Remedial Design Work Plan

Steelfields Area IV (Hydro-Air) Site
Buffalo, New York

September 2006 0107-001-100

Prepared For:

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WORK PLAN
for
BROWNFIELD CLEANUP PROGRAM
REMEDIAL DESIGN

STEELFIELDS AREA IV (HYDRO-AIR) SITE
BUFFALO, NEW YORK

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CERTIFICATION:

Peter L. Krog, P.E.	**Date**
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Registration State: New York	**SEAL:**

STEELFIELDS AREA IV (HYDRO-AIR) SITE
REMEDIAL DESIGN WORK PLAN

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1.0 INTRODUCTION

1.1 Background and History

Steelfields Ltd. owns approximately 214 acres of vacant industrial property located on in Buffalo, New York (See Figure 1-1) bordered by the Buffalo River to the north, South Park Ave and Abby Street to the east, Tifft Street to the south and an active rail yard to the west (Norfolk and Southern and South Buffalo Railway) . The property is subdivided into four parcels, shown on Figure 1-2, based on the operational and ownership history of each parcel. In October 2002, Steelfields entered into a Voluntary Cleanup Program (VCP) agreement with the NYSDEC for the entire site. Since 2003, Steelfields has performed remediation of the site in accordance with an approved Remedial Design/Remedial Action RD/RA Work Plan (September 2002) under the VCP. The remediation has progressed more or less sequentially from Area I to Area IV. To date, the Area IV parcel (Former Donner-Hanna Coke Yard Parcel) cleanup has been partially completed by Steelfields in accordance with the 2002 approved RD/RA Work Plan.

Steelfields is currently negotiating an agreement for the sale of the 30.9 acre Area IV parcel to Hydro-Air Components Inc. (Hydro-Air), which is contemplating the development of the parcel for a new manufacturing facility. Hydro-Air is seeking approval from the NYSDEC to enter into the Brownfields Cleanup Program (BCP) related to the redevelopment of the Area IV parcel. Ownership of the remaining three parcels (Area I through III) will remain with Steelfields.

Area IV may also be referred to as the Hydro-Air Site or the Site. The Site was historically utilized by Donner-Hanna Coke for storage of coke product. Tar and tar byproducts from the coke plant (Area II) were also disposed of on the western portion of the Site. The Site is listed as Class 3 inactive hazardous waste site (Site No. 915017) on the NYSDEC inactive hazardous waste site registry.

1.2 Environmental Investigations and Remedial Efforts

1.2.1 Site Assessments

The Site has been extensively investigated and characterized through a series of environmental site assessments and investigations performed over several decades on the parcel. The major documented assessments and investigations include:

- *Phase I/Phase II Investigation, Donner-Hanna Coke Site No. 915017.* Recra Environmental, Inc. and Lawler, Matusky & Skelly Engineers. July 1990
- *Phase I/Phase II Environmental Site Assessment (ESA), Former Republic Steel Plant Area ("Steel Manufacturing Site").* Malcolm Pirnie, Inc. September 1997
- *South Buffalo Redevelopment Plan, Steel Manufacturing Site, Voluntary Cleanup Site Assessment Report.* Malcolm Pirnie, Inc. September 1997
- *Voluntary Cleanup Site Assessment Report, Former Steel Manufacturing Site, Area II, Area III, and Area IV.* TurnKey Environmental Restoration, LLC. April 1999
- *Voluntary Cleanup Site Assessment Report, Former Steel Manufacturing Site, Addendum 1, Area II, Area III, and Area IV.* TurnKey Environmental Restoration, LLC. January 2000

In general, the investigations identified the following environmental impacts associated with the Area IV parcel:

- The presence of substantial quantities (approximately 60,000 to 80,000 cubic yards) of residual coke fill and smaller amounts of other fill materials (sand, demolition debris, sludges, etc.) overlying native soils across the approximately 33 acres of the site.
- The presence of tar and tar-impacted soil/fill (estimated at approximately 20,000 to 23,000 cubic yards) in the western portion of the site located in varying thicknesses from the surface down to approximately 6 to 10 feet below grade.

- The presence of volatile and semi-volatile organic compounds and inorganic compounds (i.e., cadmium, lead, chromium and cyanide) in the groundwater collected from the northern and western portions of the Site at concentrations exceeding the NYSDEC groundwater quality standards

The results of these assessments and investigations provided a detailed characterization of the environmental conditions at the Site and established the basis for the original Voluntary Cleanup Program Remedial Design/Remedial Action (RD/RA) Work Plan and this subsequent RD Work Plan for the completion of the remedial activities under the BCP.

1.3 Intended Future Use of Site

Hydro-Air Industrial Components, Inc. is contemplating a plan to consolidate and expand its current Western New York manufacturing, warehousing/distribution facilities and office operations at the now vacant Site. That plan is contingent upon, inter alia, approval for entrance of Area IV into the BCP. Hydro-Air's Site redevelopment plans include construction of a new 140,000 square foot (sq. ft.) single-story steel-framed high-bay manufacturing structure with masonry and insulated steel panel walls. An adjacent 12,700 sq. ft. single-story masonry structure will house Hydro-Air's corporate offices. The planned facility will also have parking for employees and visitors as well as truck loading docks. The preliminary planned facility layout illustrated in Figure A-1 includes provision for a 100,000 sq. ft. future expansion of the manufacturing plant and associated additional parking. Due to Hydro-Air's existing facilities lease term, its short-term manufacturing facility requirements given recent and prospective business opportunities, and other options being considered, this redevelopment project is on a fast-track schedule for completion and occupancy, if at all, by year-end 2006. As such, planning, design and regulatory approvals must be completed in an expedient manner so building construction can begin by July 31, 2006.

1.4 Purpose and Objectives

Due to Hydro-Air's business opportunity time constraints, Steelfield's VCP remediation schedule, and related complications related to completion of the remaining

remediation elements in Area IV under Steelfield's various VCP agreements, Hydro-Air proposes to complete remaining remedial measures in Area IV upon taking title to same, as currently are required of Steelfields Ltd. under it's Voluntary Cleanup Program (VCP) Remedial Design/Remedial Action (RD/RA) Work Plan while Hydro-Air concurrently begins site development work and construction of planned facilities under the New York State Brownfields Program (BCP).

Hydro-Air proposes to enter the BCP at the remedial design stage. The Remedial Design (RD) Work Plan (prepared and submitted as part of the BCP application) identifies the scope of planned remaining remedial and post-remedial measures and the means by which they will be completed, including target site-specific cleanup levels and confirmatory sampling requirements.

For all practical purposes, and to facilitate timely NYSDEC review and approvals, the BCP RD Work Plan is simply a redacted version of the Steelfields VCP RD/RA Work Plan that addresses all remaining remedial and post-remedial measures for Area IV to be performed by or on behalf of Hydro-Air. This BCP RD Work Plan neither adds, deletes or materially modifies any of the remediation or post-remediation requirements for Area IV as previously approved by NYSDEC under the Steelfields VCA.

1.5 Project Organization and Responsibilities

Hydro-Air is applying for acceptance of the Site into the BCP, and plans on executing a Brownfield Cleanup Agreement (BCA) as a non-responsible party (volunteer) per ECL§27-1405. Steelfields, Ltd. shall continue to perform the remaining remediation work elements in Area IV in full conformance with its existing Voluntary Cleanup Agreement unless and until the parcel is acquired by Hydro-Air. Steelfields and NYSDEC will amend the Steelfields Site description in the VCA to exclude Area IV, as the balance of remedial actions will transfer to Hydro- Air under their BCA. This arrangement is critical to Steelfields completing its overall site remediation schedule on target by the end of calendar year 2006.

The NYSDEC Division of Environmental Remediation shall continue to monitor the remedial actions performed by Steelfields to verify that the work they perform in Area IV is

performed in accordance with its VCA. NYSDEC shall also monitor the remaining remediation and post-remediation actions to be performed by Hydro-Air under the BCP, the Remedial Design Work Plan, and DER-10.

1.6 Summary of Remedial Tasks Completed and Remaining

As previously noted, Steelfields Ltd. performed and continues to perform a substantial portion of the previously approved remedial cleanup at the Site under the VCP in 2005 and through early 2006. The remaining remediation work required under the VCP approved Work Plan and planned for completion under the BCP is summarized below:

1.6.1 Area IV Tasks Completed to Date

Steelfields initiated remedial action in Area IV in 2004 beginning with the removal and off-site recycling of coke residuals. Approximately 43,000 cubic yards of coke residuals were removed as of April 2006.

In 2005, Steelfields initiated excavation and off-site treatment or recycling of tar-impacted soil/fill exhibiting hazardous characteristics for benzene. Off-site treatment consisted of low-temperature thermal desorption. Recycling consisted of off-site co-combustion as an alternative fuel in a coal-fired electric power generation facility. Also beginning in 2005, Steelfields initiated excavation of non-hazardous tar-impacted soil/fill in Area IV with on-site disposal in the Area II containment cell. As of April 21, 2006, a total of approximately 16,000 cubic yards of tar-impacted soil/fill has been removed from Area IV. A total of approximately 47,000 cubic yards of clean borrow soil backfill has been placed in Area IV as of April 21, 2006.

1.6.2 Area IV Tasks Remaining

- **Tar Material Removal:** Approximately 4,000 to 9,000 cubic yards of tar material (hazardous and non-hazardous) and related soil/fill exceeding SSALs remain to be

excavated in Area IV as of April 21, 2006. An additional approximately 9,000 cubic yards of non-hazardous tar-impacted soil/fill is stockpiled in Area III awaiting disposal. Verification testing will be required along all perimeters and bottoms of excavation in accordance with the Quality Assurance Plan. The excavation will then be backfilled, graded and seeded in accordance with the Soil/Fill Management Plan.

- **Backfill Placement:** The quantity of backfill borrow soil to be placed in Area IV is partly dependant upon remaining excavation volumes, but is estimated at approximately 28,000 to 32,000 cubic yards.

- **Coke Reclamation:** Approximately 3-4 stockpiles totaling between 20,000 and 30,000 cubic yards of residual coke fines, debris, and other fill materials will require transport and recycling off-site. It is currently planned that the majority of the coke residuals will be burned for energy recovery in a power plant.

- **Final Soil Cover:** Upon completion of tar-impacted soil/fill excavation in Area IV, a minimum of 12" of surface cover soil will be placed, compacted, graded, and seeded in areas where clean borrow soils were not previously placed in accordance with the Soil/Fill Management Plan.

1.6.3 Groundwater Management

As detailed in the site assessment reports, groundwater at the Site has been marginally impacted and no remedial measures were required under the approved VCP Work Plan. However, in order to monitor the effectiveness of the contaminant source removal and remediation performed at the Site, a long-term groundwater program was included in the VCP to monitor groundwater quality trends along the perimeter of the Site. A network of three groundwater monitoring wells will be installed, developed and monitored after Site remediation is complete. Sampling parameters, frequency and reporting provisions are contained in the Long-Term Groundwater Monitoring Plan included in the Appendices.

2.0 CLEANUP APPROACH

The cleanup objectives for the site soil/fill will include implementation of remedial measures that are ultimately protective of human health and the environment, but also mitigate potential short-term impacts to site construction workers and the surrounding community during the remedial construction and redevelopment period. A detailed discussion of the remedial measures to be completed at the site prior to redevelopment is presented in Sections 3.0 of this report.

A Soil/Fill Management Plan is incorporated as Appendix A to address potentially contaminated soil/fill not currently identified in the Site Assessment Reports that may be excavated or handled subsequent to the Brownfields Cleanup during infrastructure construction or other redevelopment activities. The Soils/Fill Management Plan also addresses placement of final soil and/or vegetative cover prior to occupancy and use of redeveloped parcels.

Integral to the cleanup and redevelopment activities at the site will be the following objectives to protect the public health:

- Complete vegetative coverage prior to occupancy of a redeveloped parcel. Vegetative or other cover will be established and maintained by the developer as a pre-condition of occupancy and will include pavement, buildings, and vegetated soil cover.

- Incorporation of a sub-slab depressurization system into the planned building design to protect indoor air from potential intrusion of VOCs from subsurface soils/fill. The sub-slab depressurization system will be operated and maintained until such time that it is demonstrated that continued operation of the system is unnecessary to protect indoor air quality inside the building.

- Community air monitoring with engineering controls, as necessary, during periods of remedial construction and site redevelopment to prevent unacceptable fugitive releases of airborne particulates (i.e., dust). A Community Air Monitoring Plan (CAMP) that follows New York State Department of Health (NYSDOH) and NYSDEC recommended procedures is provided in Appendix B.

- Control of surface erosion and run-off during voluntary clean-up, infrastructure and redevelopment construction activities.

- Surface stabilization to mitigate potential wind or water-borne migration of surficial soils/fill constituents in disturbed areas of the property that are not undergoing immediate redevelopment (viz., areas outside redeveloped parcels where remedial construction or utility installation has taken place).

Specific objectives of the brownfields cleanup program to protect the environment include:

- Remove, treat, or contain surface and subsurface impacted soil/fill that would potentially: leach volatile organic, semi-volatile organic, and/or inorganic constituents in sufficient concentrations to degrade on-site groundwater quality; degrade off-site shallow groundwater quality; adversely impact the surface water quality in the Buffalo River or impact the surrounding community.

- Protect the Buffalo River water quality from potential degradation from non-point surface water and/or groundwater discharges from the Site.

- Prevent degradation of off-site groundwater quality potentially resulting from the Site.

As required by the BCP, maintenance of existing institutional controls (i.e., environmental easements to prevent usage of groundwater) and any other engineering controls (e.g., vapor barriers, cover material) must be certified annually. The annual certification would include assurance that the engineering controls have not been altered and remain effective. In addition, provisions will be made in the redevelopment plan to protect existing groundwater monitoring wells. The property owner will assume responsibility for a groundwater sampling and monitoring plan, as part of the operation & monitoring activities at the Site. Appendix C of this Work Plan contains the proposed Long-Term Groundwater Monitoring Plan.

A description of the remedial measures is presented in greater detail in Section 3.0 of this Work Plan.

2.1 Site-Specific Action Levels for Soil/Fill

Site-specific action levels (SSALs) have been established and in use under the approved VCP Work Plan for subsurface soil/fill on the Steelfields Area IV (Hydro-Air) Site. These values are derived from remedial goals accepted by the NYSDEC on other restricted use brownfield redevelopment sites, and are generally consistent with NYSDEC Technical Assistance and Guidance Memorandum (TAGM) HWR-94-4046 "Determination of Soil Cleanup Objectives and Cleanup Levels." These action levels are designed to be target values that will be used in determining, with the NYSDEC, the need for and/or continuation of remedial measures. Such decisions will consider the practicality and benefit of remedial construction in light of the restricted use of the site and other planned remedial measures designed to prevent contact with constituents of concern (e.g., vapor barrier, cover material).

Conformance with SSALs will be confirmed via soil sample verification testing. Sample collection and testing protocols are described in Section 3.0 of this Work Plan and further delineated in the Site Quality Assurance Project Plan (QAPP), submitted under separate cover.

Table 1 summarizes the site-specific action levels (SSALs) established for surficial and subsurface soil/fill on the Steelfields Area IV (Hydro-Air) Site:

TABLE 1
Site Specific Action Levels – Steelfields Area IV (Hydro-Air Site)

PARAMETER	MAXIMUM CONCENTRATION IN SOIL/FILL (mg/kg)
Individual VOC	1
Total VOCs	10
Total SVOCs	500
Arsenic	75
Barium	1,000
Cadmium	15
Chromium	1,000
Lead	1,000
Mercury	10

Selenium	61
Silver	10
Cyanide (Total Amenable)	1,600

The methodology used to develop the SSALs is presented in the Site Assessment Report (Reference 1).

Existing surficial and subsurface soil/fill on the Site with constituent concentrations less than or equal to these SSALs will not require excavation or cleanup. Soil and/or fill in the bottom of excavations in Subareas E and G that contains BTEX compounds in excess of the applicable SSALs are not required to be excavated provided that they are treated in-situ by the use of oxygen release compounds (ORC) to enhance natural biodegradation in accord with the Department-approved program which is appended to this Work Plan as Appendix F.

On-site soil/fill with constituent concentrations below these SSALs is deemed suitable for grading, backfilling excavations, raising grades or other on-site uses during remediation, predevelopment, and development phases of the project. Prior to occupancy and public or private use of redeveloped parcels or subparcels of the Site, the entire surface of the redeveloped parcel or subparcel shall be covered by: structures, paved roads, sidewalks, parking lots or vegetated cover.

Criteria for determining the acceptability of off-site borrow sources for final cover soils are delineated in the Soil/Fill Management Plan (see Appendix A).

3.0 SOIL/FILL REMEDIATION

3.1 Overview

Manufactured gas plant (MGP) and coke manufacturing in the Former Donner-Hanna Coke Plant parcel (Area II) resulted in coke, coal tar, sludges and other residuals to be deposited or otherwise released to or commingled with soil/fill in Area IV (the "Site"). The tar materials are distinctive with their coal black color and pungent naphtha-like odor. The coal tar materials are complex hydrocarbons with a broad spectrum of molecular weight constituents. Specifically, they contain volatile or light oils (i.e. benzene, xylene, and toluene) to middle to heavy oils and pitch (predominately PAHs and semivolatile organics).

Inorganic constituent concentrations in Site soil and fill are highly variable and generally indicative of the slag fill which is intermixed with soil, concrete, brick and other fill materials across the Site. Elevated levels of inorganics (e.g. lead, cadmium and chromium) coexist with some coke plant/MGP wastes that are proposed to be remediated as part of this Brownfields Cleanup.

The above-described environmental conditions and constituents of concern are comprehensively addressed in this Section.

3.2 Area IV Tar Impacted Soil/Fill Remediation

3.2.1 General

The aerial and vertical extent of the tar soil/fill subareas (i.e. Subareas C, D, E, and F) along the western border of Area IV (See Figure 3) were generally defined based on extensive characterizations conducted during the Phase II Environmental Site Assessment (Reference 2). The tar soil/fill in Subareas C, D, E, and F have been previously excavated by Steelfields up to, and in some cases beyond, the limits of these Subareas defined boundaries. Verification sampling results most recently performed along the sidewalls of these tar Subarea excavations show additional soil/fill exceeding SSALs in Subarea C and F as well as additional soil/fill in Subareas D and E that exhibit hazardous waste characteristics for benzene and therefore will require excavation and appropriate treatment/disposal. Verification sampling performed along the southern sidewall of the Subarea G excavation

also exhibits hazardous waste characteristics for benzene and will require excavation and appropriate treatment/disposal. The quantities of additional tar soil/fill requiring excavation and treatment/disposal cannot be accurately quantified but are estimated to be between 4,000 and 9,000 cubic yards as of April 21, 2006.. The proposed cleanup approach for these materials is based on both the characterization of a portion of the tar soil/fill as characteristic hazardous waste (i.e. exceeding the maximum benzene concentration in a TCLP analysis) and the practical necessity of removing this material prior to redevelopment of both parcels.

Specifically, the proposed clean-up approach for the tar soil/fill is as follows:

- Remove, where present the overlying layer of residual coke or unimpacted surficial fill materials, if any.
- Perform dewatering in excavations as necessary to affect soil/fill removal and verification testing. Collected ground/surface water will be pumped or transported to the Area II terminal basin and subsequently discharged the City of Buffalo sewerage system under Steelfields Buffalo Sewer Authority discharge permit.
- Excavate tar-impacted soil/fill (based on the subareas delineated in Reference 1) and stockpile on the clay-lined biopad on adjacent Steelfields Area III. Representative soil/fill samples will be collected and analyzed for TCLP VOCs.
- Stockpiled tar-impacted soil/fill exhibiting hazardous waste characteristics (for benzene) will be kept segregated from non-hazardous tar-impacted soil/fill.

3.2.2 Verification Testing of Tar-Impacted Soil/Fill

Once limits of tar-impacted soil/fill subareas have been excavated, verification sampling and analysis will be performed. Verification testing will be performed after visually impacted soil/fill has been removed. Verification testing will be performed on the remaining sidewalls and bottom of the excavation. Sample collection methodology is described in the Site Quality Assurance Project Plan (QAPP), submitted under separate cover. Verification samples will be analyzed in accordance with USEPA Methods 8021 and 8270 for VOCs and SVOCs, respectively. Samples will be analyzed by an NYSDOH ELAP-

certified laboratory. Lateral excavation will continue until SSALs for analyzed parameters are met or NYSDEC agrees that no further excavation is required. Soil and/or fill in the bottom of excavations in Subareas E and G that contains BTEX compounds in excess of the applicable SSALs are not required to be excavated provided that they are treated in-situ by the use of oxygen release compounds (ORC) to enhance natural biodegradation in accord with the Department-approved program which is appended to this Work Plan as Appendix F.

3.2.3 Backfilling

Subgrade material used to backfill excavations shall meet the following criteria:

- Excavated on-site soil that does not have a detectable petroleum odor or visual evidence of petroleum contamination; large blocks or pieces of concrete, slag or C&D debris that is not tillable for bioremediation; and railroad ties will be reused for backfill.

- Treated on-site soil/fill tested and found to meet all SSALs in accordance with a NYSDEC-approved treatment plan can be used as backfill.

- Off-site soil/fill will originate from known sources having no evidence of disposal or releases of hazardous substances, hazardous or toxic wastes, or petroleum. All off-site sources of material to be used as backfill must be tested in accordance with the Sampling and Analytical Protocol described in the Quality Assurance Project Plan.

- 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.

All backfill material will be compacted in 12-inch lifts with the backhoe bucket or other methods approved by the field inspector or resident engineer. Excavations remaining overnight will be surrounded with orange construction fencing.

3.2.4 Handling, Treatment and Disposal of Tar-Impacted Soil/Fill

Upon completion of analytical testing and characterization of each tar material stockpile, several treatment and/or disposal methods may be implemented based on the material characteristics, community input and associated disposal costs:

- Transport, treat, reuse or dispose of stockpiled material which is characterized as non-hazardous per the TCLP analysis in accordance with one of the following options:

  i. Transport to the Steelfields Area II containment cell for disposal

  ii. Transport off-site for disposal in a permitted landfill.

  iii. Transport off-site to a permitted industrial utility boiler for energy recovery.

- Transport for disposal the stockpiled tar-impacted soil/fill, which is characterized as hazardous per TCLP analysis to an off-site, permitted treatment, storage or disposal facility (TSDF).

3.2.5 Coke Reclamation

Area IV was historically used as a storage yard for coke from the former Donner-Hanna Coke Plant. The majority of the coke which remained has been recovered by Steelfields and removed from the Site for energy recovery. As of April 21, 2006 approximately 20,000 to 30,000 cubic yards of the residual coke remains on the Site in stockpiles awaiting removal. Since this material has energy value, it will be also be removed from the site for use as a fuel source in a permitted utility boiler.

The fill underlying the coke (with the exception of the tar soil/fill subareas at the western end of the parcel) was analyzed and does not present an environmental impact to the site. It was not removed as part of the coke reclamation effort.

3.3 Groundwater and Surface Water Management

Water removed from excavations and surface water run-in to excavations during the remediation and redevelopment periods is diverted to the Terminal Basin located in Area II of the Steelfields property. After equalization in the Terminal Basin, the accumulated water is discharged under a discharge permit to the Buffalo Sewer Authority's sanitary sewer system.

4.0 HEALTH AND SAFETY AND COMMUNITY AIR MONITORING

4.1 Site-Specific HASP

A Site-Specific Health and Safety Plan (HASP) will be prepared and enforced by the remediation contractor in accordance with the requirements of 29 CFR 1910.120. The HASP will cover all on-site remediation activities. TurnKey's HASP is provided for informational purposes in Appendix D. The contractor will be required to develop a HASP as or more stringent than TurnKey's HASP.

4.2 Community Air Monitoring

Real-time community air monitoring will be performed during brownfields cleanup construction activities at the Site. A Community Air Monitoring Plan (CAMP) is attached as Appendix B. Particulate and VOC monitoring will be performed continuously at upwind and downward locations during all intrusive activities (e.g., subgrade excavation, grading, and soil/fill handling) in accordance with the CAMP. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the New York State Department of Health (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.

5.0 EROSION AND DUST CONTROLS

In conjunction with the performance of brownfield cleanup activities at the site, an important element of soil and fill management is the mitigation and control of surface erosion from stormwater runoff and wind borne dust.

