub-surface and a historical stack soil/fill samples were collected. Based on results of the investigation, Benchmark recommended that a BCP application be submitted to the NYSDEC.

1.3 Purpose and Scope

The purpose of this Soil/Fill Management Plan (SFMP) is to protect both the environment and human health during redevelopment of the Site and subsequent to completion of Brownfield Cleanup activities. While assessments of surface and subsurface soil/fill and groundwater at the Site will be performed during the RI, subsurface information is never 100 percent complete or accurate, especially on a site with a long and diverse history. As such, it is not unreasonable to anticipate the possibility that some quantity of impacted subsurface soil/fill may be encountered following completion of the IRM and Brownfield cleanup activities. In particular, soil/fill impacts may be encountered during development activities such as infrastructure construction (i.e., roads, waterline, sewers, electric, cable, etc.) or foundation excavation and site grading. The SFMP will be modified/expanded as appropriate based on the results of the RI and IRM.

Compliance with this SFMP is required to properly manage any impacted subsurface soil/fill encountered during redevelopment activities at the Site. This SFMP was developed with the express purpose of addressing unknown subsurface impacts if and when encountered. The SFMP also facilitates the transfer of responsibilities with property ownership.

This SFMP provides protocols for development and post-development activities. Items discussed herein include:

- Excavation, grading, sampling and handling of Site soils.
- Acceptability of soil/fill from off-site sources for backfill or sub-grade fill.
- Erosion and dust control measures.
- Fencing and other access controls.
- Health and safety procedures for subsurface construction work and the protection of the surrounding community.
- Acceptability and placement of final cover.
- Property Use Limitations/Environmental Easement.

1.4 Soil/Fill Management Program Responsibility

The property owner(s) or responsible entity will be responsible for all monitoring, implementation, and reporting requirements of this Plan. The property owner(s) will not

perform, contract, nor permit their employees, agents, or assigns to perform any excavations or disturbance of Site soils, except as delineated in this Plan. The property owner(s) or responsible entity will be responsible for proper notification and reporting to regulatory agencies (i.e., NYSDEC Region 9, Division of Environmental Remediation and NYS Department of Health) prior to and following construction activities. The NYSDEC may provide periodic construction oversight and monitoring during construction activities to verify that the requirements of this SFMP are adhered to.

2.0 SOIL/FILL MANAGEMENT

2.1 Excavation and Handling of On-Site Soil/Fill

An environmental professional with experience in environmental site investigations and the New York State Brownfield Cleanup Program will inspect soil/fill excavations or disturbances (e.g., when using heavy equipment to disturb more than 10 cubic yards) on behalf of the subject property owner. The soil/fill will be inspected for staining or discoloration, and will be field screened for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID). The PID detector will be calibrated as per the manufacturer's requirements. Sampling and analyses to verify excavation limits and analysis for disposal purposes will be in accordance with the protocols delineated in Section 2.3.

Excavation of impacted soil/fill will continue horizontally until visually impacted materials are removed to the satisfaction of Benchmark and the NYSDEC representative, but will not extend beyond the Site boundaries. All excavation work will be directed by an experienced engineer or scientist to remove all visually-impacted material. Impacted material will either be placed in roll-off containers or be stockpiled on plastic sheeting in an area away from the primary work activities and then sampled to determine whether it is subject to special disposal/reuse requirements[1]. The length of time soil can be stockpiled should be limited to 90 days due to potential hazardous waste storage requirement concerns.

Sampling and analyses to verify excavation limits and analysis for disposal purposes will be in accordance with the protocols delineated in Section 2.3.

2.2 Backfill Material

2.2.1 Use Criteria

Material used to backfill excavations or to increase site grades or elevations may be comprised of on-Site soil/fill or off-Site soil/fill. Backfill materials used on-Site must meet the following criteria:

[1] The presence of subsurface construction and demolition debris, such as brick, concrete, wood, miscellaneous metal products, etc. does not necessitate stockpiling in accordance with this SFMP.

- Excavated on-Site soil/fill with no evidence of visible or olfactory evidence of contamination that has been tested to meet the criteria on Table 1.

- Off-site soil will originate from known sources having no evidence of disposal or releases of hazardous substances, hazardous, toxic or radioactive wastes, or petroleum.

- All off-site sources of soil/fill to be used as backfill must be tested in accordance with the Sampling and Analytical Protocol (Section 2.3), and found to contain concentrations less than criteria listed in Table 1 – Criteria for Use of Off-Site Soil.

- No off-site materials meeting the definition of a solid waste as defined in 6NYCRR, Part 360-1.2(a) shall be used as backfill.

2.2.2 Borrow Source Sampling Requirements

If an off-site soil/fill borrow source is of unknown origin or originates from a commercial, industrial or urban site, then it must be tested to meet the criteria identified on Table 1. A tiered approach based on the volume of borrow source material imported will be used to determine the frequency of characterization sampling. A minimum of one sample will be collected for each 500 cubic yards (CY) up to 1,000 CY of material excavated. If more than 1,000 CY of borrow source material from the same general vicinity is utilized and all samples of the first 1,000 CY meet the criteria listed in Table 1, the sample collection frequency may be reduced to one sample for each additional 1,000 CY of borrow source material from the same general vicinity, up to 5,000 CY. For borrow sources greater than 5,000 CY, sampling frequency may be reduced to one sample per 5,000 CY, provided all earlier samples met Table 1 criteria. If an off-site soil/fill borrow source is of known origin, NYSDEC would be involved in the decision as to whether the source is in fact known and acceptable for use.

Grab samples will be collected for VOC analysis. For all other analyses, a minimum of four grab samples will be collected per composite sample. Approximately equal aliquots of the grab samples will be composited in the field using a stainless steel trowel and bowl. The trowel and bowl shall be decontaminated with a non-phosphate detergent (i.e., Alconox®) and potable water wash solution followed by a distilled water rinse between

sampling locations. The soil/fill samples will be analyzed in accordance with USEPA SW-846 Methodology by a NYSDOH ELAP-certified laboratory.

2.3 Soil/Fill Sampling and Analysis Protocol

Excavated soil/fill that is designated for off-site disposal (i.e., soil/fill that exhibits evidence of impacts as described in Section 2.1 of this plan) shall be sampled in accordance with the requirements of the off-site disposal facility and the appropriate regulatory authorities. In addition, the resulting excavation following removal of impacted soil/fill will require verification sampling and analysis to determine the limits of impact. Both characterization and verification sampling and analysis are discussed in the following sections.

2.3.1 Impacted Soil/Fill Characterization

The following procedure represents a suggested method for determining off-site disposal requirements for impacted soil/fill designated for off-site disposal. The sampling procedures, frequency and parameter list must be coordinated with the off-site disposal facility prior to undertaking characterization work.

Excavated soil/fill should be separately stockpiled in 250 CY or smaller piles. A representative sample will be collected from each stockpile. If the stockpiles are from a single source area or have a similar class of contaminants associated with them, sampling may be reduced to one sample per 1,000 cubic yards following receipt of data from four 250 cubic yard stockpiles without concentrations of analytes greater than the guidance concentrations in Table 1.

The samples will be analyzed by a NYSDOH ELAP-certified laboratory for target compound list (TCL) VOCs (if PID readings are >5 ppm), TCL SVOCs, target analyte list (TAL) metals and PCBs. If the results are below the concentrations in Table 1, the soil can be re-used on-Site. If the analysis of the soil/fill samples reveals concentrations of analytes greater than the concentrations in Table 1, then a duplicate sample will be analyzed by the Toxicity Characteristic Leaching Procedure (TCLP) method to determine the appropriate off-site disposal method. Parameters to be analyzed for by TCLP protocol (i.e. VOCs, SVOCs, PCB, etc.) will be determined by the potential off-site disposal facility. If TCLP hazardous waste characteristic values are exceeded, the soil/fill will be disposed of in a

permitted hazardous waste disposal facility. If TCLP analytical results are below hazardous waste characteristic values, the soil/fill will be disposed of off-site in a permitted sanitary landfill.

2.3.2 Verification Sampling

Verification sampling will be performed on the excavation sidewalls and bottom of the excavation after lateral and vertical excavation limits have been achieved and visibly impacted soil/fill has been removed. In general, one sidewall sample will be collected for each 30 linear feet of excavation sidewall and one sample will be collected from the bottom of the excavation for each 900 square feet of excavation bottom. The samples will be collected by retrieving a discrete sample from across the excavation face. The backhoe bucket will be used to assist in sample collection and avoid the need for confined space entry. For excavations having lengths greater than 30 feet, an additional discrete sample will be collected for each additional 30 feet of excavation length. Verification sampling analytical protocols will be determined based on the areas of concern as follows:

- Gasoline tank areas: TCL plus STARS List VOCs, TAL metals
- Diesel and fuel oil tank areas: TCL plus STARS List VOCs, TCL SVOCs, TAL metals, TCL PCBs
- Former transformer areas: TCL PCBs
- Other impacted areas: TCL VOCs, TCL SVOCs, TAL metals, TCL PCBs (as appropriate based on RI data)

A Category B deliverables package will be requested to facilitate data evaluation by a third-party validation expert.

2.4 Erosion Controls

An important element of soil/fill management for this Site is the mitigation and control of surface erosion from stormwater runoff. For this reason, the Master Erosion Control Plan, developed and incorporated as Appendix A, will be used during all construction activities.

2.5 Dust Controls

Particulate monitoring will be performed along the downwind-occupied perimeter of the Site during subgrade excavation, grading, and handling activities in accordance with the NYSDOH Generic Community Monitoring Plan contained in Appendix B. Dust suppression techniques will be employed as necessary to mitigate fugitive dust from unvegetated or disturbed soil/fill during intrusive activities. Techniques to be used may include one or more of the following:

- Applying water on haul roads.
- Wetting equipment and excavation faces.
- Spraying water on buckets during excavation and dumping.
- Hauling materials in properly tarped containers or vehicles.
- Restricting vehicle speeds on-site.
- Covering excavated areas and materials after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

All reasonable attempts will be made to keep visible and/or fugitive dust to a minimum. During intrusive activities, the New York State Department of Health (NYSDOH) Community Air Monitoring Plan and NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4031- Fugitive Dust Suppression and Particulate Monitoring Program will be followed. These documents are included in Appendix B.

2.6 Fencing and Access Control

The perimeter of the Site is currently fenced to restrict general access. Vehicular access is allowed through locking gates on the north and western property boundaries. Interior temporary fencing shall be erected and maintained as necessary during construction activities to control access to open excavations and construction areas. Temporary fencing will be relocated by the property owner(s) as necessary as construction proceeds.

2.7 Property Use Limitations

Environmental easements will be part of the final remedial measures for the Site and will include:

- Use restrictions such as industrial, commercial and office use. The zoning specifically prohibits residential use.
- Requirements for annual certification as discussed in Section 2.8.

The environmental easement will be recorded with Niagara County. The environmental easement will be binding for the current property owner and all subsequent property owners and occupants.

2.8 Notification and Reporting Requirements

The NYSDEC must be notified that subgrade activities are being initiated a minimum of five working days in advance of construction. The property owner(s) or other responsible entity shall complete and submit to the NYSDEC an annual report certifying that: the institutional controls put in place are still in place, have not been altered and are still effective and the conditions at the Site are fully protective of public health and the environment. If sub-grade excavation activities are completed during the year covered by the Annual Report, the Site owner shall include a certification that all work was performed in conformance with the SFMP.

3.0 HEALTH AND SAFETY PROCEDURES

During future intrusive or construction activities, the property owner(s) shall be responsible for implementing suitable procedures to prevent both Site construction workers and the community from adverse exposure to potential hazards posed by the intrusive work. This will be accomplished through adherence to a written, site-specific worker Health and Safety Plan (HASP), prepared in accordance with the regulations contained in OSHA 29CFR 1910.120 and a Community Air Monitoring Plan (CAMP) prepared in conformance with NYSDOH requirements. The site-specific worker HASP should include the following items:

- A safety and health or hazard analysis for each Site task and operation.
- Employee training requirements.
- Personal protective equipment (PPE) to be used by employees for the Site tasks.
- Medical surveillance requirements.
- Frequency and type of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of equipment.
- Site control measures.
- Decontamination procedures.
- An emergency response plan.
- Confined space entry procedures.
- A spill containment program.

As an integral component of the worker HASP, the property owner(s) will be responsible for implementing a CAMP designed to prevent the surrounding community from adverse exposures due to potential release/migration of airborne particulates. The community as referenced herein includes potential receptors located off-site (e.g., neighboring residents or businesses). The NYSDOH Generic CAMP, presented as Appendix B, will be implemented during construction work involving disturbance or handling of Site soil/fill. The Plan includes appropriate monitoring, mitigation and response measures consistent with NYSDOH and NYSDEC guidelines.

4.0 REFERENCES

1. Environmental Quality Management, Inc. *Phase I Environmental Site Assessment and Environmental Compliance Audit. Prepared for Globe Metallurgical, Inc.* September 2002.

2. Benchmark Environmental Engineering & Science, PLLC. *Phase I Environmental Site Assessment Report. 3807 Highland Avenue, Niagara Falls, NY.* September 2008.

3. Benchmark Environmental Engineering & Science, PLLC. *Preliminary Site Investigation – Letter Report. 3807 Highland Avenue, Niagara Falls, NY.* September 2008.

4. Benchmark Environmental Engineering & Science, PLLC. *Work Plan for Remedial Investigation / Alternatives Analysis Report / Interim Remedial Measures (RI/AAR/IRM). 3807 Highland Avenue Site, Niagara Falls, NY.* October 2008

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

3807 Highland Avenue Site
Niagara Falls, New York

Parameter	Allowable Concentration of Imported Soil/Fill
Volatile Organic Compounds (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,2-Dichloroethene(cis)	0.25
1,2-Dichloroethene(trans)	0.19
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
Acetone	0.05
Benzene	0.06
Butylbenzene	12
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethylbenzene	1
Hexachlorobenzene	3.2
Methyl ethyl ketone	0.12
Methyl tert-butyl ether	0.93
Methylene chloride	0.05
Propylbenzene-n	3.9
Sec-Butylbenzene	11
Tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
Trichloroethene	0.47

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

3807 Highland Avenue Site
Niagara Falls, New York

Parameter	Allowable Concentration of Imported Soil/Fill
Volatile Organic Compounds (mg/kg)	
Trimethylbenzene-1,2,4	3.6
Trimethylbenzene-1,3,5	8.4
Vinyl chloride	0.02
Xylene (mixed)	1.6
Semi-Volatile Organic Compounds (mg/kg)	
Acenaphthene	98
Acenaphthylene	107
Anthracene	500
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1.7
Benzo(g,h,i)perylene	500
Benzo(k)fluoranthene	1.7
Chrysene	1
Dibenz(a,h)anthracene	0.56
Fluoranthene	500
Fluorene	386
Indeno(1,2,3-cd)pyrene	5.6
m-Cresol(s)	0.33
Naphthalene	12
o-Cresol(s)	0.33
p-Cresol(s)	0.33
Pentachlorophenol	0.8
Phenanthrene	500
Phenol	0.33
Pyrene	500

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

3807 Highland Avenue Site
Niagara Falls, New York

Parameter	Allowable Concentration of Imported Soil/Fill
Metals (mg/kg)	
Arsenic	16
Barium	400
Beryllium	47
Cadmium	7.5
Chromium, Hexavalent[1]	19
Chromium, Trivalent[1]	1500
Copper	270
Cyanide	27
Lead	450
Manganese	2000
Mercury (total)	0.73
Nickel	130
Selenium	4
Silver	8.3
Zinc	2480
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	17
4,4'-DDT	47
4,4'-DDD	14
Aldrin	0.19
Alpha-BHC	0.02
Beta-BHC	0.09
Chlordane (alpha)	2.9
Delta-BHC	0.25
Dibenzofuran	210
Dieldrin	0.1
Endosulfan I	102

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

3807 Highland Avenue Site
Niagara Falls, New York

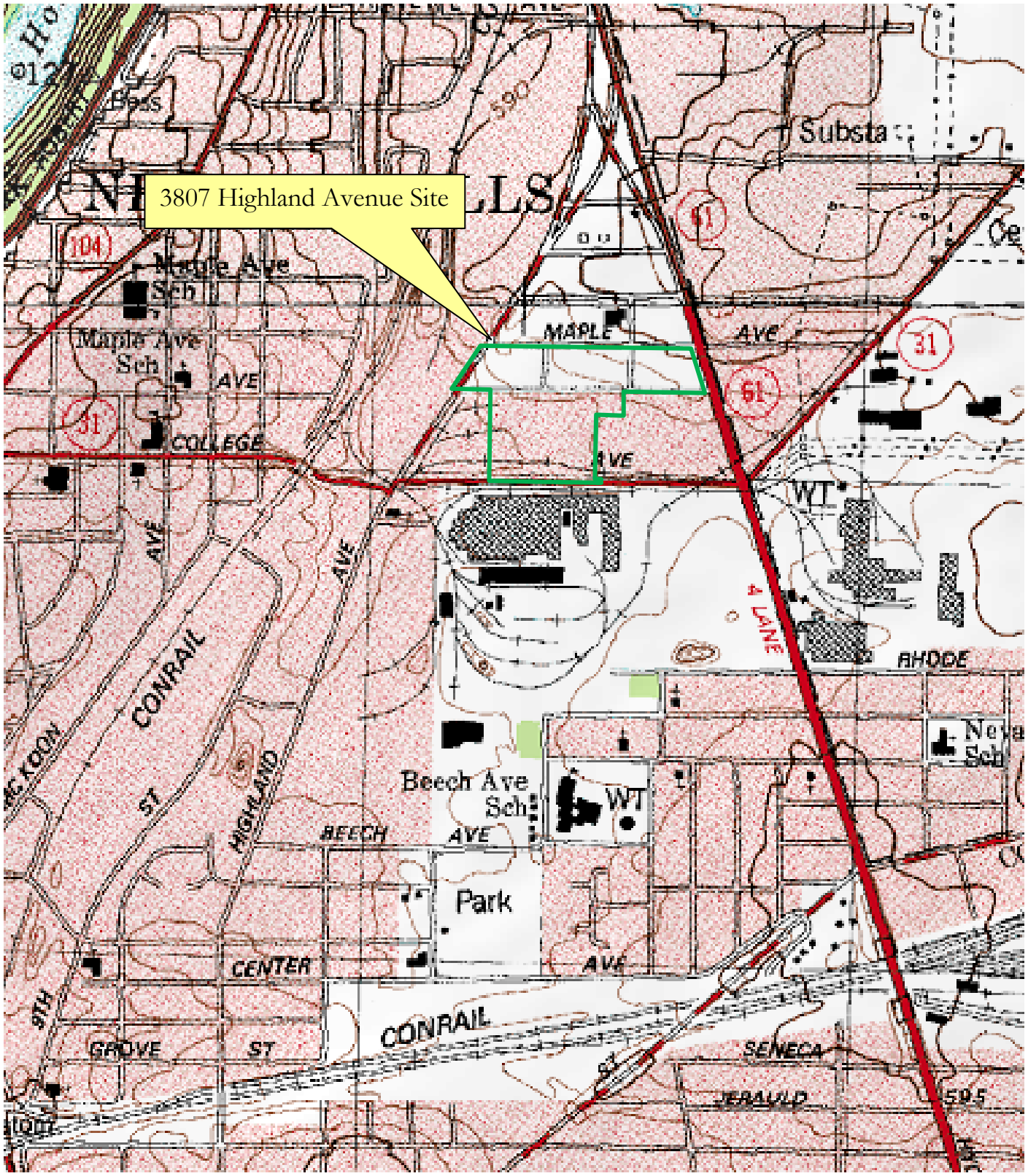
Parameter	Allowable Concentration of Imported Soil/Fill
PCBs/Pesticides (mg/kg)	
Endosulfan II	102
Endosulfan sulfate	200
Endrin	0.06
Heptachlor	0.38
Lindane	0.1
Polychlorinated biphenyls	1

Notes:

1. The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.

FIGURES

FIGURE 1



BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0170-001-102

DATE: OCTOBER 2008

DRAFTED BY: NTM

SITE LOCATION AND VICINITY MAP

RI / AAR / IRM WORK PLAN

3807 HIGHLAND AVENUE SITE

NIAGARA FALLS, NEW YORK

PREPARED FOR

GLOBE METALLURGICAL, INC.

BCP PROPERTY BOUNDARY

SOLSIL AREA

NOT TO SCALE

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0170-001-102

DATE: AUGUST 2009

DRAFTED BY: NTM

SITE PLAN

RI / AAR / IRM WORK PLAN

3807 HIGHLAND AVENUE SITE

NIAGARA FALLS, NEW YORK

PREPARED FOR

GLOBE METALLURGICAL, INC.

FIGURE 2

APPENDIX A

MASTER EROSION CONTROL PLAN
(MEC PLAN)

APPENDIX A

MASTER EROSION CONTROL PLAN

3807 HIGHLAND AVENUE SITE
NIAGARA FALLS, NEW YORK

December 2008 0170-001-102

Prepared for:

Globe Metallurgical, Inc.

MASTER EROSION CONTROL PLAN
3807 Highland Avenue Site

Table of Contents

APPENDICES

1.0 PURPOSE AND SCOPE

A Soil/Fill Management Plan (SFMP) was prepared as part of the Interim Remedial Measures (IRM) Work Plan and describes protocols for the proper handling of impacted soil/fill encountered during future intrusive or construction activities at the Site. The property owner(s) at the time of the construction will be responsible for all monitoring, implementation and reporting requirements of the SFMP.

Since erosion control will be a critical component of preventing the potential migration of contaminants onto developed property or off-site during construction activities on the Site, this Master Erosion Control Plan (MECP) was prepared to provide guidance to during construction activities. This MECP is a critical component of the SFMP. This document is generic in nature and provides minimum erosion control practices to be used by property owner(s).

2.0 GENERAL PERMIT REQUIREMENTS

If construction activities disturb more than 1 acre of land, the Federal Water Pollution Control Act (as amended, 33 U.S.C. 1251 et. seq.) and the New York State Environmental Conservation Law (Article 17, Titles 7 and 8, and Article 70) would apply.

With some exceptions, operators of construction activities that will result in the disturbance of 1 or more acres of land must obtain coverage under SPDES General Permit (GP-02-01) prior to the commencement of soil disturbance. Also requiring a permit are construction activities disturbing less than 1 acre if they are part of a larger common plan of development or sale with a planned disturbance of equal to or greater than 1 acre, or activities that are designated by the NYSDEC. The NYSDEC can require a permit for construction activities disturbing less than 1 acre based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to waters of the United States.

As the Site is being remediated and redeveloped under the Brownfield Cleanup Program, this MECP is intended to meet the functional equivalent of NYSDEC Storm water Pollution Prevention Plan. Implementation of the MECP will be the responsibility of the remediation subcontractor.

3.0 POTENTIAL EROSION CONTROL CONCERNS

Potential areas and items of concern during site construction activities include the following:

- Remediated areas or off-site properties adjacent to the construction activity need protection so they do not become impacted by Site operations.
- Storm water inlets will require protective measures to limit sediment transfer to storm sewers.
- Runoff from soil stockpiles will require erosion controls.
- Surface slopes need to be minimized as much as practical to control sediment transfer.
- Soil/fill excavated during construction will require proper handling and disposal as described in the SFMP.