A Master Erosion Control Plan (MECP) to be used by all remediation contractors and developers has been prepared and incorporated as an attachment to the SFMP, presented as Appendix A to this Work Plan. The MECP includes provisions for: silt fencing, hay baling, mulching, and other measures, as warranted.

Dust suppression techniques will be employed as necessary to mitigate fugitive dust from unvegetated or disturbed soil/fill to the extent practicable during construction and redevelopment. Dust suppression techniques will be initiated if the downwind PM-10 particulate level is 100 $\mu g/m^3$ above background (upwind perimeter). Such techniques shall be employed even if the community air monitoring results indicate particulate levels are below action levels. 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.

6.0 POST-REMEDIATION REQUIREMENTS

6.1 Soil/Fill Management Plan

This Work Plan addresses remediation activities to be performed as part of the Brownfield Cleanup of the site. Following completion of the Brownfield Cleanup activities, certain post-remediation requirements will need to be implemented by current and subsequent owners or developers of the site.

Attached as Appendix A of this Work Plan is a Soil/Fill Management Plan (SFMP) that provides protocols for the proper handling of Site soil/fill during development activities. The plan includes provisions for:

- Excavation, grading, sampling and handling of site soils.
- Acceptability of soils/fill from off-site sources for backfill of subgrade fill.
- Erosion and dust controls prior to final cover by buildings, parking and landscaping.
- Health and safety procedures for subsurface construction work and the protection of the surrounding community.
- Acceptability and placement of final cover.
- Site use restrictions.
- Program responsibilities.
- Certification and reporting requirements.

6.2 Construction Closeout Report

A construction closeout report will be prepared and submitted to the NYSDEC after the site is remediated. The report will be stamped by a NYS licensed Professional Engineer and will be submitted within 90 days of completion of the remediation. A hard copy of the final and approved construction closeout report will be submitted to the NYSDEC as well as an electronic version in PDF searchable format. At a minimum, the report will include:

- A Site or area planimetric map showing the parcel(s) remediated and residual contamination, if any.

- A survey showing: the lateral limits of excavation, the grade before excavation, the grade when excavation is complete, and grade following backfill where soil/fill is excavated. The survey will be accurate to within 0.1 feet on a grid spacing no greater than 25-feet by 25-feet.

- Tabular summaries of unit quantities including, at a minimum: volume of soil/fill excavated; disposition of excavated soil/fill and collected ground/surface water; volume/type/source of backfill; volume of ground/surface water pumped and treated.

- 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 SSALs or other pertinent acceptance criteria. An explanation shall be provided for all results exceeding acceptance criteria.

- Copies of daily inspection reports and a photographic log of remedial activities.

- Documentation of the source of cover system materials and chip mulch.

- Waste manifests/bills of lading, analytical data.

- Text describing the excavation 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.

- A certification by a licensed NYS Professional Engineer that all work was performed in accordance with the BCA, approved BCP RD Work Plan, Section 5.8 of DER-10, and the May 2004 Brownfield Cleanup Guide.

6.3 Annual Certification Report

The property owner shall complete and submit to the NYSDEC an Annual Certification Report by January 15 of each year. Such annual report shall contain certifications that: the institutional controls put in place are still in place, have not been altered and are still effective; the remedy and protective cover have been maintained; and the

conditions at the site are fully protective of public health and the environment. If the cover system has been breached during the year covered by the Annual Certification Report, the property owner shall include a certification that all work was performed in conformance with the SFMP (see Appendix A of this Work Plan). The Annual Certification Report will conform to the May 2004 Brownfield Cleanup Guide and DER-10. The Department will supply the Owner with the appropriate forms and specific requirements for certification at the appropriate time.

7.0 PROJECT SCHEDULE AND SEQUENCE OF THE WORK

The remedial design and remedial actions detailed in this Work Plan shall be completed within approximately three (3) months of the execution of the Brownfield Cleanup Agreement. Figure 4 presents an overall project schedule for the performance of remedial construction and redevelopment activities. The sequencing of the remedial construction and redevelopment activities is as follows:

1. **Brownfield Cleanup Activities:** The tar-impacted soils remediation will be completed in conjunction with the removal of the stockpiled coke materials. It is estimated that these tasks will be completed within three months.

2. **Site Redevelopment:** Following and/or concurrent with brownfield cleanup activities, the Site will be redeveloped as a manufacturing/office complex. All intrusive activities associated with development will be conducted in accordance with the SFMP, which provides protocols for the proper handling of Site soil/fill and groundwater.

3. **Groundwater Monitoring:** Site groundwater monitoring wells will be installed and sampled in accordance with the Long-Term Groundwater Monitoring Plan provided as Appendix C of this Work Plan.

8.0 CITIZEN PARTICIPATION PLAN

In accordance with NYSDEC's Brownfield Cleanup Program guidance, a Citizen Participation Plan is required for this effort. A Citizen Participation Plan is included as Appendix E of this Work Plan.

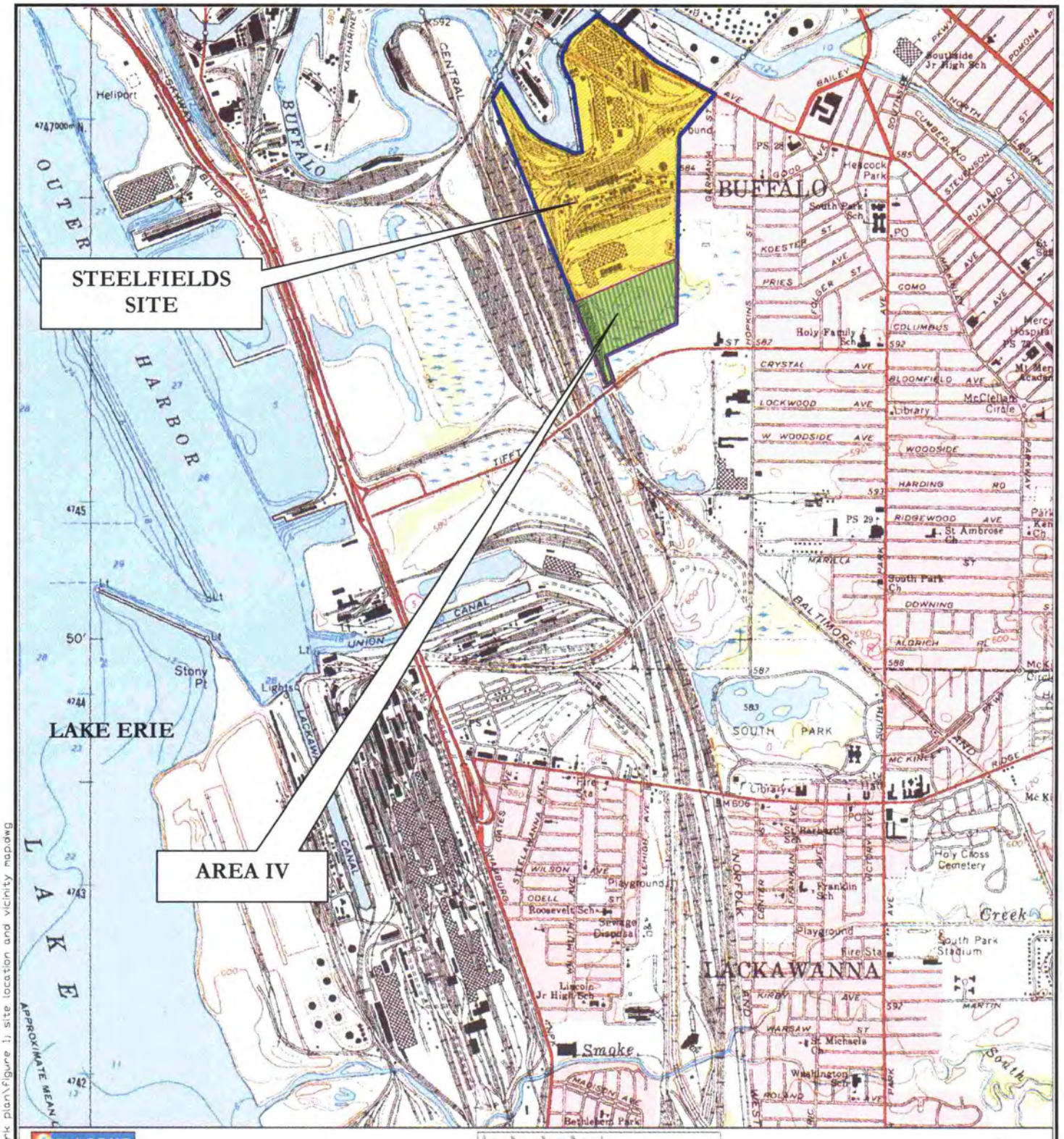
9.0 REFERENCES

1. *Former Steel Manufacturing Site: Area II - Donner-Hanna Coke Plant Parcel; Area III - Republic Steel Warehouse Parcel; Area IV - Donner-Hanna Coke Yard Parcel - Voluntary Cleanup Site Assessment Report*. TurnKey Environmental Restoration, April 1999.

2. *South Buffalo Redevelopment Plan: Steel Manufacturing Site, Voluntary Cleanup Site Assessment Report*. Malcolm Pirnie, September 1997.

FIGURES

FIGURE 1



BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
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SUITE 624
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(716) 856-0599

PROJECT NO.: 0107-001-100

DATE: APRIL 2006

DRAFTED BY: BCH

SITE LOCATION AND VICINITY MAP

BCP - REMEDIAL DESIGN WORK PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FILEPATH=g:\cad\benchmark\hydro-air\rd work plan\figure 1; site location and vicinity map.dwg

F:\CAD\Benchmark\Hydro\BP2 more Plan\Figure 2 Site Plan.dwg

N

SOUTH PARK AVE

A1-MW-7

A1-MW-8

A1-P-4

A1-P-3

AREA I
(89.89 ACRES)

A1-MW-3

A1-MW-6

A1-MW-2

A1-MW-1

A1-MW-M

A1-P-2
(destroyed @ 4')

A1-MW-M2

A1-MW-4

A1-MW-5

BUFFALO RIVER

BUFFALO RIVER

REPUTED NORFOLK SOUTHERN PROPERTY
(20.11 ACRES)

O'CONNER ST

BARGA ST

MYSIC ST

ABBY ST

BELL AVE

AREA II
(3.31 ACRES)

A2-MW-17

A2-MW-16

A2-MW-13

A2-MW-14

A2-MW-12

A2-MW-15

A2-MW-18

A2-MW-20

A2-MW-10
(destroyed @ 10')

A2-MW-19
(WATER LEVEL)

A2-MW-7

A2-MW-6

A2-MW-1

A2-MW-5

A2-MW-4

A2-MW-3

A2-MW-11

FORMER AUGUST FEINE & SONS, INC PROPERTY
(4.77 ACRES)

AREA II
(46.71 ACRES)

AREA III
(42.41 ACRES)

A3-MW-9
(WATER LEVEL)

A3-MW-3

A3-MW-6

A3-MW-7

A4-MW-5

A4-MW-9

A4-MW-10

AREA IV
(30.91 ACRES)

A4-MW-1

A4-MW-1A

A4-MW-7

A4-MW-8

TIFFT ST

SOUTH BUFFALO & BUFFALO / PITTSBURGH RAILROAD

NORFOLK SOUTHERN RAILROAD

BUFFALO SOUTHERN RAILROAD

CSX RAILROAD

LEGEND:

- GUYPOLE
- HYDRANT
- POWERPOLE
- POWERPOLE W/ LIGHT
- STEELFIELDS AREA IV BOUNDARY
- CHAIN LINK FENCE
- PROPERTY BOUNDARY
- A1-MW-2 — EXISTING MONITORING WELL IN GROUNDWATER MONITORING PROGRAM
- A1-MW-7 — EXISTING MONITORING WELL (WATER LEVEL ONLY)
- A1-MW-K2 — EXISTING MONITORING WELL
- A2-MW-19 — PROPOSED MONITORING WELL
- MONITORING WELL TO BE REPLACED DUE TO DAMAGE/OBSTRUCTION

200' 0' 200' 400'

SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)

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JOB NO.: 0107-001-100

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

DRAWN BY: BCH
DATE: APRIL 2006
CHECKED BY:
APPROVED BY:

SITE PLAN

BCP - REMEDIAL DESIGN WORK PLAN
BUFFALO, NEW YORK
STEELFIELDS AREA IV SITE

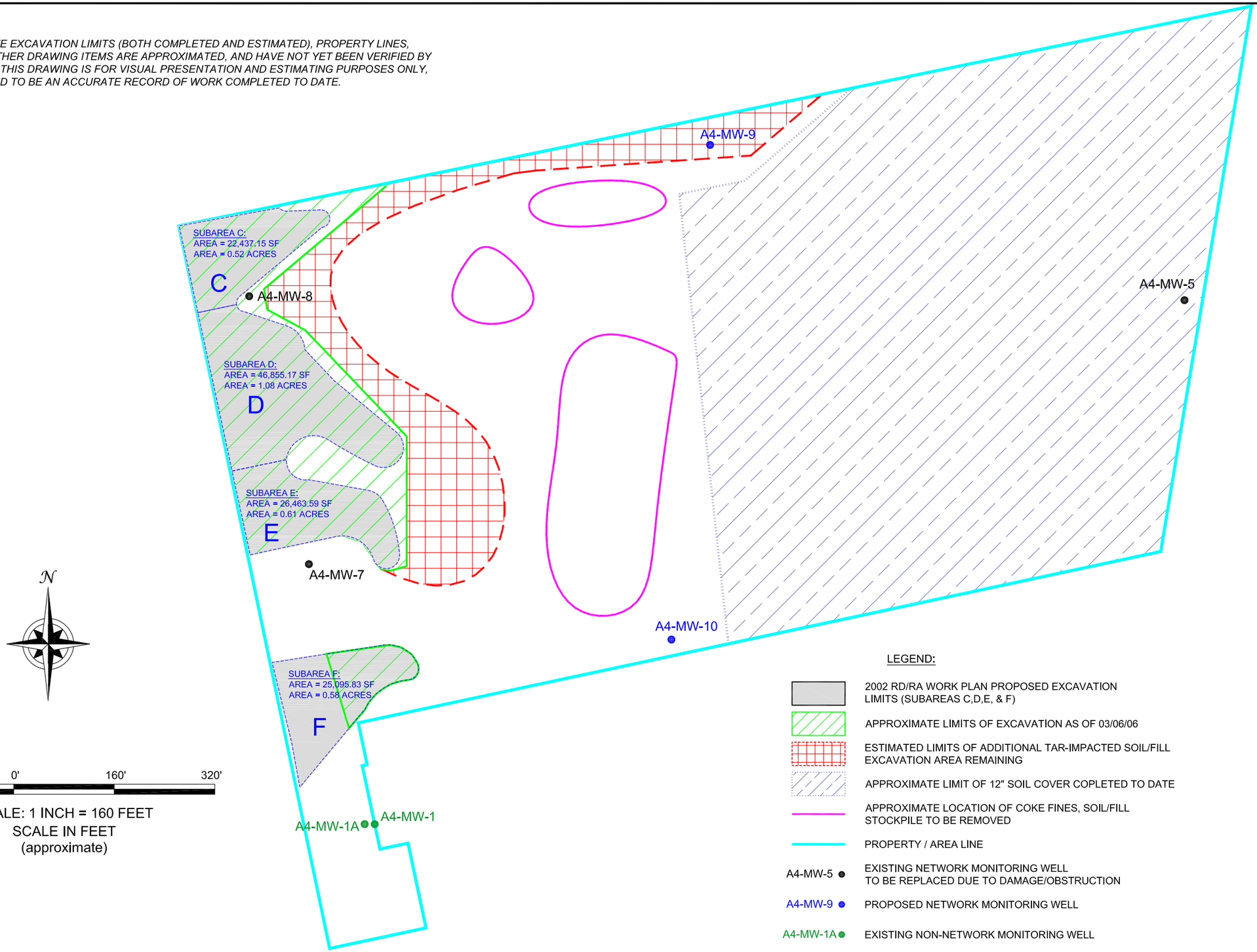
PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FIGURE 2

F:\CAD\Benchmark\Hydro-Air\RD Work Plan\Figure 3- Area IV Remediation Plan.dwg

DISCLAIMER:

ALL REPRESENTATIVE EXCAVATION LIMITS (BOTH COMPLETED AND ESTIMATED), PROPERTY LINES, AND ANY AND ALL OTHER DRAWING ITEMS ARE APPROXIMATED, AND HAVE NOT YET BEEN VERIFIED BY CERTIFIED SURVEY. THIS DRAWING IS FOR VISUAL PRESENTATION AND ESTIMATING PURPOSES ONLY, AND IS NOT INTENDED TO BE AN ACCURATE RECORD OF WORK COMPLETED TO DATE.



Note: Entire Area subject to post-remediation Soil/Fill Management Plan and Community Air Monitoring

DATE: APRIL 2006
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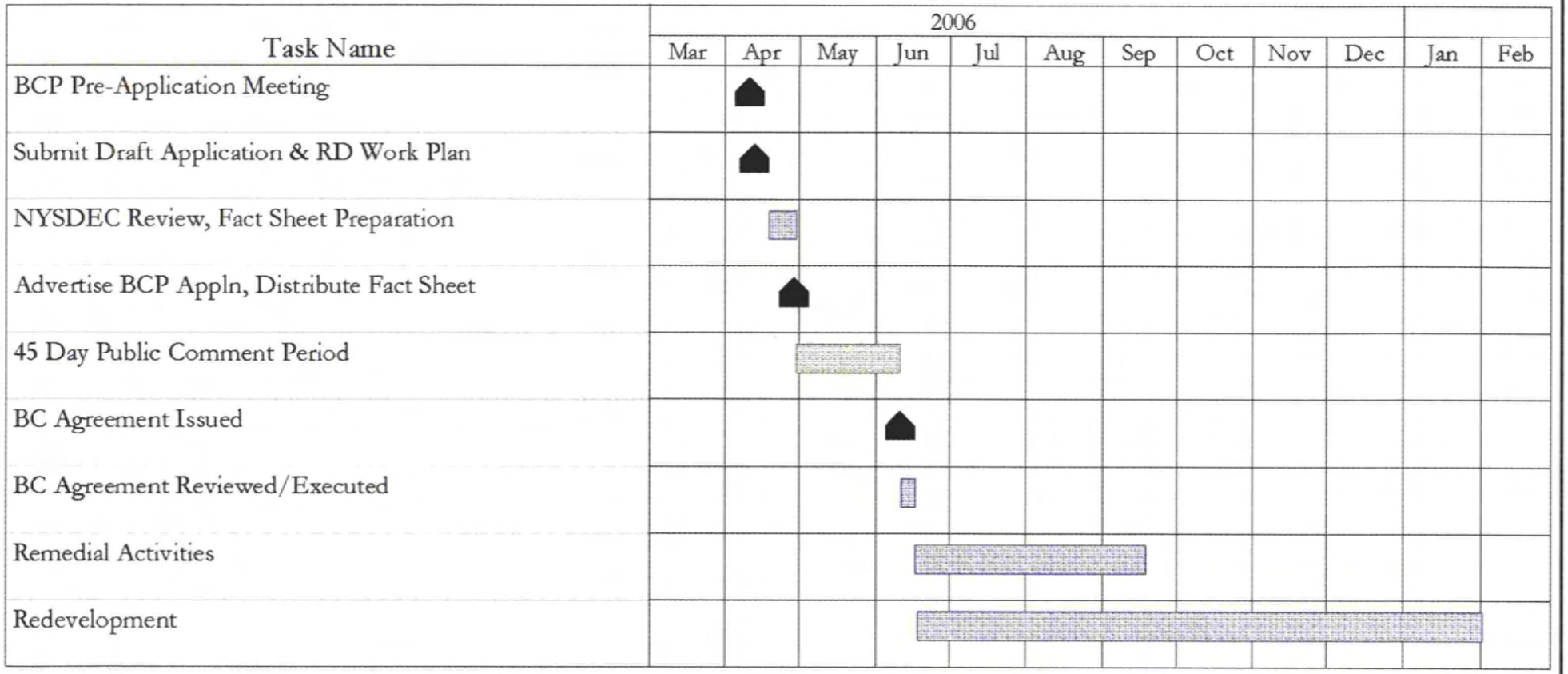
AREA IV REMEDIATION PLAN

BCP - REMEDIAL DESIGN WORK PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FIGURE 3



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PROJECT SCHEDULE

BCP - REMEDIAL DESIGN WORK PLAN

BUFFALO, NEW YORK
STEELFIELDS AREA IV SITE

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FIGURE 4

APPENDIX A

SOIL/FILL MANAGEMENT PLAN

REMEDIAL DESIGN WORK PLAN
APPENDIX A

SOIL/FILL MANAGEMENT PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

April 2006 0107-001-100

Revised September 2006

Prepared for

Hydro-Air Components, Inc.

SOIL/FILL MANAGEMENT PLAN FOR STEELFIELDS AREA IV (HYDRO-AIR) SITE

Table of Contents

SOIL/FILL MANAGEMENT PLAN FOR STEELFIELDS AREA IV (HYDRO-AIR) SITE

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1.0 INTRODUCTION

1.1 Background

Steelfields Ltd. owns approximately 214 acres of vacant industrial property located on in Buffalo, New York (See Figure A-1) bordered by the Buffalo River to the north, South Park Ave and Abby Street to the east, Tifft Street to the south and active rail yards (Norfolk & Southern, CSX and South Buffalo Railroads) to the west. The property is subdivided into four parcels, shown on Figure A-2, based on the operational and ownership history of each parcel. In October 2002, Steelfields entered into a Voluntary Cleanup Program (VCP) agreement with the NYSDEC for the entire site. Since 2003, Steelfields has performed remediation of the site in accordance with an approved Remedial Design/Remedial Action RD/RA Work Plan (September 2002) under the VCP. The remediation has progressed more or less sequentially from Area I to Area IV. To date, the Area IV parcel (Former Donner-Hanna Coke Yard Parcel) cleanup has been partially completed by Steelfields in accordance with the 2002 approved RD/RA Work Plan.

Steelfields is currently negotiating an agreement for the sale of the 30.9 acre Area IV parcel (See Figure 1-3) to Hydro-Air Components Inc. (Hydro-Air), which is contemplating the development of the parcel for a new manufacturing facility. Hydro-Air is seeking approval from the NYSDEC to enter into the Brownfields Cleanup Program (BCP) related to the redevelopment of the Area IV parcel. Ownership of the remaining three parcels (Area I through III) will remain with Steelfields.

For the purposes of this Soil/Fill Management Plan, Area IV may also be referred to throughout this report as the Hydro-Air Site or the Site. The Site was historically utilized by Donner-Hanna Coke for storage of coke product. Tar and tar byproducts from the coke plant (Area II) were also disposed of on the western portion of the Site. The Site was listed as Class 3 inactive hazardous waste site (Site No. 915017) on the NYSDEC inactive hazardous waste site registry prior to it's acquisition by Steelfields and entry into the Voluntary Cleanup Program.

1.2 Purpose and Scope

The purpose of this Soil/Fill Management Plan (S/FMP) is to protect both the environment and human health during redevelopment of the Site, subsequent to completion of Brownfield Cleanup activities.

While an assessment of surface and subsurface soil/fill and groundwater at the Site has already been performed, subsurface information is never 100 percent complete or accurate, especially on such 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 development activities such as infrastructure construction (i.e. roads, waterline, sewers, electric cable etc.) or foundation excavation and site grading.

Compliance with this S/FMP is required to properly manage subsurface soil contamination. This S/FMP was developed and incorporated into the Remedial Design Work Plan for the Site with the express purpose of addressing unknown subsurface contamination if and when encountered, thus maintaining the release and covenant not to sue by the NYSDEC. The S/FMP also facilitates the transfer of responsibilities with property ownership.

This S/FMP 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.
- deed restrictions.

- program responsibilities.
- notification and reporting requirements.

1.3 Soil/Fill Management Program Responsibility

The developer and property owner(s) will be responsible for all monitoring, implementation and reporting requirements of the S/FMP. The developer and owner will not perform, nor contract, nor permit their employees, agents, or assigns to perform any excavations or disturbance of site soils, except as delineated in this S/FMP. Any excavation, regrading or disturbance of on-site soils inconsistent with the provisions of the Plan may be grounds for NYSDEC to void its release from claims, actions, suits, proceeding by the Department against the site owner(s), successor(s) or assigns for environmental conditions on the Site. Such nonconformance with this S/FMP may also void or limit environmental insurance protection of the owner(s) and their successors and assigns in accordance with policy terms and conditions. The property owner(s) or their agents 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 site development as described in Section 2.8.