4.0 EROSION CONTROL MEASURES

4.1 Background

Standard soil conservation practices need to be incorporated into the construction plans to mitigate soil erosion damage, off-site sediment migration, and water pollution from erosion. These practices combine vegetative and structural measures, many of which will be permanent in nature and become part of the completed project (i.e., drainage channels and grading). Other measures will be temporary and serve only during the construction stage. Selected erosion and sediment control measures will meet the following criteria:

- Minimize erosion through project design (maximum slopes, phased construction, etc.).
- Incorporate temporary and permanent erosion control measures.
- Remove sediment from sediment-laden storm water before it leaves the Site.

4.2 Temporary Measures

Temporary erosion and sedimentation control measures and facilities will be used during construction. These measures will be installed and maintained by the property owner(s) until they are either no longer needed or until such time as permanent measures are installed and become effective. At a minimum, the following temporary measures will be used:

- Silt fencing
- Straw/hay bales
- Temporary vegetation/mulching
- Temporary sedimentation basins
- Cautious placement, compaction and grading of stockpiles

Appendix A-A presents erosion control details.

4.2.1 Silt Fencing

Construction and regrading activities will result in surface water flow to drainage ditches and swales, storm sewers, and adjacent properties. Silt fencing will be the primary sediment control measure used in these areas. Prior to extensive soil excavation or grading activities, silt fences will be installed along the perimeter of all construction areas. The orientation of the fencing will be adjusted as necessary as the work proceeds to accommodate changing Site conditions. Intermediate fencing will be used upgradient of the perimeter fencing to help lower surface water runoff velocities and reduce the volume of sediment to perimeter fencing. Stockpiles will also be surrounded with silt fencing.

As sediment collects, the silt fences will be cleaned as necessary to maintain their integrity. Removed sediment will be used elsewhere on-site as general fill. All perimeter silt fences will remain in place until construction activities in an area are completed and vegetative cover has been established.

4.2.2 Straw and/or Hay Bales

Straw and/or hay bales will be used to intercept sediment laden storm water runoff in drainage channels during construction. The use of either hay or straw will be based on the availability of materials at the time of construction. Bales will be placed in swales and ditches where the anticipated flow velocity is not expected to be greater than 5 feet/second (fps). Intermediate bales will be placed upgradient of the final barrier to reduce flow velocities and sediment loadings where higher velocities are anticipated.

As with silt fencing, sediment will be removed as necessary from behind the bales and disposed of on-site. Bales that have become laden with sediment or that have lost their structural integrity or effectiveness due to the weather will be replaced.

4.2.3 Cautious Placement of Stockpiles

Excavation activities will produce stockpiles of soil and subgrade soil/fill materials. Careful placement and construction of stockpiles will be required to control erosion. Stockpiles will be placed no closer than 50 feet from storm water inlets and parcel boundaries. Additionally, stockpiles will be graded and compacted as necessary for positive

surface water runoff and dust control. Impacted stockpiles will be underlain and covered with secured polyethylene tarpaulin until proper disposal has been secured.

4.3 Permanent Control Measures During Site Redevelopment

Permanent erosion and sedimentation control measures and structures will be installed as soon as practical during construction for long-term erosion protection. Examples of permanent erosion control measures include:

- Using maximum slopes in erosion prone areas to limit erosion.
- Minimizing the potential contact with, and migration of, subsurface soil/fill through the placement of a "clean" soil cover system in all areas not covered with structures, roads, parking areas, sidewalks, etc.
- Planting and maintaining vegetation.
- Limiting runoff flow velocities to the extent practical.
- Lining collection channels with riprap, erosion control fabric, vegetation, or similar materials.

5.0 CONSTRUCTION MANAGEMENT PRACTICES

5.1 General

The following general construction practices should be evaluated for erosion and sedimentation control purposes during Site construction activities:

- Clearing and grading only as much area as is necessary to accommodate the construction needs to minimize disturbance of areas subject to erosion (i.e. phasing the work).
- Covering exposed or disturbed areas of the Site as quickly as practical.
- Installed all erosion and sediment control measures prior to disturbing the Site subgrade.
- Minimizing both on-site and off-site tracking of soil by vehicles by using routine entry/exit routes.

5.2 Monitoring, Inspection, and Maintenance

All erosion and sedimentation controls described in this Plan should be inspected by a qualified representative of the property owner(s) within 24 hours of a heavy rainfall event and repaired or modified as necessary to effectively control erosion of turbidity problems. Inspections should include areas under construction, stockpile areas, erosion control devices (i.e., silt fences, hay bales, etc.), and entry/exit routes. Routine inspections of the entire Site should also be made during the construction. If inspections indicate problems, corrective measures should be implemented within 24 hours. Appendix A-B includes the Inspection and Maintenance Report Form.

APPENDIX A-A

EROSION CONTROL DETAILS

- Silt Fence
- Straw Bale Dike
- Perimeter Dike/Swale
- Temporary Swale
- Sediment Trap for Drop Inlet

New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

New York State Standards and Specifications for Erosion and Sediment Control

August 2005

New York State
Department of Environmental Conservation

George E. Pataki, Governor

STANDARD AND SPECIFICATIONS FOR TEMPORARY CRITICAL AREA PLANTINGS

Definition

Providing erosion control protection to a critical area for an interim period. A critical area is any disturbed, denuded slope subject to erosion.

Purpose

To provide temporary erosion and sediment control. Temporary control is achieved by covering all bare ground areas that exist as a result of construction or a natural event.

Conditions Where Practice Applies

Temporary seedings may be necessary on construction sites to protect an area, or section, where final grading is complete, when preparing for winter work shutdown, or to provide cover when permanent seedings are likely to fail due to mid-summer heat and drought. The intent is to provide temporary protective cover during temporary shutdown of construction and/or while waiting for optimal planting time.

Criteria

Water management practices must be installed as appropriate for site conditions. The area must be rough graded and slopes physically stable. Large debris and rocks are usually removed. Seedbed must be seeded within 24 hours of disturbance or scarification of the soil surface will be necessary prior to seeding.

Fertilizer or lime are not typically used for temporary seedings.

IF: Spring or summer or early fall, then seed the area with ryegrass (annual or perennial) at 30 lbs. per acre (Approximately 0.7 lb./1000 sq. ft. or use 1 lb./1000 sq. ft.).
IF: Late fall or early winter, then seed Certified 'Aroostook' winter rye (cereal rye) at 100 lbs. per acre (2.5 lbs./1000 sq. ft.).

Any seeding method may be used that will provide uniform application of seed to the area and result in relatively good soil to seed contact.

Mulch the area with hay or straw at 2 tons/acre (approx. 90 lbs./1000 sq. ft. or 2 bales). Quality of hay or straw mulch allowable will be determined based on long term use and visual concerns. Mulch anchoring will be required where wind or areas of concentrated water are of concern. Wood fiber hydromulch or other sprayable products approved for erosion control (nylon web or mesh) may be used if applied according to manufacturers' specification. Caution is advised when using nylon or other synthetic products. They may be difficult to remove prior to final seeding.

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface.

Purpose

The primary purpose is to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch is also used alone for temporary stabilization in non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 3.7
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/ yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	8” x 100” 2-sided plastic, 48” x 180” 1-sided plastic	—	—	Use without additional mulch. Excellent for seeding establishment. Tie down as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Compost	Up to 3” pieces, moderately to highly stable	3-9 cu. yds.	134-402 cu. yds.	1-3”	Coarser textured mulches may be more effective in reducing weed growth and wind erosion.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 3.8
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR TEMPORARY SWALE

Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary swales are constructed:

1. to divert flows from entering a disturbed area.

2. intermittently across disturbed areas to shorten overland flow distances.

3. to direct sediment laden water along the base of slopes to a trapping device.

4. to transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.2 on page 5A.5 for details.

	Swale A	Swale B
Drainage Area	<5 Ac	5-10 Ac
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or flatter	2:1 or flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specification for Waterways on page 5B.11.

Stabilization

Stabilization of the swale shall be completed within 7 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

Type of Treatment	Channel Grade[1]	Flow Channel A (<5 Ac.)	Flow Channel B (5-10 Ac)
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with RECP, Sod, or lined with plastic or 2 in. stone
3	5.1-8.0%	Seed and cover with RECP, Sod, or line with plastic or 2 in. stone	Line with 4-8 in. or stone or Recycled Concrete Equivalent[2] or geotextile
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[2] or geotextile	Site Specific Engineering Design

[1] In highly erodible soils, as defined by the local approving agency, refer to the next higher slope grade for type of stabilization.
[2] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

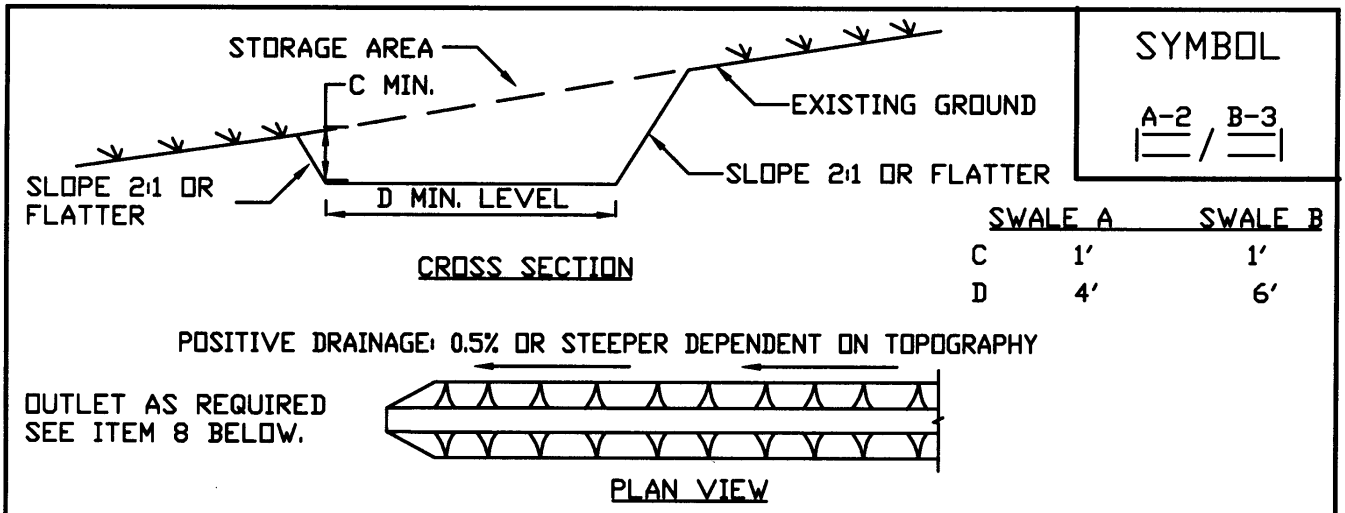
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

If a swale is used to divert clean water flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 5A.2
Temporary Swale



CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW:

TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC. OR LESS)	B(5 AC -10AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED AND COVER USING RECP
3	5.1-8.0%	SEED AND COVER WITH RECP	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE
4	8.1-20.%	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

TEMPORARY SWALE

STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area.

Purpose

The purpose of a perimeter dike/swale is to prevent off site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.3 on page 5A.8 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from affected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area – Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres, see earth dike or temporary swale; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height – 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike – 2 feet minimum.

Width of swale – 2 feet minimum.

Grade – Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 8 percent.

Stabilization – The disturbed area of the dike and swale shall be stabilized within 7 days of installation, in accordance with the standard and specifications for temporary swales.

Outlet

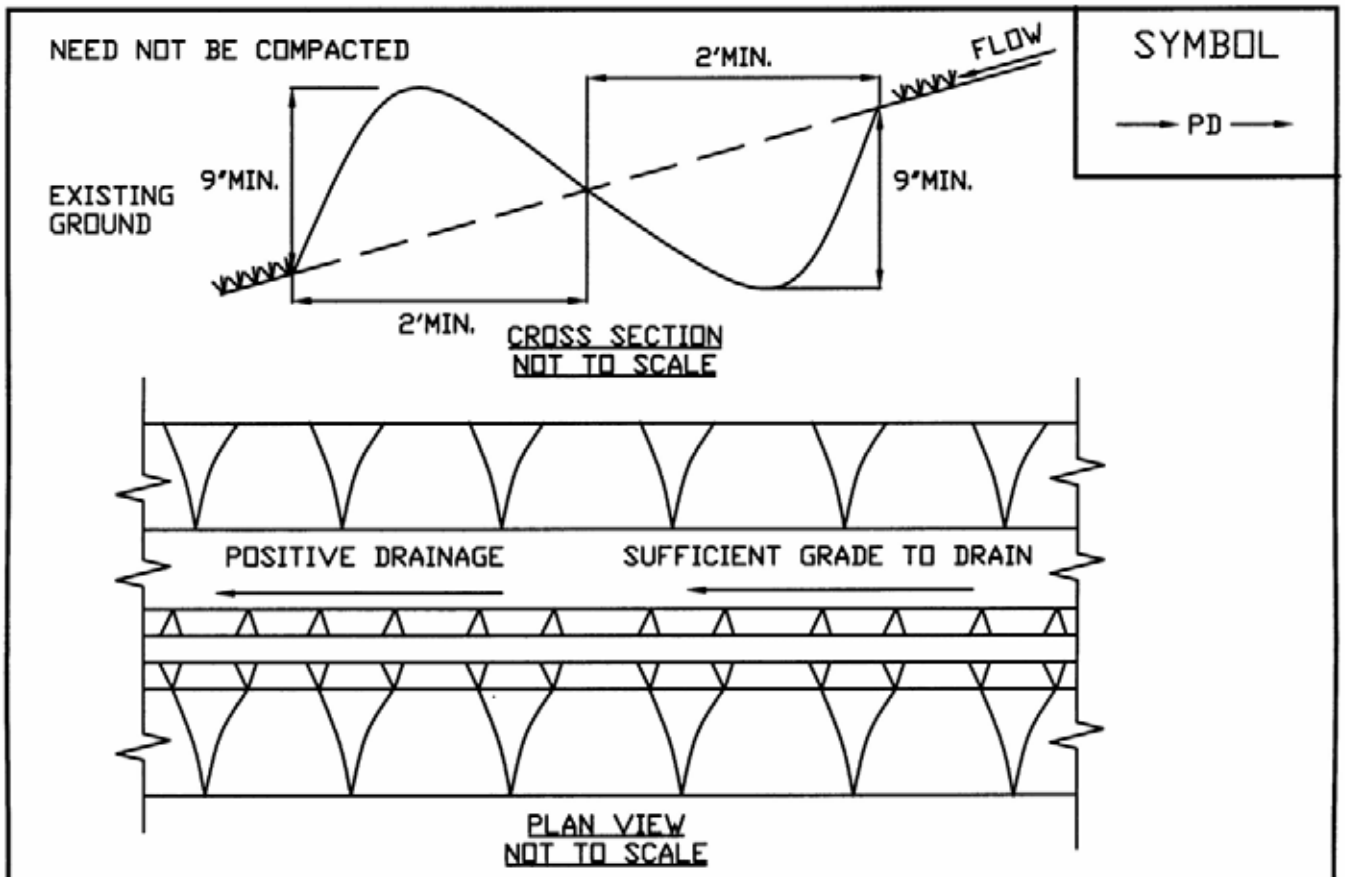
1. Perimeter dike/swale shall have a stabilized outlet.

2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.

3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.

4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 5A.3
Perimeter Dike/Swale



CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATIONS FOR TEMPORARY SEEDING AND MULCHING, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

MAX. DRAINAGE AREA LIMIT: 2 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PERIMETER DIKE OR SWALE

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE

Definition

A temporary barrier of straw, or similar material, used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits.

Constructed Slope	Percent Slope	Slope Length (ft.)
2:1	50	25
3:1	33	50
4:1	25	75

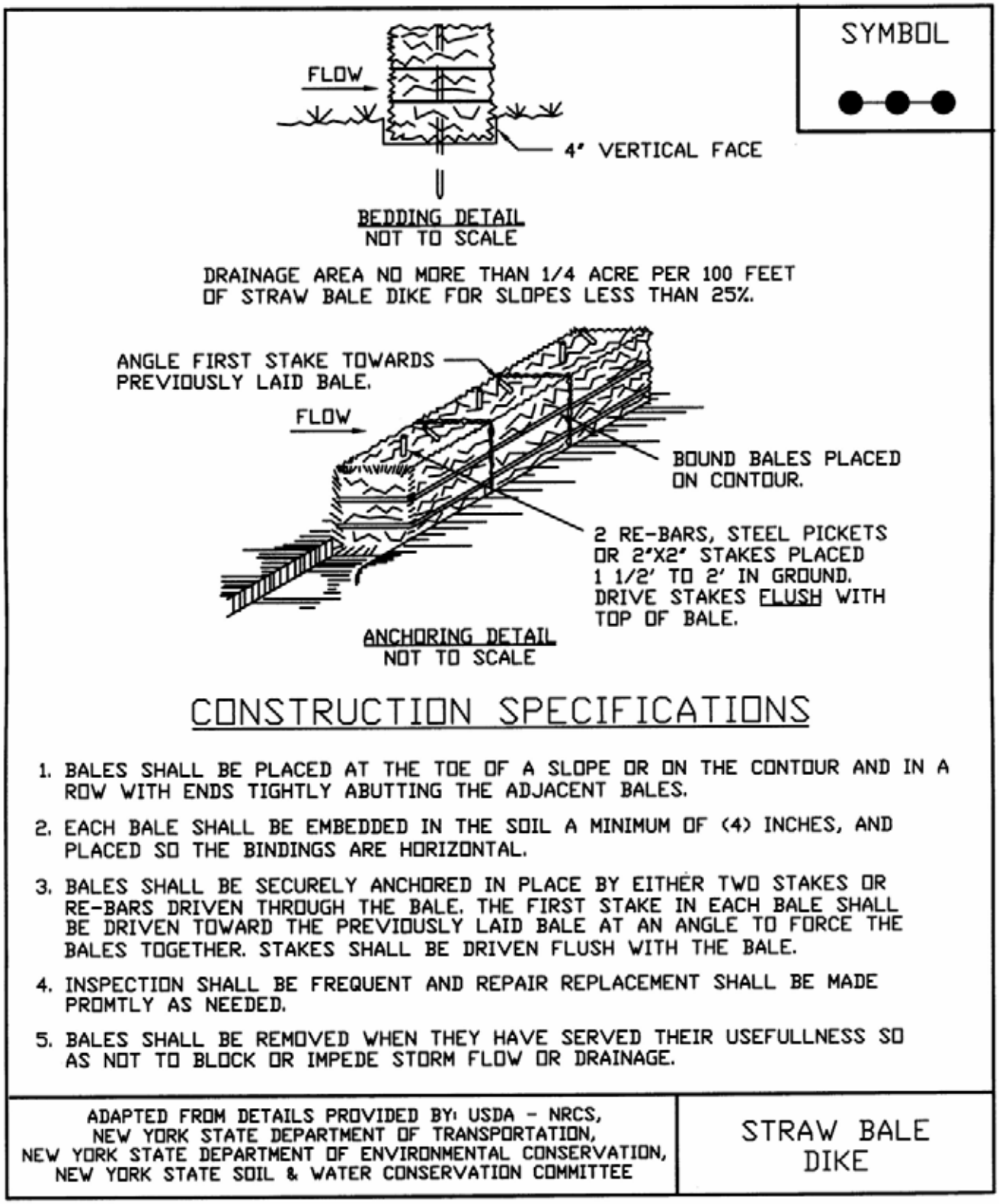
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage areas in this instance shall be less than one quarter of an acre per 100 feet of fence and the length of slope above the dike shall be less than 200 feet.

Design Criteria

The above table is adequate, in general, for a one-inch rainfall event. Larger storms could cause failure of this practice. Use of this practice in sensitive areas for longer than one month should be specifically designed to store expected runoff. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5A.7 on page 5A.18 or details.

Figure 5A.7
Straw Bale Dike



STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence placed on a slope are:

Slope Steepness	Maximum Length (ft.)
2:1	25
3:1	50
4:1	75
5:1 or flatter	100

2. Maximum drainage area for overland flow to a silt fence shall not exceed ¼ acre per 100 feet of fence, with maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff. All silt fences shall be placed as close to the areas as possible, but at least 10 feet from the toe of a slope to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

Sensitive areas to be protected by silt fence may need to be reinforced by using heavy wire fencing for added support to prevent collapse.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. A detail of the silt fence shall be shown on the plan. See Figure 5A.8 on page 5A.21 for details.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682

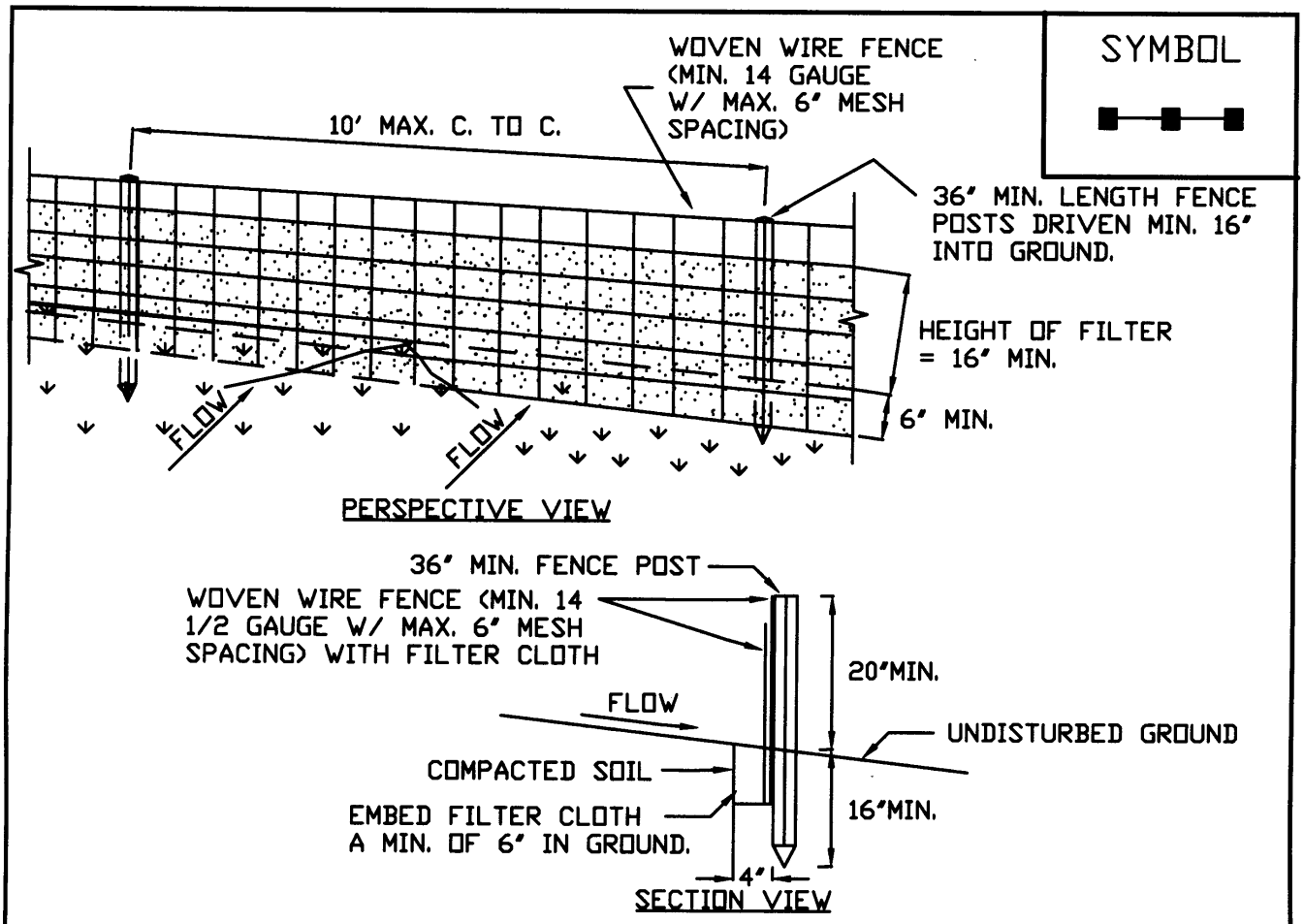
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated Units: Envirofence, Geofab, or approved equal, may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.8.