The NYSDEC will provide periodic construction oversight and monitoring during site redevelopment activities to verify that the requirements of this S/FMP are adhered to.

2.0 SOIL/FILL MANAGEMENT

2.1 Excavation and Handling of On-Site Soil/Fill

A Professional Engineer with experience in environmental site investigations and the New York State Voluntary Cleanup Program will inspect soil/fill excavations or disturbances 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. Excavated soil/fill that is visibly petroleum or tar-stained, discolored or produces elevated PID readings (i.e. sustained readings of 5 ppm above background or greater) will be stockpiled in an area away from the primary work activities and then sampled for reuse, treatment or disposal. The length of time that potentially impacted soil can be temporarily stockpiled while awaiting analytical results shall be limited to 90 days or as otherwise agreed to by the mutual consent of the property owner and NYSDEC. Sampling and analysis will be in accordance with the protocols delineated in Section 2.3. Analyzed soil/fill that is determined to contain one or more constituents in excess of the site-specific action levels (SSALs) and additional criteria shown in Table 2-1 shall be covered or treated on-site according to a NYSDEC-approved treatment plan or transported off-site to a permitted waste management facility for disposal. Soil/fill that exhibits no petroleum or tar staining, discoloration or elevated PID readings, or soil/fill, which has been analyzed and found to meet SSALs, may be reused on-site as subgrade backfill. No excavated soil/fill may be removed from the site except for off-site disposal at a permitted waste management facility.

2.2 Subgrade Material

Subgrade material used to backfill excavations or to increase site grades or elevations shall meet the following criteria:

- Excavated on-site soil/fill meeting the requirements of Section 2.1.

- On-site soil/fill treated in accordance with a NYSDEC-approved treatment plan and tested to meet the requirements of Table 2-1.

- Off-site soil/fill originating from known sources having no evidence of disposal or releases of hazardous substances, hazardous, toxic or radioactive wastes, or petroleum and tested to meet all SSALs.

- All off-site sources of soil 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 2-1 plus organic pesticides/herbicides and PCBs as defined in Appendix A of Technical and Administrative Guidance Memorandum (TAGM) Number 4046.

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

TABLE 2-1

PARAMETER	MAXIMUM CONCENTRATION IN SOIL/FILL (mg/kg) [1,2]
Individual VOC	1
Total VOCs [3]	10
Total SVOCs [4]	500
Total cPAHs [5]	10
Arsenic	75
Barium	1,000
Cadmium	15
Chromium	1,000
Lead	1,000
Mercury	10
Selenium	61
Silver	10
Cyanide (Total Amenable)	1,600

NOTES:
(1) Off-site backfill material shall also meet recommended soil cleanup objectives for organic pesticides/herbicides and PCBs as defined in TAGM 4046.
(2) All analyses shall be performed per USEPA SW-846 methodology or other methods acceptable to NYSDEC.
(3) NYSDEC STARS List VOCs per USEPA Method 8021
(4) Target Compound List (TCL) SVOCs per USEPA Method 8270

(5) Carcinogenic polynuclear aromatic hydrocarbons (i.e., benzo(a)anthracene, benzo(a)pyrene, dibenzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene per USEPA Method 8270.

2.3 Soil/Fill Sampling and Analysis Protocol

2.3.1 Excavated On-Site Soil/Fill

Excavated soil/fill that is visibly stained, discolored or produces elevated PID readings will be sampled and classified for reuse, treatment or off-site disposal. A tiered approach based upon the volume of soil/fill being excavated will be used to determine the frequency of sampling. A minimum of one composite sample will be collected for each 250 cubic yards up to1000 cubic yards of material excavated. If more than 1,000 cubic yards of soils are excavated from the same general vicinity and all samples of the first 1,000 cubic yards meet the SSALs in Table 2-1, the sample collection frequency may be reduced to one composite for each additional 1,000 cubic yards of soil from the same general vicinity, up to 5,000 cubic yards. For excavations that generate greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, providing all earlier samples met SSALs. A minimum of four grab samples will be collected for each 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 detergent and tap water between sampling locations. The composite sample will be analyzed by a NYSDOH ELAP certified laboratory for the parameters listed on Table 2-1. VOCs may be excluded from the analysis provided that the soil/fill does not exhibit elevated PID readings.

Any excavated soil that produces elevated PID readings will be separately stockpiled in 1000 cubic yard or smaller piles. A single grab sample will be collected from the stockpile from the zone displaying the most elevated field PID reading. The grab sample will be analyzed by a NYSDOH ELAP certified laboratory for volatile organic compounds (EPA Method 8021). A composite sample shall also be prepared from each stockpile for analysis of the other parameters listed in Table 2-1.

If the analysis of the soil/fill samples reveals levels of parameters greater than one or

more SSAL, then a duplicate sample will be analyzed by the Toxicity Characteristic Leaching Procedure (TCLP) method for the particular metal or compounds in question to determine the appropriate off-site disposal method. 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.

2.4 Final Surface Coverage

Vegetative or other (e.g., asphalt, buildings, concrete) surface coverage over the entire redeveloped parcel will be required by the developer or owner as a pre-condition of occupancy. A minimum of 12-inches of soil cover will be placed in all areas where concrete, asphalt or buildings are not present or proposed as part of the final development. Of the total 12-inches of cover, the upper 6-inches will be topsoil as specified below.

Topsoil used for the final soil cover shall meet the following general specifications:

1. Fertile, friable, natural loam surface soil, capable of sustaining plant growth, free of, clods of hard earth, plants or roots, sticks or other extraneous material harmful to plant growth. Supply a well-graded topsoil with the following approximate analysis:

   (a)

Sieve Size	Percent Passing by Weight
3-inch	100
No. 4	>75
No. 200	>30
0.002 mm	<20

   (b) pH 5.5 to pH 7.6.

   (c) Minimum organic content of 2.5 percent as determined by ignition loss.

   (d) Soluble salt content not greater than 500 ppm.

2. Before delivery, collect soil samples for every 5,000 cubic yards of topsoil provided by Developer.

In addition to the above specifications, all topsoil must be tested and found to contain constituent concentrations less than those specified in NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046.

TAGM 4046 establishes soil cleanup objectives for inorganics based on site background. The following background levels for heavy metals will be utilized for topsoil:

Parameter	Concentration (mg/kg)
Arsenic	25
Barium	1000
Cadmium	15
Chromium	350
Lead	400
Mercury	1.0
Selenium	5.0
Silver	5.0

(Note: The methodology used to develop background levels for the above described metals (except lead) is based on background concentrations throughout the Buffalo, N.Y. area as described in Appendix A of the April 1999 Site Assessment Reports. The proposed limit for lead was derived from the February 1998 NYSDEC document entitled Guidelines for Petroleum Spill Inactivation.)

Grass seed used for the final soil cover shall meet the following general specifications:

1. Grass seed mixture: Provide fresh, clean, new-crop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America. Provide seed of the grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified.

2. The entire ground surface disturbed by construction operations shall be seeded with 100 lbs/acre of seed conforming to the following:

Name of Grass	Application Rate (lbs/acre)	Purity (%)	Germination (%)
Perennial Ryegrass	10	95	85
Kentucky Bluegrass	20	85	75
Strong Creeping Red Fescue	20	95	80
Chewings Fescue	20	95	80
Hard Fescue	20	95	80
White Clover	10	98	75

(a) Germination and purity percentages should equal or exceed the minimum seed standards listed. If it is necessary to use seed with a germination percentage less than the minimum recommended above, increase the seeding rate accordingly to compensate for the lower germinations.

(b) Weed seed content not over 0.25 percent and free of noxious weeds.

(c) All seed shall be rejected if the label lists any of the following grasses:
1) Sheep Fescue
2) Meadow Fescue
3) Canada Blue
4) Alta Fescue
5) Kentucky 31 Fescue
6) Bent Grass

3. In addition to the seed mixtures listed above, one bushel per acre of oats or rye seed shall be sowed over the entire area, including drainage ditches, to provide a quick shade cover and to prevent erosion during turf establishment.

2.5 Erosion Controls

An important element of soil and fill management on this site is the mitigation and control of surface erosion from stormwater runoff. For this reason a Master Erosion Control Plan to be used by all developers has been developed and incorporated as Attachment A2.

2.6 Dust Controls

Particulate monitoring will be performed along the downwind occupied perimeter of subareas or parcels during subgrade excavation, grading and handling activities in accordance with the Community Monitoring Plan further detailed in Section 3.0.

Dust suppression techniques will be employed as necessary to mitigate fugitive dust from unvegetated or disturbed soil/fill to the extent practicable during post-remediation construction and redevelopment. Such techniques shall be employed even if the community air monitoring results indicate particulate levels are below action levels. Techniques to be utilized 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.

2.7 Access Control

A 6-foot tall chain link fence currently surrounds a portion of the site. Additional construction fencing shall be temporarily erected and maintained as necessary by the building contractor to control access around utility trenches and other construction excavations.

2.8 Property Use Limitations

Requirements for surface coverage over the site and limitations placed on the type of buildings to be constructed will be enforced through the issuance of building permits by the City of Buffalo. Obtaining a building permit from the City will be contingent upon agreeing to implement and comply with this S/FMP. Deed restrictions shall be applicable to successors and assigns of the property. Specifically, the deed restrictions will be recorded with the Erie County Clerk and:

1. shall prohibit any parcel or subparcel of the Site from being used for purposes other than for the industrial, commercial, and recreational use (and designed) to preclude contact with contamination by humans without the express written waiver of such prohibition by the NYSDEC (Department), or if at such time the Department shall no longer exist, any New York State department, bureau, or other entity replacing the Department;

2. shall prohibit the use of the groundwater underlying any parcel or subparcel of the Site for drinking water, industrial, or other purposes;

3. shall require owner(s) or the site and subparcels thereof and their successors and

assigns to continue in full force and effect any institutional controls, operation and maintenance, and/or soils management required by the Brownfields Cleanup Agreement (BCA), the RD Work Plan (including the Soil/Fill Management Plan);

4. shall provide that Participants, on behalf of themselves and their successors and assigns, consent to the enforcement by the Department, or if at such time the Department shall no longer exist, any New York State department, bureau, or other entity replacing the Department, of the prohibitions and restrictions that the BCA requires to be recorded, and thereby covenant not to contest such enforcement.

5. the prohibitions described in the BCA shall be for the duration provided in that document and shall be enforceable only by the Department, or, if at such time the Department shall no longer exist, any New York State department, bureau, or other entity replacing the Department, but shall not be enforceable by any other party,

6. if there is performed on the Site an additional response action acceptable to the Department, or, if at such time the Department shall no longer exist, any New York State department, bureau, or other entity replacing the Department, such as to allow it to be used for residential or other purposes, the Department or its successor shall execute a document in recordable form terminating that portion of the instrument relating to the matter identified in the BCA for the area in the Site which the Department has determined may be used for residential purposes; and

7. in the event of a conflict between the above-described Deed Restrictions and those contained in or attached to the BCA, those contained in or attached to the BCA shall apply.

Certain stormwater system design criteria will also be required to be implemented during site development. In areas with known groundwater impacts, subsurface injection of storm water from building and parking area stormwater systems could mobilize additional contaminants. In these areas, stormwater injection (drywells) will be prohibited on the Site and stormwater conveyance pipes will be required to have gasketed joints for water tightness to prevent the infiltration of impacted groundwater into the collection systems.

2.9 Notification and Reporting Requirements

The following minimum notification and reporting requirements shall be followed by

the property owner prior to and following site development, as appropriate:

- The NYSDEC and NYSDOH will be notified that subgrade activities are being initiated a minimum of 5 working days in advance of construction.

- A construction certification report stamped by a NYS-licensed Professional Engineer, will be prepared and submitted to the NYSDEC and NYSDOH within 90 days after development. At a minimum, the report will include:

    - An area map showing the parcel that was developed;

    - A map of the developed property showing actual building locations and dimensions, roads, parking areas, utility locations, berms, fences, property lines, sidewalks, green areas, contours and other pertinent improvements and features;

    - Plans showing areas and depth of fill removal;

    - Copies of daily inspection reports;

    - A text narrative describing the excavation activities performed, health and safety monitoring performed (both site specific and Community Air Monitoring), quantities and locations of soil/fill excavated, disposal locations for the soil/fill, soil sampling locations and results, a description of any problems encountered, location and acceptability test results for backfill sources, and other pertinent information necessary to document that the site activities were carried out properly;

    - Plans documenting the thickness of the clean soil cover system; and

    - A certification that all work was performed in conformance with the S/FMP.

- The owners of developed parcels shall complete and submit to the New York State Department of Environmental Conservation, an Annual Report by January 15th of the following year [or in accordance with the specific requirements of the Brownfield Cleanup Agreement (BCA)]. This report shall contain certification that the institutional controls put in place, pursuant to the Soil/Fill Management Plan, are still in place, have not been altered and are still effective.

2.10 Vapor Intrusion Controls

Extensive site investigation and characterization data have not detected the presence of chlorinated volatile organic compounds in site soil/fill or groundwater currently targeted by the New York State Health Department for vapor intrusion control. Volatile organic compounds consisting primarily of BTEX compounds have been and will be further remediated in the soil/fill and groundwater at the western end of the site as part of the tar-impacted soil fill remediation described in the Work Plan.

Although the proposed manufacturing and office complex will be constructed on the eastern half of the site (where coke residuals removal and replacement with clean cover soils has already occurred), installation of a sub-slab vapor depressurization system will be constructed and operated to address potential vapor intrusion concerns.

3.0 HEALTH AND SAFETY PROCEDURES

During redevelopment activities, the developer shall be responsible for implementing suitable procedures to prevent both site construction workers and the community from adverse exposure to residual parameters of concern and other potential hazards posed by the redevelopment work. This will be accomplished through adherence to a written, parcel-specific worker Health and Safety Plan, prepared in accordance with the regulations contained in OSHA 29CFR 1910.120 and the attached Community Air Monitoring Plan.

Although brownfields cleanup remedial measures are anticipated to reduce the potential for encountering parameters of concern above site-specific action levels, the redevelopment activities governed by this Soils Management Plan are a required element of the Brownfields Cleanup Agreement for the site. Thus, 29CFR 1910.120(a)(1)(iii) indicates that these activities are subject to OSHA's hazardous waste operations and emergency response (Hazwoper) standard. This includes the requirement for preparation and implementation of a site-specific worker Health and Safety Plan addressing the following items:

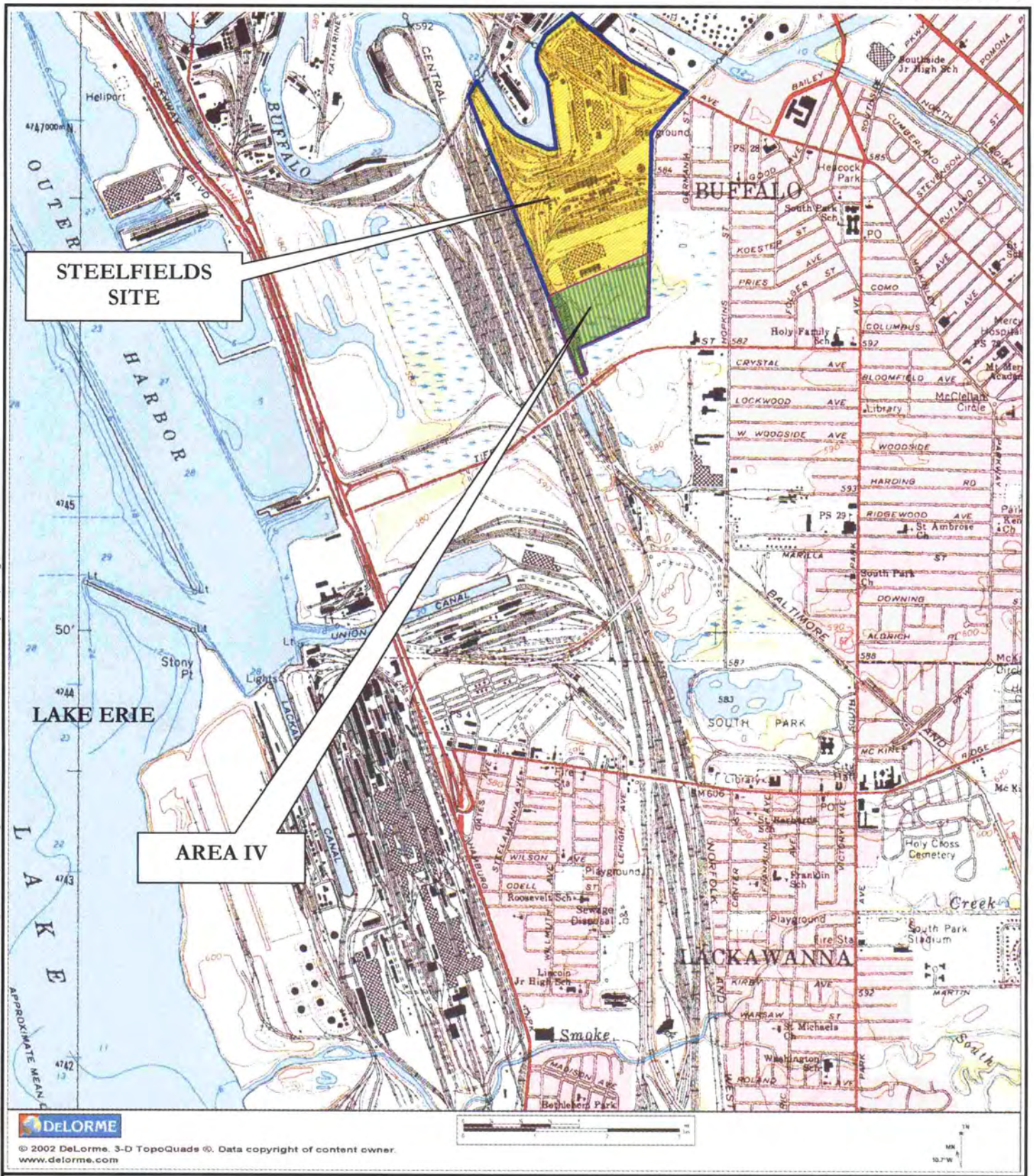
- A safety and health or hazard analysis for each site task and operation.
- Employee training requirements.
- Personal protective equipment (PPE) to be used by employees for the site tasks.
- Medical surveillance requirements.
- Frequency and type of air monitoring, personnel monitoring, and environmental 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 developer or site/parcel owner will be responsible for implementing a Community Air Monitoring Plan designed to prevent the surrounding community from adverse exposures due to potential release/migration of airborne particulates or vapors. The community as referenced herein includes potential receptors located off-site (e.g., neighboring residents or businesses) as well as on-site receptors not directly involved in redevelopment activities (e.g. businesses or contractors occupying the site prior to final redevelopment). The Community Air Monitoring Plan presented as Attachment A will be implemented during redevelopment work involving disturbance or handling of Site fill soils. The Plan includes appropriate monitoring, mitigation and response measures consistent with NYSDOH and NYSDEC guidelines. The results of the Community Air Monitoring Plan must be documented to the NYSDEC as described in Section 2.8.

FIGURES

FIGURE A-1



BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

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

PROJECT NO.: 0107-001-100

DATE: APRIL 2006

DRAFTED BY: BCH

SITE LOCATION AND VICINITY MAP

APPENDIX A - SOIL/FILL MANAGEMENT PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR

HYDRO-AIR COMPONENTS, INC.

FILEPATH=g:\cad\benchmark\hydro-air\rd work plan\appendix a; soil-fill management plan\figure a-1; site location and vicinity map.dwg

N

SOUTH PARK AVE

SOUTH PARK AVE

ABBY ST

O'CONNER ST

BARKAA ST

MYSTIC ST

BELL AVE

ABBY ST

TIFFT ST

REPUTED NORFOLK SOUTHERN PROPERTY
(20.11 ACRES)

AREA I
(89.89 ACRES)

AREA II
(3.31 ACRES)

FORMER AUGUST FEINE & SONS, INC PROPERTY
(4.77 ACRES)

AREA III
(42.41 ACRES)

AREA IV
(30.91 ACRES)

AREA II
(46.71 ACRES)

BUFFALO RIVER

BUFFALO RIVER

A1-MW-1
A1-MW-2
A1-MW-3
A1-MW-4
A1-MW-5
A1-MW-6
A1-MW-7
A1-MW-8
A1-MW-M2
A1-P-2 (abandoned @ 6')
A1-P-3
A1-P-4
A2-MW-1
A2-MW-3
A2-MW-4
A2-MW-5
A2-MW-6
A2-MW-7
A2-MW-10 (abandoned @ 15')
A2-MW-11
A2-MW-12
A2-MW-13
A2-MW-14
A2-MW-15
A2-MW-16
A2-MW-17
A2-MW-18
A2-MW-19 (WATER LEVEL)
A2-MW-20
A3-MW-3
A3-MW-6
A3-MW-7
A3-MW-9 (WATER LEVEL)
A4-MW-1
A4-MW-1A
A4-MW-5
A4-MW-7
A4-MW-8
A4-MW-9
A4-MW-10

SOUTH BUFFALO & BUFFALO / PITTSBURGH RAILROAD

NORFOLK SOUTHERN RAILROAD

BUFFALO SOUTHERN RAILROAD

CSX RAILROAD

LEGEND:

- GUYPOLE
- HYDRANT
- POWERPOLE
- POWERPOLE W/ LIGHT
- STEELFIELDS AREA IV BOUNDARY
- CHAIN LINK FENCE
- PROPERTY BOUNDARY
- A1-MW-2 — EXISTING MONITORING WELL IN GROUNDWATER MONITORING PROGRAM
- A1-MW-7 — EXISTING MONITORING WELL (WATER LEVEL ONLY)
- A1-MW-K2 — EXISTING MONITORING WELL
- A2-MW-19 — PROPOSED MONITORING WELL
- MONITORING WELL TO BE REPLACED DUE TO DAMAGE/OBSTRUCTION

200' 0' 200' 400'

SCALE: 1 INCH = 200 FEET
SCALE IN FEET
(approximate)

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
720 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

JOB NO.: 0107-001-100

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

DRAWN BY: BCH
DATE: APRIL 2006
CHECKED BY:
APPROVED BY:

SITE PLAN

APPENDIX A - SOIL/FILL MANAGEMENT PLAN
BUFFALO, NEW YORK
STEELFIELDS AREA IV SITE

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FIGURE A-2

ATTACHMENT A1

Community Air Monitoring Plan For Post Remediation-Redevelopment Activities

COMMUNITY AIR MONITORING PLAN
for
POST REMEDIATION AND REDEVELOPMENT AND ACTIVITIES

STEELFIELDS AREA IV (HYDRO-AIR) SITE
BUFFALO, NY

April 2006 0107-001-100
Revised September 2006

Prepared for:

Hydro-Air Components, Inc.

COMMUNITY AIR MONITORING PLAN FOR POST REMEDIATION AND REDEVELOPMENT ACTIVITIES

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ATTACHMENTS

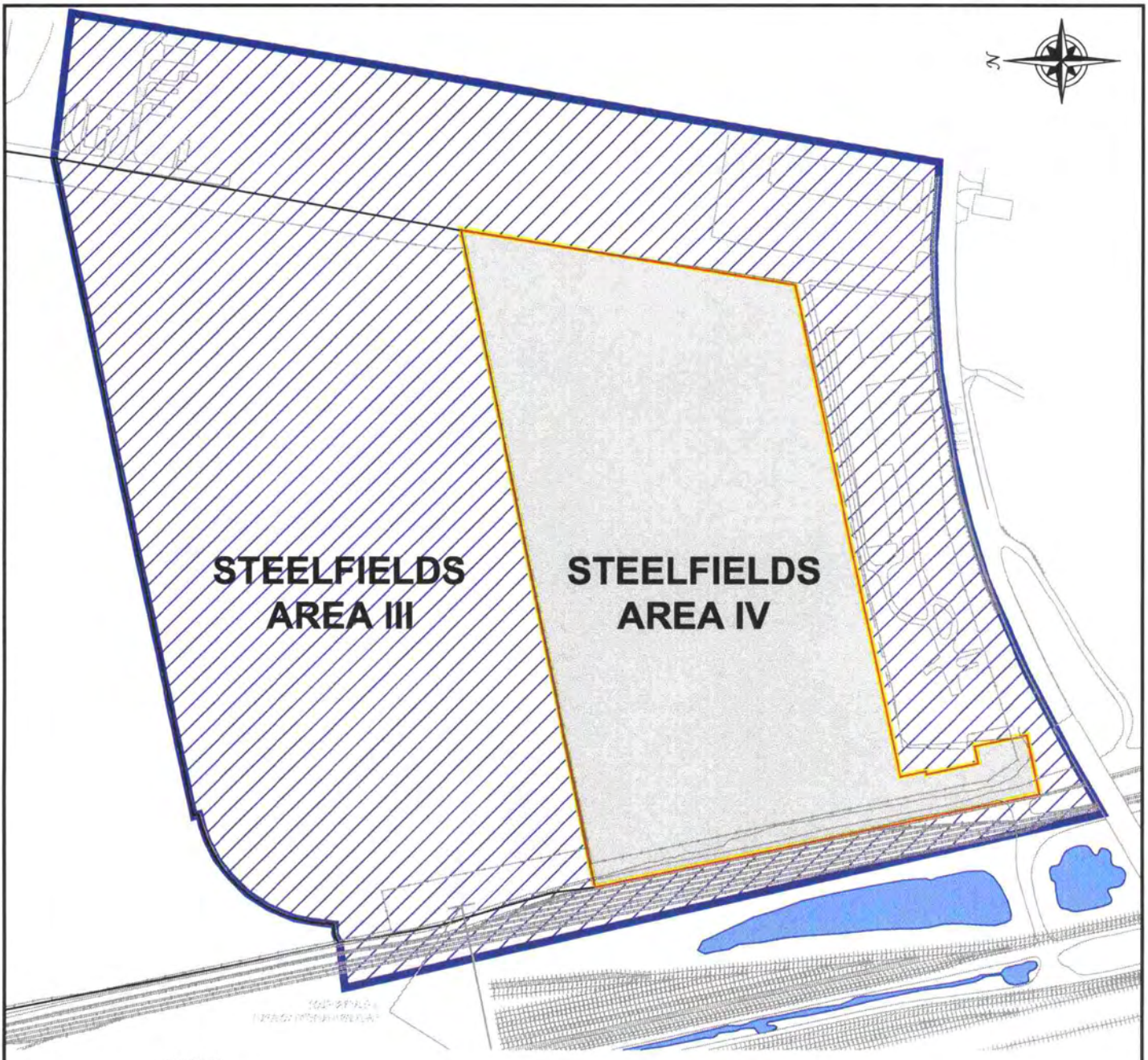
1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) presents requirements for real-time community air monitoring and responses following completion of voluntary cleanup activities at Area IV - the Former Donner Hanna Coke Storage Yard Site (hereafter referred to as the Site) located in Buffalo, NY. This plan is generally consistent with the requirements for community air monitoring at remediation sites as established by the New York State Department of Health (NYSDOH) and the New York State Department of Environmental Conservation (NYSDEC). It follows procedures and practices outlined under the 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.

This CAMP requires real-time monitoring for particulates (i.e., dust) only at the downwind perimeter of each designated work area when certain activities are in progress at the Site. 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 from potential airborne contaminant releases as a direct result of redevelopment or post-remediation monitoring and maintenance activities. The community, as referenced in this document, includes off-site residences, public buildings and grounds, and commercial or industrial establishments on or adjacent to the site, including the Hickory Woods neighborhood (see Figure 1). The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, this CAMP helps to confirm that work activities did not spread contamination into the surrounding community.

FIGURE A-1-1

G:\CAD\Benchmark\Hydro-Air\RD Work Plan\Appendix A; Soil-Fill Management Plan\Figure A-1-a; Community Air Monitoring Site Plan.dwg



LEGEND:

- GUYPOLE
- HYDRANT
- POWERPOLE
- POWERPOLE W/ LIGHT
- STEELFIELDS AREA IV BOUNDARY
- CHAIN LINK FENCE
- STEELFIELDS PROPERTY BOUNDARY
- MONITORED OFF-SITE COMMUNITY

400' 0' 400' 800'

SCALE: 1 INCH = 400 FEET
SCALE IN FEET
(approximate)

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(718) 856-0599

PROJECT NO.: 0107-001-100
DATE: APRIL 2006
DRAFTED BY: BCH

COMMUNITY AIR MONITORING SITE PLAN

APPENDIX A: SOIL/FILL MANAGEMENT PLAN - ATTACHMENT 1

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

2.0 MONITORING AND MITIGATION REQUIREMENTS

Real-time air monitoring for particulate levels and organic vapors at the perimeter of the work area will be necessary. Periodic monitoring will be required for all ground intrusive activities. Ground intrusive activities include, but are not limited to, subgrade soil/fill excavation, grading and handling, subgrade trench excavation and backfill.

"Periodic" monitoring will reasonably consist of taking at least one reading immediately following the installation of the above-referenced activities and taking at least one reading during intrusive activities. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include any subgrade excavation and backfilling within 100 feet of occupied structures or publicly-accessible locations.

2.1 Organic Vapors

VOCs must be monitored at the downwind perimeter of the site on a continuous basis or as otherwise specified throughout the site. 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 various action levels referenced in this section.

2.1.1 Vapor Emission Response Plan

If the ambient air concentration of total organic vapors at the downwind perimeter of the site 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 site 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 site 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 site, the Site Safety and Health Officer (SSHO) must be notified and work activities shut down. The SSHO will determine when re-entry of the work 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 under the Major Vapor Emission Monitoring program described below. All 15-minute readings must be recorded and be available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Routine trips will be made into the surrounding community during construction activities to check for the presence of nuisance odors. If nuisance odors are determined to be pervasive in the surrounding community, construction activities will be halted or modified until odor mitigation measures are applied before resuming work.

2.1.2 Major Vapor Emission Monitoring

If the organic vapor level is greater than 5 ppm over background 200 feet downwind from the site or half the distance to the nearest off-site receptor (residential or commercial structure), whichever is less, all work activities must be halted. If, following the cessation of the work activities or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial structure from the site perimeter, then the air quality must be monitored within 20 feet of the perimeter of the nearest off-site receptor (20-foot zone).

If efforts to abate the emission source are unsuccessful and if 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 will automatically be placed into effect.

2.1.3 Major Vapor Emission Response Plan

Upon activation of Major Vapor Emission Response Plan, the following activities will be undertaken:

1. All Emergency Response Contacts as listed below and in the Site-Specific Health and Safety Plan will be contacted.

2. The local police authorities will immediately be contacted by the SSHO and advised of the situation.

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

4. The SSHO will determine if site workers can safely undertake source abatement measures. Abatement measures may include covering the source area with clean fill or plastic sheeting, or consolidating contaminated materials to minimize surface area. The SSHO will adjust worker personal protective equipment as necessary to protect workers from over-exposure to organic vapors.

The following personnel are to be notified by the SSHO in the listed sequence if the Major Vapor Emission Response Plan is activated:

Contact	Phone
Police/Fire Department	911
NYSDOH	(716) 847-4502
NYSDEC	(716) 851-7220
State Emergency Response Hotline	(800) 457-7362

In addition, the SSHO will provide these authorities with a description of the apparent source of the contamination and abatement measures being taken by the contractor, if any.

2.2 Airborne Particulates

Fugitive dust suppression and airborne particulate monitoring shall be performed during any redevelopment or post-remediation activities involving disturbance or handling of site soil/fill. Fugitive dust suppression techniques will include the following minimum measures:

- Excavated stockpiles from post remediation site redevelopment activities that generate unacceptable dust levels, will be seeded, covered with synthetic materials (e.g., tarps, membranes, etc.), or watered, to reduce dust generation to acceptable levels.

- Stockpiles of soil/fill from post-remediation and redevelopment activities that are contaminated (i.e. are visually stained, discolored or produce elevated PID readings) and awaiting analytical results should be covered with tarps or poly membranes at the end of each day's work activities.

- All fill materials leaving the site will be hauled in properly covered containers or haul trailers.

Additional dust suppression efforts may be required as discussed below.

2.2.1 Particulate Monitoring

Particulate concentrations should be monitored at least periodically (i.e., not less than two times per day) at the upwind and downwind perimeters of the work zone at temporary particulate monitoring stations during work activities. 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 (ug/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 ug/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 ug/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, such as those described in Section 2.2.3 are employed and 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.

2.2.2 Visual Assessment

In conjunction with the real-time monitoring program, the property owner(s) or their agents will be responsible for visually assessing fugitive dust migration from the site. If airborne dust is observed leaving undeveloped portions of the Former Steel Manufacturing Site property (i.e., migrating onto off-site parcels or redeveloped areas of the site), the work will be stopped and supplemental dust suppression techniques will be employed.

2.2.3 Supplemental Dust Suppression

Supplemental dust suppression techniques may include but are not necessarily limited

to the following measures:

- Reducing the excavation size, number of excavations or volume of material handled.
- Restricting vehicle speeds.
- Applying water on buckets during excavation and dumping.
- Wetting equipment and excavation faces.
- Wetting haul roads.
- Restricting work during extreme wind conditions.
- Use of a street sweeper on paved haul roads, where feasible.

Work can resume using supplemental dust suppression techniques provided that the measures are successful in reducing the downwind particulate concentration to below 150 ug/m^3 or 100 ug/m^3 above background, and in preventing visible dust migration off-site.

3.0 MONITORING EQUIPMENT

3.1 Particulate Monitoring Equipment

Particulate monitoring will be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

Size Range:	<0.1 to 10 microns
Sensitivity:	1 ug/m^3
Range:	0.001 to 10 mg/m^3
Overall Accuracy:	+/- 10% as compared to gravimetric analysis of stearic acid or reference dust
Battery Rating:	8-hour continuous operation
Operating Conditions:	
Temperature:	0-40°C
Humidity:	0-99% relative humidity

The device will be fitted with a microprocessor capable of calculating 15-minute moving average concentrations. An adjustable audible alarm will be provided to indicate exceedance of the action levels prescribed in Section 2.2.

3.2 Weather Station Equipment

A portable meteorological station will be utilized to record wind speed, direction, temperature, relative humidity and barometric pressure. Weather station parameters will be verified on a routine basis throughout the workday.

4.0 QA/QC REQUIREMENTS

Quality Assurance/Quality Control (QA/QC) requirements for the particulate meter and organic vapor monitoring equipment include instrument calibration, training, and documentation/record keeping.

4.1 Instrument Calibration

Instrument calibration shall be performed in accordance with the manufacturer's instructions at the beginning of each workday. Following calibration and initial (upwind) measurement of background conditions, audio alarms shall be set so as to activate at the appropriate action levels based on a 15-minute moving average (i.e., short term exposure limit) concentration.

4.2 Training

All persons responsible for calibrating, handling and/or interpreting the meters or meter output data should be experienced with such work. As a minimum, the following training and experience will be required:

- 40-hour OSHA Hazwoper Training per 29 CFR 1910.120(e)(3) and 1910.120(e)(8).
- 8 hour supervisory training, in compliance with 29 CFR 1910.120(e)(4).
- Site-specific training, as required by the Site Health and Safety Plan.
- A minimum 40-hours field experience in the operation of same or similar equipment.

The Site Safety and Health Officer will designate the person(s) responsible for performing air-monitoring work. Construction activities involving disruption or handling of site fill soils will not be performed unless a qualified individual is available on site to perform the community air monitoring specified in this document.

4.3 Documentation and Reporting

Documentation of community air monitoring information will be required to provide written record of the air monitoring results and response actions taken, and to allow for verification that the program was followed in accordance with this Community Air Monitoring Plan. Monitoring information will be recorded on forms presented in Attachment A1-1 or on similar loose-leaf forms to facilitate photocopying. The following documentation schedule will be followed during typical site conditions (i.e., organic vapor and particulate concentrations below action levels).

Item	Documentation Schedule
Instrument Calibration Results	Whenever calibration is performed (minimum once daily).
Background Monitoring Results	At beginning of work day and once every 4 hours thereafter.
Downwind Monitoring Results (15-minute moving average)	Hourly

All documentation records will be maintained in the project file for inspection by the NYSDEC and/or the NYSDOH upon request. NYSDEC will be provided copies of the monitoring results recorded during voluntary cleanup activities as part of close-out reporting for the site. Monitoring results recorded during redevelopment activities will be maintained and furnished to NYSDEC upon substantial completion of the redevelopment project.

During the redevelopment period, NYSDEC and NYSDOH will be contacted if will be contacted in writing within 5 days of exceeding the 150 ug/m3 respirable dust action level. These notifications will include a description of the control measures implemented to prevent further exceedances.

ATTACHMENT 1

Community Air Monitoring Documentation Forms

HYDRO - AIR COMMUNITY AIR MONITORING DAILY LOG

Date:

LOCATION of ACTIVITIES/MONITORING STATIONS (Provide Sketch on Attached Map):

DESCRIPTION OF SITE ACTIVITIES:

WEATHER CONDITIONS:

Time of Day:	A.M.	P.M.
Ambient Air Temp.:		
Wind Direction:		
Wind Speed:		
Precipitation:		

PARTICULATE MONITORING	Location	Time	Value	Duration	Corrective Measures Taken (Eng Controls/Work Stoppage, etc.)
Exceedence of 100 ug/m3 [1]					
Exceedence of 150 ug/m3 [1]					
Visual Observation of Fugitive Dust			NA		
			NA		
			NA		

VOC MONITORING (site)	Location	Time	Value	Duration	Corrective Measures Taken (Eng Controls/Work Stoppage, etc.)
Exceedence of 5 ppm [1]					Temporarily halt Work and continue monitoring
Reading of 5 to 25 ppm [1]					Temporarily halt Work, abate emissions with corrective actions and continue monitoring 3
Exceedence of 25 ppm [2]					Shut Down Work Immediately and notify Site Safety & Health Officer
VOC MONITORING (community)	**Location**	**Time**	**Odors Present**		**Corrective Measures Taken (Eng Controls/Work Stoppage, etc.)**
Routine Inspection					
Routine Inspection					

1. Above background for 15 minute moving average.

2. Above background at Site perimeter (indicate location on attached sketch)

3. Work may resume when total VOC conc. 200 ft downwind or half the distance to nearest receptor (whicever is less) is below 5 ppm for 15 min.

NOTE: All exceedences are to be reported to Benchmark within 15 minutes.

Completed By:

Checked By:

ATTACHMENT A2

Master Erosion Control Plan

MASTER EROSION CONTROL PLAN
for
STEELFIELDS AREA IV (HYDRO-AIR) SITE

BUFFALO, NY

April 2006 0107-001-100

Prepared for:

Hydro-Air Components, Inc.

MASTER EROSION CONTROL PLAN
STEELFIELDS MANUFACTURING SITE

Table of Contents

1.0 INTRODUCTION

A Soil/Fill Management Plan (S/FMP) was prepared as part of the Remedial Design (RD) Work Plan that describes protocols for the proper handling of site soil/fill during site development activities. The property owner at the time of development will be responsible for all monitoring, implementation and reporting requirements of the S/FMP.

Since erosion control will be a critical component of preventing the potential migration of contaminants onto developed property or off-site during development of the site, this Master Erosion Control Plan (MECP) was prepared to provide guidance to developers during build-out activities on the properties. This MECP is a critical component of the S/FMP. This document is generic in nature and provides minimum erosion control practices to be utilized by site owners and/or developers. More specific plans for each parcel may be developed by the property owner(s) after the long-term development approach for each property has been determined.

2.0 GENERAL PERMIT REQUIREMENTS

Since development activities will disturb more than five acres 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) require that the project developer obtain coverage under the NYS Department of Environmental Conservation SPDES General Permit for Storm Water Discharges from Construction Activities that are classified as "Associated with Industrial Activity", Permit #GP-93-06 (Construction Storm Water General Permit).

Requirements for coverage under the general permit includes the submittal of a Notice of Intent form and the development of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must fulfill permit requirements and should be prepared in accordance with "Chapter Four: The Storm Water Management and Erosion Control Plan" in *Reducing Impacts of Storm Water Runoff from New York Development, NYSDEC, 1992.* The Notice of Intent application form and the text of the Construction Storm Water General Permit are provided in Attachment A.

A complete Storm Water Management and Erosion Control Plan (SWM & ECP) should provide the following information:

- A background discussion of the scope of the construction project;

- A statement of the storm water management objectives;
- An evaluation of post-development runoff conditions;
- A description of proposed storm water control measures; and
- A description of the type and frequency of maintenance activities required to support the control measure.

The Plan should address issues such as erosion prevention, sedimentation control, hydraulic loading, pollutant loading, ecological protection, physical site characteristics that impact design, and site management planning. Descriptions of proposed features and structures at the site should include a description of drainage structure placement, supporting engineering data and calculations, construction scheduling, and references to established design criteria.

3.0 POTENTIAL EROSION AND SEDIMENT CONTROL CONCERNS

Redevelopment activities will be implemented for light industrial use of the property. Potential areas and items of concern during site re-development activities include the following:

- Portions of the site not covered by buildings, sidewalks, roadways, parking areas, or other structures will be required to have vegetative cover to limit erosion of remaining subsurface soil/fill materials.
- Remediated areas or off-site properties adjacent to unremediated parcels 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 development will require proper handling and disposal.

4.0 EROSION AND SEDIMENT CONTROL MEASURES

4.1 Background

Standard soil conservation practices need to be incorporated into the construction and development 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 (ie. 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 slope lengths, phased construction, etc.)
- Incorporate temporary and permanent erosion control measures; and
- 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 utilized during construction. They will be installed by the site developer and will be maintained 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

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 utilized 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 utilized 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. Silt fences will be installed in accordance with the details presented in Attachment B.

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. Bales should be installed in accordance with the details presented in Attachment B.

4.2.3 Temporary Vegetation and Mulching

Due to the extensive nature of the planned site remediation activities and the anticipated project schedule, development of the site is expected to occur in phases as the

remediation proceeds. As a result, intermediate areas where development activities will not occur or resume for an extended period of time (greater than 90 days) will be seeded with a quick germinating variety of grass or covered with a layer of mulch to control fugitive dust and erosion. Soil/fill stockpiles that will not be utilized for an extended period of time will also vegetated or covered.

4.2.4 Temporary Sedimentation Basins

Temporary sedimentation basins will be constructed as necessary upgradient of storm water inlets to reduce the volume of sediment-laden runoff from the site. The basins can be as simple as a small excavated area along the alignment of a storm water ditch or as elaborate as a full-scale sedimentation basin with outlet structures designed for certain storm events from a given area of the site. The basins will be cleaned as necessary and the removed sediment utilized elsewhere on-site as subgrade fill material.

4.2.5 Cautious Placement of Stockpiles

As development occurs, excavation activities will produce stockpiles of soil and subgrade fill materials. Careful placement and construction of stockpiles will be required to control erosion. Stockpiles will be placed no closer than fifty feet from the Buffalo River, storm water inlets and parcel boundaries. Additionally, stockpiles will be graded and compacted as necessary for positive surface water runoff and dust control.

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. Since the detailed development approach for the site has not been determined, specific design features are yet to be selected. Examples of permanent erosion control measures could include:

- Utilizing 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.

- Construction of permanent storm water detention ponds where appropriate.
- 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 development activities:

- Clearing and grading only as much area as is necessary to accommodate the construction needs to minimize disturbance of areas subject to erosion (ie. phasing the work).
- Covering exposed or disturbed areas of the site as quickly as practical.
- All erosion and sediment control measures should be installed prior to disturbing the site subgrade.
- Both on-site and off-site tracking of soil by vehicles should be minimized by utilizing routine entry/exit routes.

5.2 Monitoring, Inspection and Maintenance

All erosion and sedimentation controls described in this Plan will be inspected by a qualified representative of the site developer 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 (ie. silt fences, hay bales, etc.) and locations where vehicles enter and leave the site. Routine inspections of the entire site should also be made on a monthly basis during development.

If inspections indicate problems, corrective measures should be implemented within 24 hours. A report summarizing the scope of the inspection, name of the inspector, date,

observations made, and a description of the corrective actions taken should be completed. Examples of inspection forms to be completed are included in Attachment C.

ATTACHMENT A
NYSDEC SPDES GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

1. Notice of Intent
2. NYSDEC SPDES General Permit For Storm Water Discharges from Construction

See Reverse for Instructions

SPDES FORM

DEC

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-3505

Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity Under the SPDES General Permit

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a SPDES permit issued for storm water discharges associated with industrial activity in the State in Section II of this form. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Facility Operator Information

Name: Phone:

Address: Status of Owner/Operator:

City: State: ZIP Code:

II. Facility/Site Location Information

Name: Is the Facility Located on Indian Lands? (Y or N)

Address:

City: State: ZIP Code:

Latitude: Longitude: Quarter: Section: Township: Range:

III. Site Activity Information

MS4 Operator Name:

Receiving Water Body:

If You are Filing as a Co-permittee, Enter Storm Water General Permit Number: Are There Existing Quantitative Data? (Y or N) Is the Facility Required to Submit Monitoring Data? (1, 2, or 3)

SIC or Designated Activity Code: Primary: 2nd: 3rd: 4th:

If This Facility is a Member of a Group Application, Enter Group Application Number:

If You Have Other Existing NPDES Permits, Enter Permit Numbers:

IV. Additional Information Required for Construction Activities Only

Project Start Date: Completion Date: Estimated Area to be Disturbed (in Acres): Is the Storm Water Pollution Prevention Plan in Compliance with State and/or Local Sediment and Erosion Plans? (Y or N)

V. Certification: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: Date:

Signature:

APPENDIX A - Notice of Intent ("NOI")

Instruction—NYSDEC Form 91-19-12 (9/92)

Notice of Intent (NOI)

For Storm Water Discharges Associated With Industrial Activity to Be Covered Under the SPDES General Permit

Who Must File A Notice Of Intent Form

Federal law at 40 CFR Part 122 prohibits point source discharges of storm water associated with industrial activity to a water body(ies) of the U.S. without a National Pollutant Discharge Elimination System (NPDES) permit. New York State has been delegated the NPDES program and administers its State Pollutant Discharge Elimination System (SPDES) program in lieu of EPA's NPDES program. Wherever the term "NPDES" is used in the NOI form, the reader should substitute "SPDES". The operator of an industrial activity that has a storm water discharge that qualifies for coverage under a SPDES Storm Water General Permit must submit the NOI form to obtain coverage. If you have questions about whether federal regulations require you to obtain a permit for your storm water discharge, contact the EPA Storm Water Hotline at (703) 821-4823. If you have questions concerning the applicability and coverage of the SPDES Storm Water General Permits, contact the New York State of Environmental Conservation at (518) 457-9601. In order to cancel your coverage under the General Permit you must submit a Notice of Termination (NOT) form. Failure to submit a NOT will result in the obligation to pay a yearly Regulatory Fee.

Where To File The NOI Form

New York State intends on using EPA's information management system. Therefore, NOIs must be sent to the following address:

Storm Water Notice of Intent
PO Box 1215
Newington, VA 22122

Completing The Form

You must type or print using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, call the EPA Storm Water Hotline at (703) 821-4823.

Section I—Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same as the name of the facility. The responsible party is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Enter the appropriate letter to indicate the legal status of the operator of the facility:

F—Federal M—Public (other than federal or state)
S—State P—Private

Section II—Facility/Site Location Information

Give the facility's or site's official or legal name and complete street address, including city, state, and ZIP code. If the facility or site lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Indicate whether the facility is located on Indian lands.

Section III—Site Activity Information

If the storm water discharges to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g. municipality name, county name) and the receiving water of the discharge from the MS4. (A MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by a state, city, town, borough, county, parish, district, association, or other public body which is designed or used for collecting or conveying storm water.)

If the facility discharges storm water directly to receiving water(s), enter the name of the receiving water.

If you are filing as a co-permittee and a storm water general permit number has been issued, enter that number in the space provided.

Indicate whether or not the owner or operator of the facility has existing quantitative data that represent the characteristics and concentration of pollutants in storm water discharges.

Indicate whether the facility is required to submit monthly data by entering one of the following:

1 Not required to submit monitoring date;
2 Required to submit monitoring data;
3 Not required to submit monitoring data; submitting certification for monitoring exclusion.

Those facilities that must submit monitoring data (e.g. choice 2) are: Section 313 EPCRA facilities; primary metal industries; land disposal units/incinerators/BIFs; wood treatment facilities; facilities with coal pile runoff; and, battery reclaimers.

List, in decreasing order of significance, up to four 4-digit standard industrial classification (SIC) codes that best describe the principal products or services provided at the facility or site identified in Section II of this application.