Figure 5A.8
Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	SILT FENCE

STANDARD AND SPECIFICATIONS FOR SEDIMENT TRAP

Definition

A temporary sediment control device formed by excavation and/or embankment to intercept sediment laden runoff and retain the sediment.

Purpose

The purpose of the structure is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties, and rights-of-way below the sediment trap from sedimentation.

Conditions Where Practice Applies

A sediment trap is usually installed in a drainage way, at a storm drain inlet, or other points of collection from a disturbed area.

Sediment traps should be used to artificially break up the natural drainage area into smaller sections where a larger device (sediment basin) would be less effective.

Design Criteria

If any of the design criteria presented here cannot be met, see Standard and Specification for Sediment Basin on page 5A.49.

Drainage Area

The drainage area for sediment traps shall be in accordance with the specific type of sediment trap used (Type I through V).

Location

Sediment traps shall be located so that they can be installed prior to grading or filling in the drainage area they are to protect. Traps must not be located any closer than 20 feet from a proposed building foundation if the trap is to function during building construction. Locate traps to obtain maximum storage benefit from the terrain and for ease of cleanout and disposal of the trapped sediment.

Trap Size

The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area. The volume of a constructed trap shall be calculated using standard mathematical procedures. The volume of a natural sediment trap may be approximated by the equation: Volume (cu.ft.) = 0.4 x surface area (sq.ft.) x maximum depth (ft.).

Trap Cleanout

Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth of the trap. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

Embankment

All embankments for sediment traps shall not exceed five (5) feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum four (4) foot wide top and side slopes of 2:1 or flatter. The embankment shall be compacted by traversing with equipment while it is being constructed. The embankment shall be stabilized with seed and mulch as soon as it is completed

The elevation of the top of any dike directing water to any sediment trap will equal or exceed the maximum height of the outlet structure along the entire length of the trap.

Excavation

All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Excavated portions of sediment traps shall have 1:1 or flatter slopes.

Outlet

The outlet shall be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.

Sediment traps must outlet onto stabilized (preferable undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. Distance between inlet and outlet should be maximized to the longest length practicable.

Trap Details Needed on Erosion and Sediment Control Plans

Each trap shall be delineated on the plans in such a manner that it will not be confused with any other features. Each trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. If the drawings are such that this information cannot be delineated on the drawings, then a table shall be developed. If a table is developed, then each trap on a plan shall have a number and the numbers shall be consecutive.

The following information shall be shown for each trap in a summary table format on the plans.

1. Trap number
2. Type of trap
3. Drainage area
4. Storage required
5. Storage provided (if applicable)
6. Outlet length or pipe sizes
7. Storage depth below outlet or cleanout elevation
8. Embankment height and elevation (if applicable)

Type of Sediment Traps

There are five (5) specific types of sediment traps which vary according to their function, location, or drainage area.

I. Pipe Outlet Sediment Trap
II. Grass Outlet Sediment Trap
III. Catch Basin Sediment Trap
IV. Stone Outlet Sediment Trap
V. Riprap Outlet Sediment Trap

I. Pipe Outlet Sediment Trap

A Pipe Outlet Sediment Trap consists of a trap formed by embankment or excavation. The outlet for the trap is through a perforated riser and a pipe through the embankment. The outlet pipe and riser shall be made of steel, corrugated metal or other suitable material. The top of the embankment shall be at least 1 ½ feet above the crest of the riser. The top 2/3 of the riser shall be perforated with one (1) inch nominal diameter holes or slits spaced six (6) inches vertically and horizontally placed in the concave portion of the corrugated pipe.

No holes or slits will be allowed within six (6) inches of the top of the horizontal barrel. All pipe connections shall be watertight. The riser shall be wrapped with ½ to ¼ inch hardware cloth wire then wrapped with filter cloth with a sieve size between #40-80 and secured with strapping or connecting band at the top and bottom of the cloth. The cloth shall cover an area at least six (6) inches above the highest hole and six (6) inches below the lowest hole. The top of the riser pipe shall not be covered with filter cloth. The riser shall have a base with sufficient weight to prevent flotation of the riser. Two approved bases are:

1. A concrete base 12 in. thick with the riser embedded 9 in. into the concrete base, or

2. One quarter inch, minimum, thick steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or earth placed on it to prevent flotation. In either case, each side of the square base measurement shall be the riser diameter plus 24 inches.

Pipe outlet sediment traps shall be limited to a five (5) acre maximum drainage area. Pipe outlet sediment traps may be interchangeable in the field with stone outlet or riprap sediment traps provided that these sediment traps are constructed in accordance with the detail and specifications for that trap.

Select pipe diameter from the following table:

Minimum Sizes

Barrel Diameter[1] (in.)	Riser Diameter[1] (in.)	Maximum Drainage Area (ac.)
12	15	1
15	18	2
18	21	3
21	24	4
21	27	5

[1] Barrel diameter may be same size as riser diameter.

See details for Pipe Outlet Sediment Trap ST-I in Figure 5A.16 (1) and 5A.16 (2) on pages 5A.38 and 5A.39.

II. Grass Outlet Sediment Trap

A Grass Outlet Sediment Trap consists of a trap formed by excavating the earth to create a holding area. The trap has a discharge point over natural existing grass. The outlet crest width (feet) shall be equal to four (4) times the drainage area (acres) with a minimum width of four (4) feet. The outlet shall be free of any restrictions to flow. The outlet lip must remain undisturbed and level. The volume of this trap shall be computed at the elevation of the crest of the outlet. Grass outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Grass Outlet Sediment Trap ST-II in Figure 5A.17 on page 5A.40.

III. Catch Basin Sediment Trap

A Catch Basin Sediment Trap consists of a basin formed by excavation on natural ground that discharges through an opening in a storm drain inlet structure. This opening can either be the inlet opening or a temporary opening made by omitting bricks or blocks in the inlet.

A yard drain inlet or an inlet in the median strip of a dual highway could use the inlet opening for the type outlet. The trap should be out of the roadway so as not to interfere with future compaction or construction. Placing the trap on the opposite side of the opening and diverting water from the roadway to the trap is one means of doing this. Catch basin sediment traps shall be limited to a three (3) acre maximum drainage area. The volume of this trap is measured at the elevation of the crest of the outlet (invert of the inlet opening).

See details for Catch Basin Sediment Trap ST-III in Figure 5A.18 on page 5A.41.

IV. Stone Outlet Sediment Trap

A Stone Outlet Sediment Trap consists of a trap formed by an embankment or excavation. The outlet of this trap is over a stone section placed on level ground. The minimum length (feet) of the outlet shall be equal to four (4) times the drainage area (acres).

Required storage shall be 3,600 cubic feet per acre of drainage area.

The outlet crest (top of stone in weir section) shall be level, at least one (1) foot below top of embankment and no more than one (1) foot above ground beneath the outlet. Stone used in the outlet shall be small riprap (4 in. x 8 in.). To provide more efficient trapping effect, a layer of filter cloth should be embedded one (1) foot back into the upstream face of the outlet stone or a one (1) foot thick layer of two (2) inch or finer aggregate shall be placed on the upstream face of the outlet.

Stone Outlet Sediment Traps may be interchangeable in the field with pipe or riprap outlet sediment traps provided they are constructed in accordance with the detail and specifications for those traps. Stone outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Stone Outlet Sediment Trap ST-IV in Figure 5A.19 on page 5A.42.

V. Riprap Outlet Sediment Trap

A Riprap Outlet Sediment Trap consists of a trap formed by an excavation and embankment. The outlet for this trap shall be through a partially excavated channel lined with riprap. This outlet channel shall discharge onto a stabilized area or to a stable watercourse. The riprap outlet sediment trap may be used for drainage areas of up to a maximum of 15 acres.

Design Criteria for Riprap Outlet Sediment Trap

1. The total contributing drainage area (disturbed or undisturbed either on or off the developing property) shall not exceed 15 acres.
2. The storage needs for this trap shall be computed using 3600 cubic feet of required storage for each acre of drainage area. The storage volume provided can be figured by computing the volume of storage area available behind the outlet structure up to an elevation of one (1) foot below the level weir crest.
3. The maximum height of embankment shall not exceed five (5) feet.
4. The elevation of the top of any dike directing water to a riprap outlet sediment trap will equal or exceed the minimum elevation of the embankment along the entire length of this trap.

Riprap Outlet Sediment Trap ST-V
(for Stone Lined Channel)

Contributing Drainage Area (ac.)	Depth of Channel (a) (ft.)	Length of Weir (b) (ft.)
1	1.5	4.0
2	1.5	5.0
3	1.5	6.0
4	1.5	10.0
5	1.5	12.0
6	1.5	14.0
7	1.5	16.0
8	2.0	10.0
9	2.0	10.0
10	2.0	12.0
11	2.0	14.0
12	2.0	14.0
13	2.0	16.0
14	2.0	16.0
15	2.0	18.0

See details for Riprap Outlet Sediment Trap ST-V on Figures 5A.20(1) and 5A.20(2) on pages 5A.43 and 5A.44.

Optional Dewatering Methods

Optional dewatering devices may be designed for use with sediment traps. Included are two methods, which may be used. See Figure 5A.21 on page 5A.45 for details.

Figure 5A.16(1)
Pipe Outlet Sediment Trap: ST-I

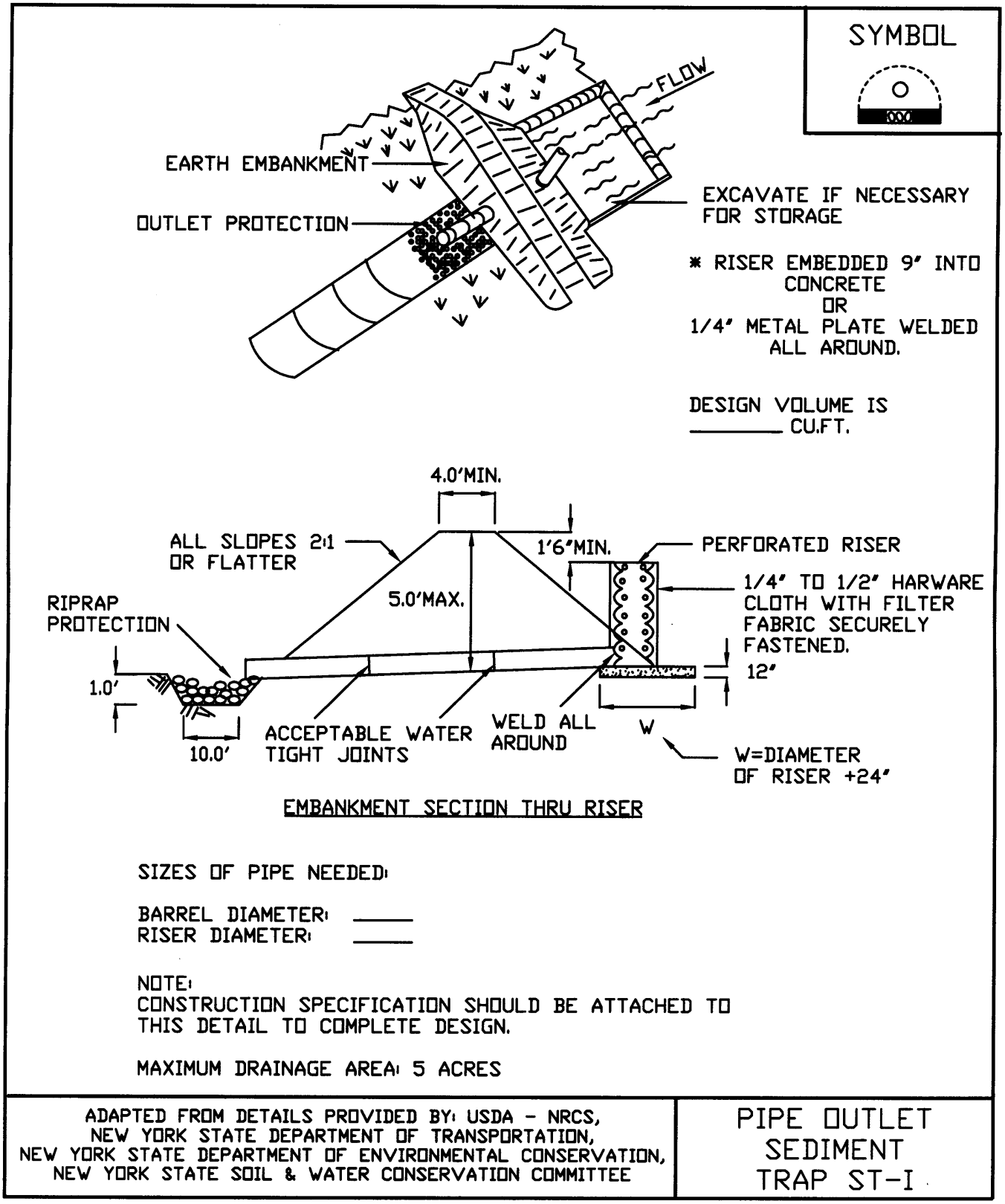


Figure 5A.16(2)
Pipe Outlet Sediment Trap: ST-I—Construction Specifications

SYMBOL

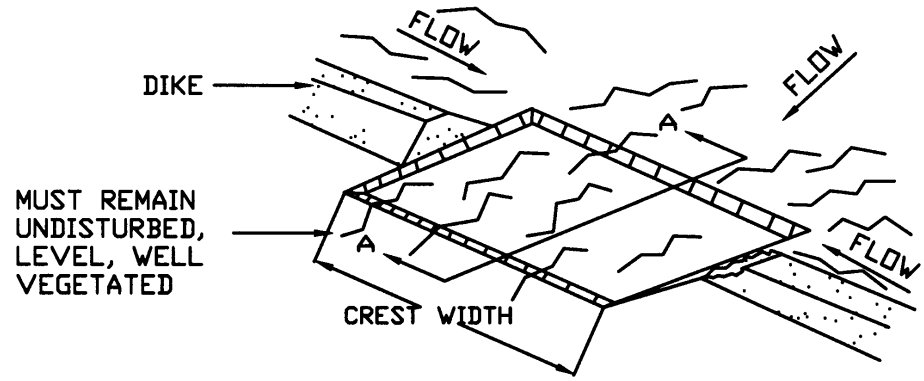
CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
4. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
5. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
7. THE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
8. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER; CUT SLOPES 1:1 OR FLATTER.
9. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.
10. THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH ONE (1) INCH DIAMETER HOLES OR SLITS SPACED SIX (6) INCHES VERTICALLY AND HORIZONTALLY AND PLACED IN THE CONCAVE PORTION OF PIPE. NO HOLES WILL BE ALLOWED WITHIN SIX (6) INCHES OF THE HORIZONTAL BARREL.
11. THE RISER SHALL BE WRAPPED WITH 1/4 TO 1/2 INCH HARDWARE CLOTH WIRE THEN WRAPPED WITH FILTER CLOTH (HAVING AN EQUIVALENT SIEVE SIZE OF 40-80). THE FILTER CLOTH SHALL EXTEND SIX (6) INCHES ABOVE THE HIGHEST HOLE AND SIX (6) INCHES BELOW THE LOWEST HOLE. WHERE ENDS OF THE FILTER CLOTH COME TOGETHER, THEY SHALL BE OVER-LAPPED, FOLDED AND STAPLED TO PREVENT BYPASS.
12. STRAPS OR CONNECTING BANDS SHALL BE USED TO HOLD THE FILTER CLOTH AND WIRE FABRIC IN PLACE. THEY SHALL BE PLACED AT THE TOP AND BOTTOM OF THE CLOTH.
13. FILL MATERIAL AROUND THE PIPE SPILLWAY SHALL BE HAND COMPACTED IN FOUR (4) INCH LAYERS. A MINIMUM OF TWO (2) FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
14. THE RISER SHALL BE ANCHORED WITH EITHER A CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLOTATION. FOR CONCRETE BASED THE DEPTH SHALL BE TWELVE (12) INCHES WITH THE RISER EMBEDDED NINE (9) INCHES. A 1/4 INCH MINIMUM THICKNESS STEEL PLATE SHALL BE ATTACHED TO THE RISER BY A CONTINUOUS WELD AROUND THE BOTTOM TO FORM A WATERTIGHT CONNECTION AND THEN PLACE TWO (2) FEET OF STONE, GRAVEL, OR TAMPED EARTH ON THE PLATE.

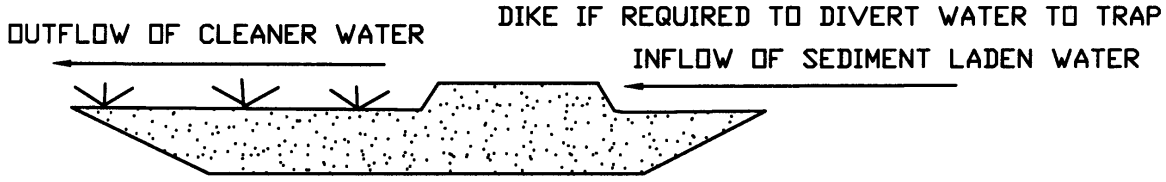
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PIPE OUTLET
SEDIMENT TRAP
ST-I

Figure 5A.17
Grass Outlet Sediment Trap: ST-II



SYMBOL



CREST WIDTH (FT)=4xDRAINAGE AREA (ACRES)

SECTION A - A
EXCAVATED GRASS OUTLET SEDIMENT TRAP

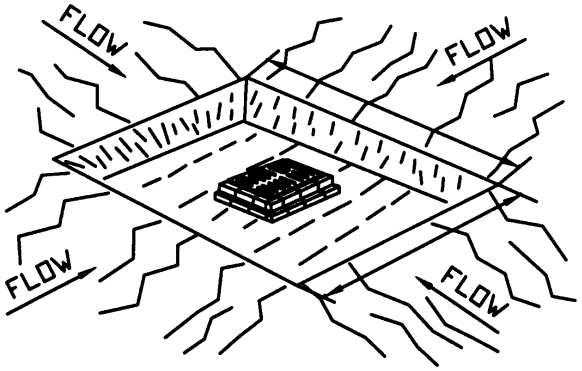
CONSTRUCTION SPECIFICATIONS

1. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE AREA.
2. MINIMUM CREST WIDTH SHALL BE 4 x DRAINAGE AREA
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
4. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
6. THE SEDIMENT TRAP SHALL BE REMOVED AND AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
7. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 5 ACRES

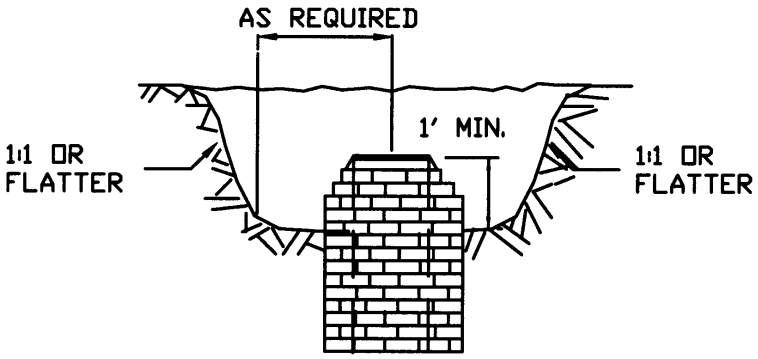
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	GRASS OUTLET SEDIMENT TRAP ST-II

Figure 5A.18
Catch Basin Sediment Trap: ST-III



SYMBOL

YARD DRAIN



CROSS SECTION

CONSTRUCTION SPECIFICATIONS

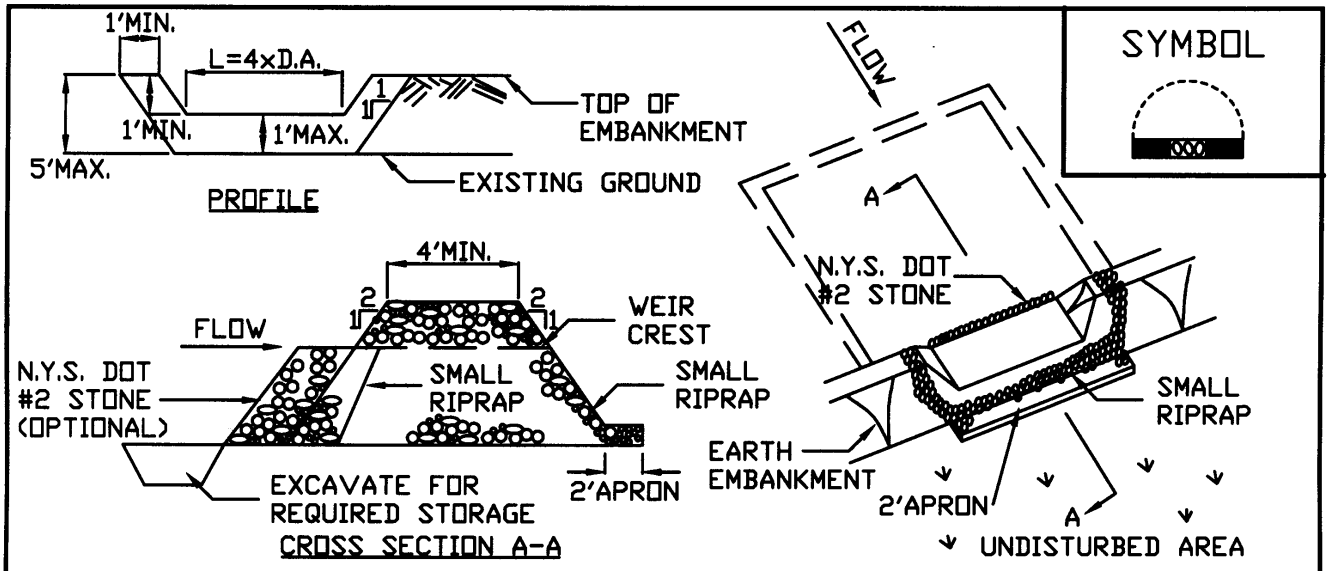
1. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
2. THE VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
3. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
5. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
6. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 3 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

CATCH BASIN
SEDIMENT TRAP
ST-III

Figure 5A.19
Stone Outlet Sediment Trap: ST-IV



OPTION: A ONE FOOT LAYER OF N.Y.S. DOT #2 STONE MAY BE PLACED ON THE UPSTREAM SIDE OF THE RIPRAP INPLACE OF THE EMBEDDED FILTER CLOTH.

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"-8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE OUTLET SEDIMENT TRAP ST-IV

Figure 5A.20(1)
Riprap Outlet Sediment Trap: ST-V

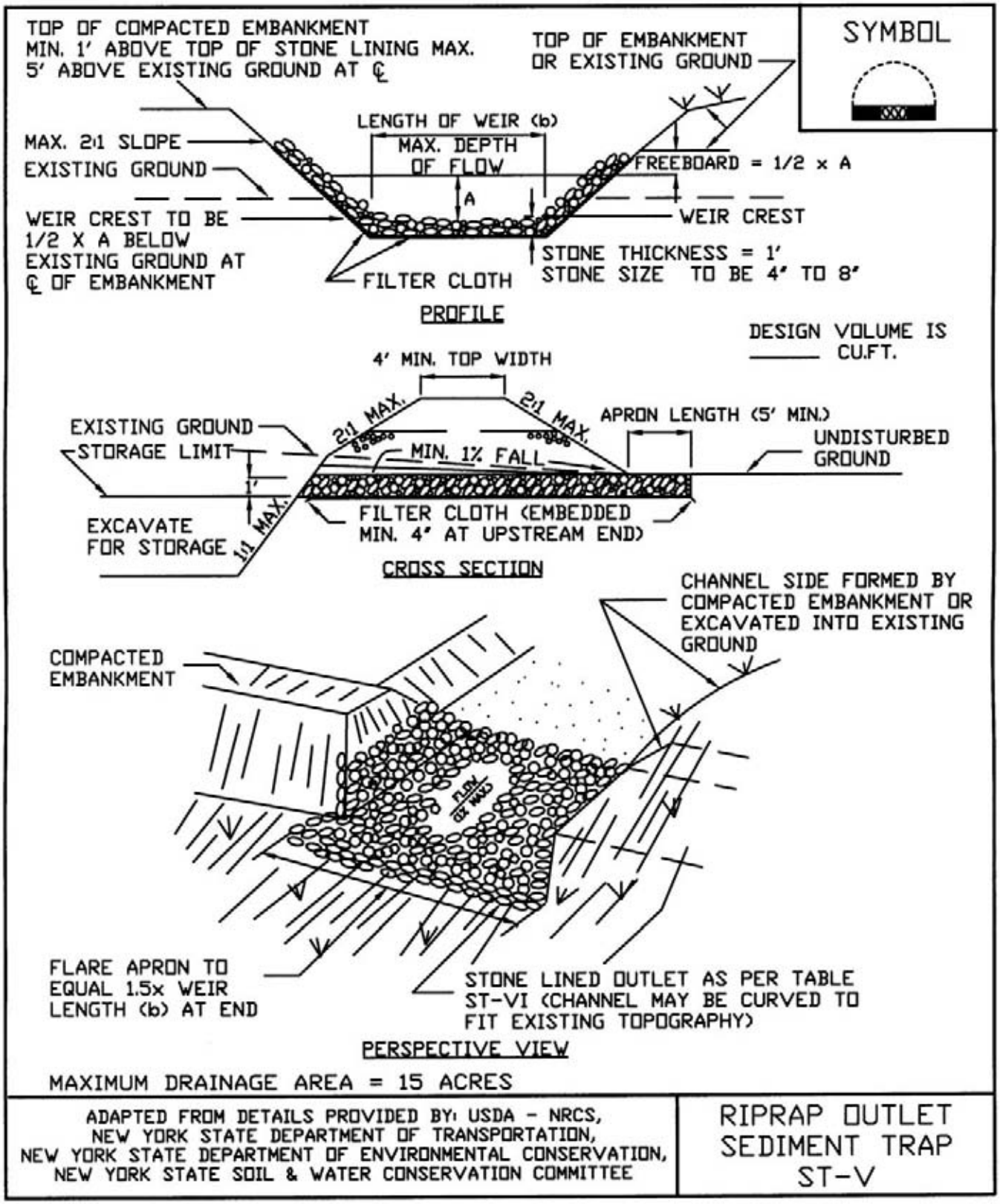


Figure 5A.202)
Riprap Outlet Sediment Trap: ST-V—Construction Specifications

SYMBOL

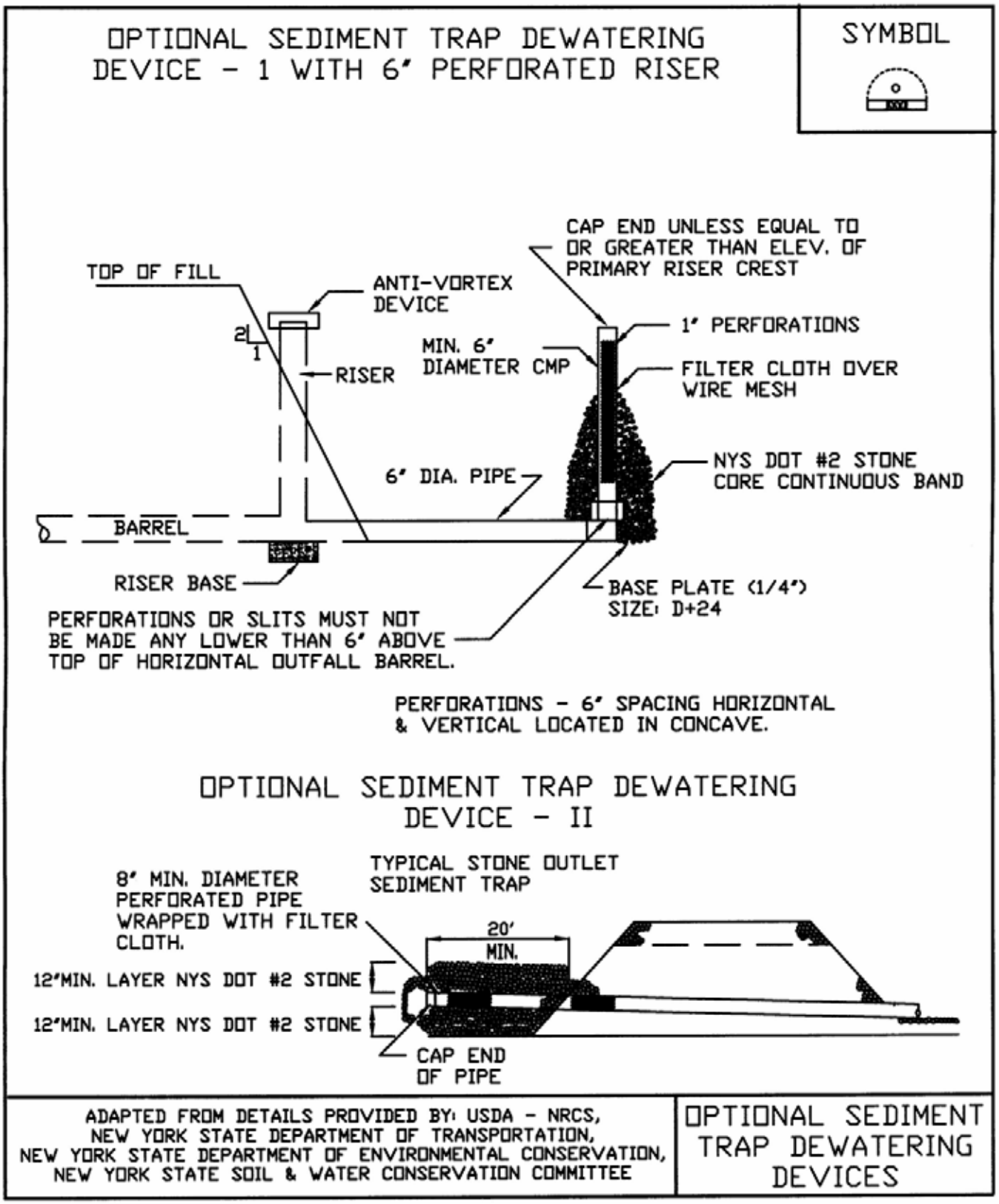
CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF OF EMBANKMENT SHALL BE FIVE (5) FEET, MEASURED AT CENTERLINE OF EMBANKMENT.
3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER.
4. ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF EMBANKMENT.
5. STORAGE AREA PROVIDED SHALL BE FIGURED BY COMPUTING THE VOLUME AVAILABLE BEHIND THE OUTLET CHANNEL UP TO AN ELEVATION OF ONE (1) FOOT BELOW THE LEVEL WEIR CREST.
6. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO PLACEMENT OF STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNEL.
7. STONE USED IN THE OUTLET CHANNEL SHALL BE FOUR (4) TO EIGHT (8) INCH RIPRAP. TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED ONE (1) FOOT WITH SECTION NEAREST ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL.
8. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
9. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRED AS NEEDED.
10. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
11. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
12. DRAINAGE AREA FOR THIS PRACTICE IS LIMITED TO 15 ACRES OR LESS.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

RIPRAP OUTLET
SEDIMENT TRAP
ST-V

Figure 5A.21
Optional Sediment Trap Dewatering Devices



ATTACHMENT A-B

INSPECTION AND MAINTENANCE REPORT FORM

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Regular Inspector:_____Rainfall Event Inspector:_____Rainfall (inches):_____

Contractor Activities	OK	NO	N/A	Notes
Are construction onsite traffic routes, parking, and storage of equipment and supplies restricted to areas specifically designated for those uses?				
Are locations of temporary soil stock piles of construction materials in approved areas?				
Is there any evidence of spills and resulting cleanup procedures?				
General Erosion & Sediment Controls				
Are sediment and erosion BMPs installed in the proper location and according to the specifications set out in the SWM & ECP?				
Are all operational storm drain inlets protected from sediment inflow?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, seeding or mulching?				
Is there any evidence that sediment is leaving the site?				
Is there any evidence of erosion or cut fill slopes?				
Perimeter Road Use				
Does much sediment get tracked on to the perimeter road? Is the gravel clean or is it filled with sediment? Does all traffic use the perimeter road to leave the site? Is maintenance or repair required for the perimeter road?				

_____ _____

Inspected by (Signature) Date

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Inspector:_____

STABILIZATION MEASURES					
Area	Date Since Last Disturbed	Date of Next Disturbance	Stabilized? Yes/No	Stabilized with	Condition

Stabilization Required: _____

_____

_____

_____

_____

_____

To be performed by: _____ On or before: _____

APPENDIX B

NYSDOH
GENERIC COMMUNITY AIR MONITORING PLAN
&
TAGM #4031

APPENDIX B

New York State Department of Health
Generic Community Air Monitoring Plan [1]

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

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

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

Community Air Monitoring Plan

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

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

[1] Taken from Appendix 1A of the Draft DER-10 Technical Guidance for Site Investigation and Remediation, December 2002.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring

particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

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

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

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

TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4031

FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

TO: Regional Hazardous Waste Remediation Engrs., Bur. Directors & Section Chiefs

FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation

SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM -- FUGITIVE DUST SUPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

DATE: Oct 27, 1989

Michael J. O'Toole, Jr. (signed)

1. Introduction

Fugitive dust suppression, particulate monitoring, and subsequent action levels for such must be used and applied consistently during remedial activities at hazardous waste sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2. Background

Fugitive dust is particulate matter--a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles, liquid droplets or solids, over a wide range of sizes--which becomes airborne and contributes to air quality as a nuisance and threat to human health and the environment.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the ambient air quality standard for particulates so as to reflect direct impact on human health by setting the standard for particulate matter less than ten microns in diameter (PM_{10}); this involves fugitive dust whether contaminated or not. Based upon an examination of air quality composition, respiratory tract deposition, and health effects, PM_{10} is considered conservative for the primary standard--that requisite to protect public health with an adequate margin of safety. The primary standards are 150 ug/m^3 over a 24-hour averaging time and 50 ug/m^3 over an annual averaging time. Both of these standards are to be averaged arithmetically.

There exists real-time monitoring equipment available to measure PM_{10} and capable of integrating over a period of six seconds to ten hours. Combined with an adequate fugitive dust suppression program, such equipment will aid in preventing the off-site migration of contaminated soil. It will also protect both on-site personnel from exposure to high levels of dust and the public around the site from any exposure to any dust. While specifically intended for the protection of on-site personnel as well as the public, this program is not meant to replace long-term monitoring which may be required given the contaminants inherent to the site and its air quality.

3. Guidance

A program for suppressing fugitive dust and monitoring particulate matter at hazardous waste sites can be developed without placing an undue burden on remedial activities while still being protective of health and environment. Since the responsibility for implementing this program ultimately will fall on the party performing the work, these procedures must be incorporated into appropriate work plans. The following fugitive dust suppression and particulate monitoring program will be employed at hazardous waste sites during construction and other activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Such activities shall also include the excavation, grading, or placement of clean fill, and control measures therefore should be considered.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

   Object to be measured: Dust, Mists, Aerosols
   Size range: <0.1 to 10 microns
   Sensitivity: 0.001 mg/m^3
   Range: 0.001 to 10 mg/m^3
   Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust

   Operating Conditions:
   Temperature: 0 to 40°C
   Humidity: 10 to 99% Relative Humidity

   Power: Battery operated with a minimum capacity of eight hours continuous operation

   Automatic alarms are suggested.

   Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation

shall require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the entity operating the equipment to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m^3 over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m^3 be exceeded, the Division of Air Resources must be notified in writing within five working days; the notification shall include a description of the control measures implemented to prevent further exceedences.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM_{10} at or above the action level. Since this situation has the potential to migrate contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

    1. Applying water on haul roads.
    2. Wetting equipment and excavation faces.
    3. Spraying water on buckets during excavation and dumping.
    4. Hauling materials in properly tarped or watertight containers.
    5. Restricting vehicle speeds to 10 mph.
    6. Covering excavated areas and material after excavation activity ceases.
    7. Reducing the excavation size and/or number of excavations.

    Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess water which would result in

unacceptable wet conditions, the chance of exceeding the 150 ug/m^3 action level at hazardous waste site remediations is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m^3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended.

There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require appropriate toxics monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX B

SITE-SPECIFIC HEALTH AND SAFETY PLAN

SITE HEALTH AND SAFETY PLAN
for
REMEDIAL INVESTIGATION ACTIVITIES

3807 HIGHLAND AVENUE SITE
NIAGARA FALLS, NEW YORK

December 2008 0170-001-102

Revised September2009

Prepared for:

Globe Metallurgical, Inc.
and
Solsil, Inc.

3807 Highland Avenue Site
Health and Safety Plan for Remedial Investigation Activities

Plan Reviewed by (initial):

Corporate Health and Safety Director: Thomas H. Forbes

Project Manager: Michael Lesakowski

Designated Site Safety and Health Officer: Bryan C. Hann

Acknowledgement:

I acknowledge that I have reviewed the information contained in this site-specific Health and Safety Plan, and understand the hazards associated with performance of the field activities described herein. I agree to comply with the requirements of this plan.

NAME (PRINT)	SIGNATURE	DATE

3807 HIGHLAND AVENUE SITE
HEALTH AND SAFETY PLAN FOR
REMEDIAL INVESTIGATION ACTIVITIES

TABLE OF CONTENTS

3807 HIGHLAND AVENUE SITE
HEALTH AND SAFETY PLAN FOR
REMEDIAL INVESTIGATION ACTIVITIES

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120 and USEPA Standard Operating Safety Guidelines, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC employees (referred to jointly hereafter as Benchmark) during investigation activities at 3807 Highland Avenue located in Niagara Falls, Niagara County, New York. This HASP presents information and procedures for Benchmark employees who will be involved with field activities, including the assignment of responsibilities, personnel protection requirements, work practices and emergency response procedures. It is not intended to cover the activities of other contractors or subcontractors on the Site; these firms will be required to develop and enforce their own HASP as discussed below. In order to ensure that proper coordination on such key issues as emergency notification and decontamination exists between Benchmark and other contractors or subcontractors, Benchmark will review all HASPs and coordinate procedures where appropriate.

This HASP presents information on known Site health and safety hazards obtained from available historical information for previously investigated areas of the Site, and identifies the equipment, materials, and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during the course of field activities to provide real-time data for on-going assessment of potential hazards. This HASP will be updated as new investigation data becomes available.

All Benchmark personnel involved with the field activities associated with the Site Investigation will be required to comply with this HASP and any field modifications as directed by the Site Safety and Health Officer.

1.2 Site Location and Description

The Site is bounded by Highland Avenue to the west, College Avenue to the south, Maple Avenue to the north, and Hyde Park Boulevard to the east (northeastern portion). Properties adjacent to the Site include several industrial properties, including Schleifmittel-

Treibacher (former General Abrasives) to the east, PreMax (former Chisholm-Ryder) to the west and the former Hazorb/Niagara Vest/Union Carbide BCP site to the south.

Environmental investigations completed on the adjacent Hazorb/Niagara Vest/Union Carbide Brownfield Cleanup Program (BCP) site identified the presence of PCBs, PAHs, and metals above the NYSDEC Part 375 restricted-industrial SCOs in soil/fill and debris, as well as the presence of asbestos containing material (ACM) and PCBs along College Avenue. Based on the similar nature of historic industrial use on the adjacent property, similar contaminants of concern may be present at the Project Site.

1.3 Site History

The Site is located in an industrialized area of Niagara Falls and is surrounded by current or former industrial sites. The Site, measuring approximately 17-acres, is currently being re-furbished and has not been in operation since 2003. The Site was used for industrial manufacturing since at least 1913; most recently the Site was used to manufacture silicon metal and ferrosilicon metal.

1.4 Previous Investigations

A summary of the investigations that have occurred at the Site are presented below.

1.4.1 September 2008– Phase I Environmental Site Assessment

In September 2008, Benchmark conducted a Phase I Environmental Site Assessment (ESA) at the Site. Benchmark identified several recognized environmental conditions (RECs) and recommended additional Site investigation.

1.4.2 September 2008 – Preliminary Site Investigation

In September 2008, Benchmark conducted a limited Preliminary Site Investigation at the Site. The limited investigation included soil borings to evaluate potential impacts associated with past heavy industrial operations, and to provide general characterization of the property. Surface, sub-surface and a historical stack soil/fill samples were collected. Based on results of the investigation, Benchmark recommended that a BCP application be submitted to the NYSDEC.

1.5 Investigation Activities

Benchmark personnel will be on-site for Remedial Investigation activities including the following:

- Completion of test pits and soil borings across the property for assessment of surface and subsurface conditions (i.e., visual/olfactory/PID) and to obtain soil/fill samples for chemical characterization.
- Collection of surface soil samples.
- Installation of groundwater monitoring wells, well development, and groundwater sampling for chemical characterization.
- Collection of at least one sediment sample from a smoke stack.
- Aboveground storage tank, drum and container sampling to determine proper disposal.

2.0 ORGANIZATIONAL STRUCTURE

This chapter of the HASP describes the lines of authority, responsibility and communication as they pertain to health and safety functions at the Site. The purpose of this chapter is to identify the personnel who will impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations and establishes the lines of communication among them for health and safety matters. The organizational structure described in this chapter is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at this Site.

2.1 Roles and Responsibilities

All Benchmark personnel on the Site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this Site are detailed in the following paragraphs.

2.1.1 Corporate Health and Safety Director

The Benchmark Corporate Health and Safety Director is **Mr. Thomas H. Forbes**. The Corporate Health and Safety Director is responsible for developing and implementing the Health and Safety program and policies for Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates Benchmark's Health and Safety training and medical monitoring programs, and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for this Site is **Mr. Michael Lesakowski**. The Project Manager has the responsibility and authority to direct all Benchmark work operations at the Site. The Project Manager coordinates safety and health functions with the Site Safety and Health

Officer, and bears ultimate responsibility for proper implementation of this HASP. He may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the Site Work Plan.
- Providing Benchmark workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the Site Safety and Health Officer (SSHO).
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liason with Site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) for this Site is **Mr. Bryan H. Hann**. The qualified alternate SSHO is **Mr. Nathan T. Munley**. The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the Site during all work operations and has the authority to halt work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Managing the safety and health functions for Benchmark personnel on the Site.
- Serving as the point of contact for safety and health matters.
- Ensuring that Benchmark field personnel working on the Site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.
- Performing or overseeing Site monitoring as required by the HASP.
- Assisting in the preparation and review of the HASP.

- Maintaining site-specific safety and health records as described in this HASP.
- Coordinating with the Project Manager, Site Workers and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers

Site workers are responsible for: complying with this HASP or a more stringent HASP, if appropriate (i.e. Contractor and Subcontractor's HASP); using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other Site personnel who will have health and safety responsibilities in the work zone will include subcontractors and governmental agencies performing Site inspection work (viz. New York State Department of Environmental Conservation and/or its designated oversight contractor) who will be responsible for developing, implementing and enforcing a Health and Safety Plan equally stringent or more stringent than Benchmark's HASP. Benchmark assumes no responsibility for the health and safety of anyone outside its direct employ. During activities involving subcontractors, the subcontractor's HASP shall cover all non-Benchmark Site personnel. The subcontractor(s) shall assign a SSHO who will coordinate with Benchmark's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

3.0 HAZARD EVALUATION

The possibility exists that workers will be exposed to hazardous substances during subsurface soil sampling, well development, and groundwater monitoring. The principal points of exposure would be through direct contact with impacted media or vapors during sample collection and handling activities. In addition, the use of large equipment will also present conditions for potential physical injury to workers. Adherence to the medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, establishment work zones and site control, appropriate decontamination procedures and contingency planning outlined herein will reduce the potential for chemical exposures and physical injuries.

3.1 Chemical Hazards

Table 1 identifiesconstituents of potential concern and ranges of concentrations, by media, observed during previous investigations. Based on this work, the constituents of potential concern include: SVOCs (PAHs), metals, and PCBs. Table 2 lists toxicity and exposure data for these constituents of potential concern. As additional data is obtained, Tables 1 and 2 will be updated accordingly. Brief descriptions of the toxicology of these materials and related health and safety guidance and criteria are provided below.

- **Arsenic (CAS #7440-38-2)** is a naturally occurring element and is usually found combined with one or more elements, such as oxygen or sulfur. Inhalation is a more important exposure route than ingestion. First phase exposure symptoms include nausea, vomiting, diarrhea and pain in the stomach. Prolonged contact is corrosive to the skin and mucus membranes. Arsenic is considered a Group A human carcinogen by the USEPA. Exposure via inhalation is associated with an increased risk of lung cancer. Exposure via the oral route is associated with an increased risk of skin cancer.

- **Cadmium** is a natural element and is usually combined with one or more elements, such as oxygen, chloride or sulfur. Breathing high levels of cadmium severely damages the lungs and can cause death. Ingestion of high levels of cadmium severely irritates the stomach, leading to vomiting and diarrhea. Long term exposure to lower levels of cadmium leads to a buildup of this substance in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones. Cadmium is suspected to be a human carcinogen.

- **Chromium (CAS #7440-47-3)** is used in the production of stainless steel, chrome plated metals, and batteries. Two forms of chromium, hexavalent (CR+6) and trivalent (CR+3) are toxic. Hexavalent chromium is an irritant and corrosive to the skin and mucus membranes. Chromium is a potential occupational carcinogen. Acute exposures to dust may cause coughing, wheezing, headaches, pain and fever.