For industrial activities defined in 40 CFR 122.26(b)(14)(i)-(xi) that do not have SIC codes that accurately describe the principal products produced or services provided, the following 2-character codes are to be used:

HZ Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under subtitle C of RCRA [40 CFR 122.26(b)(14)(iv)];

LF Landfills, land application sites, and open dumps that receive or have received any industrial wastes, including those that are subject to regulation under subtitle D of RCRA [40 CFR 122.26(b)(14)(v)];

SE Steam electric power generating facilities, including coal handling sites [40 CFR 122.26(b)(14)(vii)];

TW Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage [40 CFR 122.26(b)(14)(ix)];

CO Construction activities [40 CFR 122.26(b)(14)(x)].

If the facility listed in Section II has participated in Part 1 of an approved storm water group application and a group number has been assigned, enter the group application number in the space provided.

If there are other SPDES permits presently issued for the facility or site listed in Section II, list the permit numbers. If an application for the facility has been submitted but no permit number has been assigned, enter the application number.

Section IV—Additional Information Required for Construction Activities Only

Construction activities must complete Section IV in addition to Sections I through III. Only construction activities need to complete Section IV.

Enter the project start date and the estimated completion date for the entire development plan.

Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre).

Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans, or storm water management plans.

Section V—Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manage of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, state, federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Notice

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may decrease or reduce the burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20490, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20603.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT

FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

Permit No. GP-93-06

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: August 1, 1993

Expiration Date: August 1, 1998

George A. Danskin
Chief Permit Administrator

George A Danskin
Authorized Signature

Address:
50 Wolf Road
Albany, N.Y. 12233-1750

Date: July 14, 1993

PREFACE

The Clean Water Act ("CWA")[1] provides that storm water discharges associated with industrial activity from a point source[2] (including discharges through a municipal separate storm sewer system) to waters of the United States[3] are unlawful, unless authorized by a National Pollutant Discharge Elimination System ("NPDES") permit. In New York which is a NPDES-delegated state, this is accomplished through the administration of the state Pollutant Discharge Elimination System ("SPDES") program.

A discharger which is subject to the federal storm water (NPDES) regulations may be eligible to obtain coverage under a general permit by submitting a Notice of Intent ("NOI") to the address given on the NOI form.

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[1] Also referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972 (Pub.L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483 and Pub. L. 97-117, 33 U.S.C. 1251 et.seq.)

[2] "Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharges. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

[3] "Waters of the United States" means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(b) All interstate waters, including interstate "wetlands";

(c) All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition;

(f) The territorial sea;

(g) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA are not waters of the United States. This exclusion applies only to manmade bodies of water with neither were originally created in waters of the United States (such as disposal areas in wetlands) nor resulted from the impoundment of waters of the United States.

Copies of the General Permit and the Notice of Intent forms for New York are available by calling 1-(800)-952-2490. The United States Environmental Protection Agency (EPA) has established the Stormwater Hotline at (703) 821-4823 to provide information pertaining to the NPDES stormwater regulations.

If you have questions whether federal regulations require you to obtain a permit for your storm water discharge, contact the EPA Storm Water Hotline. If you have questions concerning the applicability and coverage of the SPDES Storm Water General Permits, contact the New York State Department of Environmental Conservation in Albany at (518) 457-9601. In order to cancel your coverage under the General Permit, you must submit a Notice of Termination ("NOT") form. Failure to submit a NOT will result in the continued obligation to pay a yearly Regulatory Fee.

Additionally, copies of the general permit, the NOI form and the NOT form can be obtained by calling the New York State Department of Environmental Conservation ("DEC") Storm Water Information Line at (800) 952-2490 (in New York State), any DEC Regional Office (See Appendix B), or directly from DEC in Albany at the telephone number given above.

Coverage under this general permit is available August 1, 1993 and expires on August 1, 1998.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT
FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES
THAT ARE CLASSIFIED AS "ASSOCIATED WITH INDUSTRIAL ACTIVITY"

TABLE OF CONTENTS

Part I. COVERAGE UNDER THIS PERMIT

A. **Permit Area & Applicability.** The permit covers all areas of New York State where New York State implements Section 402 of the CWA. Except as in compliance with this general permit or with a duly authorized individual permit from DEC, discharge of stormwater associated with industrial activity from construction activity by any person shall be unlawful.

B. **Eligibility.**

1. This permit may authorize all discharges of storm water associated with industrial activity from construction activity[4], (those sites or common plans of development or sale that will result in the disturbance of five or more acres total land area[5]), (henceforth referred to as storm water discharges from construction activities) occurring after the effective date of this permit, including discharges occurring after the effective date of this permit where the construction activity was initiated before the effective date of this permit, except for discharges identified under paragraph I.C (see below).

2. This permit may only authorize a storm water discharge from construction activities that is mixed with a storm water discharge associated with industrial activities other than construction, where:

   a. the industrial activity other than construction is located on the same site as the construction activity;

   b. storm water discharges from construction activities are in compliance with the terms of this permit; and

   c. storm water discharges associated with industrial activity other than construction are occurring (including storm water discharges from dedicated asphalt plants and dedicated concrete plants) are covered by a different SPDES general permit or individual permit authorizing such discharges.

C. **Limitations on Coverage.** The following storm water discharges from construction activities are not authorized by this permit:

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[4] "Storm Water Discharges Associated With Industrial Activity" covered under this general permit includes those defined in 40 CFR Section 122.26(b)(14)(x).

[5] On June 4, 1992, the United States Court of Appeals for the Ninth Circuit remanded the exemption for construction sites of less than five acres to the EPA for further rule making. (Nos. 90-70671 and 91-70200). Any effect of this decision on construction sites of less than five acres will not apply until further EPA or DEC action. Regulations for construction sites of five acres or more remain in effect.

1. Discharges associated with industrial activity after construction activities have been completed and the site has undergone final stabilization[6];

2. Discharges that are mixed with sources of non-storm water other than those expressly authorized under this permit (Part II.A, Page 7 and Part III.D.5, Page 15);

3. Discharges that are subject to an existing SPDES individual or general permit or which are issued an individual or alternative general permit (Page 19); and

4. Discharges that are likely to adversely affect a listed or proposed to be listed endangered or threatened species or its critical habitat.

D. **Authorization.**

1. An operator[7] must submit a completed Notice of Intent ("NOI") form approved and provided by the State Director[8] (or a photocopy thereof), in order to be authorized to discharge under this general permit[9]. The NOI shall be signed in accordance with Part V.G (see Page 18) of this permit and submitted to the address indicated on the approved NOI form.

2. All contractors and subcontractors of the operator identified under Part III.E.1 (Page 16) must provide certification under Part III.E.2 (Page 16) of this permit in order to be authorized to discharge storm water under this permit.

3. Unless notified by the State Director to the contrary, operators who submit an NOI in accordance with the requirements of this permit are authorized to discharge storm water from construction activities under the terms and conditions of this permit 2 days after the date that the NOI is postmarked. The State Director may deny coverage under this permit and require submittal of an application for an individual SPDES permit at any time based on a review of the NOI or other information (see Part V.J of this permit, Page 19).

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[6] "Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% the cover for the area has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed.

[7] For the purposes of this permit, the term "operator" means the person, persons, or legal entity which owns or leases the property on which the construction activity is occurring.

[8] "State Director" means the New York State Commissioner of Environmental Conservation, or an authorized representative.

[9] A copy of the approved NOI form is provided in Appendix A of this notice.

4. A copy of the NOI or other indication that storm water discharges from the site are covered under a SPDES permit, and a brief description of the project shall be posted at the construction site in a prominent place for public viewing (such as alongside a building permit).

5. A signed copy of the NOI shall also be submitted concurrently to the local governing body and any other authorized agency[10] having jurisdiction or regulatory control over the construction project.

6. New storm water discharges from construction activities which require any other Uniform Procedures Act permit (Environmental Conservation Law, 6 NYCRR Part 621) must submit the information specified in Appendix G.

   Upon review of this information, DEC may authorize the applicant to submit an NOI to obtain coverage under this general permit.

7. Renotification. Upon renewal of this general permit or issuance of a new general permit, the permittee is required to notify the State Director of his intent to be covered by the new general permit.

E. Deadlines for Notification.

1. Operators who intend to obtain coverage under this general permit for storm water discharges from construction activities shall submit an NOI in accordance with the requirements of this Part at least 2 days prior to the commencement of construction[11] activities ;

2. For storm water discharges from construction activities where the operator changes, a new NOI in accordance with the requirements of this Part shall be submitted by the new operator at least 2 days prior to the change in operator. Additionally, the operator being replaced must submit a Notice of Termination ("NOT") in accordance with Part VI (Page 21) of this permit and notify the new operator of the requirement to submit a new NOI to obtain coverage under this permit. The new operator must also review and sign the pollution prevention plan in accordance with Part III.B.

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[10] For the purposes of this general permit, "any other authorized agency" shall include any local, regional, or state entity or agency except the Department of Environmental Conservation (DEC) which has authority to review storm water discharge from the project, including authority under any approved watershed protection plan or regulations.

[11] "Commencement of Construction" means the initial disturbance of soils associated with clearing, grading, or excavating activities, or other construction activities

Part II. SPECIAL CONDITIONS AND PROHIBITIONS

A. Prohibition On Non-Stormwater Discharges.

Discharges other than storm water must be in compliance with a SPDES permit (other than this permit). However, the following non-storm water discharges are authorized by this permit: discharges from fire fighting activities; fire hydrant flushings; waters used to wash vehicles or control dust in accordance with Part III.D.2.e.(2) (Page 13); routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; and foundation or footing drains where flows are not contaminated with process materials such as solvents. Except for flows from fire fighting activities, these discharges must be included in the storm water pollution prevention plan (See Part III).

B. Maintaining Water Quality - The discharge authorized by this general permit shall neither cause nor contribute to a violation of water quality standards as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York including, but not limited to:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no suspended, colloidal and settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no: residue from oil and floating substances; visible oil film; globules; or grease.

Part III. STORM WATER POLLUTION PREVENTION PLANS

A storm water pollution prevention plan shall be developed by the operator for construction activities at each site to be covered by this permit. Storm water pollution prevention plans shall be prepared in accordance with good engineering practices. The plan shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges. In addition, the plan shall describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharges and to assure compliance with the terms and conditions of this permit. Operators are responsible for implementing the provisions of the storm water pollution prevention plan and ensuring that all contractors and

subcontractors who perform professional services at the site provide certification of the pollution prevention plan in accordance with Part I.D.2. (Page 5) and Part III.E.2. (Page 14) of this permit. All contractors and subcontractors identified in the storm water pollution prevention plan in accordance with Part III.E.1 (Page 16) of this permit must agree to implement applicable provisions of the pollution prevention plan and satisfy the certification requirement of Part III.E.2 (Page 16). Contractors and subcontractors which are not operators, as defined in this permit (Page 5), do not have to submit a NOI in addition to the NOI submitted by the operator.

A. **Deadlines for Plan Preparation and Compliance.**

1. For construction activities that have begun on or before February 1, 1994, the plan shall be developed prior to, and provide compliance with the terms and schedule of the plan beginning on, February 1, 1994. However, the plan for sedimentation basins shall provide for compliance no later that April 1, 1994.

2. For construction activities that begin after February 1, 1994, the plan shall be developed prior to the submittal of an NOI and provide for compliance with the terms and schedule of the plan beginning with the initiation of construction activities.

B. **Signature and Plan Review**

1. The plan shall be signed in accordance with Part V.G (Page 18), and be retained at the site where the construction activity occurs in accordance with Part IV (retention of records, Page 17) of this permit.

2. The permittee shall submit a copy of the pollution prevention plan and any amendments thereto to the local governing body and any other authorized agency having jurisdiction or regulatory control over the construction activity. The operator shall make plans available upon request to the State Director and any local agency having jurisdiction; or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system , to the municipal operator of the system.

3. The State Director, or authorized representative, may notify the permittee at any time that the plan does not meet one or more of the minimum requirements of this Permit. Such notification shall identify those provisions of the permit which are not being met by the plan, and identify which provisions of the plan requires modifications in order to meet the minimum requirements of this Permit. Within 7 days of such notification, (or

as otherwise provided by the State Director), the permittee shall make the required changes to the plan and shall submit to the State Director a written certification that the requested changes have been made.

C. Keeping Plans Current. The permittee shall amend the plan whenever:

1. There is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the plan; or

2. The storm water pollution prevention plan proves to be ineffective in:

a. Eliminating or significantly minimizing pollutants from sources identified under Part III.D.2 (See below) of this permit, or in otherwise

b. Achieving the general objectives of controlling pollutants in storm water discharges from construction activity.

3. Additionally, the plan shall be amended to identify any new contractor and/or subcontractor that will implement a measure of the storm water pollution prevention plan (See Part III.E, Page 16). Amendments to the plan may be reviewed by the State Director in the same manner as provided by Part III.B above.

D. Contents of Plan. The storm water pollution prevention plan shall include the following items and shall be prepared in accordance with Appendix F (THE STORMWATER MANAGEMENT AND EROSION CONTROL PLAN). Any deviation from Appendix F or the requireents listed below shall be explained and justified in the storm water pollution prevention plan.

1. Site Description. Each plan shall provide a description of pollutant sources and other information as indicated:

a. A description of the nature of the construction activity;

b. A description of the intended sequence of major activities which disturb soils for major portions of the site (e.g. grubbing, excavation, grading);

c. Estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities;

d. An estimate of the runoff coefficient[12] of the site after construction activities are completed and existing data describing the soil or the quality of any discharge from the site;

e. A site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, an outline of areas which will not be disturbed, the location of major structural and nonstructural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands), and locations where storm water is discharged to surface or ground water(s); and

f. The name of the receiving water(s) and areal extent of wetland acreage at the site.

2. Controls. Each plan shall include a description of appropriate controls and measures that will be implemented at the construction site. The plan will clearly describe for each major activity identified in Part III.D.1.b above, appropriate control measures and the timing during the construction process that the measures will be implemented. For example, the plan might provide the following: perimeter controls for one portion of the site will be installed after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site; perimeter controls will be actively maintained until final stabilization of those portions of the site upward of the perimeter control; temporary perimeter controls will be removed after final stabilization. The description and implementation of controls shall address the following minimum components:

a. Erosion and Sediment Controls

Except as noted below in Part III.D.2.b, the erosion and sediment control component of a storm water pollution prevention plan shall conform to and be implemented in a manner consistent with the technical standards set forth in Appendix E. Where conformance to Appendix E is not attainable, the operator shall describe what equivalent erosion and sediment control practices will be implemented together with an explanation as to why conformance with Appendix E cannot be achieved. This explanation, together with the alternative erosion and sediment control measures and design specifications, shall be presented in the storm water pollution prevention plan.

[12] "Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

A description of interim and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be included in the plan. Except as provided in Parts III.D.2.(a)(1)and (2) below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.

(1). Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently cease is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

(2). Where construction activity will resume on a portion of the site within 21 days from when activities ceased, (e.g. the total time period that construction activity is temporarily ceased is less than 21 days) then stabilization measures do not have to be initiated on that portion of site by the 14th day after construction activity temporarily ceased.

b. <u>Erosion and Sediment Controls - Structural Practices</u>.

A description of structural practices to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Such practices may include silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. Structural practices should be placed on upland soils to the degree attainable.

(1) For common drainage locations that serve an area with 10 or more disturbed acres at one time, a

temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. The 3,600 cubic feet of storage area per acre drained does not apply to flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin. For drainage locations which serve 10 or more disturbed acres at one time and where a temporary sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent controls is not attainable, smaller sediment basins and/or traps shall be used.

(2) For drainage locations serving less than 10 acres, sediment basins and/or sediment traps should be used. At a minimum, silt fences or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area unless a sediment basin providing storage for 3,600 cubic feet of storage per acre drained is provided.

c. Storm Water Management.

Storm water management controls shall conform to and be implemented in a manner consistent with the technical standards set forth in Appendix D). Where conformance to Appendix D is not attainable, the operator shall describe what practices will be implemented together with an explanation as to why conformance with Appendix D cannot be achieved. This explanation, together with the alternative storm water management practices and design specifications shall be presented in the storm water pollution prevention plan.

A description of measures that will be installed during the construction process to control storm water discharges that will occur after construction operations have been completed. Structural measures should be placed on upland soils to the degree attainable.

(1) Such practices may include: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The pollution prevention plan shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels.

(2) Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel for the purpose of providing a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., no significant changes in the hydrological regime of the receiving water).

d. Other Controls.

(1) Waste Disposal. No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a federal or State law.

(2) Off-site vehicle tracking of sediments and the generation of dust shall be minimized.

(3) The plan shall ensure and demonstrate compliance with applicable State and local waste disposal, sanitary sewer or septic system regulations.

e. Approved Local or Regional Control Plans.

(1) Storm water pollution prevention plans must include procedures and requirements specified in applicable sediment and erosion site plans, site permits, storm water management site plans or site permits or duly adopted regulations approved by local officials or any authorized agency. Permittees shall provide a certification in their storm water pollution prevention plan that their storm water pollution prevention plan complies with all requirements applicable to protecting surface and ground water resources in sediment and erosion site plans or site permits, storm water management site plans, site permits, or duly adopted regulations approved by local governing bodies or any authorized agency. Permittees shall comply with any such requirements during the term of the permit.

(2) Storm water pollution prevention plans must be amended to reflect any change applicable to protecting surface and ground water resources in sediment and erosion site plans or site permits, storm water management site plans or site permits, or duly adopted regulations approved by local officials or any authorized agency for which the permittee receives written notice. Where the permittee receives such written notice of a change, the permittee shall provide a recertification in

the storm water pollution prevention plan that the storm water pollution prevention plan has been modified to address such changes.

(3) Operators seeking alternative permit requirements shall submit an individual permit application in accordance with Part V.J (Page 19) of the permit at the address indicated in Part IV.C (Page 17) of this permit for the appropriate DEC Office, along with a description of why requirements in approved local or regional plans, permits or regulations or changes to such plans, permits, or regulations, should not be applicable as a condition of a SPDES permit.

3. Maintenance. A description of procedures to ensure the timely maintenance of vegetation, erosion and sediment control measures and other protective measures identified in the site plan in good and effective operating condition.

In cases where the installed structural controls are designed, in whole or part, to provide for storm water management after construction activity is completed and final stabilization of the site, a description of the post-construction operation and maintenance needs shall be included.

A description of any arrangements that have been made to ensure long term maintenance of storm water facilities after construction operations have been completed and permit coverage is terminated, and a statement describing who will be responsible for maintenance shall be included.

4. Inspections. The operator or qualified personnel of the operator shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, structural control measures, and locations where vehicles enter or exit the site at least once every seven calendar days and within 24 hours of the end of a storm that is 0.5 inches or greater. Where portions of the construction area have been finally stabilized, inspection of such portions shall be conducted at least once every month until the entire site is finally stabilized.

a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the plan shall be

observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

b. Based on the results of the inspection, the site description identified in the plan in accordance with paragraph III.D.1 (Page 9) of this permit and pollution prevention measures identified in the plan in accordance with paragraph III.D.2 (Page 10) of this permit shall be revised as appropriate, but in no case later than 7 calendar days following the inspection. Such modifications shall provide for timely implementation of any changes to the plan within 7 calendar days following the inspection.

c. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with paragraph III.D.4.b (See above) of the permit shall be made and retained as part of the storm water pollution prevention plan for at least three years from the date that the site is finally stabilized. Such reports shall identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with Part V.G (Page 18) of this permit.

5. Non-Storm Water Discharges - Except for flows from fire fighting activities, sources of non-storm water listed in Part II.A (Page 7) of this permit that are combined with storm water discharges from the construction activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

E. Contractors

1. The storm water pollution prevention plan must clearly identify for each measure identified in the plan, the contractor(s) and/or subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the plan must sign a copy of the certification statement in Part III.E.2 (See below) of this permit in accordance with Part V.G (Page 18) of this permit. All certifications must be included in the storm water pollution prevention plan.

2. Certification Statement. All contractors and subcontractors identified in a storm water pollution prevention plan in accordance with Part III.E.1 (Page 16) of this permit shall sign a copy of the following certification statement before undertaking any construction activity at the site identified in the storm water pollution prevention plan:

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the pollution prevention plan for the construction site identified in such plan as a condition of authorization to discharge storm water. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards."

The certification must include the name and title of the person providing the signature in accordance with Part V.G (Page 18) of this permit; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification is made.

Part IV. RETENTION OF RECORDS

A. The operator shall retain copies of storm water pollution prevention plans and all reports required by this permit, and records of all data used to complete the NOI to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. This period may be extended by the State Director at any time upon written notification.

B. The operator shall retain a copy of the storm water pollution prevention plan required by this permit at the construction site from the date of initiation of construction activities to the date of final stabilization.

C. Addresses. Except for the submittal of NOIs and NOTs, all written correspondence under this permit directed to the DEC, including the submittal of individual permit applications, shall be sent to the address of the appropriate DEC Office as listed in Appendix B.

Part V. STANDARD PERMIT CONDITIONS

A. Duty to Comply.

The operator must comply with all conditions of this permit. All contractors and subcontractors must comply with the terms of the pollution prevention plan. Any permit noncompliance constitutes a violation of the CWA and the Environmental Conservation Law and is grounds for enforcement action; for permit revocation or modification; or for denial of a permit renewal application.

B. Continuation of the Expired General Permit.

This permit expires on August 1, 1998. However, an expired general permit continues in force and effect until a new general permit is issued. Operators seeking authorization under a new general permit must submit a new NOI in accordance with the terms of such new general permit.

C. Need to halt or reduce activity not a defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the construction activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Duty to Provide Information. The permittee shall furnish to the State Director; or local, or any other agency approving sediment and erosion plans, grading plans, or storm water management plans, or with regulatory control over the project; or in the case of a storm water discharge associated with industrial activity which discharges through a municipal separate storm sewer system with a SPDES permit, to the municipal operator of the system, any information which is requested to determine compliance with this permit or other information.

F. Other Information. When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI or in any other report to the State Director, he or she shall promptly submit such facts or information.

G. Signatory Requirements. All NOIs, NOTs, storm water pollution prevention plans, reports, certifications or information required by this permit or submitted pursuant to this permit, shall be signed as follows:

1. All NOIs and NOTs shall be signed as follows:

a. For a corporation: by (1) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person authorized to and who performs similar policy or decision-making functions for the corporation; or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The pollution prevention plan and all reports required by the permit and other information requested by the State Director or local agency shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described above and submitted to the State Director.

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

c. Certification. Any person signing documents under paragraph V.G (Page 18) shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

H. **Property Rights**. The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

I. **Severability**. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

J. **Requiring an individual permit or an alternative general permit.**

1. The State Director may require any person authorized by this permit to apply for and/or obtain either an individual SPDES permit or an alternative SPDES general permit. Where the State Director requires a discharger authorized to discharge under this permit to apply for an individual SPDES permit, the State Director shall notify the discharger in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the discharger to file the application, and a statement that on the effective date of issuance or denial of the individual SPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the appropriate DEC Office indicated in Appendix B of this permit. The State Director may grant additional time to submit the application upon request of the applicant. If a discharger fails to submit in a timely manner an individual SPDES permit application as required by the State Director under this paragraph, then the applicability of this permit to the individual SPDES permittee is automatically terminated at the end of the day specified by the State Director for application submittal.

2. Any discharger authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii) and 6 NYCRR Part 621, with reasons supporting the request, to the State Director at the address for the appropriate DEC Office (see addresses in Appendix B of this permit). The request may be granted by issuance of an individual permit or an alternative general permit at the discretion of the State Director.

3. When an individual SPDES permit is issued to a discharger otherwise subject to this permit, or the discharger is authorized to discharge under an alternative SPDES general permit, the applicability of this permit to the individual SPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual SPDES permit is denied to an operator otherwise subject to this permit, or the operator is denied for coverage under an alternative SPDES general permit, the applicability of this permit to the individual SPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the State Director.

K. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

L. Inspection and Entry. The permittee shall allow the State Director or an authorized representative of EPA, the State, or, in the case of a construction site which discharges through a municipal separate storm sewer, an authorized representative of the municipal operator or the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

M. Permit Actions. This permit may, at any time, be modified, revoked, and renewed. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Part VI. TERMINATION OF COVERAGE

A. Notice of Termination ("NOT"). Where a site has been finally stabilized and all storm water discharges from construction activities that are authorized by this permit are eliminated[13], the operator must submit an NOT form approved and provided by the State Director (or photocopy thereof).The NOT shall be signed in accordance with Part V.G (Page 18) of this permit and submitted to the address indicated on the approved NOT form.