- **Lead (CAS #7439-92-1)** can affect almost every organ and system in our bodies. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed. Lead may decrease reaction time, cause weakness in fingers, wrists or ankles and possibly affect memory. Lead may cause anemia.

- **Mercury (CAS #7439-97-6)** is used in industrial applications for the production of caustic and chlorine, and in electrical control equipment and apparatus. Over-exposure to mercury may cause coughing, chest pains, bronchitis, pneumonia, indecision, headaches, fatigue and salivation. Mercury is a skin and eye irritant.

- **Polynuclear Aromatic Hydrocarbons (PAHs)** are formed as a result of the pyrolysis and incomplete combustion of organic matter such as fossil fuel. PAH aerosols formed during the combustion process disperse throughout the atmosphere, resulting in the deposition of PAH condensate in soil, water and on vegetation. In addition, several products formed from petroleum processing operations (e.g., roofing materials and asphalt) also contain elevated levels of PAHs. Hence, these compounds are widely dispersed in the environment. PAHs are characterized by a molecular structure containing three or more fused, unsaturated carbon rings. Seven of the PAHs are classified by USEPA as probable human carcinogens (USEPA Class B2). These are: benzo(a)pyrene; benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; chrysene; dibenzo(a,h)anthracene; and indeno(1,2,3-cd)pyrene. The primary route of exposure to PAHs is through incidental ingestion and inhalation of contaminated particulates. PAHs are characterized by an organic odor, and exist as oily liquids in pure form. Acute exposure symptoms may include acne-type blemishes in areas of the skin exposed to sunlight.

- **Polychlorinated Biphenyls (PCBs)** are a series of compounds that were commonly used in transformer oil and are suspected carcinogens. PCBs may vary in form from oily liquids to white solids. Exposure may cause nausea, vomiting, weight loss, jaundice, edema and abdominal pain.

With respect to the anticipated activities defined in Section 1.4, possible routes of exposure to the above-mentioned contaminants are presented in Table 3. The use of proper respiratory equipment, as outlined in Section 7.0, will minimize the potential for exposure to

airborne contamination. Further, exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

3.2 Physical Hazards

Remedial investigation activities at the Site may present the following physical hazards:

- The potential for physical injury during heavy equipment use, such as drill rigs.
- The potential for slip and fall injuries due to slippery terrain.

These hazards represent only some of the possible means of injury which may be present during investigation and sampling activities at the Site. Since it is impossible to list all potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

4.0 TRAINING

4.1 Site Workers

All personnel performing site investigation activities (such as, but not limited to, equipment operators and general laborers) and who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors/managers responsible for the site shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Additional site-specific training shall also be provided by the SSHO prior to the start of field activities. A description of topics to be covered by this training is provided below.

4.1.1 Initial and Refresher Training

Initial and refresher training is conducted by a qualified instructor as specified under OSHA 29 CFR 1910.120(e)(5), and is specifically designed to meet the requirements of OSHA 29 CFR 1910.120(e)(3) and 1910.120(e)(8). The training covers, as a minimum, the following topics:

- OSHA HAZWOPER regulations.
- Site safety and hazard recognition, including chemical and physical hazards.
- Medical monitoring requirements.
- Air monitoring, permissible exposure limits, and respiratory protection level classifications.
- Appropriate use of personal protective equipment (PPE), including chemical compatibility and respiratory equipment selection and use.
- Work practices to minimize risk.
- Work zones and Site control.

- Safe use of engineering controls and equipment.
- Decontamination procedures.
- Emergency response and escape.
- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

Initial training also incorporates workshops for PPE and respiratory equipment use (Levels A, B and C), and respirator fit testing. Records and certification received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at Benchmark Environmental Engineering and Science, PLLC's Buffalo, NY office. Contractors and Subcontractors are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not been certified as having received health and safety training in conformance with 29 CFR 1910.120(e) is prohibited from working in the exclusion and contamination reduction zones, or to engage in any on-site work activities that may involve exposure to hazardous substances or wastes.

4.1.2 Site Training

Site workers are given a copy of the HASP and provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The site briefing shall be provided by the SSHO prior to initiating field activities and shall include:

- Names of personnel and alternates responsible for Site safety and health.
- Safety, health and other hazards present on the Site.

- The Site lay-out including work zones and places of refuge.
- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the Site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure (see Section 5).
- Decontamination procedures (see Section 12).
- The Emergency Response Plan (see Attachment 2).
- Confined space entry procedures, if required (see Section 13).
- The spill containment program (see Section 9).
- Site control (see Section 11).

Supplemental health and safety briefings will also be conducted by the SSHO on an as-needed basis during the course of the work. Supplemental briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during on-going Site characterization and analysis. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in Site conditions (viz., based on monitoring results); changes in the work schedule/plan; newly discovered hazards; and safety incidents occurring during Site work.

4.2 Supervisor Training

On-site safety and health personnel who are directly responsible for or who supervise the safety and health of workers engaged in hazardous waste operations (i.e., SSHO) shall receive, in addition to the appropriate level of worker training described in Section 4.1, above, 8 additional hours of specialized supervisory training, in compliance with 29 CFR

1910.120(e)(4).

4.3 Emergency Response Training

Emergency response training is addressed in Attachment 2 of this HASP, Emergency Response Plan.

4.4 Site Visitors

Benchmark's SSHO will provide a site-specific briefing to all Site visitors and other non-Benchmark personnel who enter the Site beyond the Site entry point. The site-specific briefing will provide information about Site hazards, the Site lay-out including work zones and places of refuge, the emergency communications system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

Site visitors will not be permitted to enter the exclusion zone or contaminant reduction zones unless they have received the level of training required for Site workers as described in Section 4.1.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to Benchmark employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment and termination physicals for all Benchmark employees involved in hazardous waste Site field operations. Annual exams are provided for those employees who are engaged in hazardous waste site field operations for more than 30 days per year, or who meet other specific criteria listed in 29 CFR 1910.120(f). Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, or developed signs or symptoms of over-exposure to hazardous substances or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by ADP Screening & Selection Services, an occupational health care provider under contract with TurnKey-Benchmark. ADP's local facility is Health Works WNY, Seneca Square Plaza, 1900 Ridge Road, West Seneca, New York 14224. The facility can be reached at (716) 823-5050 to schedule routine appointments or post-exposure examinations.

Medical evaluations are conducted according to the Benchmark-TurnKey Medical Monitoring Program and include an evaluation of the workers' ability to use respiratory protective equipment. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).
- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).

- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).

- Medical certification of physical requirements (viz., sight, musculoskeletal, cardiovascular) for safe job performance and to wear respiratory protection equipment.

The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data.

In conformance with OSHA regulations, Benchmark will maintain and preserve medical records for a period of 30 years following termination of employment. Employees are provided a copy of the physician's post-exam report, and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

All Benchmark employees shall conform to the following safe work practices during all on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Respiratory protective equipment and clothing must be worn by all personnel entering the Site as required by the HASP or as modified by the Site Safety Officer. Excessive facial hair (i.e., beards, long mustaches or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.
- Due to possible contraindications, use of prescribed drugs should be reviewed with the Benchmark occupational physician.
- Alcoholic beverage and illegal drug intake are strictly forbidden during the work day.
- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan.
- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective Site operations.
- All employees have the obligation to immediately report and if possible, correct unsafe work conditions.
- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion

into full-face respirators will be provided for Benchmark employees, as requested and required.

The recommended specific safety practices for working around the subcontractor's equipment (e.g., drill rig, site truck.) are as follows:

- Although the subcontractors are responsible for their equipment and safe operation of the Site, Benchmark personnel are also responsible for their own safety.
- Subsurface work will not be initiated without first clearing underground utility services.
- Heavy equipment should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage. The Site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.
- Care should be taken to avoid overhead wires when moving heavy-equipment from location to location.
- Hard hats, safety boots and safety glasses should be worn at all times in the vicinity of heavy equipment. Hearing protection is also recommended.
- The work Site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the Site.
- Proper lighting must be provided when working at night.
- Investigation activities should be discontinued during an electrical storm or severe weather conditions.
- The presence of combustible gases should be checked before igniting any open flame.
- Personnel shall stand upwind of any investigation activity when not immediately involved in sampling/logging/observing activities.
- Personnel will not approach the edge of an unsecured trench/excavation closer than 2 feet.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Equipment Selection

Personal protective equipment (PPE) will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the Site, the task-specific conditions and duration, and the hazards and potential hazards identified at the Site.

Equipment designed to protect the body against contact with known or suspect chemical hazards are grouped into four categories according to the degree of protection afforded. These categories, designated A through D consistent with United States Environmental Protection Agency (USEPA) Level of Protection designation, are:

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.

- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.

- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.

- **Level D:** Should not be worn on any site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

OSHA requires the use of certain PPE under conditions where an immediate danger to life and health (IDLH) may be present. Specifically, OSHA 29 CFR 1910.120(g)(3)(iii) requires use of a positive pressure self-contained breathing apparatus, or positive pressure air-line respirator equipped with an escape air supply when chemical exposure levels present a substantial possibility of immediate serious injury, illness or death, or impair the ability to escape. Similarly, OSHA 29 CFR 1910.120(g)(3)(iv) requires donning totally-encapsulating chemical protective suits (with a protection level equivalent to Level A protection) in

conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate serious illness, injury or death, or impair the ability to escape.

In situations where the types of chemicals, concentrations, and possibilities of contact are unknown, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components are detailed below for levels A/B, C, and D protection.

7.2 Protection Ensembles

7.2.1 Level A/B Protection Ensemble

Level A/B ensembles include similar respiratory protection, however Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by: comparing the concentrations of identified substances in the air with skin toxicity data, and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing.

The recommended PPE for level A/B is:

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA).
- Chemical-resistant clothing. For Level A, clothing consists of totally-encapsulating chemical resistant suit. Level B incorporates hooded one-or two-piece chemical splash suit.
- Inner and outer chemical resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

7.2.2 Level C Protection Ensemble

Level C protection is distinguished from Level B by the equipment used to protect

the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing an air-purifying device. The device (when required) must be an air purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection will be used only with proper fitting, training and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

Recommended PPE for Level C conditions includes:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO.
- Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit).
- Inner and outer chemical-resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

An air monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

7.2.3 Level D Protection Ensemble

As indicated above, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances and where the atmospheric contains at least 19.5% oxygen.

Recommended PPE for Level D includes:

- Coveralls
- Safety boots/shoes
- Safety glasses or chemical splash goggles
- Hardhat
- Optional gloves; escape mask; face shield

7.2.4 Recommended Level of Protection for Site Tasks

Based on current information regarding both the contaminants suspected to be present at the Site and the various tasks that are included in the investigation, the minimum required Levels of Protection for these tasks shall be as identified in Table 4.

8.0 EXPOSURE MONITORING

8.1 General

Based on the results of historic sample analysis and the nature of the proposed work activities at the Site, the possibility exists that particulates may be released to the air during intrusive sampling activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PEL) established by OSHA for the individual compounds (see Table 2), in which case respiratory protection will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 On-Site Work Zone Monitoring

Benchmark personnel will conduct routine, real-time air monitoring during all intrusive construction phases such as excavation, backfilling, drilling, etc. The work area will be monitored at regular intervals using a photo-ionization detector (PID), combustible gas meter and a particulate meter. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by Benchmark personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change. Monitoring instruments will be calibrated in accordance with manufacturer's instructions before use.

8.1.2 Off-Site Community Monitoring

In addition to on-site monitoring within the work zone(s), monitoring at the down-wind portion of the site perimeter will be conducted when any intrusive activities are performed outdoors of the facility. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community as a result of intrusive investigation work.

The monitoring will be performed at the downwind perimeter location at regular intervals and at a minimum of once per half hour during times when organic vapors,

explosive gases or particulates exceed established limits for five minutes or longer until such time as work zone concentrations decrease to below the perimeter monitoring action levels. If sustained concentrations of organic vapors, explosive gas, or particulates are detected in excess of the threshold values identified in Section 7.2.2 at the downwind perimeter location for a period of ***5*** minutes or longer, the actions identified in Section 7.2.2 shall be taken. Pertinent emergency response information including the telephone number and address of the Fire Department are included in Attachment 2 - Emergency Response Plan.

Ground intrusive activities are defined by NYSDOH Generic Community Air Monitoring Plan (Attachment 1). Ground intrusive activities include soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the collection of groundwater samples from existing wells. Continuous monitoring is required for ground intrusive activities and periodic monitoring is required for non-intrusive activities. Periodic monitoring consists of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring while bailing a well, and taking a reading before leaving a sampling location. This may be upgraded to continuous if the sampling location is in close proximity to individuals not involved in the Site activity (i.e., on a curb of a busy street). The action levels below will be used during periodic monitoring. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community because of Site investigation work. During intrusive RI/IRM activities, the NYSDOH Community Air Monitoring Plan and NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4031- Fugitive Dust Suppression and Particulate Monitoring Program will be followed. These documents are included in Attachment #1.

8.2 Monitoring Action Levels

8.2.1 On-Site Work Zone Action Levels

The PID or other appropriate instrument(s) will be used as specified in this Health and Safety Plan. Methane gas will be monitored with the "combustible gas" option on the combustible gas meter or other appropriate instrument(s) in accordance with this plan. In addition, fugitive dust/particulate concentrations will be monitored using a real-time particulate monitor as specified in this plan. Readings obtained in the breathing zone may be

interpreted (with regard to other site conditions) as follows for on-site Benchmark personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to background on the PID) - Continue operations under Level D.
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings above background to *5* ppm on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C.
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of *5* to 50 ppm above background on the PID - Continue operations under Level B, re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.
- Total atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The explosimeter will be used to monitor levels of both combustible gases and oxygen during construction activities. Action levels based on the instrument readings shall be as follows:

- Less than 10% LEL - Continue engineering operations with caution.
- 10-25% LEL - Continuous monitoring with extreme caution, determine source/cause of elevated reading.
- Greater than 25% LEL - Explosion hazard, evaluate source and leave the Work Zone.
- 19.5% - 21% oxygen - proceed with extreme caution; attempt to determine potential source of oxygen displacement.
- Less than 19.5% oxygen - leave work zone immediately.
- 21-25% oxygen - Continue engineering operations with caution.
- Greater than 25% oxygen - Fire hazard potential, leave Work Zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities. Action levels based on the instrument readings shall be as follows:

- Less than 50 mg/m^3 - Continue field operations.
- 50-150 mg/m^3 - Don dust/particulate mask or equivalent
- Greater than 150 mg/m^3 - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (viz., wetting of excavated soils or tools at discretion of Site Safety and Health Officer).

Readings with the combustible gas meter, particulate monitor and organic vapor analyzers will be recorded and documented in the Health and Safety Logbook. All instruments will be calibrated before use and the procedure will be documented in the Health and Safety Logbook.

8.2.2 Community Air Monitoring

In addition to the action levels prescribed in Section 8.2.1 for Benchmark personnel on-site, the following criteria shall also be adhered to for the protection of downwind receptors consistent with NYSDOH requirements (Appendix C):

- **ORGANIC VAPOR PERIMETER MONITORING:**
  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background, work activities will be halted and monitoring continued. If the sustained organic vapor decreases below 5 ppm over background, work activities can resume but more frequent intervals of monitoring, as directed by the Site Health and Safety Officer, must be conducted.

  - If the sustained ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone are greater than 5 ppm over background but less than 25 ppm, activities can resume provided that: the organic vapor level 200 feet downwind of the working site or half the distance to the nearest off-site residential or commercial structure, whichever is less, is below 5 ppm over background; and more frequent intervals of monitoring, as directed by the Site Health and Safety Officer, are conducted.

- If the sustained organic vapor level is above 25 ppm at the perimeter of the exclusion zone, the Site Health and Safety Officer must be notified and work activities shut down. The Site Health and Safety Officer will determine when re-entry of the exclusion zone is possible and will implement downwind air monitoring to ensure vapor emissions do not impact the nearest off-site residential or commercial structure at levels exceeding those specified in the ***Organic Vapor Contingency Monitoring Plan*** below. All readings will be recorded and will be available for New York State Department of Environmental Conservation (DEC) and Department of Health (DOH) personnel to review.

o **ORGANIC VAPOR CONTINGENCY MONITORING PLAN:**

- If the sustained organic vapor level is greater than 5 ppm over background 200 feet downwind from the work area or half the distance to the nearest off-site residential or commercial property, whichever is less, all work activities must be halted.

- If, following the cessation of the work activities or as the result of an emergency, sustained organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest off-site residential or commercial structure (20-foot zone).

- If efforts to abate the emission source are unsuccessful and if sustained organic vapor levels approach or exceed 5 ppm above background within the 20-foot zone for more than 30 minutes, or are sustained at levels greater than 10 ppm above background for longer than one minute, then the ***Major Vapor Emission Response Plan*** (see below) will automatically be placed into effect.

o **MAJOR VAPOR EMISSION RESPONSE PLAN:**

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Appendix A) will be advised.

2. The local police authorities will immediately be contacted by the Site Health and Safety Officer and advised of the situation.

3. Frequent air monitoring will be conducted at 30-minute intervals within the 20-foot zone. If two sustained successive readings below action levels are measured, air monitoring may be halted or modified by the Site Health and Safety Officer.

The following personnel are to be notified in the listed sequence in the event that a Major Vapor Emission Plan is activated:

Responsible Person	Contact	Phone Number
SSHO	Police	911
SSHO	State Emergency Response Hotline	(800) 457-7362

Additional emergency numbers are listed in the Emergency Response Plan included as Appendix A.

- **EXPLOSIVE VAPORS:**
  - Sustained atmospheric concentrations of greater than 10% LEL in the work area - Initiate combustible gas monitoring at the downwind portion of the Site perimeter.
  - Sustained atmospheric concentrations of greater than 10% LEL at the downwind Site perimeter – Halt work and contact local Fire Department.

- **AIRBORNE PARTICULATE COMMUNITY AIR MONITORING**

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and integrating over a period of 15-minutes for comparison to the airborne particulate action levels. 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. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background (upwind perimeter) reading for the 15-

minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression provided that the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and that visible dust is not migrating from the work area.

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

Pertinent emergency response information including the telephone number of the Fire Department is included in the Emergency Response Plan (Appendix A).

9.0 SPILL RELEASE/RESPONSE

This chapter of the HASP describes the potential for and procedures related to spills or releases of known or suspected petroleum and/or hazardous substances on the Site. The purpose of this Section of the HASP is to plan appropriate response, control, counter-measures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

- Potential hazardous material spills and available controls.
- Initial notification and evaluation.
- Spill response.
- Post-spill evaluation.

9.1 Potential Spills and Available Controls

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this Site. For the purpose of this evaluation, hazardous materials posing a significant spill potential are considered to be:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

- Extremely Hazardous Substances as identified in 40 CFR Part 355, Attachment 1, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.

- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.

- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

Oil/petroleum products are considered to pose a significant spill potential whenever

the following situations occur:

- The potential for a "harmful quantity" of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes of 1,000 gallons or more, or lesser quantities that either form a visible sheen on the water or violate applicable water quality standards.

- The potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.

- The potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a Site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1,100 gallons or greater.

The evaluation indicates that, based on Site history and the scope of work, a hazardous material spill is not likely to occur during investigation efforts. However, the procedures identified below will be followed in the event of an unanticipated release.

9.2 Initial Spill Notification and Evaluation

Any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries. The Emergency Response Plan presented in Attachment 2 of this HASP will immediately be implemented if an emergency release has occurred.

Following initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the Site owner who will in turn notify NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies are to be contacted regarding the release, and will follow-up with written reports as required by the applicable regulations.

9.3 Spill Response

For all spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be roped, ribboned or otherwise blocked off to prevent unauthorized access.
- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

For minor spills, the Benchmark will maintain a Spill Control and Containment Kit in the Field Office or other readily accessible storage location. The kit will consist of, at a minimum, a 50 lb. bag of "speedy dry" granular absorbent material, absorbent pads, shovels, empty 5-gallon pails and an empty open-top 55-gallon drum. Spilled materials will be absorbed, and shoveled into a 55-gallon drum for proper disposal (USEPA approval will be secured for on-site treatment of the impacted soils/absorbent materials, if applicable). Impacted soils will be hand-excavated to the point that no visible signs of contamination remains, and will be drummed with the absorbent.

In the event of a major release or a release that threatens surface water, a spill response contractor will be called to the Site. The response contractor may use heavy equipment (e.g., excavator, backhoe, etc.) to berm the soils surrounding the spill site or create diversion trenching to mitigate overland migration or release to navigable waters. Where feasible, pumps will be used to transfer free liquid to storage containers. Spill control/cleanup contractors in the Western New York area that may be contacted for assistance (in order of preference) include:

- The Environmental Service Group of NY, Inc.: (716) 695-6720

- Op-Tech: (716) 873-7680
- Environmental Products and Services, Inc.: (716) 447-4700

9.4 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared as indicated in Section 9.2. The report will identify the root cause of the spill, type and amount of material released, date/time of release, response actions, agencies notified and/or involved in cleanup, and procedures to be implemented to avoid repeat incidents. In addition, all re-useable spill cleanup and containment materials will be decontaminated, and spill kit supplies/disposable items will be replenished.

10.0 HEAT/COLD STRESS MONITORING

Although most Site Investigation activities will occur in a climate controlled environment, measures will be taken to minimize heat/cold stress to Benchmark employees working outdoors. The Site Safety and Health Officer and/or his or her designee will be responsible for monitoring Benchmark field personnel for symptoms of heat/cold stress.

10.1 Heat Stress Monitoring

Personal protective equipment may place an employee at risk of developing heat stress, a common and potentially serious illnesses often encountered at construction, landfill, waste disposal, industrial or other unsheltered sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning and age. Personal protective equipment may severely reduce the body's normal ability to maintain temperature equilibrium (via evaporation and convection), and require increased energy expenditure due to its bulk and weight.

Proper training and preventive measures will mitigate the potential for serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat (i.e., eight fluid ounces must be ingested for approximately every 1 lb of weight lost). The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed

to replace lost perspiration. When heavy sweating occurs, workers should be encouraged to drink more.

- Train workers to recognize the symptoms of heat related illness.

Heat-Related Illness - Symptoms:

- Heat rash may result from continuous exposure to heat or humid air.

- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms; pain in the hands, feet and abdomen.

- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting.

- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 100 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest periods stay the same, If the pulse rate is 100 beats per minute at the beginning of the nest rest period, the following work cycle should be further shortened by 33%.

- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period

remains the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the work cycle may be further shortened by 33%. Oral temperature should be measured at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No Benchmark employee will be permitted to continue wearing semi-permeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

10.2 Cold Stress Monitoring

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

    1) **Frostnip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions, removal of boots and gloves, soaking the injured part in warm water (102 to 108 degrees Fahrenheit) and drinking a warm beverage. Do not rub skin to generate friction/ heat.

    2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish gray area of tissue which will be firm to the touch but will yield little pain. The treatment is identical for Frostnip.

    3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard and will yield little to no pain. Treatment is identical to that for Frostnip.

- **Hypothermia** is a serious cold stress condition occurring when the body loses heat at a rate faster than it is produced. If untreated, hypothermia may be fatal. The stages of hypothermia may not be clearly defined or visible at first, but generally include:

    1) Shivering
    2) Apathy (i.e., a change to an indifferent or uncaring mood)
    3) Unconsciousness
    4) Bodily freezing

Employees exhibiting signs of hypothermia should be treated by medical

professionals. Steps that can be taken while awaiting help include:

1) Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)

2) Perform active re-warming with hot liquids for drinking (Note: do not give the victim any liquid containing alcohol or caffeine) and a warm water bath (102 to 108 degrees Fahrenheit).

3) Perform passive re-warming with a blanket or jacket wrapped around the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in a heated areas, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if hypothermia has set in).
- For monitoring the body's recuperation from excess cold, oral temperature recordings should occur:
    - At the Site Safety Technicians discretion when suspicion is based on changes in a worker's performance or mental status.
    - At a workers request.
    - As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20 degrees Fahrenheit or wind chill less than 30 degrees Fahrenheit with precipitation).
    - As a screening measure whenever anyone worker on Site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92

degrees Fahrenheit) will not be allowed to return to work for 48 hours without the recommendation of a qualified medical doctor.

11.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for investigation activities will be established by Benchmark on a daily basis and communicated to all employees and other Site users by the SSHO. It shall be the Site Safety and Health Officer's responsibility to ensure that all Site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- Exclusion Zone ("Hot Zone") - The area where contaminated materials may be exposed, excavated or handled and all areas where contaminated equipment or personnel may travel. The zone will be delineated by flagging tape. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.

- Contaminant Reduction Zone - The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment and samples must remain in the Contaminant Reduction Zone until decontaminated.

- Support Zone - The part of the Site that is considered non-contaminated or "clean." Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

In the absence of other task-specific work zone boundaries established by the SSHO, the following boundaries will apply to all investigation activities involving disruption or handling of Site soils, sediment or groundwater:

- Exclusion Zone: 50 foot radius from the outer limit of the sampling activity.

- Contaminant Reduction Zone: 100 foot radius from the outer limit of the sampling activity.

- Support Zone: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contaminant Reduction Zones will be strictly controlled by Benchmark. Only personnel who are essential to the completion of the task will be allowed access to these areas and only if they are wearing the prescribed level of protection. Entrance of all personnel must be approved by the SSHO.

The Contractor will maintain a Health and Safety Logbook containing the names of

workers and their level of protection. The zone boundaries may be changed by the SSHO as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

12.0 DECONTAMINATION

12.1 Decontamination for Benchmark Employees

The degree of decontamination required is a function of a particular task and the environment within which it occurs. The following decontamination procedure will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions which may arise at the Site. All Benchmark personnel on-site shall follow the procedure below.

Station 1 - Equipment Drop: Deposit visibly contaminated (if any) re-useable equipment used in the contamination reduction and exclusion zones (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic sheeting.

Station 2 - Boots and Gloves Wash and Rinse: Scrub outer boots and outer gloves.

Station 3 - Tape, Outer Boot and Glove Removal: Remove tape, outer boots and gloves. Deposit tape and gloves in waste disposal container.

Station 4 - Canister or Mask Change: If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot cover donned, and worker returns to duty.

Station 5 - Outer Garment/Face Piece Removal: Protective suit removed and deposited in separate container provided by Contractor. Face piece or goggles are removed if used. Avoid touching face with fingers. Face piece and/or goggles deposited on plastic sheet. Hard hat removed and placed on plastic sheet.

Station 6 - Inner Glove Removal: Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in waste disposal container.

Following PPE removal, personnel shall wash hands, face and forearms with absorbent wipes. If field activities proceed for a duration of 6 consecutive months or longer, shower facilities will be provided for worker use in accordance with OSHA 29 CFR 1910.120(n).

12.2 Decontamination for Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (e.g., heat stroke), immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a Site contaminant would be considered "Immediately Dangerous to Life or Health."

12.3 Decontamination of Field Equipment

Decontamination of heavy equipment will be conducted by the subcontractor in accordance with his approved Health and Safety Plan in the Contamination Reduction Zone. As a minimum, this will include manually removing heavy soil clods, followed by high pressure water and detergent or steam cleaning.

Decontamination of all tools used for sample collection purposes will be conducted by Benchmark personnel. It is expected that all tools will be constructed of nonporous, nonabsorbent materials (i.e., metal) which will aid in the decontamination effort. Any tool or part of a tool made of porous, absorbent material (i.e., wood) will be placed into suitable containers and prepared for disposal.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 identifies a confined space as a space which is large enough and so configured that an employee can physically enter and do assigned work, has limited or restricted means for entry and exit, and is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, trenches, storage tanks, process vessels, pits, sewers, tunnels, underground utility vaults, pipelines, sumps, wells, and excavations.

Confined space entry by Benchmark employees is not anticipated to be necessary to complete the Site investigation activities identified in Section 1.4. In the event that the scope of work changes or confined space entry appears necessary, the Project Manager will be consulted to determine if feasible engineering alternatives to confined space entry can be implemented. If confined space entry by Benchmark employees cannot be avoided through reasonable engineering measures, task-specific confined space entry procedures will be developed and a confined-space entry permit will be issued through Benchmark's corporate Health and Safety Director. Benchmark employees shall not enter a confined space without these procedures and permits in place.

14.0 FIRE PREVENTION AND PROTECTION

14.1 General Approach

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper Site preparation and safe storage of combustible and flammable materials.
- Availability of coordination with private and public fire authorities.
- Adequate job-site fire protection and inspections for fire prevention.
- Adequate indoctrination and training of employees.

14.2 Equipment and Requirements

Fire extinguishers will be provided by Benchmark and are required to be provided by the subcontractor on all heavy equipment brought on-site. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary. Recharge or replacement shall be mandatory immediately after each use.

14.3 Flammable and Combustible Substances

All storage, handling or use of flammable and combustible substances will be under the supervision of qualified persons. All tanks, containers and pumping equipment, whether portable or stationary, which are used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the National Fire Protection Association.

14.4 Hot Work

If the scope of work necessitates welding or blow torch operation, the hot work

permit presented in Attachment 3 will be completed by the SSHO and reviewed/issued by the Project Manager.

15.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Attachment 2.

16.0 REFERENCES

1. Benchmark Environmental Engineering & Science, PLLC. *Phase I Environmental Site Assessment Report. 3807 Highland Avenue, Niagara Falls, NY*. September 2008.

2. Benchmark Environmental Engineering & Science, PLLC. *Preliminary Site Investigation – Letter Report. 3807 Highland Avenue, Niagara Falls, NY*. September 2008.

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

CONSTITUENTS OF POTENTIAL CONCERN

3807 Highland Avenue Site
Niagara Falls, New York

Parameter	CAS No.	Maximum Detected Concentration in Sample (mg/kg)
Semi-Volatile Organic Compounds (SVOCs)		
Anthracene	120-12-7	1200
Benzo(a)anthracene	56-55-3	1800
Benzo(b)fluoranthene	205-99-2	2300
Benzo(k)fluoranthene	207-08-9	2300
Benzo(a)pyrene	50-32-8	910
Chrysene	218-01-9	1500
Dibenzo(a,h)anthracene	53-70-3	100
Fluoranthene	206-44-0	4800
Fluorene	86-73-7	470
Indeno(1,2,3-cd)pyrene	193-39-5	850
Naphthalene	91-20-3	130
Phenanthrene	85-01-8	4100
Pyrene	129-00-0	3200
Inorganic Compounds:		
Arsenic	7440-38-2	666
Barium	7440-39-3	4510
Cadmium	7440-43-9	9.3
Chromium	7440-47-3	830
Lead	7439-92-1	1900
Mercury	7439-97-6	1.2
Polychlorinated Byphenls (PCBs):		
Aroclor 1254	11097-69-1	0.63
Aroclor 1260	11096-82-5	0.84

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

3807 Highland Avenue Site
Niagara Falls, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits [1]		
				PEL	TLV	IDLH
Semi-volatile Organic Compounds (SVOCs)[2]: ppm						
Anthracene	*none*	120-12-7	*none*	--	--	--
Benzo(a)anthracene	*none*	56-55-3	*none*	--	--	--
Benzo(b)fluoranthene	*none*	205-99-2	*none*	--	--	--
Benzo(k)fluoranthene	*none*	207-08-9	*none*	--	--	--
Benzo(a)pyrene	*none*	50-32-8	*none*	--	--	--
Chrysene	*none*	218-01-9	*none*	--	--	--
Dibenzo(a,h)anthracene	*none*	53-70-3	*none*	--	--	--
Fluoranthene	*none*	206-44-0	*none*	--	--	--
Fluorene	*none*	86-73-7	*none*	--	--	--
Indeno(1,2,3-cd)pyrene	*none*	193-39-5	*none*	--	--	--
Naphthalene	Naphthalin, Tar camphor, White tar	91-20-3	*none*	10	10	250
Phenanthrene	*none*	85-01-8	*none*	--	--	--
Pyrene	*none*	129-00-0	*none*	--	--	--
Polychorinated Biphenyls (PCBs) : ppm						
Aroclor 1254	chlorodiphenol (54% Chlorine)	11097-69-1	Ca	1	0.5	5
Aroclor 1260	chlorodiphenol (60% Chlorine)	11096-82-5	Ca	1	0.5	5
Inorganic Compounds: mg/m [3]						
Arsenic	*none*	7440-38-2	Ca	0.01	0.01	5
Barium	*none*	7440-39-3	*none*	0.5	0.5	50
Cadmium	*none*	7440-43-9	Ca	0.005	0.01	9
Chromium	*none*	7440-47-3	*none*	1	0.5	250
Lead	*none*	7439-92-1	*none*	0.05	0.15	100
Mercury	*none*	7439-97-6	C-0.1	0.1	0.05	10

Notes:

1. Concentration limits as reported by NIOSH Pocket Guide to Chemical Hazards, February 2004 (NIOSH Publication No. 97-140, fourth printing with changes and updates).
2. " -- " = concentration limit not available; exposure should be minimized to the extent feasible through appropriate engineering controls & PPE.

Explanation:
Ca = NIOSH considers constituent to be a potential occupational carcinogen.
C-## = Ceiling Level equals the maximum exposure concentration allowable during the work day.
IDLH = Immediately Dangerous to Life or Health.
ND indicates that an IDLH has not as yet been determined.
TLV = Threshold Limit Value, est. by American Conference of Industrial Hygienists (ACGIH), equals the max. exposure conc. allowable for 8 hrs/day @ 40 hrs/week.
TLVs are the amounts of chemicals in the air that almost all healthy adult workers are predicted to be able to tolerate without adverse effects. There are three types.
TLV-TWA (TLV-Time-Weighted Average) which is averaged over the normal eight-hour day/forty-hour work week. (Most TLVs.)
TLV-STEL or Short Term Exposure Limits are 15 minute exposures that should not be exceeded for even an instant. It is not a stand alone value but is accompanied by the TLV-TWA. It indicates a higher exposure that can be tolerated for a short time without adverse effect as long as the total time weighted average is not exceeded.
TLV-C or Ceiling limits are the concentration that should not be exceeded during any part of the working exposure.
Unless the initials "STEL" or "C" appear in the Code column, the TLV value should be considered to be the eight-hour TLV-TWA.
PEL = Permissible Exposure Limit, established by OSHA, equals the maximum exposure concentration allowable for 8 hours per day @ 40 hours per week

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 3

POTENTIAL ROUTES OF EXPOSURE TO THE CONSTITUENTS OF POTENTIAL CONCERN

3807 Highland Avenue Site
Niagara Falls, New York

Activity [1]	Direct Contact with Soil	Inhalation of Vapors or Dust	Direct Contact with Groundwater
Remedial Investigation Tasks			
1. Test pit excavation, soil borings & soil sampling.	x	x	
2. Surface soil sampling.	x	x	
3. Drum and container sampling.	x	x	
4. Monitoring Well Installation and Groundwater Sampling	x	x	x

Notes:

1. Activity as described in Section 1.5 of the Health and Safety Plan.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 4

REQUIRED LEVELS OF PROTECTION
FOR RI/IRM TASKS

3807 Highland Avenue Site
Niagara Falls, New York

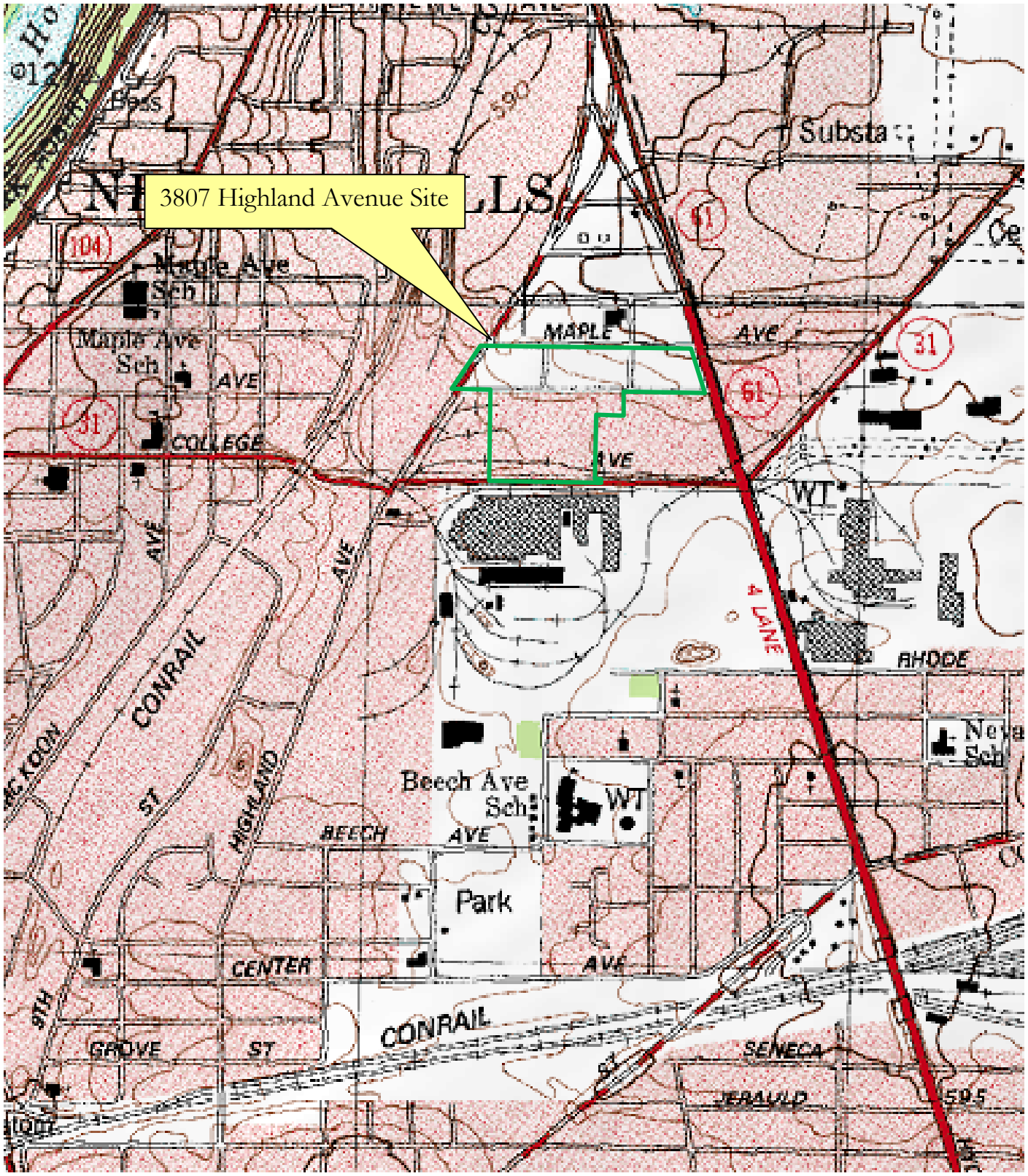
Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
Remedial Investigation Tasks					
1. Test pit excavation, soil borings & soil sampling.	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
2. Surface soil sampling.	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
3. Drum and container sampling.	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
4. Monitoring Well Installation and Groundwater Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS

Notes:

1. Respiratory equipment shall conform to guidelines presented in Section 7.0 of this HASP. The Level C requirement is an air-purifying respirator equiped with organic compound/acid gas/dust cartridge.
2. HH = hardhat; L= Latex; L/N = latex inner glove, nitrile outer glove; N = Nitrile; S = Saranex; SG = safety glasses; SGSS = safety glasses with sideshields; STSS = steel toe safety shoes.
3. Latex outer boot (or approved overboot) required whenever contact with contaminated materials may occur. SSHO may downgrade to STSS (steel-toed safety shoes) if contact will be limited to cover/replacement soils.
4. Dust masks shall be donned as directed by the SSHO (site safety and health officer) or site safety technician whenever potentially contaminated airborne particulates (i.e., dust) are present in significant amounts in the breathing zone. Goggles may be substituted with safety glasses w/side-shields whenever contact with contaminated liquids is not anticipated.

FIGURES

FIGURE 1



BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0170-001-102

DATE: OCTOBER 2008

DRAFTED BY: NTM

SITE LOCATION AND VICINITY MAP

RI / AAR / IRM WORK PLAN

3807 HIGHLAND AVENUE SITE

NIAGARA FALLS, NEW YORK

PREPARED FOR

GLOBE METALLURGICAL, INC.

ATTACHMENT 1

NYSDOH GENERIC COMMUNITY AIR MONITORING PLAN
&
TAGM #4031

APPENDIX 1A

New York State Department of Health
Generic Community Air Monitoring Plan

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

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

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

Community Air Monitoring Plan

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

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

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

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

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

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

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

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

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

TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4031

FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

TO: Regional Hazardous Waste Remediation Engrs., Bur. Directors & Section Chiefs

FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation

SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM -- FUGITIVE DUST SUPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

DATE: Oct 27, 1989

Michael J. O'Toole, Jr. (signed)

1. Introduction

Fugitive dust suppression, particulate monitoring, and subsequent action levels for such must be used and applied consistently during remedial activities at hazardous waste sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2. Background

Fugitive dust is particulate matter--a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles, liquid droplets or solids, over a wide range of sizes--which becomes airborne and contributes to air quality as a nuisance and threat to human health and the environment.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the ambient air quality standard for particulates so as to reflect direct impact on human health by setting the standard for particulate matter less than ten microns in diameter (PM_{10}); this involves fugitive dust whether contaminated or not. Based upon an examination of air quality composition, respiratory tract deposition, and health effects, PM_{10} is considered conservative for the primary standard--that requisite to protect public health with an adequate margin of safety. The primary standards are 150 ug/m^3 over a 24-hour averaging time and 50 ug/m^3 over an annual averaging time. Both of these standards are to be averaged arithmetically.

There exists real-time monitoring equipment available to measure PM_{10} and capable of integrating over a period of six seconds to ten hours. Combined with an adequate fugitive dust suppression program, such equipment will aid in preventing the off-site migration of contaminated soil. It will also protect both on-site personnel from exposure to high levels of dust and the public around the site from any exposure to any dust. While specifically intended for the protection of on-site personnel as well as the public, this program is not meant to replace long-term monitoring which may be required given the contaminants inherent to the site and its air quality.

3. Guidance

A program for suppressing fugitive dust and monitoring particulate matter at hazardous waste sites can be developed without placing an undue burden on remedial activities while still being protective of health and environment. Since the responsibility for implementing this program ultimately will fall on the party performing the work, these procedures must be incorporated into appropriate work plans. The following fugitive dust suppression and particulate monitoring program will be employed at hazardous waste sites during construction and other activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Such activities shall also include the excavation, grading, or placement of clean fill, and control measures therefore should be considered.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

   Object to be measured: Dust, Mists, Aerosols
   Size range: <0.1 to 10 microns
   Sensitivity: 0.001 mg/m^3
   Range: 0.001 to 10 mg/m^3
   Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust

   Operating Conditions:
   Temperature: 0 to 40°C
   Humidity: 10 to 99% Relative Humidity

   Power: Battery operated with a minimum capacity of eight hours continuous operation

   Automatic alarms are suggested.

   Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation

shall require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the entity operating the equipment to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m^3 over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m^3 be exceeded, the Division of Air Resources must be notified in writing within five working days; the notification shall include a description of the control measures implemented to prevent further exceedences.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM_{10} at or above the action level. Since this situation has the potential to migrate contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

    1. Applying water on haul roads.
    2. Wetting equipment and excavation faces.
    3. Spraying water on buckets during excavation and dumping.
    4. Hauling materials in properly tarped or watertight containers.
    5. Restricting vehicle speeds to 10 mph.
    6. Covering excavated areas and material after excavation activity ceases.
    7. Reducing the excavation size and/or number of excavations.

    Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess water which would result in

unacceptable wet conditions, the chance of exceeding the 150 ug/m^3 action level at hazardous waste site remediations is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m^3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended.

There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require appropriate toxics monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

ATTACHMENT 2

EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN
for
REMEDIAL INVESTIGATION ACTIVITIES

at the
3807 HIGHLAND AVENUE SITE

NIAGARA FALLS, NEW YORK

December 2008 0170-001-102

Prepared for:

Globe Metallurgical, Inc.
Niagara Falls, New York

3807 HIGHLAND AVENUE SITE
HEALTH AND SAFETY PLAN FOR RI ACTIVITIES
ATTACHMENT 2: EMERGENCY RESPONSE PLAN

TABLE OF CONTENTS

LIST OF FIGURES

1.0 GENERAL

This report presents the site-specific Emergency Response Plan (ERP) referenced in the Site Health and Safety Plan (HASP) prepared for Remedial Investigation (RI) activities at the 3807 Highland Avenue Site in Niagara Falls, New York. This appendix of the HASP describes potential emergencies that may occur at the Site; procedures for responding to those emergencies; roles and responsibilities during emergency response; and training all workers must receive in order to follow emergency procedures. This ERP also describes the provisions this Site has made to coordinate its emergency response planning with other contractors on-site and with off-site emergency response organizations.

This ERP is consistent with the requirements of 29 CFR 1910.120(l) and provides the following site-specific information:

- Pre-emergency planning.
- Personnel roles, lines of authority, and communication.
- Emergency recognition and prevention.
- Safe distances and places of refuge.
- Evacuation routes and procedures.
- Decontamination procedures.
- Emergency medical treatment and first aid.
- Emergency alerting and response procedures.
- Critique of response and follow-up.
- Emergency personal protective equipment (PPE) and equipment.

2.0 PRE-EMERGENCY PLANNING

This Site has been evaluated for potential emergency occurrences, based on Site hazards, the required work tasks, the site topography, and prevailing weather conditions. The results of that evaluation indicate the potential for the following site emergencies to occur at the locations indicated.

Type of Emergency:

1. Medical, due to physical injury
2. Fire

Source of Emergency:

1. Slip/trip/fall
2. Fire

Location of Source:

1. Non-specific

3.0 ON-SITE EMERGENCY RESPONSE EQUIPMENT

Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean up. Emergency response equipment available on the Site is listed below. The equipment inventory and storage locations are based on the potential emergencies described above. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this Site but not ordinarily stocked.

Any additional personal protective equipment (PPE) required and stocked for emergency response is also listed in below. During an emergency, the Emergency Response Coordinator (ERC) is responsible for specifying the level of PPE required for emergency response. At a minimum, PPE used by emergency responders will comply with Section 7.0, Personal Protective Equipment, of this HASP. Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is replenished as necessary to maintain response capabilities.