[13] For the purposes of this certification, elimination of storm water discharges from construction activity means that all disturbed soils at the identified facility have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activities from the identified site that are authorized by a SPDES general permit have otherwise been eliminated.

See Reverse for Instructions

SPDES FORM

DEC

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-3505

Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity Under the SPDES General Permit

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a SPDES permit issued for storm water discharges associated with industrial activity in the State in Section II of this form. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Facility Operator Information

Name: Phone:

Address: Status of Owner/Operator:

City: State: ZIP Code:

II. Facility/Site Location Information

Name: Is the Facility Located on Indian Lands? (Y or N)

Address:

City: State: ZIP Code:

Latitude: Longitude: Quarter: Section: Township: Range:

III. Site Activity Information

MS4 Operator Name:

Receiving Water Body:

If You are Filing as a Co-permittee, Enter Storm Water General Permit Number: Are There Existing Quantitative Data? (Y or N) Is the Facility Required to Submit Monitoring Data? (1, 2, or 3)

SIC or Designated Activity Code: Primary: 2nd: 3rd: 4th:

If This Facility is a Member of a Group Application, Enter Group Application Number:

If You Have Other Existing NPDES Permits, Enter Permit Numbers:

IV. Additional Information Required for Construction Activities Only

Project Start Date: Completion Date: Estimated Area to be Disturbed (in Acres): Is the Storm Water Pollution Prevention Plan in Compliance with State and/or Local Sediment and Erosion Plans? (Y or N)

V. Certification: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: Date:

Signature:

91-19-12 (9/92)—10g

Instruction—NYSDEC Form 91-19-12 (9/92)

Notice of Intent (NOI)

For Storm Water Discharges Associated With Industrial Activity to Be Covered Under the SPDES General Permit

Who Must File A Notice Of Intent Form

Federal law at 40 CFR Part 122 prohibits point source discharges of storm water associated with industrial activity to a water body(ies) of the U.S. without a National Pollutant Discharge Elimination System (NPDES) permit. New York State has been delegated the NPDES program and administers its State Pollutant Discharge Elimination System (SPDES) program in lieu of EPA's NPDES program. Wherever the term "NPDES" is used in the NOI form, the reader should substitute "SPDES". The operator of an industrial activity that has a storm water discharge that qualifies for coverage under a SPDES Storm Water General Permit must submit the NOI form to obtain coverage. If you have questions about whether federal regulations require you to obtain a permit for your storm water discharge, contact the EPA Storm Water Hotline at (703) 821-4823. If you have questions concerning the applicability and coverage of the SPDES Storm Water General Permits, contact the New York State of Environmental Conservation at (518) 457-9601. In order to cancel your coverage under the General Permit you must submit a Notice of Termination (NOT) form. Failure to submit a NOT will result in the obligation to pay a yearly Regulatory Fee.

Where To File The NOI Form

New York State intends on using EPA's information management system. Therefore, NOIs must be sent to the following address:

Storm Water Notice of Intent
PO Box 1215
Newington, VA 22122

Completing The Form

You must type or print using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, call the EPA Storm Water Hotline at (703) 821-4823.

Section I—Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same as the name of the facility. The responsible party is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Enter the appropriate letter to indicate the legal status of the operator of the facility:

F—Federal	M—Public (other than federal or state)
S—State	P—Private

Section II—Facility/Site Location Information

Give the facility's or site's official or legal name and complete street address, including city, state, and ZIP code. If the facility or site lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Indicate whether the facility is located on Indian lands.

Section III—Site Activity Information

If the storm water discharges to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g. municipality name, county name) and the receiving water of the discharge from the MS4. (A MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by a state, city, town, borough, county, parish, district, association, or other public body which is designed or used for collecting or conveying storm water.)

If the facility discharges storm water directly to receiving water(s), enter the name of the receiving water.

If you are filing as a co-permittee and a storm water general permit number has been issued, enter that number in the space provided.

Indicate whether or not the owner or operator of the facility has existing quantitative data that represent the characteristics and concentration of pollutants in storm water discharges.

Indicate whether the facility is required to submit monthly data by entering one of the following:

1 Not required to submit monitoring date;
2 Required to submit monitoring data;
3 Not required to submit monitoring data; submitting certification for monitoring exclusion.

Those facilities that must submit monitoring data (e.g. choice 2) are: Section 313 EPCRA facilities; primary metal industries; land disposal units/incinerators/BIFs; wood treatment facilities; facilities with coal pile runoff; and, battery reclaimers.

List, in decreasing order of significance, up to four 4-digit standard industrial classification (SIC) codes that best describe the principal products or services provided at the facility or site identified in Section II of this application.

For industrial activities defined in 40 CFR 122.26(b)(14)(i)-(xi) that do not have SIC codes that accurately describe the principal products produced or services provided, the following 2-character codes are to be used:

HZ Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under subtitle C of RCRA [40 CFR 122.26(b)(14)(iv)];

LF Landfills, land application sites, and open dumps that receive or have received any industrial wastes, including those that are subject to regulation under subtitle D of RCRA [40 CFR 122.26(b)(14)(v)];

SE Steam electric power generating facilities, including coal handling sites [40 CFR 122.26(b)(14)(vii)];

TW Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage [40 CFR 122.26(b)(14)(ix)];

CO Construction activities [40 CFR 122.26(b)(14)(x)].

If the facility listed in Section II has participated in Part 1 of an approved storm water group application and a group number has been assigned, enter the group application number in the space provided.

If there are other SPDES permits presently issued for the facility or site listed in Section II, list the permit numbers. If an application for the facility has been submitted but no permit number has been assigned, enter the application number.

Section IV—Additional Information Required for Construction Activities Only

Construction activities must complete Section IV in addition to Sections I through III. Only construction activities need to complete Section IV.

Enter the project start date and the estimated completion date for the entire development plan.

Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre).

Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans, or storm water management plans.

Section V—Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manage of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, state, federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Notice

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may decrease or reduce the burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20490, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503.

APPENDIX B - Filing Locations

- Notices of Intent should be sent to: Storm Water Notice of Intent, P. O. Box 1215, Newington, VA 22122;
- Notices of Termination should be sent to: Storm Water Notice of Termination, P. O. Box 1185, Newington, VA 22212
- Discharge Monitoring Reports ("DMRs") should be sent to DEC, Division of Water, 50 Wolf Road, Albany, NY 12233-3506;
- Written reports submitted in accordance with 6 NYCRR Part 595 (Chemical Bulk Storage) should be sent to DEC, Division of Spill Prevention, Response and Remediation, 50 Wolf Road, Albany, NY 12233-3520.

All other reports and submittals required by this permit, including individual SPDES applications, should be submitted in accordance with the table below.

The filing location depends on the county in which the discharge is located. To determine the mailing address for the proper Filing Location, find the county in which the discharge is located in the table below. Use the letter in the "KEY" column to the right of the county name to find the proper mailing address in the list at the right.

Discharge Location - County	NYSDEC Region	KEY	Discharge Location - County	NYSDEC Region	KEY
Albany	4	F	Ontario	8	N
Allegany	9	O	Orange	3	E
Broome	7	L	Orleans	8	N
Cattaraugus	9	O	Oswego	7	L
Cayuga	7	L	Otsego	4	G
Chautauqua	9	O	Putnam	3	E
Chemung	8	N	Rensselaer	4	F
Chenango	7	L	Rockland	3	E
Clinton	5	H	St. Lawrence	6	J
Columbia	4	F	Saratoga	5	I
Cortland	7	L	Schenectady	4	F
Delaware	4	G	Schoharie	4	G
Dutchess	3	E	Schuyler	8	N
Erie	9	O	Seneca	8	N
Essex	5	H	Steuben	8	N
Franklin	5	H	Suffolk	1	A
Fulton	5	I	Sullivan	3	E
Genesee	8	N	Tioga	7	L
Greene	4	F	Tompkins	7	L
Hamilton	5	H	Ulster	3	E
Herkimer	6	K	Warren	5	I
Jefferson	6	J	Washington	5	I
Lewis	6	J	Wayne	8	N
Livingston	8	N	Westchester	3	E
Madison	7	L	Wyoming	9	O
Monroe	8	N	Yates	8	N
Montgomery	4	F	Bronx	2	D
Nassau	1	A	Kings	2	D
Niagara	9	O	New York	2	D
Oneida	6	K	Queens	2	D
Onondaga	7	L	Richmond	2	D

KEY

A NYSDEC REGION 1, Bldg. 40 SUNY Stony Brook, NY 11794; Phone: (516) 751-7900

D NYSDEC REGION 2, One Hunters Point Plaza, 47-40 21st St, Long Island City, NY 11101; Phone: (718) 482-4851

E NYSDEC REGION 3, 21 South Putt Corners Rd., New Paltz, NY 12561; Phone: (914) 255-5453

F NYSDEC REGION 4, 2176 Guilderland Ave., Schenectady, NY 12306; Phone: (518) 382-0680

G NYSDEC REGION 4 SUB-OFFICE, Route 10, Jefferson Road, Stamford, NY 12167; Phone: (607) 652-7364

H NYSDEC REGION 5, Route 86, Ray Brook, NY 12977; Phone: (518) 891-1370

I NYSDEC REGION 5 SUB-OFFICE, Hudson St., Warrensburg, NY 12885; Phone: (518) 623-3671

J NYSDEC REGION 6, State Office Bldg.,317 Washington St., Watertown, NY 13601; Phone: (315) 785-2245

K NYSDEC REGION 6 SUB-OFFICE, State Office Building., 207 Genesee St., Utica NY 13501-2885; Phone: (315) 793-2554

L NYSDEC REGION 7, 615 Erie Boulevard West, Syracuse, NY 13204; Phone: (315) 426-7400

N NYSDEC REGION 8, 6274 East Avon-Lima Rd., Avon, NY 14414; Phone: (716) 226-2466

O NYSDEC REGION 9, 270 Michigan Ave., Buffalo, NY 14203; Phone: (716) 851-7000

Mail individual SPDES permit applications to "Division of Regulatory Affairs"

Please See Instructions Before Completing This Form

SPDES FORM

DEC

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-3505

Notice of Termination (NOT) for Coverage Under the SPDES General Permit for Storm Water Discharges Associated with Industrial Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the SPDES program. ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.

I. Permit Information

NPDES Storm Water General Permit Number: _____

Check Here if You are No Longer the Operator of the Facility: ☐

Check Here if the Storm Water Discharge is Being Terminated: ☐

II. Facility Operator Information

Name: _____ Phone: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

III. Facility/Site Location Information

Name: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

Latitude: _____ Longitude: _____ Quarter: _____ Section: _____ Township: _____ Range: _____

IV. Certification: I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that are authorized by a NPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

Print Name: _____ Date: _____

Signature: _____

Instructions For Completing Notice of Termination (NOT) Form

Who Should File A Notice of Termination (NOT) Form

Permittees who are presently covered under the New York State Issued State Pollutant Discharge Elimination System (SPDES) General Permit for Storm Water Associated with Industrial Activity should submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with industrial activity as defined in the storm water regulations at 40 CFR 122.26(b)(14), or when they are no longer the operator of the facilities. Failure to file a Notice of Termination will result in the continued obligation to pay a yearly Regulatory Fee.

For construction activities, elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activity from the construction site that are authorized by a SPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed. Permit Number: NYR100000 (Construction)

Where to File NOT Form

New York State is using EPA's information management system. Therefore, NOTs must be sent to the following address:

Storm Water Notice of Termination
Box 1185
Newington, VA 22122

Completing the Form

Type or print, using upper-case letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only spaces for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, call the EPA Storm Water Hotline at (703) 821-4823.

SEE REVERSE SIDE OF THIS FORM
FOR FURTHER INSTRUCTIONS

Expiration: August 1, 1998

91-19-13 (9/92)—10g

Instructions—NYSDEC Form 91-19-13(9/92)
Notice of Termination (NOT) of Coverage Under The SPDES General Permit for Storm Water Discharges Associated With Industrial Activity

Section I Permit Information

Enter the existing SPDES Storm Water General Permit number assigned to the facility or site identified in Section III. If you do not know the permit number, contact the EPA Storm Water Hotline at (703) 821-4823.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box.

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

Section II Facility Operator Information

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Section III Facility/Site Location Information

Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

Section IV Certification

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, which means: (I) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (II) the manage of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipality, state, federal, or other public facility: by either a principal executive officer or ranking elected official.

Paperwork Reduction Notice

Public reporting burden for this application is estimated to average 0.5 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may decrease or reduce the burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20490, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20603.

APPENDIX D
STORMWATER MANAGEMENT GUIDELINES FOR NEW DEVELOPMENT

I. BACKGROUND

Stormwater runoff from developing areas can lead to off-site problems including flooding and erosion and water quality degradation. By changing land cover on developed sites, there can be reduced infiltration into the soil, decreased interception of precipitation by vegetation, and changes in the timing of runoff. Large runoff volumes and high rates of discharge from these sites can cause flooding and erosion if not properly controlled and conveyed from the sites. Additionally, pollutants, such as sediment, oil, grease, metals and nutrients, can be washed off impervious areas during storm events and be transported to lakes and streams and may contribute to water quality degradation. This is reflected in the Nonpoint Source Assessment Report published by NYS DEC in February 1989.

To minimize the effects of development, ideally the quantity and quality of stormwater runoff that reaches surface waters during and after development should not be altered from pre–development conditions. A variety of structural and non–structural measures -- for example, detention ponds, recharge basins, infiltration pits and trenches, diversion ditches, storage terraces and vegetative swales and other vegetative measures including artificial wetlands -- may be used to control and alleviate the adverse impacts of stormwater runoff.

The following guidelines, which include guidance for siting, sizing, and design of stormwater management measures, may be considered in the preparation and review of stormwater management plans to ensure that runoff during and after development is not substantially altered from pre–development conditions. Of course, such preparation and review should proceed on a case–by–case basis, attendant to the facts and circumstances surrounding the particular project involved.

Generally, appropriate stormwater management plans will achieve the following water and natural resource management objectives:

- reduce the rate of runoff from new land development to prevent increases in flooding and flood damage;
- reduce the erosion potential from a development or construction project; assure the adequacy of existing and proposed culverts and bridges; increase water recharge into the ground; decrease nonpoint source pollution and water quality degradation;
- maintain stream channels for their biological functions as well as for drainage through reduced streambank erosion;
- increase opportunities for preserving open space through stream corridor and flood plain protection; and
- increase recreational opportunities through the multiple use of stormwater management facilities.

II. GUIDANCE

The attached guidelines were developed as an aid to persons preparing and reviewing stormwater management plans. They provide guidance on sound management practices, but are not fixed and inflexible rules to be applied in reviewing stormwater management plans without considering the particular facts and circumstances of a particular project. Local conditions, for example the protection of a sensitive lake or trout stream from the influence of urbanization, may indicate the need for additional control measures.

It should be noted that some communities may have duly adopted stormwater management requirements, and that they should be consulted and complied with. For example, special regulations for controlling stormwater runoff in the Lake George Park are being promulgated under Article 43–0112 of the Environmental Conservation Law and watershed rules and regulations for certain water supply watersheds have been adopted.

STORMWATER MANAGEMENT GUIDELINES FOR NEW DEVELOPMENT

1. DEFINITIONS

Baseflow – The portion of stream flow that is not due to storm runoff, is supported by groundwater discharge into a channel.

Conditional negative declaration – A negative declaration may be issued by a lead agency for an unlisted action (under SEQR), in which the action as initially proposed may result in one or more significant adverse environmental effects; however mitigation measures will modify the proposed action so that no significant adverse environmental impacts will result (6 NYCRR 617.6(h)).

Drywell – Similar to infiltration trench but smaller with inflow from pipe; commonly covered with soil and used for drainage areas of less than 1 acre such as roadside inlets and rooftop runoff.

EIS – An Environmental Impact Statement.

Extended detention – A practice designed to store stormwater run–off by collection as a temporary pool of water, usually having at least a 24 hour residence time. A practice which is used to control peak discharge rates, and which provides gravity settling of pollutants.

First flush – The delivery of a disproportionately large load of pollutants during the early part of storms due to the rapid runoff of accumulated pollutants. The first flush in these guidelines is defined as one–half inch of runoff per acre of land which has been made more impervious from pre–development (natural) conditions through land clearing, land grading and construction/development activities.

Flood plain – For a given flood event, that area of land adjoining a continuous watercourse which has been covered temporarily by water.

Forebay – An extra storage area or treatment area, such as a sediment pond or created wetland, near an inlet of a stormwater management facility to trap incoming sediments or take up nutrients before they reach a retention or extended detention pond.

HEC–2 – U.S. Army Corp of Engineers Computer Program 723–X6–L202A intended for calculating water surface profiles for steady or gradually varied flow in natural or man–made channels.

Impervious area – Impermeable surfaces, such as pavement or rooftops, which prevent the infiltration of water into the soil.

Infiltration – A practice designed to promote the recharge of groundwater by containment and concentration of stormwater in porous soils.

Infiltration basin – An impoundment made by excavation or embankment construction; commonly serves a drainage area of 5 to 50 acres; usually closer to 50.

Outfall – The terminus of a storm drain where the contents are released.

Peak flow – The maximum instantaneous flow of water during a storm, usually in reference to a specific design storm event.

Peak flow attenuation – The reduction of the peak discharge of storm runoff by storage and gradual release of that storage.

Retention – A practice designed to store stormwater run–off by collection as a permanent pool of water without release except by means of evaporation, infiltration, or attenuated release when runoff volume exceeds the permanent storage capacity of the permanent pool.

Riparian area – A relatively narrow strip of land that borders a stream or river.

Riprap – A combination of large stone, cobbles and boulders used to line channels, stabilize stream banks, reduce runoff velocities, or filter out sediment.

Riser – A vertical pipe extending from the bottom of a pond that is used to control the discharge rate from the pond for a specified design storm.

Sand attenuating filter – A chamber open to the surface containing a surface layer of sand over a high void aggregate base; these are innovative but apparently effective practices for atypical situations such as where a site is unsuitable for stormwater infiltration or retention.

SEQR – An acronym for the State Environmental Quality Review Act; Article 8 of the Environmental Conservation Law.

Sheetflow – Runoff which flows over the ground surface as a thin, even layer, not concentrated in a channel.

Special flood hazard area – an area in a community that has been identified as susceptible to a 1% or greater chance of flooding in any given year. A 1% probability flood also is known as the 100–year flood.

SPDES – An acronym for the State Pollutant Discharge Elimination System; A regulatory/permit program administered under Article 17 of the Environmental Conservation Law, by the NYS Department of Environmental Conservation to control point source discharges of water pollution.

Storm frequency – The average frequency of occurrence of events having a given volume and duration. For example: a 2–year; 10–year; or 100–year storm.

Storm drain – Any open or closed conduit designed to convey stormwater.

Storm duration – The length of time over which a precipitation event occurs (e.g., 24–hours).

Storm volume – The total amount of precipitation occurring over the storm duration.

Swale – A natural depression or wide shallow ditch used to temporarily route, or filter runoff.

TR–20 – A rainfall runoff model developed by the USDA Soil Conservation Service for hydrologic analyses of a watershed under present conditions of land cover/use and structural or channel modifications using single event storm rainfall–frequency data. Output consists of peaks and/or flood hydrographs, their time of occurrence and water surface elevations at any desired cross section or structure.

2. FLOOD CONTROL GUIDELINES

The following guidelines should be used to ensure that stormwater runoff is safely conveyed through a development site during and after construction. Also through peak flow attenuation, the guidelines can be used to facilitate the control of stormwater runoff so as to minimize or alleviate flooding and stream bank erosion associated with land development and urbanization. The guidelines are as follows:

A. **Peak Flow Attenuation**

(1) The release of stormwater runoff from development should not exceed pre–development (natural) conditions. To accomplish this, stormwater runoff should be controlled so that during and after development, the site will generate no greater peak than prior to development for a 2–year, 10–year, and 100–year 24–hour storm considered individually.

- Attenuation of the 2–year storm is intended to achieve the stream channel erosion control objective.
- Attenuation of the 10–year storm is intended to assure the adequacy of existing and proposed culverts and storm drain systems.
- Attenuation of the 100–year storm is intended to reduce the rate of runoff from development to prevent expansion of the 100–year flood plain so as to alleviate flooding of improved properties and roadways.

(2) It is not necessary that peak flow attenuation requirements be satisfied only by means of detention basins. For example, infiltration trenches, dry wells, or stone reservoirs underneath paving, may be used for the purpose of attenuating peak flows for smaller storms with appropriate consideration for length of life of the stormwater facility, and feasibility of maintenance.

(3) Where dams are to be constructed for attenuating peak flows, approval may have to be obtained from DEC pursuant to Article 15–0503 of the Environmental Conservation Law.

B. **100–Year Flood Plains**

(1) At a minimum, encroachment into the special flood hazard area should be allowed only in compliance with local restrictions adopted for community participation in the National Flood Insurance Program (NFIP). A permit is required for encroachment into flood plains in Part 500 communities [1].

(2) A 50' buffer (building restriction line) should be established from the flood hazard area as a safety factor to allow for inaccuracy in the determination. Pursuant to Article 24 (ECL), a 100-foot buffer is required around a protected wetland.

(3) The stormwater management plan for all developments of 5 or more acres or containing 5 or more dwelling units located wholly or partially within a 100–year flood plain where flood elevation data are not available through the NFIP, must include a study to determine 100–year flood plain elevations in accordance with TR–20, HEC–2 or other standard engineering methods. Such elevation data shall be used to regulate flood plain encroachments in accordance with the NFIP. The 100–year flood plain elevation and the building restriction line should be shown on the plan.

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[1] Part 500 community – A community for which flood insurance regulations are administered by the State of New York under 6 NYCRR 500 pursuant to Article 36 of the Environmental Conservation Law.

C. Runoff Convevance Systems

(1) Priority should be given to maintaining natural drainage systems, including perennial and intermittent streams, swales and drainage ditches in an open condition.

(2) Where closed storm drain systems (i.e., those involving a culvert or similar conduit) are deemed essential, justification should be made as to why it is necessary to have a closed system. When justified, the closed system should be designed to:

(a) convey the 10–year storm flow within the closed storm drain system; and

(b) provide for safe overland conveyance of flow of the 100–year storm through the development (generally over the top of the closed storm drain system). All overland flow conveyance structures should be at least 1' above the 100–year flood plain elevation and the outfalls of such convenances should be stabilized with rip–rap or other suitable material to reduce erosion.

(3) Any alteration to a protected stream, a stream bed or the banks thereof, including the installation of stormwater conveyance systems will require an Article 15, Protection of Water Permit and may require an Article 24, Freshwater Wetlands Permit. When stream protection measures are mandated on a protected stream, a fisheries habitat technician should be involved with the planning and design of such measures.

(4) Any culvert or stormwater structure placed in a stream should not impede fish migration.

D. Stream Corridor Management

(1) Consistent with the State's Stream Corridor Management Program, land clearing and land grading within a stream corridor should be avoided or minimized, except at stream crossing so that stream and drainage courses remain in a natural state. [2]

(2) Care should be exercised to ensure that riparian vegetation, including grasses, shrubs and trees in the stream corridor or along the watercourse, remain undisturbed during land clearing, land grading and land development.

3. WATER QUALITY MANAGEMENT GUIDELINES

The following guidelines should be used in conjunction with the flood control guidelines to protect water quality from runoff associated with land clearing, land grading and construction activities. The guidelines should be followed by a project applicant/sponsor in preparing and implementing a stormwater management plan (SMP). The guidelines should apply to all land areas where soil permeability has been changed as a result of land clearing, land grading and land development.

A. Control of "First Flush"

Control of the "first flush" is important in stormwater management because most runoff–related water quality contaminants are transported from land, particularly impervious surfaces, during the initial stages of a storm event. For example, from 70% to 95% of the contaminants in stormwater can be removed by capturing the first flush of runoff

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[2] New York State Department of Environmental Conservation, "Stream Corridor Management: A Basic Reference Manual". Albany, 1986.

through infiltration practices [3]. Regardless of whether infiltration, retention or extended detention practices are used to capture the first flush, the guideline is as follows:

> Provide for control of the first 1/2-inch of runoff from all land areas for which the perviousness has been changed over pre-development (natural) conditions due to land clearing, land grading and construction [4].

B. Control of Thermal Discharges

Control of thermal energy in stormwater runoff in watersheds having streams which support cold water fisheries is essential. Impervious surfaces, for example, asphalt parking areas and roofs, store large quantities of heat during hot weather in summer. The heat from such surfaces is released to stormwater through conduction during storm events. Stormwater runoff having elevated temperatures can, in turn, increase stream temperatures during storm events and adversely impact cold water fisheries. Accordingly:

> Stormwater discharges should be consistent with the thermal criteria found in Part 704 of the Water Quality Regulations, Title 6, Chapter X, New York State Codes, Rules and Regulations.

C. Hierarchy of Methods for Managing Stormwater Quality

The following stormwater management systems, summarized in descending order of preference, should be used to control the first flush when designing stormwater facilities. The practices are: (1) infiltration, (2) retention, and (3) extended detention. When a stream supporting a cold water fishery is the object of protection, extended detention should be placed ahead of retention in the hierarchy. A combination of these practices, including stormwater management adjuncts (number 4 in the hierarchy), may be used to achieve first flush control objectives. The project sponsor/applicant should provide justification for the rejection of practices listed as priority 1, 2, or 3.

(1) **Infiltration** - Infiltration of runoff on-site by use of vegetated depressions and buffer areas, pervious surfaces, drywells, infiltration basins and trenches permits immediate recharge of groundwater and aids quality treatment through soil filtration. This practice eliminates or minimizes direct stormwater discharges to a waterbody and provides thermal benefits to cold water fisheries.

(2) **Retention** - Retention by use of wet ponds and wetlands constructed in upland areas provides for the storage of collected runoff in a holding area prior to release in a waterway allowing quality treatment by sedimentation, flocculation, and biological removal. Retention is used when post-development runoff volume is expected to exceed the capabilities of infiltration. However, summer temperatures of water in a retention facility may exceed temperatures required to sustain a cold water fishery. Therefore, retention is not appropriate where stored (warm) water in a retention facility is displaced by storm runoff and discharged to a trout stream in contravention of Part 704 standards.

(3) **Extended Detention** - Extended detention provides for the temporary storage of collected runoff in a holding area prior to release into a waterway. Settling is the primary pollutant removal mechanism associated with extended detention. As such, the degree of removal is dependent on whether a given pollutant is in particulate or soluble form. Removal is likely

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3 Maryland Department of Natural Resources, "Minimum Water Quality Objectives and Planning Guidelines for Infiltration Practices," Water Resources Administration, Sediment and Stormwater Division, Annapolis, MD, April,1986.

4 Note that, in addition to paved surface areas and land areas connected to buildings, the contributory area for which the first 1/2-inch of runoff should be controlled includes lawn and similarly landscaped surfaces.

to be quite high if a pollutant is a particulate, whereas very limited removal can be expected for soluble pollutants.

Extended detention can provide thermal benefits to a trout stream. By using a perforated, low flow drain pipe encased in a gravel jacket having an adequate mass, extended detention may be used to dissipate heat and cool stormwater runoff prior to its discharge to a trout stream.

(4) **Stormwater Management Adjuncts** - Flow and pollutant attenuation by use of open vegetated swales, vegetated buffer zones, or filter strips, provides water quality treatment by filtration, attenuation, buffering, sedimentation, biological and removal and particle retention. These practices should be used to compliment infiltration, retention or extended detention.

4. DESIGN GUIDELINES FOR CONTROLLING THE FIRST ONE-HALF INCH OF RUNOFF

Following are design guidelines for controlling the first 1/2-inch of runoff from the contributory drainage.

A. Infiltration

(1) Infiltration systems should be designed to capture the first one-half inch of stormwater runoff from impervious surfaces, lawns and similarly landscaped areas in the development site. Stormwater volumes in excess of this amount should be managed for quantity control by supplemental practices.

(2) Infiltration systems should incorporate measures which:

a. Recognize that the recommended design time to drain stored runoff from an infiltration system depends on the specific method or practice. Accordingly, the following ponding or storage times represent the maximum design time period for the referenced facility:

TYPE	TIME (24-hour days)
Infiltration Basin	5
Infiltration Trench	15
Dry Wells	15
Porous Pavement	2
Vegetated Depression	1

b. Ensure that infiltration measures are placed at least 100' from septic systems and water supply wells.

c. Recognize that soils with infiltration rates less than .5 inches per hour are unsuitable for infiltration measures.

d. Provide for a vertical separation distance of at least 4 feet between the bottom of the infiltration system and the seasonably high groundwater table or bedrock. (The excavation of an inspection trench/pit or soil borings at the proposed site of the infiltration facilities to determine the elevation of bedrock and groundwater, and the documentation of such tests must be conducted under the direction of a professional engineer, architect, or landscape architect licensed to practice in New York State.)

e. Trap excess loads of sediment, grease, oils, and settleable solids and other objectionable materials including floatable organics, materials from roadways, parking surfaces, and similar paved areas before they enter the infiltration system.

f. Route design runoff flows through an infiltration basin without scouring or eroding the basin floor and clogging the surface soil pores.

g. Route base flow (if any exists) rapidly through the basin to prevent ponding or standing water.

h. Distribute storm runoff volume evenly over the floor of the basin to maximize exfiltration rates.

i. Provide for safe emergency overflow with measures to provide a non–erosive velocity or flow along its length and at the outfall.

In addition to the above;

j. Infiltration systems should not receive runoff until the entire contributory drainage area to the infiltration system is permanently stabilized.

k. Placement of infiltration facilities in areas which have been filled is unacceptable. Compacted fill material loses permeability and the in situ/fill material interface may cause slope failure due to slippage.

l. If on–site septic systems are to be used, soils must be able to accommodate loading from both on–site infiltration facilities and on–site septic systems.

B. <u>Retention</u>

(1) **Retention (Wet) Ponds**

a. Retention is the preferred method of stormwater management when the water table or bedrock is too high for infiltration and soils are poorly drained. Retention improves stormwater quality by gravity settling, naturally occurring chemical flocculation, and biological uptake.

b. Wet ponds (another term for retention pond) should not be constructed by impounding existing wetlands unless authorized by the DEC under Article 24 Freshwater Wetlands Act. If existing wetlands are to be located in an anticipated permanent pool area, the maximum normal pool elevation should not increase mean water depth in the wetland area.

c. Retention ponds should be enhanced with areas of shallow water habitat for additional water quality benefits. Retention ponds also can be part of a created shallow water wetland design, (see use of wetlands for stormwater management).

d. Retention ponds (other than shallow marshes addressed later) should be designed as follows:

i. pond geometry should provide for complete mixing of inflow before discharging.

ii. in larger ponds, diversion barriers such as small islands should be used to increase effective length of flow and permit maximum mixing.

iii. the depth of the pond will vary depending on its intended use. The pond contour should include:

- an average pond depth of 3–6 feet;
- a shallow area 0.5' to 2' deep at the inlet;
- a littoral area or bench 10 feet in width along the perimeter to promote marsh habitat for filtering and nutrient removal; and
- an area 8' to 14' in depth to promote gravity settling and fish habitat.

iv. the minimum drainage area to be served by a wet (retention) pond should be approximately 10 acres. Soils should have infiltration rates less than 0.5 inches/hour.

v. if soils are so porous that an unreasonably large drainage area is required to sustain a relatively small pond, then infiltration practices should be used.

vi. the residence time of pond water should be 24 to 40 hours to remove a minimum of two–thirds of the suspended solids and other pollutants from the incoming stormwater. For removal of phosphorus compounds in lake watersheds where eutrophication is a threat or problem, larger volume ponds should be designed to provide a 14–day residence time.

vii. retention ponds should accommodate up to 10–year storm volumes. The minimum volume retained should be that associated with the first one–half inch of runoff. Excess volumes, for example, the 100–year storm, may be detained.

viii. velocity dissipation devices should be placed at the outfall of all retention structures and along the length of any outfall channel as necessary to provide a non–erosive velocity of flow from the structure to water course. Velocity dissipation devices may be required in stream channels at outfall locations to prevent erosion and fisheries habitat degradation. Pursuant to Article 15 (ECL), a Protection of Waters Permit may have to be obtained in order to install in–stream velocity dissipation devices in protected streams.

ix. the construction of wet (retention) ponds in and around class AA, A, B, C(T) and (TS) streams (water suitable for trout) may not be appropriate to protect these waters and should not be permitted except where, pursuant to 6 NYCRR Part 704 of the Water Quality Regulations, Title 6, Chapter X, retention will not be injurious to cold water fisheries or their habitat. This practice may elevate water temperatures as well as reduce dissolved oxygen levels.

x. pursuant to Article 15–0503 of the Environmental Conservation Law, approval for construction of a dam for a stormwater retention facility may have to be obtained from DEC.

(2) **Use of Wetlands in Stormwater Management**

The use of wetlands for stormwater management is receiving increased attention. Wetlands are known to provide water quality benefits by filtering and trapping suspended solids including sediment, chemical adsorption, biological assimilation, microbial decomposition and chemical decomposition.

a. **Use of Existing Wetlands** - It is generally not acceptable to discharge untreated stormwater directly into naturally existing wetlands. Direct, untreated discharges may overload the natural system, and make it impractical to manage (e.g., by periodic sediment removal) resulting in contamination of the wetland and accelerated succession. Direct discharges also may alter the hydrology and hydroperiod of the wetland, which may significantly alter the vegetative community therein.

However, incorporating an existing wetland in its natural state into a well–designed stormwater management plan may be an acceptable method of stormwater management when adverse impacts to the wetland can be avoided. Natural wetlands should be used only for final polishing after pre–treatment by preliminary practices, such as infiltration, retention or extended detention. In these situations, ultimate discharge to the natural wetland may maintain base flow into the system, thereby helping to maintain the health of the wetland.

Except as provided for in section B. (1) b.,natural wetlands should not be impounded for the creation of either wet or dry ponds.

b. **Use of Artificially Created Wetlands** - Wetlands may be created as part of a stormwater management plan to provide water quality improvement. They may enhance treatment provided by wet ponds and create extended detention areas by enlarging the wetland portions of existing basins.

A created wetland also can provide first–flush treatment when one or more smaller ponds are included. Such a design would be essential if no other pre–treatment practices are used. In the winter when vegetative uptake mechanisms are absent, a pond in the wetland retains higher levels of nitrogen compounds which would otherwise escape downstream.

c. **Factors for Consideration in Designing Created Wetlands** -

i. Location -- the preferred locations are: upland areas adjacent to, but separated from, existing streams and wetlands by vegetated filter

strips wide enough to provide a buffer; in an upland extended detention basin; or as a forebay to a wet pond or detention basin.

ii. Hydraulic design -- specific stormwater management plan criteria must be determined for each site to ensure the created wetland is sufficient to meet the demands being place on it and to determine hydrologic impacts to receiving wetlands, if any.

iii. Expected inflows -- inflows may be composed of stormwater surface water or groundwater. Stormwater should be introduced to wetlands as sheet flow whenever possible. If inflow is conveyed through the outfall, a forebay is necessary. Incoming velocities should not exceed 4 fps during two–year storm events.

iv. Shape and depth -- shallow ponds do not have as long a residence time as deeper ponds. Therefore, caution should be used in substituting deep ponds with shallow marshes. However, the water quality values provided by the substrate, biota and vegetation in wetlands may provide services not provided by deeper ponds. It is important to determine what water quality improvement is needed and whether ponds or wetlands better serve that need.

When creating wetlands, 75% of the wetland should be 18 inches or shallower. Twenty–five percent of the total surface area should be reserved for open water areas that are deeper than 18 inches. However, if the water exits the wetland through an outlet structure, the outlet should be located in water approximately 3 feet deep. Similarly, if a forebay is used, it should be at least 3 feet deep and comprise 10% of the total wetland and pond volume.

v. Vegetative composition – the plant species selected should be compatible with the physical nature of the wetland (e.g., depth), the climate conditions of the area, and their tolerance to the presence of pollutants. A planting scheme and schedule should be incorporated into the stormwater management plan.

C. Extended Detention

(1) Extended detention ponds may be used to enhance water quality in stormwater runoff. Extending the detention time of dry or wet ponds is an effective, low cost means of removing particulate pollutants and controlling increases in downstream bank erosion. Extended detention is preferred over retention where there is a need to maintain stream temperatures in support of a trout fishery pursuant to the thermal criteria found in Part 704 of the Water Quality Regulations, Title 6, Chapter X.

(2) When extended detention ponds are used, they may be acceptable with the following conditions:

a. The "first–flush" runoff volume (i.e., the first one–half inch of runoff from the contributory drainage) should be extended over a 24–hour detention period.

b. Stormwater runoff volume generated from a one–inch storm should be released over a 24–hour detention period. The control device should be adjusted so that smaller runoff events (0.1 to 0.2 inches), which normally pass through the pond quickly, are detained for at least a minimum of six hours. In larger watersheds, up to 40 hours of extended detention may be needed for streambank erosion control.

c. Pond outfall velocities should not exceed 4 fps during 2–year storm events.

d. Velocity dissipation devices should be placed at the outfall of all extended detention structures and along the length of any outfall length channel as necessary to provide a non–erosive velocity of flow from the structure to a water course. Velocity dissipation devices may be required in stream channels at outfall locations to prevent erosion and fisheries habitat degradation. Pursuant to Article 15 (ECL), a Protection of Waters Permit may have to be obtained in order to install in–stream velocity dissipation devices in protected streams.

e. Pursuant to Article 15–0503 of the Environmental Conservation Law, approval for construction of a dam for a stormwater detention facility may have to be obtained from DEC.

D. Stormwater Management Adjuncts

Generally, relatively small volumes of stormwater (i.e., drainage from less than 1 acre or relatively small storms) can be managed entirely by flow and pollution attenuation practices including vegetative swales, filter strips, and water quality inlets. These practices usually are used to supplement other practices such as those described above; therefore, they are referred to herein as stormwater management adjuncts. Where vegetative swales and filter strips will be used, stormwater should to the extent possible be managed as sheetflow and have velocities less than 4 fps during 2–year storm events. The following design criteria should be considered when swales, filter strips and water quality inlets are used to control stormwater runoff.

(1) **Vegetative swales** [5] - Vegetative swales typically are applied in single family residential developments and highway medians as an alternative to curb and gutter drainage systems. When individual lots are greater than 0.5 acre, open section roadways with vegetated swales and check dams are preferred over curb and gutter management systems for stormwater conveyance. In designing and constructing swales:

a. small slopes in the flow of swales should be graded as close to zero as drainage will permit. Side–slopes of swales should be no greater than 3:1.

b. a dense cover of water tolerant, erosion resistant grass must be established. Reed canary grass is recommended for this purpose. Swale grasses should not be mowed close to the ground, as this impedes the filtering and hydraulic functions of the swale. Also, if a swale is adjacent to a roadway, sensitive species with a low salt tolerance (e.g., bluegrass) should be avoided.

c. underlying soils should have a percolation rate of at least 0.5 inches per hour.

d. the swale should be tilled before the grass cover is established to restore infiltration capacity lost as a result of prior construction activities.

e. Check dams can be installed in swales to promote additional infiltration. A preferred method is to sink a railroad tie halfway into the swale, and place stones on the downstream side to prevent a scour hole from forming. If a check dam is used, the designer should make sure that the maximum ponding time of runoff backed up behind the check dam does not exceed 24 hours.

(2) **Filter Strips** [6] - Filter strips do not provide enough storage or infiltration to effectively reduce peak discharges to pre-development levels for design storms. Filter strips are however, viewed as one component of an integrated stormwater management system.

a. The top edge of the filter strip should follow across the same elevational contour. If a section on the top edge of the strips dips below the contour, it is likely that runoff will eventually form a channel toward the low spot.

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5 Adopted from: Schueler, T.R. "Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs", Department of Environmental Programs, Metropolitan Washington Council of Governments, Washington, D.C. July, 1987.

6 Ibid.

b. A shallow stone trench which follows the contour can be used as level spreader at the top of the strip to distribute flow evenly. This also can serve to protect the strip from anthropogenic damage.

c. The top edge of the filter strip should directly abut the contributing impervious area. Otherwise, runoff may travel along the top of the filter strip rather than through it. Berms can be placed at 50–100 foot intervals perpendicular to the top edge of the filter strip to prevent runoff from by–passing the strip.

d. As an absolute minimum, a grass strip should be at least 20 feet wide. Improved performance can be achieved if the strip is 50–75 feet wide, plus an additional four feet wide per each one percent of slope at the site (particularly if it is a forested strip).

e. Wooded filter strips are preferred to grassed strips. If an existing wooded belt cannot be preserved at the project site, the grassed strip should be managed to gradually become wooded by intentional plantings.

f. If a filter strip has been used as a sediment control measure during the construction phase, it is advisable to regrade and reseed the top edge of the strip. Otherwise, the sediment trapped in the filter strip may affect the flow patterns across the strip, thereby reducing its effectiveness.

(3) **Water Quality Inlets (oil/grit separators)** - The primary function of a water quality inlet (also known as an oil/grit separator) is to remove sediment and hydrocarbon loadings from impervious surfaces such as parking lots less than one acre in size before runoff reaches an infiltration basin or other stormwater management facility. If contaminants such as sediment and oil or other petroleum–based products found on parking lots and street surfaces are not removed, they will clog soil pores and prevent infiltration of runoff in the soil in infiltration basins or trenches.

A water quality inlet usually is designed as an underground, reinforced concrete vault consisting of three chambers: a sediment/grit removal chamber, an oil separation chamber and an outlet chamber. Owing to their limited capacity, water quality inlets store only a small fraction of the 2–year design storm volume. Therefore, they play no role in attenuating the post–development peak discharge rate. Furthermore, since runoff rapidly flows through an inlet, only moderate removal of coarse sediment, oil/grease, and debris can be expected, while removal of fine–grained particulate pollutants such as silt and clay will be more limited. Water quality inlets have little effect on removing soluble pollutants such as phosphorus. It is to be noted that a State Pollutant Discharge Elimination System (SPDES) Permit may be needed for parking lots or impervious storage areas associated with industrial and commercial activities.

a. oil/grit separators generally should be designed for areas less than one acre in size.

b. the depth of the permanent pool in each chamber should be at least 4 feet, and there should be at least 400 cubic feet of wet storage in the chambers for each impervious acre in the contributory drainage.

c. the first chamber should be designed for grit and sediment removal. The first and second chamber should be separated by a trash rack to prevent clogging orifices between the two chambers.

d. the second chamber should be designed for separation of oil and other hydrocarbons from runoff. Separation can be achieved by installing an inverted pipe with a 90° elbow in the baffle or wall that separates the second from third chamber.

e. the grit/oil separator should be equipped with manholes to facilitate cleanout and maintenance.

5. REFERENCES

The basic design criteria, methodologies and construction specifications for stormwater management should be those of the Soil Conservation Service, the Soil and Water Conservation Society, the Department of Environmental Conservation, and the Metropolitan Council of Governments which may be found in the most current edition of the following publications and their subsequent revisions:

A. Empire State Chapter, Soil and Water Conservation Society, New York Guidelines for Urban Erosion and Sediment Control, Syracuse, 1988.

B. Soil Conservation Service. "Urban Hydrology for Small Watersheds", Technical Release No., 55. June 1986.

C. Soil Conservation Service. "Engineering Field Manual", latest edition, as applicable.

E. "Soil Conservation Service Standards and Specifications for Ponds." Specifications No, 378. July 1981. (This document allows for use of metal pipe risers. Steel structures may corrode in 20 years or less. Therefore, use materials other than steel, especially in aggressive environments.)

F. U.S. Department of Agriculture, Soil Conservation Service, Ponds-Planning Design, Construction. Agriculture Handbook No. 590. 1982.

G. New York State Department of Environmental Conservation, "Guidelines for Design of Dams", Revised January 1988.

H. New York State Department of Environmental Conservation, "An Owners Guidance Manual for the Inspection and Maintenance of Dams in New York State". June 1987.

I. New York State Department of Environmental Conservation. "Stream Corridor Management: A Basic Reference Manual." Albany, 1986

J. Metropolitan Washington Council of Governments, Controlling Urban Runoff-A Practical Manual for Planning and Designing Urban BMPs. July 1987.

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
STORMWATER MANAGEMENT
SELF–ASSESSMENT CHECKLIST

File No.: _____ Date Initiated: _____

Project Name: _____

Location: _____
(Address)

_____
(County Region

Applicant: _____
(Last Name) (First Name) (MI)

FLOOD CONTROL

A. Peak Flow Attenuation

- The pre–development peak discharge rates from the project site are:

  2–year storm _____ cfs
  10–year storm _____ cfs
  100–year storm _____ cfs

- The post–development peak discharge rates from the project site are:

  2–year storm _____ cfs
  10–year storm _____ cfs
  100–year storm _____ cfs

- A dam(s) _____ (will/will not) be constructed for attenuating peak flows. If a dam is to be constructed, a permit for Dam Construction will/will not), pursuant to Article 15–0503 of the Conservation Law, be required.

- The proposed development project _____ (is/is not) in compliance with local restrictions adopted pursuant to the National Flood Insurance Program.

- All closed stormwater drainage systems on the project site are, at a minimum, designed to convey the _____-year storm while providing for the _____- year storm through the development.

- The proposed project _____(is/is not) in compliance with all provisions of Article 15 (Protection of Waters Act), Article 24 (Freshwater Wetlands Act), and Article 25 (Tidal Wetlands Act) of the Environmental Conservation Law.

WATER QUALITY MANAGEMENT

The Stormwater Management Facilities _____ (have, don't have) water quality improvement features.

If they do, what management facilities are included

Infiltration _____
Retention _____
Extended Detention _____

Is the first 1/2 inch of runoff from the altered land area being treated?

_____ (Yes) _____ (No)

If not, how much runoff will be captured and treated?

_____

If the proposed stormwater facilities do not provide for water quality management, or if less than the first 1/2 inch is managed, explain why:

_____
_____
_____
_____
_____
_____

The classification of the waters which receive the stormwater is

_____

The thermal criteria contained in 6 NYCRR Part 704 _____ (will/will not) be met.

_____
(Signature)

_____
(License No.)

APPENDIX E
EROSION AND SEDIMENT CONTROL GUIDELINES

I. BACKGROUND

Sediment in runoff from construction sites can have a significant effect on the quality of downstream waters. Construction sites have also been identified as a significant source category in the State Nonpoint Source Assessment Report.

The potential effects of increased sediment are varied:

> Sediment may destroy fish habitat through blanketing of fish spawning and feeding areas and elimination of certain food organisms, directly impact fish through gill abrasion and fin rot, and reduce sunlight penetration, thereby impairing photosynthesis of aquatic plants. Suspended sediment decreases recreational values, reduces fishery habitat, adds to the mechanical wear of water supply pumps and distribution systems, and adds to treatment costs for water supplies. Nutrients and toxic substances attached to sediment particles are transported to waterbodies and may enter aquatic food chains, cause fish toxicity problems, contribute to algal blooms, impair recreational uses, and degrade the water as a drinking water source. [1]

The following guidelines are designed for consideration by both government officials and project sponsors in the preparation and review of erosion and sediment control plans for a land development project. If implemented properly, the guidelines herein will assist in achieving the following water and natural resource management objectives.

- reduce the erosion potential from a development or construction project;
- decrease nonpoint source pollution and water quality degradation;
- maintain stream channels for their biological functions, as well as for drainage, through reduced sediment deposition.

II. GUIDANCE

The attached guidelines were developed to aid persons in preparing and reviewing erosion and sediment control plans. They provide guidance on sound management practices, but are not fixed and inflexible rules to be applied in reviewing erosion control plans without considering the particular facts and circumstances of a particular project.

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[1] Nonpoint Source Management Program. January, 1990.

EROSION AND SEDIMENT CONTROL GUIDELINES FOR NEW DEVELOPMENT

A. Existing vegetation on a project site should be retained and protected as much as possible to minimize soil loss on a project site and to minimize erosion control costs.

B. Sediment control practices/measures, where necessary, should be designed to protect the natural character of rivers, streams, lakes, coastal waters or other waterbodies on–site and minimize erosion and sedimentation off-site from the start of land disturbance activities to establishment of permanent stabilization.

1. The off-site impacts of erosion and sedimentation related to land clearing, grading and construction activities should not be any greater during and following land disturbance activities than under pre–development conditions.

2. Pursuant to Part 700 et seq. of Title 6, Chapter X of NYCRR:

   a. toxic and other deleterious substances shall not be discharged in amounts that will adversely affect the taste, color or odor thereof, or impair the waters of the state for their best (classified) usages,

   b. suspended, colloidal and settleable solids shall not be discharged in amounts that causes substantial visible contrast to natural conditions, or causes deposition or impairs the waters for their best (classified) usages.

This means that stream reaches on-site and downstream of construction areas should not have substantial visible contrast relative to color, taste, odor, turbidity and sediment deposition from the reaches upstream of the construction area. Impacts such as these which result from construction or developmental activities are a violation of Part 700 water quality standards and may be subject to enforcement actions.

C. Erosion and sediment control measures should be constructed in accordance with an erosion and sediment control plan. The plan should:

1. describe the temporary and permanent structural and vegetative measures that will be used to control erosion and sedimentation for each stage of the project from land clearing to the finished stage.

2. provide a map showing the location of erosion and sediment control measures.

3. provide dimensional details of proposed erosion and sediment control facilities as well as calculations used in the siting and sizing sediment basins. (Guidance for performing calculations can be obtained in the reference cited in Section E.8.)

4. identify temporary erosion and sediment control facilities which will be converted to permanent stormwater management facilities.

5. provide an implementation schedule for staging temporary and permanent erosion and sediment control facilities.

6. provide a maintenance schedule for soil erosion and sediment control facilities and describe maintenance activities to be performed.

D. Erosion and sediment control measures should be constructed prior to beginning any other land disturbances. The devices should not be removed until the disturbed land areas are stabilized.

E. Specify guidance.

1. Exposure Restrictions: No more than 5 acres of unprotected soil should be exposed at any one time. Previous earthwork should be stabilized in accord with approved design standards and specifications referenced in Section E.8 before additional area is exposed. (Site factors including topography, soil erosion potential, proximity to wetlands and water courses may require limiting the amount of raw earth that can be exposed at any one time to less than 5 acres.)

2. Grading: Perimeter grading should blend with adjoining properties.

3. Vegetative Protection: Where protection of trees and/or other vegetation is required, the location of the site to be protected should be shown on the erosion control plan. The method of protecting vegetation during construction should conform to the design criteria referenced in Section E.8.

4. Drainage control.

   a. Surface runoff that is relatively clean and sediment free should be diverted or otherwise prevented from flowing through areas of construction activity on the project site. This will greatly reduce sediment loading in surface runoff.

   b. A fill associated with an approved temporary sediment control structure or permanent stormwater management structure, should not be created which causes water to pond off–site on adjacent property, without first having obtained ownership or permanent easement for such use from the owner of the off–site or adjacent property.

   c. Natural drainage channels should not be altered or relocated without the proper approvals. Pursuant to Article 15 of the Environmental Conservation Law, a protected stream and the bed and banks thereof should not be altered or relocated without the approval of the Department of Environmental Conservation. [2]

   d. Runoff from any land disturbing activity should not be discharged or have the potential to be discharged off-site or into storm drains or into watercourses unless such discharge is directed through a properly designed, installed and maintained structure, such as a sediment trap, to retain sediment on-site. Accumulated sediment should be removed when 60% of the storage capacity of the sediment retention structure is filled with sediment.

   e. For finished grading, adequate gradients should be provided so as to prevent water from standing on the surface of lawns for more than 24 hours after the end of a rainfall, except in a swale flow area which may drain as long as 48 hours after the end of rainfall.

   f. Permanent swales or other points of concentrated water flow should be stabilized with sod, rip–rap, paving, or covered with a approved erosion control matting as provided for in the design criteria referenced in Section E.8.

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[2] A natural drainage channel refers to a swale, water course in a gully, or a protected or unprotected stream. Natural drainage channels should not be altered or relocated on adjacent properties without first having obtained ownership or a permanent easement for the altered or relocated drainage channel from the owner of the off-site or adjacent property.

g. Surface flows over cut and fill slopes should be controlled as provided for in the design criteria for vegetating waterways referenced in Section E.8.

5. Timing.

a. Except as noted below, all sites should be seeded and stabilized with erosion control materials, such as straw mulch, jute mesh, or excelsior within 15 days of final grading. If construction has been suspended, or sections completed, areas should be seeded immediately and stabilized with erosion control materials. Maintenance should be performed as necessary to ensure continued stabilization.

i. For active construction areas such as borrow or stockpile areas, roadway improvements, and areas within 50 ft. of a building under construction, a perimeter sediment control system consisting, for example, of silt fencing or hay bales, should be installed and maintained to contain soil.

ii. On cut side of roads, ditches should be stabilized immediately with rock rip–rap or other non-erodible liners, or where appropriate, vegetative measures such as sod. When seeding is approved, an anchor mulch should be used and soil should be limed and fertilized in accord with recommendations referenced in Section E.8.

iii. Permanent seeding should optimally be undertaken in the spring from March 21 through May 20, and in late summer and early fall from August 25 to October 15. During the peak summer months and in the fall after October 15 when seeding is found to be impracticable, an appropriate mulch should be applied. Permanent seeding may be undertaken during summer if plans provide for adequate watering of the seedbed.

iv. All slopes steeper than 3:1 (h:v), as well as basin or trap embankments, and perimeter dikes should, upon completion, be immediately stabilized with sod, seed and anchored straw mulch, or other approved stabilization measures. Areas outside of the perimeter sediment control system should not be disturbed. Maintenance should be performed as necessary to ensure continued stabilization.

b. Temporary sediment trapping devices should be removed within thirty (30) calendar days following establishment of permanent stabilization in all contributory drainage areas. Stormwater management structures used temporarily for sediment control should be converted to the permanent configuration within this time period as well.

6. Stream protection.

a. The bed and banks of all on-site and off-site streams that may be impacted by land clearing, grading, and construction activities should be protected to prevent stream, river, lake or coastal sedimentation, streambank erosion, stream enlargement and degradation or loss of fisheries habitat. Measures for protecting the bed and/or banks of a stream may include; for example, gabion baskets, rip-rap, log cribbing, and vegetative measures. [3]

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[3] Whenever possible, vegetative streambank stabilization practices are recommended over structural practices such as rip-rap and gabion linings which may unnecessarily alter the existing stream ecosystem.

b. Where temporary work roads or haul roads cross stream channels, adequate waterway openings must be constructed using spans, culverts, washed rock backfill or other acceptable, clean methods that will ensure that road construction and use do not result in turbidity and sediment downstream. All stream crossing activities and appurtenances shall be in compliance with a permit issued pursuant to Article 15 of the Environmental Conservation Law, where applicable, and should be carried out in conformance with guidelines in DEC's Stream Corridor Management manual. [4]

7. Maintenance.

a. An erosion control plan for a project site should identify maintenance requirements for erosion and sediment control practices utilized, and it should provide a maintenance schedule. All erosion and sediment control measures should be inspected periodically and maintained in conformance with the schedule so as to ensure they remain in effective, operating condition until such times as they are removed.

b. All points of construction ingress and egress should be protected to prevent the deposition of materials onto traversed public thoroughfare, either by installing and maintaining a stabilized construction entrance, or by washing all vehicle wheels in a safe disposal area. All materials deposited onto public thoroughfares should be removed immediately. Proper precautions should be taken to ensure that materials deposited onto public thoroughfares are removed so that they do not enter catch basins, storm sewers, or combined sewers.

c. Accumulated sediment should be removed when 60% of the storage capacity of the retention structure is filled with sediment.

8. Design specifications.

Designs, standards and specifications for controlling erosion and sedimentation are found in the following publication and should be identified and shown in the erosion control plan:

Empire State Chapter, Soil & Water Conservation Society, New York Guidelines for Urban Erosion and Sediment Control, Syracuse. March 1988.

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[4] New York State Department of Environmental Conservation, "Stream Corridor Management: A Basic Reference Manual," Albany, 1986.

Appendix F

THE STORMWATER MANAGEMENT AND EROSION CONTROL PLAN* (Structure and Content)

INTRODUCTION

Water quality impacts and flooding associated with land development can be mitigated by installing structural and vegetative stormwater control measures. In order to properly choose, size and site a stormwater management measure or a combination of measures for a specific project or development site, certain information must be gathered and analyzed beforehand. Such information gathering and analyses can best be accomplished within the framework of a stormwater management and erosion control plan. Such a plan should be required for all development proposals that meet applicability criteria set forth by the locality. Suggested criteria are presented in Chapter III. The purpose of this chapter is to provide local planning agencies, developers and consultants with a framework for (1) structuring a stormwater management and erosion control plan, (2) identifying the kinds of information that should be gathered, and (3) describing the kinds of analyses that should be made.

STORMWATER MANAGEMENT PLAN: STRUCTURE AND CONTENT

At a minimum, a stormwater management and erosion control plan should:

- provide background information about the scope of the project.
- provide a statement of stormwater management objectives.
- compare post-development stormwater runoff conditions with pre-development conditions.
- describe proposed structural and vegetative stormwater measures to ensure that the quantity, temporal distribution and quality of stormwater runoff during and after development is not substantially altered from pre-development conditions.
- identify the type and frequency of maintenance required by the stormwater management and erosion control facilities utilized.

Within the above context, the following outline details the structure and content of a stormwater management and erosion control plan.

I. BACKGROUND INFORMATION

A. PROJECT DESCRIPTION

1. Describe what is being proposed (i.e., residential lot subdivision, planned unit development, commercial/retail development, or industrial development).
2. Describe project size (i.e., number of acres, number of dwelling units, other buildings, and density).
3. Describe other improvements which will be made on project site, including streets and roads, utilities (water, sewer, etc.), and give particular attention to acreage of land that will become paved and covered with buildings. Lawn acreage also should be specified.

*Appendix F is a reprint of Chapter 4 of the NYS DEC April, 1992 publication entitled, Reducing the Impacts of Stormwater Runoff from New Development

4. Provide a location map.* Include watersheds in the community that may be impacted by project. Also, show highways, roads, and proximity of project to nearest city, village or hamlet, and to the nearest waterbody, and other prominent features.

5. Provide a base map containing boundary lines of the project site, sub-catchments, and contributory watersheds at a scale agreed upon by the municipality and developer. **

6. Provide an analysis of site limitations and development constraints by including such factors as slope, soil erodibility, depth to bedrock, depth to seasonal high water, soil percolation, etc., to facilitate evaluation of site suitability for proposed stormwater and erosion control facilities in relation to the overall development proposal.

7. Provide a statement describing how this project will meet stormwater management objectives established by the municipality.

8. Provide a general description of the approaches which will be taken to control erosion and sedimentation and stormwater runoff.

9. Provide a statement indicating when project is to begin and the expected date of completion.

10. Provide a map and descripiton of all critical environmental areas, conservation areas, wildlife habitats, easements, etc., to be protected. (These areas should be marked in the field.)

11. Provide an analysis of potential impacts from the proposed development to natural resource features on-site and off-site such as streams, lakes, wetlands, water supplies, coastal estuaries, etc. A determination as to whether the proposed development will affect any designated primary or principal aquifer should also be included.

B. EXISTING (PRE-DEVELOPMENT) CONDITIONS

1. Provide map showing topography (contours) under existing conditions. On this same map, show drainage patterns, including ditches, culverts, permanent streams, intermittent/ephemeral streams or drainages, wetlands, or other waterbodies, and existing roads. Indicate sizes of existing culverts. Delineate watershed and sub-watershed boundaries on the map.

2. Provide a map showing existing land use, open space, public facilities, utility lines, water supply wells on site, and predominant vegetation cover types (forested, brushland, grassland, cropland, pasture, etc.).

3. Obtain soils survey information and, by sub-catchment, provide tabular information detailing the area in acres that are in each of the Soil Conservation Service (SCS) Hydrologic Soil Groups A, B, C or D in Table 10 in Chapter III. Soils information should be obtained by conducting a site-specific soil survey.

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* Include a north arrow on all maps.

** For subdivision review purposes, maps typically have a scale ranging from 1" = 50' to 1" = 200'. Map scales in the range of 1" = = 1' to 1" = 40' are not uncommon depending on project size and amount of detail required. Maps for stormwater management planning can adopt any of the above scales. The contour interval for the maps should be two feet or an appropriate interval selected on the basis of site conditions and agreed upon by the municipality and developer.

4. Where applicable, provide a map showing designated 100-year flood plain boundaries in affected drainage basins in the community including any available 100-year flood elevations and floodways. Show culverts downstream of project and culvert size. Show existing easements for storm drains, sewers, and other utilities. Show the extent of the drainage area served by a man-made stormwater drainage network if that network system is collecting runoff from outside of the natural drainage basin and is discharging into the basin of concern.

5. Provide hydrologic data describing rainfall characteristics. This should include:

   a. Precipitation data for several return periods (i.e., the 1-year, 2-year, 10-year, and 100-year storms for a 24-hour duration).

   b. Provide stream channel survey data by sub-catchment showing channel conditions including roughness and vegetation.

C. PROPOSED FUTURE (DEVELOPMENT) CONDITIONS

1. Provide a map showing by sub-catchment, the completed project, including lot layout, approximate location of buildings, streets, and other paved surfaces, final contours, utility lines, water supply wells, individual sewage disposal systems, and location and types of easements.

2. Provide tabular information, by sub-catchment, showing the acres of impervious area created in the proposed development as well as the extent of lawn and areas where the land has been made more impervious than pre-development conditions.

3. By sub-catchment, show on a map changes to land surface, including areas of cuts and fills, changes in vegetative cover types, and final contours. Indicate by sub-catchment, land-clearing and earth moving start-up and completion dates.

4. Indicate construction schedule including estimated completion date(s) and proposed winter shutdowns.

II. COMPARISON OF PRE-DEVELOPMENT WITH POST-DEVELOPMENT RUNOFF

A. METHODOLOGIES

1. Describe or identify the methodology used to compare and evaluate pre- with post-development runoff conditions in terms of volumes, peak rates of runoff, routing, and hydrographs. (Chapter III. describes several commonly used hydrologic models for computing runoff.)

   - Peak discharge rates and total runoff volumes from the project area for existing site conditions and post-development conditions for the 2-year and 10-year, 24 hour storm events should be calculated. The relevant variables used in this determination, such as curve number and time of concentration should be included.

   - Downstream analysis of the 100-year, 24 hour event, including peak discharge rates, total runoff volumes and evaluation of impacts to receiving waters and/or wetlands should be evaluated.

- Storage volume and surface area requirements necessary to provide flood control for runoff generated during 2-year, 10-year and 100-year, 24 hour storm events should be calculated.

- Discharge provisions for the proposed control measures, including peak discharge rates, outlet design, discharge capacity for each stage, outlet channel design, and a description of the point of discharge should be provided.

- Sufficient detail should be provided to show that the stormwater facility(ies) is/are capable of withstanding the discharge from the 100-year storm event.

2. Describe or identify the methodology used to compare and evaluate pre- with post-development pollutant loading. Contaminants to be compared include total suspended solids, total phosphorus, total nitrogen, and biological oxygen demand. Pollutant loading coefficients may be used. (Chapter III. describes several commonly used models for calculating pollutant loading.)

   - Water quality treatment facilities should be designed to control the first 1/2 inch of runoff or runoff from the 1-year, 24 hour storm event, or whichever is greater.

   - The necessary storage volumes should be calculated and the proposed stormwater measure(s) should be described in detail. The plans should provide sufficient detail of the water quality control measures to ensure that the relevant design criteria will be met.

   - Specific information may include surface area dimensions, depths, inlet designs, planting specifications for use of aquatic vegetation, percent solids removal expected, discharge rates and outlet design.

B. CALCULATIONS

1. State any assumptions used in making the calculations.

2. Provide assumptions and coefficient values used in the hydrologic calculations for making above comparisons. Evaluate the post-development effect of stormwater runoff on identified flood plains or designated flood hazard areas in the community.

3. Compare pollutant loading between before and after conditions. Provide computations.

III. STORMWATER MANAGEMENT

A. STORMWATER MANAGEMENT FACILITIES

1. Describe in a narrative and show on a map, by sub-catchment, proposed stormwater management facilities. A soil profile to at least one foot below the stormwater management facility should be provided.

2. Provide designs of proposed structural stormwater management facilities. Pursuant to the provisions in Chapter V. for peak flow attenuation and water quality management, indicate which facilities will be used to attenuate peak flows, which will be used to enhance stormwater runoff quality, and which facilities will serve a dual role. Identify the materials to be used in constructing these facilities.

3. Calculations for sizing stormwater facilities should be provided.

4. Provide designs and calculations for siting and sizing such specialized measures and devices as filter strips, water quality inlets (oil/grit separator) forebays, etc., which will be used to remove sediment, oil-based products, and other contaminants found in urban runoff.

5. Provide an evaluation of the amount of treatment or level of pollutant reduction that can be expected from the proposed stormwater management facility(ies). Contaminants to be considered in this evaluation include total suspended solids (TSS), total phosphorus (P), total nitrogen (N), biological oxygen demand (BOD) and thermal pollution. Evaluation of the effectiveness of stormwater management practices can be based on reports on the effectiveness of comparable stormwater facilities on similar sites. Pollutant loading coefficients for total P, total N and BOD, and models for making this evaluation are identified and briefly discussed in Chapter III.

   Guidance for evaluating the level of reduction of TSS (and other pollutants attached thereto) that can be expected from selected stormwater management facilities can be found in the publication entitled "Methodology for Analysis of Detention Basins for Control of Urban Runoff Quality". [1] Also, the BMPSOFT model and P8 Urban Catchment Model referred to in Table 14 in Chapter VI may be used to calculate the level of reduction of TSS (and other pollutants) that can be expected from selected stormwater management facilities.

6. Provide information on the design provisions that address safety considerations (e.g., gentle slopes and benches in ponds) and accommodate maintenance needs (including access to conduct maintenance operations).

B. STORMWATER CONVEYANCE SYSTEM

1. Describe in a narrative and map by sub-catchment the stormwater conveyance (drainage) system. Indicate which segments of the drainage system are open channels and which segments are piped (culverts). Provide rationale and justification for installing piped segments.

2. Provide plan view and cross-sectional designs of stormwater conveyance systems. Hydrologic calculations for siting and sizing the stormwater conveyance system should be provided. Identify materials to be used.

3. Provide plans, designs and identify materials to be used for preventing erosion in channel sections of stormwater conveyance systems. Show how erosion at culvert inlets and outfalls will be prevented.

C. RECREATIONAL AND/OR LANDSCAPE FEATURES (Optional)

1. Describe and illustrate any recreational or landscape features which are to be factored into the stormwater management system to enhance the aesthetics of the facility(ies) and provide multiple use options.

2. On the map prepared under Section I.C.1., show the location of recreational facilities.

3. Provide landscaping sketches and designs for the stormwater management facilities.

IV. EROSION AND SEDIMENT CONTROL

A. TEMPORARY EROSION AND SEDIMENT CONTROL FACILITIES
(to be used during land clearing, land grading and the construction phases)

1. Describe temporary structural facilities and vegetative measures which will be used to control erosion and sedimentation.

2. Provide a map showing, by sub-catchment, the location of temporary vegetative and structural erosion and sediment control facilities.

3. Provide dimensional details of proposed erosion and sediment control facilities and identify the materials that will be used in developing these facilities. Calculations used in siting and sizing sediment basins should be provided (see New York Guidelines for Urban Erosion and Sediment Control).

4. Identify temporary erosion and sediment control facilities which will be converted to permanent stormwater management facilities.

5. Provide an implementation schedule for the staging of temporary erosion and sediment control facilities.

6. Provide a maintenance schedule for soil erosion and sediment control facilities.

B. PERMANENT EROSION AND SEDIMENT CONTROL FACILITIES

1. Describe permanent structural and vegetative practices which will be used to provide long-term control of erosion and sedimentation when construction activities are completed and the project site is restored.

2. Provide a map showing, by catchment, the location of permanent erosion control facilities, including both structural and vegetative.

3. By sub-catchment, provide an implementation schedule for restoring the project site with permanent erosion and sediment control facilities.

V. IMPLEMENTATION SCHEDULE AND MAINTENANCE

A. Provide an implementation schedule for staging of all stormwater management facilities. Describe how this schedule will be coordinated with the staging of erosion and sediment control facilities and construction activities.

B. Provide a description of the arrangements which will be made for ensuring long-term maintenance of stormwater management and erosion control facilities. Back-up contingency plans should be provided and described. Those responsible for performing maintenance should be identified.

ACCOUNTABILITY DURING PLAN IMPLEMENTATION

Significant progress has been made in preparing improved development plans that address stormwater and erosion control concerns. Quite often, however, there is a breakdown between what is called for in the plan and what is actually delivered during the plan implementation phase. Frequently erosion and sediment controls during construction tend to fail because they are either not properly installed or properly maintained. Deposition of sediment in a stream, lake, or other receiving waterbody is the end result.

There are two things that a municipality can do to ensure that stormwater management and erosion and sediment control practices are being properly installed and maintained during the construction phase of the project:

1. If the municipality has an inadequate inspection and enforcement staff, it can extract a fee from the developer(s) to retain staff to do the inspections and provide enforcement.

2. The municipality also can require the developer(s) to establish a dedicated fund, such as a surety bond or irrevocable letter of credit. In the event the developer fails to properly install and maintain required stormwater management and erosion control practices, the municipality can draw upon the fund to do the necessary work itself or to have it done by another firm. In such case, the municipality should require an easement for the purpose of entering onto the property to install, maintain or repair stormwater and erosion control practices.

ATTACHMENT B
EROSION CONTROL DETAILS

1. Silt Fence
2. Straw Bale Dike
3. Perimeter Dike/Swale
4. Temporary Swale
5. Sediment Trap for Drop Inlet

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 are to be used for no more than 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 (feet)
2:1	50	25
2-1/2:1	40	50
3:1	33	75
3-1/2:1	30	100
4:1	25	125

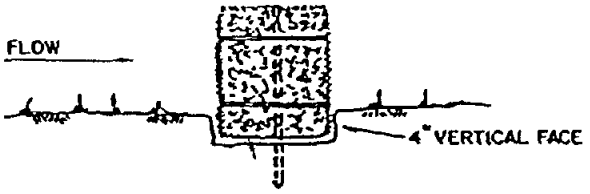
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

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

Design Criteria

A design is not required. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 4.3 on page 4.10 or details.

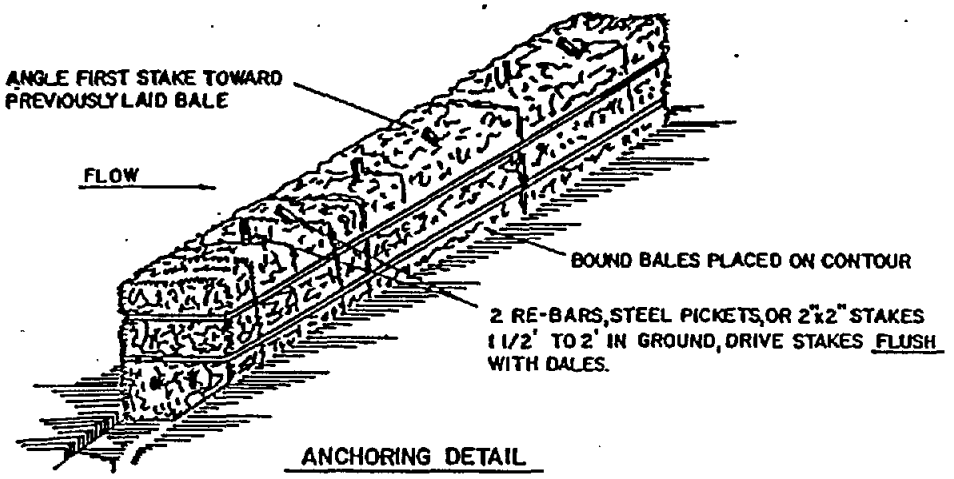
Figure 4.3
Straw Bale Dike Details



BEDDING DETAIL

STANDARD SYMBOL

SBD — DRAINAGE AREA NO MORE THAN 1/4 ac. PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%



ANCHORING DETAIL

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	STRAW BALE DIKE	STANDARD DRAWING SBD-1

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric (filter cloth) 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.

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 are:

Slope Steepness	Maximum Slope Length (Ft)
2:1	50
3:1	75
4:1	125
5:1	175
Flatter than 5:1	200

2. Maximum drainage area for overland flow to a silt fence shall not exceed 1/2 acre per 100 feet of 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. All silt fences shall be placed as close to the area as possible, and the area below the fence must be undisturbed or stabilized.

A detail of the silt fence shall be shown on the plan, and contain the following minimum requirements:

1. The type, size, and spacing of fence posts.
2. The size of woven wire support fences. (OPTIONAL)
3. The type of filter cloth used.
4. The method of anchoring the filter cloth.
5. The method of fastening the filter cloth to the fencing support.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. See Figure 4.4 on page 4.12 for details.