Emergency Equipment	Quantity	Location
First Aid Kit	1	Site Vehicle
Chemical Fire Extinguisher	2 (minimum)	All heavy equipment and Site Vehicle

Emergency PPE	Quantity	Location
Full-face respirator	1 for each worker	Site Vehicle
Chemical-resistant suits	4 (minimum)	Site Vehicle

4.0 EMERGENCY PLANNING MAPS

An area-specific map of the Site will be developed on a daily basis during performance of field activities. The map will be marked to identify critical on-site emergency planning information, including: emergency evacuation routes, a place of refuge, an assembly point, and the locations of key site emergency equipment. Site zone boundaries will be shown to alert responders to known areas of contamination. There are no major topographical features, however the direction of prevailing winds/weather conditions that could affect emergency response planning are also marked on the map. The map will be posted at site-designated place of refuge and inside the Benchmark-TurnKey personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project Manager: *Michael Lesakowski*
Work: (716) 856-0599
Mobile: (716) 818-3954

Corporate Health and Safety Director: *Thomas H. Forbes*
Work: (716) 856-0599
Mobile: (716) 864-1730

Site Safety and Health Officer (SSHO): *Bryan C. Hann*
Work: (716) 856-0635
Mobile: (716) 870-1165

Alternate SSHO: *Nathan Munley*
Work: (716) 856-0635
Mobile: (716) 289-1072

NIAGARA FALLS MEMORIAL MEDICAL CENTER (ER):	(716) 278-4000
FIRE:	911
AMBULANCE:	911
NIAGARA FALLS POLICE:	911
STATE EMERGENCY RESPONSE HOTLINE:	(800) 457-7362
NATIONAL RESPONSE HOTLINE:	(800) 424-8802
NYSDOH:	(716) 847-4385
NYSDEC:	(716) 851-7220
NYSDEC 24-HOUR SPILL HOTLINE:	(800) 457-7252

The Site location is:

3807 Highland Avenue
Niagara Falls, New York 14305
Site Phone Number: (Insert Cell Phone or Field Trailer): _____

6.0 EMERGENCY ALERTING & EVACUATION

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of each contractor's Site Health and Safety Officer to ensure an adequate method of internal communication is understood by all personnel entering the site. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site excavation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

If evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Section 12.0 of the HASP are followed to the extent practical without compromising the safety and health of site personnel. The evacuation routes and assembly area will be determined by conditions at the time of the evacuation based on wind direction, the location of the hazard source, and other factors as determined by rehearsals and inputs from emergency response organizations. Wind direction indicators are located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the emergency response coordinator at the time the evacuation alarm sounds. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the construction Site Health and Safety Officer to review evacuation routes and procedures as necessary and to inform all TurnKey-Benchmark workers of any changes.

Personnel exiting the site will gather at a designated assembly point. To determine that everyone has successfully exited the site, personnel will be accounted for at the assembly

site. If any worker cannot be accounted for, notification is given to the SSHO (***Bryan Hann*** or ***Nathan Munley***) so that appropriate action can be initiated. Contractors and subcontractors on this site have coordinated their emergency response plans to ensure that these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

7.0 EXTREME WEATHER CONDITIONS

In the event of adverse weather conditions, the Site Safety and Health Officer in conjunction with the Contractor's SSHO will determine if engineering operations can continue without sacrificing the health and safety of site personnel. Items to be considered prior to determining if work should continue include but are not limited to:

- Potential for heat/cold stress.
- Weather-related construction hazards (e.g., flooding or wet conditions producing undermining of structures or sheeting, high wind threats, etc).
- Limited visibility.
- Potential for electrical storms.
- Limited site access/egress (e.g., due to heavy snow)

8.0 EMERGENCY MEDICAL TREATMENT & FIRST AID

Personnel Exposure:

The following general guidelines will be employed in instances where health impacts threaten to occur acute exposure is realized:

- Skin Contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to Mercy Hospital.
- Inhalation: Move to fresh air and, if necessary, transport to Mercy Hospital.
- Ingestion: Decontaminate and transport to Mercy Hospital.

Personal Injury:

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to the Niagara Falls Memorial Medical Center via ambulance. The Site Health and Safety Officer will supply available chemical specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the SSHO to ensure that the expended items are replaced.

Directions to Niagara Falls Memorial Medical Center (see Figure A-1):

- Travel south on Highland Avenue, which becomes 11th Street.
- Make a slight left onto Portage Rd.
- Turn right onto Pine Ave. (62-A)
- Turn left onto 10th St.

The Niagara Falls Memorial Medical Center is located at 621 10th St., and is approximately 2 miles south of the Site.

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

Following an emergency, the SSHO and Project Manager shall review the effectiveness of this Emergency Response Plan (ERP) in addressing notification, control and evacuation requirements. Updates and modifications to this ERP shall be made accordingly. It shall be the responsibility of each contractor to establish and assure adequate records of the following:

- Occupational injuries and illnesses.
- Accident investigations.
- Reports to insurance carrier or State compensation agencies.
- Reports required by the client.
- Records and reports required by local, state, federal and/or international agencies.
- Property or equipment damage.
- Third party injury or damage claims.
- Environmental testing logs.
- Explosive and hazardous substances inventories and records.
- Records of inspections and citations.
- Safety training.

10.0 EMERGENCY RESPONSE TRAINING

All persons who enter the worksite, including visitors, shall receive a site-specific briefing about anticipated emergency situations and the emergency procedures by the SSHO. Where this site relies on off-site organizations for emergency response, the training of personnel in those off-site organizations has been evaluated and is deemed adequate for response to this site.

FIGURES

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0170-001-102

DATE: SEPTEMBER 2009

DRAFTED BY: NTM

HOSPITAL ROUTE MAP

EMERGENCY RESPONSE PLAN

3807 HIGHLAND AVENUE SITE

NIAGARA FALLS, NEW YORK

PREPARED FOR

GLOBE METALLURGICAL, INC.

FIGURE A-1

ATTACHMENT 3

HOT WORK PERMIT FORM

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

HOT WORK PERMIT

PART 1 - INFORMATION

Issue Date:	
Date Work to be Performed: Start:	Finish (permit terminated):
Performed By:	
Work Area:	
Object to be Worked On:	

PART 2 - APPROVAL

(for 1, 2 or 3: mark Yes, No or NA)*

Will working be on or in:	Finish (permit terminated):	
1. Metal partition, wall, ceiling covered by combustible material?	yes	no
2. Pipes, in contact with combustible material?	yes	no
3. Explosive area?	yes	no

* = If any of these conditions exist (marked "yes"), a permit will not be issued without being reviewed and approved by Thomas H. Forbes (Corporate Health and Safety Director). Required Signature below.

PART 3 - REQUIRED CONDITIONS**

(Check all conditions that must be met)

	PROTECTIVE ACTION		PROTECTIVE EQUIPMENT
	Specific Risk Assessment Required		Goggles/visor/welding screen
	Fire or spark barrier		Apron/fireproof clothing
	Cover hot surfaces		Welding gloves/gauntlets/other:
	Move movable fire hazards, specifically		Wellintons/Knee pads
	Erect screen on barrier		Ear protection: Ear muffs/Ear plugs
	Restrict Access		B.A.: SCBA/Long Breather
	Wet the ground		Respirator: Type:
	Ensure adequate ventilation		Cartridge:
	Provide adequate supports		Local Exhaust Ventilation
	Cover exposed drain/floor or wall cracks		Extinguisher/Fire blanket
	Fire watch (must remain on duty during duration of permit)		Personal flammable gas monitor
	Issue additional permit(s):		

Other precautions:

** Permit will not be issued until these conditions are met.

SIGNATURES

Orginating Employee:	Date:
Project Manager:	Date:
Part 2 Approval:	Date:

APPENDIX C

CITIZEN PARTICIPATION PLAN

New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
3807 Highland Avenue Site
Globe Metallurgical, Inc.
and
Solsil, Inc.

Site #C932145
3807 Highland Avenue
Niagara Falls, New York

September 2009

Contents

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the brownfield site's remedial process.

Applicant: **Globe Metallurgical, Inc. and Solsil, Inc. ("Applicant")**
Site Name: **3807 Highland Avenue Site ("Site")**
Site Number: **C932145**
Site Address: **3807 Highland Avenue, Niagara Falls, NY 14305**
Site County: **Niagara**

1. What is New York's Brownfield Cleanup Program?

New York' Brownfield Cleanup Program (BCP) is designed to encourage the private sector to investigate, remediate (clean up) and redevelop brownfields. A brownfield is any real property where redevelopment or reuse may be complicated by the presence or potential presence of a contaminant. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal and financial burdens on a community. If the brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC), which oversees Applicants that conduct brownfield site remedial activities.[1] An Applicant is a person whose request to participate in the BCP has been accepted by NYSDEC. The BCP contains investigation and remediation (cleanup) requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at: **www.dec.ny.gov/chemical/8450.html**

2. Citizen Participation Plan Overview

This Citizen Participation (CP) Plan provides members of the affected and interested public with information about how NYSDEC will inform and involve them during the investigation and remediation of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Appendix A contains a map identifying the location of the site.

[1] "Remedial activities, remedial action, and remediation" are defined as all activities or actions undertaken to eliminate, remove, treat, abate, control, manage, or monitor contaminants at or coming from a brownfield site.

Project Contacts
Appendix B identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's remedial program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Document Repositories
The locations of the site's document repositories also are identified in Appendix B. The document repositories provide convenient access to important project documents for public review and comment.

Site Contact List
Appendix C contains the brownfield site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and remediation process. The brownfield site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project, including notifications of upcoming remedial activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The brownfield site contact list includes, at a minimum:

- Chief executive officer and zoning chairperson of each county, city, town and village in which the site is located;
- Residents, owners, and occupants of the site and properties adjacent to the site;
- The public water supplier which services the area in which the site is located;
- Any person who has requested to be placed on the site contact list;
- The administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility; and
- Document repositories.

Where the site or adjacent real property contains multiple dwelling units, the Applicant will work with the Department to develop an alternative method for providing such notice in lieu of mailing to each individual. For example, the owner of such a property that contains multiple dwellings may be requested to prominently display fact sheets and notices required to be developed during the site's remedial process. This procedure would substitute for the mailing of such notices and fact sheets, especially at locations where renters, tenants, and other residents may number in the hundreds or thousands, making the mailing of such notices impractical.

The brownfield site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix B. Other additions to the brownfield site contact list may be made on a site-specific basis at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

CP Activities

Appendix D identifies the CP activities, at a minimum, that have been and will be conducted during the site's remedial program. The flowchart in Appendix E shows how these CP activities integrate with the site remedial process. The public is informed about these CP activities through fact sheets and notices developed at significant points in the site's remedial process.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a brownfield site, and the nature and progress of efforts to investigate and remediate a brownfield site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a brownfield site's investigation and remediation.

The public is encouraged to contact project staff anytime during the site's remedial process with questions, comments, or requests for information about the remedial program.

This CP Plan may be revised due to changes in major issues of public concern, identified in Section 6, or in the nature and scope of remedial activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

3. Site Information

Site Description

The Site is an approximate 17-acre parcel , commonly referred to as 3807 Highland Avenue, Niagara Falls New York. The Site includes an office building, a factory/furnace building, and several maintenance and/or storage buildings. The Site is currently being refurbished and has not been in operation since 2003. A site location map is included as Appendix A.

Site History
The Site was used for industrial manufacturing since at least 1913; most recently the Site was used to manufacture silicon metal and ferrosilicon metal. Globe currently owns the property and plans to refurbish/redevelop the vacant factory buildings to manufacture metallurgical and chemical-grade silicon metal and silicon-based specialty alloys. Solsil plans to build a new facility on the western portion of the Site that will produce and develop high-purity silicon for use in photovoltaic solar cells.

Environmental History
In September 2008, Benchmark conducted a Phase I Environmental Site Assessment (ESA) at the Site. Benchmark identified several recognized environmental conditions (RECs) and recommended additional Site investigation.

In September 2008, Benchmark conducted a limited Preliminary Site Investigation at the Site. The limited investigation included soil borings to evaluate potential impacts associated with past heavy industrial operations, and to provide general characterization of the property. Surface, sub-surface and a historical stack soil/fill samples were collected. Based on results of the investigation, Benchmark recommended that a BCP application be submitted to the NYSDEC.

4. Remedial Process

Note: See Appendix E for a flowchart of the brownfield site remedial process.

Application

The Applicant has applied for and been accepted into the New York's Brownfield Cleanup Program as a Volunteer. A Volunteer is not responsible for the disposal or discharge of the contaminants or their ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination on-site, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the Site will be used for restricted purposes. To achieve this goal, the Applicant will conduct remedial activities at the Site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement provides the responsibilities of each party in conducting a remedial program at the Site.

If the Applicant conducts a remedial investigation (RI) of the Site, it will be performed with NYSDEC oversight, and with the following goals:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other impacted media;

2) Identify the source(s) of the contamination;

3) Assess the impact of the contamination on public health and/or the environment; and

4) Provide information to support the development of a Remedial Work Plan to address the contamination, or to support a conclusion that the contamination does not need to be addressed.

The Applicant will prepare an RI Report after it completes the RI. This report will summarize the results of the RI and will include the Applicant's recommendation of whether remediation is needed to address site-related contamination. The RI Report is subject to review and approval by NYSDEC. Before the RI Report is approved, a fact sheet that describes the RI Report will be sent to the Site's contact list.

NYSDEC determines whether the Site poses a significant threat to public health and/or the environment. If NYSDEC determines that the Site is a "significant threat," a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying community group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the Site and the development/implementation of a remedy.

For more information about the TAG Program and the availability of TAGs, go online at: www.dec.ny.gov/regulations/2590.html

Remedy Selection

If remediation is required, the Applicant will be able to develop a Remedial Work Plan. The Remedial Work Plan describes how the Applicant would address the contamination related to the site.

The public will have the opportunity to review and comment on the draft Remedial Work Plan. The site contact list will be sent a fact sheet that describes the draft Remedial Work Plan and

announces a 45-day public comment period. NYSDEC will factor this input into its decision to approve, reject or modify the draft Remedial Work Plan.

A public meeting may be held by NYSDEC about the proposed Remedial Work Plan if requested by the affected community and if significant substantive issues are raised about the draft Remedial Work Plan. Please note that in order to request a public meeting, the health, economic well-being, or enjoyment of the environment of those requesting the public meeting must be threatened or potentially threatened by the site. In addition, the request for the public meeting should be made within the first 30 days of the 45-day public comment period for the draft Remedial Work Plan. A public meeting also may be held at the discretion of the NYSDEC project manager in consultation with other NYSDEC staff as appropriate.

Construction

Approval of the Remedial Work Plan by NYSDEC will allow the Applicant to design and construct the alternative selected to remediate the site. The site contact list will receive notification before the start of site remediation. When the Applicant completes remedial activities, it will prepare a final engineering report that certifies that remediation requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the remediation is protective of public health and the environment for the intended use of the site. The site contact list will receive a fact sheet that announces the completion of remedial activities and the review of the final engineering report.

Certificate of Completion and Site Management

Once NYSDEC approves the final engineering report, NYSDEC will issue the Applicant a Certificate of Completion. This Certificate states that remediation goals have been achieved, and relieves the Applicant from future remedial liability, subject to statutory conditions. The Certificate also includes a description of any institutional and engineering controls or monitoring required by the approved remedial work plan. If the Applicant uses institutional controls or engineering controls to achieve remedial objectives, the site contact list will receive a fact sheet that discusses such controls.

An institutional control is a non-physical restriction on use of the brownfield site, such as a deed restriction that would prevent or restrict certain uses of the remediated property. An institutional control may be used when the remedial action leaves some contamination that makes the site suitable for some, but not all uses.

An engineering control is a physical barrier or method to manage contamination, such as a cap or vapor barrier.

Site management will be conducted by the Applicant as required. NYSDEC will provide appropriate oversight. Site management involves the institutional and engineering controls required for the brownfield site. Examples include: operation of a water treatment plant, maintenance of a cap or cover, and monitoring of groundwater quality.

5. Citizen Participation Activities

CP activities that have already occurred and are planned during the investigation and remediation of the site under the BCP are identified in Appendix D: Identification of Citizen Participation Activities. These activities also are identified in the flowchart of the BCP process in Appendix E. NYSDEC will ensure that these CP activities are conducted, with appropriate assistance from the Applicant.

All CP activities are conducted to provide the public with significant information about site findings and planned remedial activities, and some activities announce comment periods and request public input about important draft documents such as the Proposed Remedial Work Plan.

All written materials developed for the public will be reviewed and approved by NYSDEC for clarity and accuracy before they are distributed. Notices and fact sheets can be combined at the discretion, and with the approval, of NYSDEC.

6. Major Issue of Public Concern

This section of the CP Plan identifies major issues of public concern, if any, that relate to the site. Additional major issues of public concern may be identified during the site's remedial process.

Local Residents

The Site Remediation will be carried out by professionals experienced in performing cleanup activities in densely populated areas. All work will be conducted under a Site-Wide Health and Safety Plan and Community Air Monitoring Program approved by the NYSDEC and NYSDOH. The Site Remediation will be conducted over a limited duration and during normal business hours. Soil excavations will be secured to eliminate the risk of injury. The Site

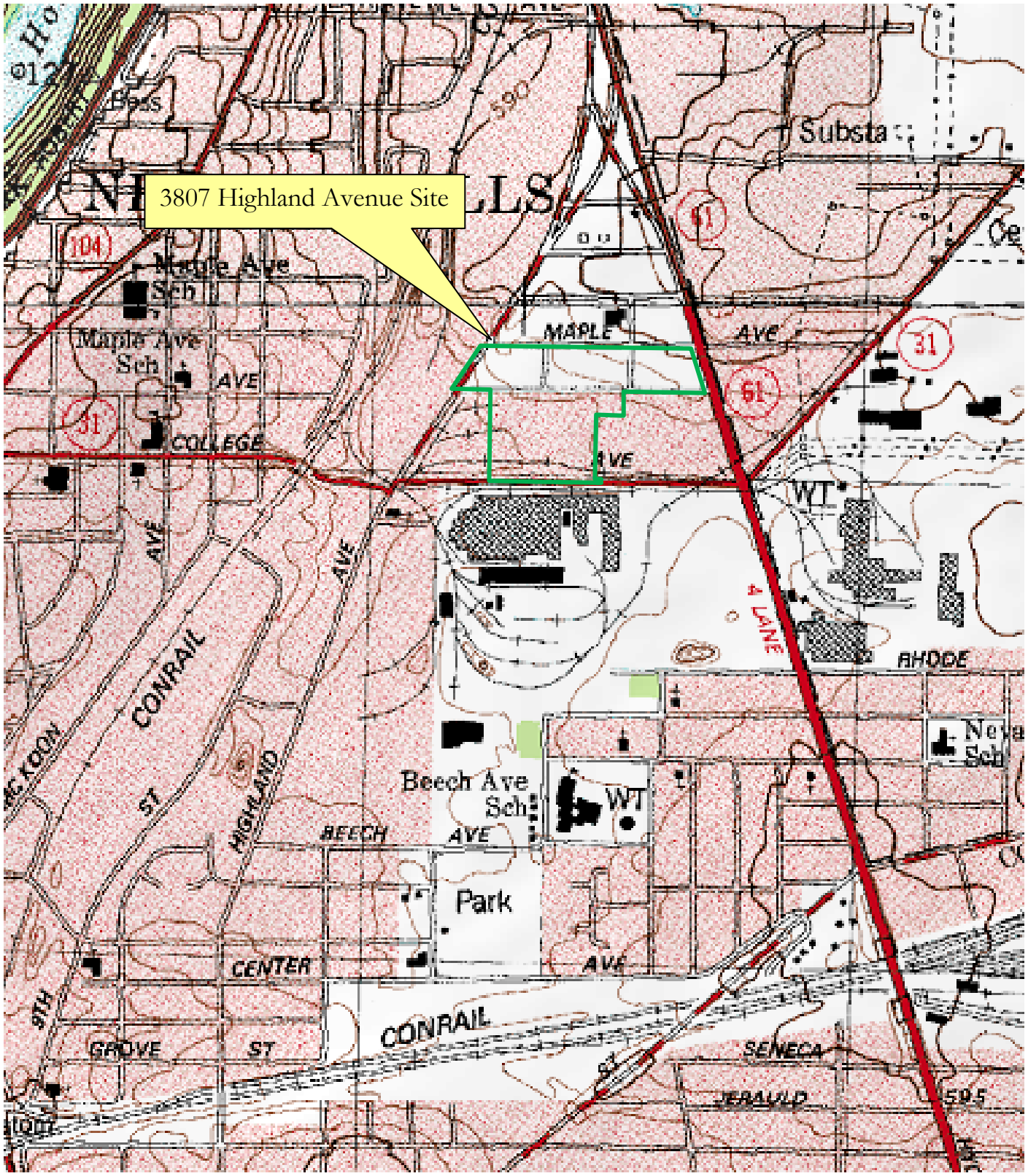
Remediation will be performed with minimal equipment; hence, there will be no change in traffic patterns.

Stakeholders

The sequencing of events is important to the timely redevelopment of the Site. The remedial work must be completed Summer 2010.

Appendix A – Site Location Maps

FIGURE 1



BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0170-001-102

DATE: OCTOBER 2008

DRAFTED BY: NTM

SITE LOCATION AND VICINITY MAP

RI / AAR / IRM WORK PLAN

3807 HIGHLAND AVENUE SITE

NIAGARA FALLS, NEW YORK

PREPARED FOR

GLOBE METALLURGICAL, INC.

BCP PROPERTY BOUNDARY

SOLSIL AREA

NOT TO SCALE

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0170-001-102

DATE: AUGUST 2009

DRAFTED BY: NTM

SITE PLAN

RI / AAR / IRM WORK PLAN

3807 HIGHLAND AVENUE SITE

NIAGARA FALLS, NEW YORK

PREPARED FOR

GLOBE METALLURGICAL, INC.

FIGURE 2

Appendix B – Project Contacts and Document Repositories

Project Contacts

For information about the site's remedial program, the public may contact the following NYSDEC project contacts:

Mr. Michael Hinton, P.E.
Project Manager
NYSDEC Region 9
Division of Environmental Remediation
270 Michigan Avenue
Buffalo, NY 14203
(716) 851-7220

Mr. Mark Baetzhold
Citizen Participation Specialist
NYSDEC Region 9
270 Michigan Avenue
Buffalo, NY 14203
(716) 851-7220

New York State Department of Health (NYSDOH):

Mr. Matt Forcucci
Project Manager
NYSDOH
584 Delaware Avenue
Buffalo, New York 14202
(716) 847-4501

Document Repositories

The document repositories identified below have been established to provide the public with convenient access to important project documents:

Niagara Falls Public Library
Earl W. Brydges Building
1425 Main Street
Niagara Falls, NY 14305
Attn: Ms. Betty Babanoury, Director
Phone: (716) 286-4881
Hours: M-W 9:00-9:00
T-S 9:00-5:00
Sun. (closed)

NYSDEC Region 9 Office
270 Michigan Avenue
Buffalo, NY 14203
Attn: Ms. Megan Gollwitzer
Phone: (716) 851-7220
Hours: M-F 8:30-4:45
(Call for appointment)

Appendix C – Brownfield Site Contact List

(see attached)

Appendix C

BCP Site Contact List Information

Globe Metallurgical, Inc.
3807 Highland Avenue Site
Brownfield Cleanup Program Application

New York State Contacts:

Senator Hillary Rodham-Clinton
U.S. Senate
726 Exchange Street, Suite 511
Buffalo, NY 14210

Senator Charles Schumer
U.S. Senate, Suite 660
130 So. Elmwood Ave
Buffalo, NY 14202

Senator Antoine Thompson
NYS Senate Dist. 60
65 Court Street
Buffalo, NY 14202

Assembly, Francine Delmonte
138th District
1700 Pine Ave.
Niagara Falls, NY 14301

Rep. Louise Slaughter
NY 28th District
1910 Pine Ave.
Niagara Falls, NY 14301

Mr. Michael Basile
WNY Public Info. Office
186 Exchange St.
Buffalo, NY 14204

Community Outreach File
NYSDEC
270 Michigan Ave.
Buffalo, NY 14203

DER File
NYSDEC
270 Michigan Ave.
Buffalo, NY 14203

Niagara County Contacts:

Chairman William Ross
Niagara County Legislature
6761 Walmore Road
Niagara Falls, NY 14304

Mr. Michael Shanley
Niag. Co. Emergency Planning
Niagara & Hawley Street
Lockport, NY 14094

Wayne Jagow
Niagara County Clerk
PO Box 461
Lockport, NY 14095

Mr. Daniel Bristol
Niagara Falls City Admin.
4010 Barton Street
Niagara Falls, NY 14305

Mr. James Devald, P.E.
Niagara Co. Health Dept.
5467 Upper Mountain Road
Lockport, NY 14094

Mr. Paul Dickey
Niagara County Health Dept.
5467 Upper Mountain Rd.
Lockport, NY 14094-1899

Appendix C

BCP Site Contact List Information

Globe Metallurgical, Inc.
3807 Highland Avenue Site
Brownfield Cleanup Program Application

Niagara County Contacts (cont'd):

Clerk James Sobczyk
Niagara County Legislature
175 Hawley Street
Lockport, NY 14094

Herbert Downs
Niagara Cty. Water District
PO Box 315
Lockport, Ny 14094

Amy Fisk, Env. Planner
Niagara Cty. Econ. Devpt.
6311 Inducon Corporate Dr.
Sanborn, NY 14132

David E. Wertman, MPA Comm.
Niagara Co. Health Dept.
5467 Upper Mountain Rd.
Lockport, NY 14094

Mr. Samuel M. Ferraro, Exec. Dir.
Niagara Co. Ind. Dev. Agency
6311 Inducon Corporate Drive
Sanborn, NY 14132

Mr. Dennis F. Virtuoso
Niagara Co. Legislature #4
2703 Independence Ave.
Niagara Falls NY 14301

Alan Nusbaum City of Niagara Fall
Dept. of Planning/Env. Services
745 Main Street
Niagara Falls, NY 14302

Mr. Greg Lewis
Niagara County Manager
59 Park Avenue
Lockport, NY 14094

Ms. Dawn Walczak
Niagara County EMC
59 Park Avenue
Lockport, NY 14094

Mr. James Volkosh, Director
Niagara Cty. Emergency Services
PO Box 496
Lockport, NY 14095-0496

Daniel Stapleton, Director
Niagara County Dept. of Health
5467 Upper Mountain Rd, Suite 100
Lockport, NY 14094

Ms. Carol Antonucci
Niagara Falls City Clerk
745 Main Street
Niagara Falls, NY 14302

Robert Buzzelli, City Engineer
City Hall Room 303
745 Main Street
Niagara Falls, NY 14302

Gerald Grose
Niagara Falls Water Board
5815 Buffalo Avenue
Niagara Falls, NY 14304

Appendix C

BCP Site Contact List Information

Globe Metallurgical, Inc.
3807 Highland Avenue Site
Brownfield Cleanup Program Application

Local News Media:

ATTN: Aaron Besecker
The Buffalo News
1 News Plaza
Buffalo, NY 14240

WKBW-TV
7 Broadcast Plaza
Buffalo, NY 14202

WBEN News Radio 930
Entercom Radio of Buffalo
500 Corporate Pkwy, Suite 200
Buffalo, NY 14226

ATTN: Env. News Desk
WGRZ TV - CH. 2
259 Delaware Avenue
Buffalo, NY 14202

ATTN: Environmental News Desk
WIVB - CH. 4
2077 Elmwood Avenue
Buffalo, NY 14207

ATTN: Michael Desmond
WNED, Env. News Desk
PO 1263, Horizons Plaza
Buffalo, NY 14240

ATTN: Tracey Drury
Business First
465 Main Street
Buffalo, NY 14203-1793

ATTN: Aaron Besecker
The Niagara Gazette
310 Niagara Street
Niagara Falls, NY 14302

ATTN: Mike Hudson, Editor
Niagara Falls Reporter
1625 Buffalo Ave
Niagara Falls, NY 14303

ATTN: News Director
WLVL 1340
PO Box 477
Lockport, NY 14095-0477

ATTN: Environmental News Desk
WJYE
1700 Rand Building
Buffalo, NY 14203

Environmental News Desk
The Niagara Gazette
310 Niagara Street
Niagara Falls, NY 14302

Supplier of Potable Water:

Niagara County Water District
PO Box 315
Lockport, NY 14905-0315

Document Repository:

Niagara Falls Public Library
Earl W. Brydges Building
1425 Main Street
Niagara Falls, NY 14305

Appendix C

BCP Site Contact List Information

Globe Metallurgical, Inc.
3807 Highland Avenue Site
Brownfield Cleanup Program Application

Nearby Schools:

Principal Lawrence Martinez
Sixty Sixth Street School
630 66th Street
Niagara Falls, NY 14304

Principal Maria Chille-Zafuto
Niagara Middle School
6431 Girard Ave.
Niagara Falls, NY 14304

Principal Joseph Colburn
Gaskill Middle School
910 Hyde Park Blvd.
Niagara Falls NY 14301

Other Interested Groups:

Brian Smith
Citizens' Campaign for the Env.
227 McConkey Drive
Tonawanda, NY 14223

Citizens' Environmental Coalition
33 Central Avenue
Albany, NY 12210

Joe Gardella
BEMC
176 Admiral Road
Buffalo, NY 14216

Charles Lamb
Sierra Club – Niagara Region
335 Walnut Lane
Youngstown, NY 14174

Julie Barrett O'Neil, Director
Buffalo Niagara Riverkeeper
1250 Niagara Street
Buffalo, NY 14213

Mr. Michael Podd
4827 Rogers Rd.
Hamburg, NY 14075

Appendix C

BCP Site Contact List Information

Globe Metallurgical, Inc.
3807 Highland Avenue Site
Brownfield Cleanup Program Application

Electronic Government Contacts:

Abby Snyder	amsnyder@gw.dec.state.ny.us
Daniel David	drdavid@gw.dec.state.ny.us
Larry Ennist	ldennist@gw.dec.state.ny.us
Greg Sutton	gpsutton@gw.dec.state.ny.us
Mike Hinton	mjhinton@gw.dec.state.ny.us
Mark Baetzhold	mtbaetzh@gw.dec.state.ny.us
Megan Gollwitzer	megollwi@gw.dec.state.ny.us
Rich Fedigan	rjf01@health.state.ny.us
Matt Forcucc	imjf13@health.state.ny.us
Mike Basile	basile.michael@epa.gov

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Appendix C

AREA PROPERTY OWNERS

Globe Metallurgical, Inc.
3807 Highland Avenue Site

Brownfield Cleanup Program Application

Adjacent Property Address		Owner Name and Mailing Address
No.	Street	
3700	Highland Ave.	Michael Prakash Bhimsingh 3700 Highland Avenue Niagara Falls, NY 14305
3702	Highland Ave.	Isabel A. Anderson 3702 Highland Avenue Niagara Falls, NY 14305
3710	Highland Ave.	James E. Walker 3710 Highland Avenue Niagara Falls, NY 14305
3711	Highland Ave.	The House of God 3711 Highland Avenue Niagara Falls, NY 14305
3712	Highland Ave.	Kelvin & Sonya S. Agee 3712 Highland Avenue Niagara Falls, NY 14305
3716, 3718	Highland Ave.	Musid Mohammad Dubashi 3718 Highland Avenue Niagara Falls, NY 14305
3719, 3721	Highland Ave.	Eddie Ashley 3721 Highland Avenue Niagara Falls, NY 14305
3729	Highland Ave.	Niagara Mohawk Power Corp. (Right-of-Way)
3800	Highland Ave.	Dalana Realty, Inc. 3800 Highland Ave. Niagara Falls, NY 14305
4101	Highland Ave.	Niagara Falls Urban Renewal 4101 Highland Ave. Niagara Falls, NY 14305
4110	Highland Ave.	Armand Cerrone 4110 Highland Ave. Niagara Falls, NY 14305
1501	College Ave.	Niagara Vest, Inc. 1501 College Ave. Niagara Falls, NY 14305
1402, 1503, 1511, 1925 & 2000	College Ave.	Niagara Mohawk Power Corp. (Right-of-Way)

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Appendix C

AREA PROPERTY OWNERS

Globe Metallurgical, Inc.
3807 Highland Avenue Site

Brownfield Cleanup Program Application

Adjacent Property Address		Owner Name and Mailing Address
No.	Street	
1655	College Ave.	George J. Wolf 1655 College Ave. Niagara Falls, NY 14305
1731 & 1777	College Ave.	Hazorb, Inc. 1731 College Ave. Niagara Falls, NY 14305
1901	College Ave.	Eastern Ohio Paving, Inc. 1901 College Ave. Niagara Falls, NY 14305
2001	College Ave.	David Kushner 2001 College Ave. Niagara Falls, NY 14305
1701	Maryland Ave.	Frank A. Amendola 1701 Maryland Avenue Niagara Falls, NY 14305
3851	Hyde Park Blvd.	William Viele 3851 Hyde Park Blvd. Niagara Falls, NY 14305
3857	Hyde Park Blvd.	3857 Hyde Park Blvd. 3857 Hyde Park Blvd. Niagara Falls, NY 14305
3925	Hyde Park Blvd.	Park Development Associates 3925 Hyde Park Blvd. Niagara Falls, NY 14305
3938	Hyde Park Blvd.	Niagara County IDA 3938 Hyde Park Blvd. Niagara Falls, NY 14305
3940	Hyde Park Blvd.	Schleifmittel Treibacher 3940 Hyde Park Blvd. Niagara Falls, NY 14305
4011	Hyde Park Blvd.	4011 Hyde Park Blvd, LLC 4011 Hyde Park Blvd. Niagara Falls, NY 14305
4120	Hyde Park Blvd.	Norman C. & Barbara A. Oliver 4120 Hyde Park Blvd. Niagara Falls, NY 14305
4129	Hyde Park Blvd.	Henry M. Felicetti Etal 4129 Hyde Park Blvd. Niagara Falls, NY 14305

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Appendix C

AREA PROPERTY OWNERS

Globe Metallurgical, Inc.
3807 Highland Avenue Site

Brownfield Cleanup Program Application

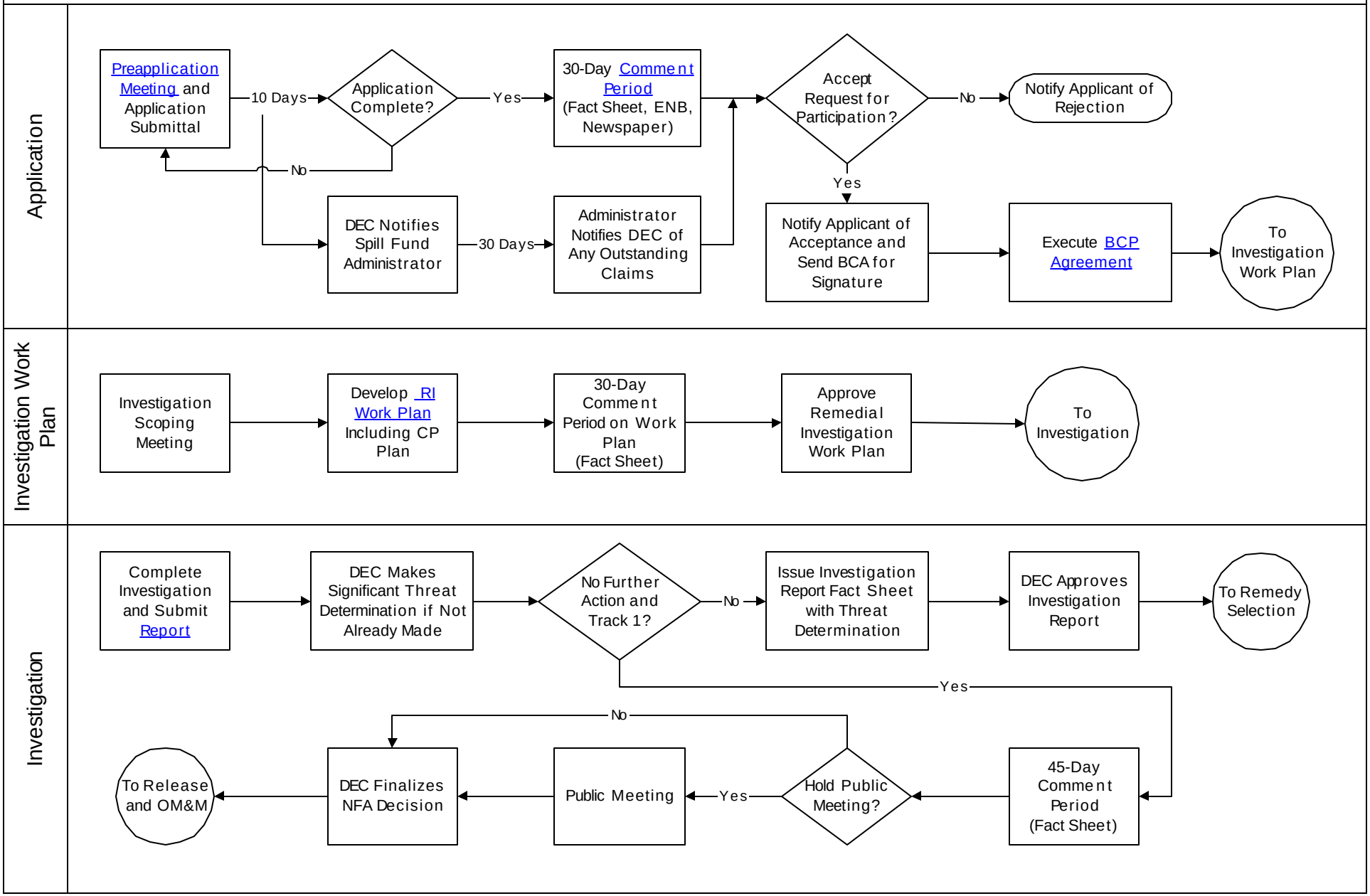
Adjacent Property Address		Owner Name and Mailing Address
No.	Street	
3701 & 3703	Lehigh Court	Jack Brundage 3701 Lehigh Court Niagara Falls, NY 14035
3707, 3711, 3713, & 3715	Lehigh Court	John A. Brundage 3702 Lehigh Court Niagara Falls, NY 14305
3723, 3727	Lehigh Court	J.A. Brundage - The Drain 3727 Lehigh Court Niagara Falls, NY 14305
1910	Maple Ave.	Norman C. & Barbara A. Oliver 1910 Maple Avenue Niagara Falls, NY 14305
2109	Maple Ave.	Pierce Lonberger 2109 Maple Avenue Niagara Falls, NY 14305

Appendix D – Identification of Citizen Participation Activities

Required Citizen Participation (CP) Activities:	CP Activities Occur at this Point:
Application Process:	
• Prepare brownfield site contact list (BSCL) • Establish document repositories • Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period • Publish above ENB content in local newspaper • Mail above ENB content to BSCL	At time of preparation of application to participate in BCP. When NYSDEC determines that BCP application is complete. The 30-day comment period begins on date of publication of notice in ENB. End date of comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice and notice to the BSCL should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement:	
• Prepare Citizen Participation (CP) plan	Draft CP Plan must be submitted within 20 days of entering Brownfield Site Cleanup Agreement. CP Plan must be approved by NYSDEC before distribution
After Remedial Investigation (RI) Work Plan Received:	
• Mail fact sheet to BSCL about proposed RI activities and announcing 30-day public comment period on draft RI Work Plan	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, comment periods will be combined and public notice will include fact sheet. 30-day comment period begins/ ends as per dates identified in fact sheet.
After RI Completion:	
• Mail fact sheet to BSCL describing results of RI	Before NYSDEC approves RI Report
After Remedial Work Plan (RWP) Received:	
• Mail fact sheet to BSCL about proposed RWP and announcing 45-day comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager in consultation with other NYSDEC staff as appropriate)	Before NYSDEC approves RWP. 45-day comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day comment period.
After Approval of RWP:	
• Mail fact sheet to BSCL summarizing upcoming remedial construction	Before the start of remedial construction.
After Remedial Action Completed:	
• Mail fact sheet to BSCL announcing that remedial construction has been completed • Mail fact sheet to BSCL announcing issuance of Certificate of Completion (COC)	At the time NYSDEC approves Final Engineering Report. These two fact sheets should be combined when possible if there is not a delay in issuance of COC.

Appendix E – Brownfield Cleanup Program Process

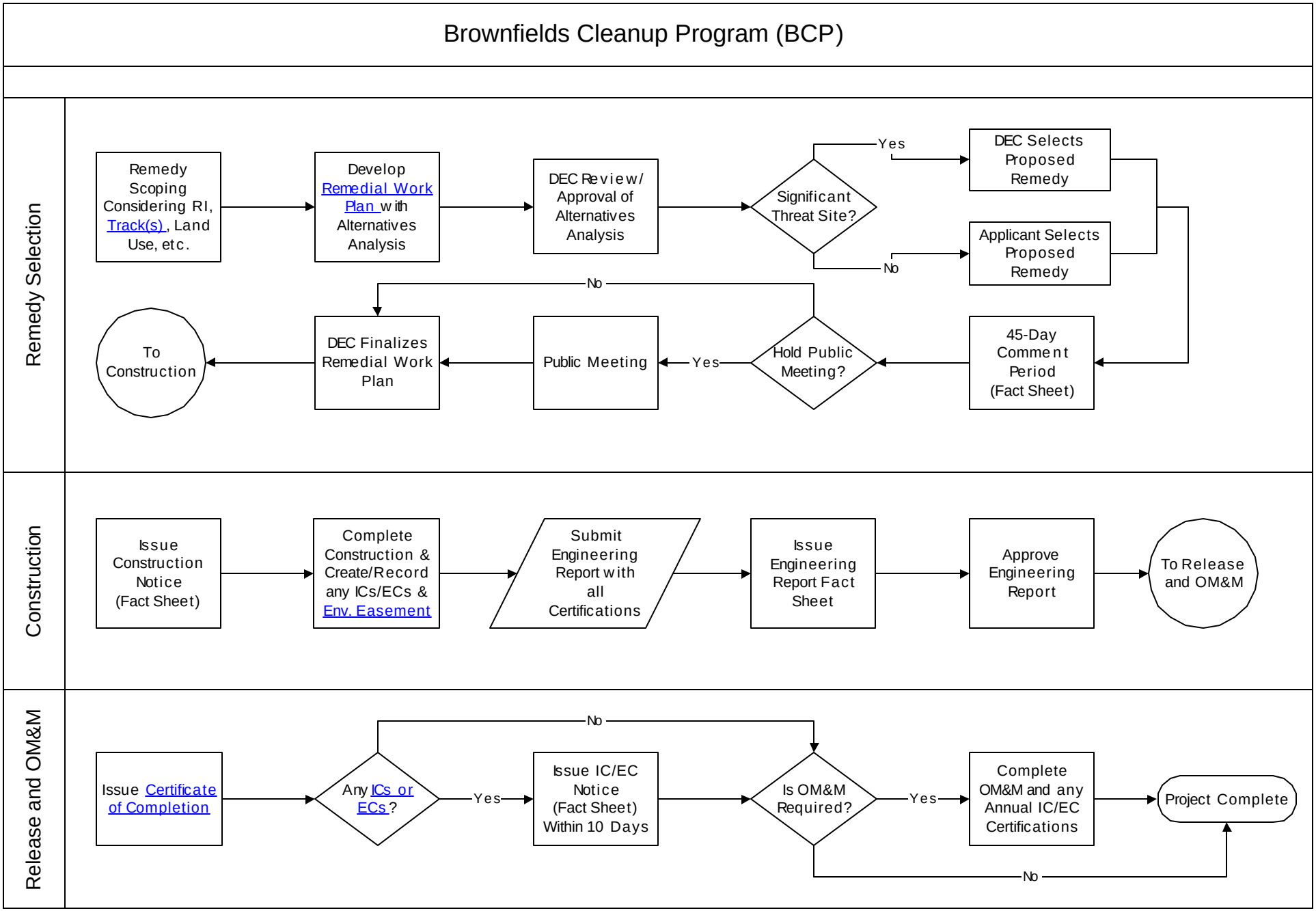
Brownfields Cleanup Program (BCP)



Underlined Topics are Links to Fact Sheets

11/20/03

Brownfields Cleanup Program (BCP)



Underlined Topics are Links to Fact Sheets

11/20/03

APPENDIX D

PROJECT DOCUMENTATION

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

INSPECTOR'S DAILY REPORT

Page _____ of _____

CONTRACTOR:	JOB NO.:
CLIENT:	DATE:

LOCATION:		DAY: Su M Tu W Th F Sa	
WEATHER:	TEMP: °F	START:	END:

WORK PERFORMED:

TEST PERFORMED:	QA PERSONNEL:
	SIGNATURE:

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

INSPECTOR'S DAILY REPORT

(CONTINUED) Page _____ of _____

CONTRACTOR:	JOB NO.:
CLIENT:	DATE:

MEETINGS HELD & RESULTS:

CONTRACTOR'S WORK FORCE AND EQUIPMENT

DESCRIPTION	H	#	DESCRIPTION	H	#	DESCRIPTION	H	#
Field Engineer						Front Loader Ton		
Superintendent						Bulldozer		
Laborer-Foreman						DJ Dump Truck		
Laborer						Water Truck		
Operating Engineer			Equipment			Backhoe		
Carpenter			Generators			Excavator		
Ironworker			Welding Equipment			Pad foot roller		
Concrete Finisher			Roller					
			Paving Equipment					
			Air Compressor					

REMARKS:

REFERENCES TO OTHER FORMS:

SAMPLES COLLECTED:

Sample Number:

Approx. Location of Stockpile:

No. of Stockpile

Date of Collection:

Weather:

Field Observations:

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

DAILY LOG	DATE			
	REPORT NO.			
	PAGE		OF	

PROBLEM IDENTIFICATION REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Problem Description:

Problem Location (reference test location, sketch on back of form as appropriate):

Problem Causes:

Suggested Corrective Measures or Variances:

Linked to Corrective Measures Report No. *or Variance Log No.*

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

DAILY LOG	DATE			
	REPORT NO.			
	PAGE		OF	

CORRECTIVE MEASURES REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Corrective Measures Undertaken (reference Problem Identification Report No.)

Retesing Location:

Suggested Method of Minimizing Re-Occurrence:

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative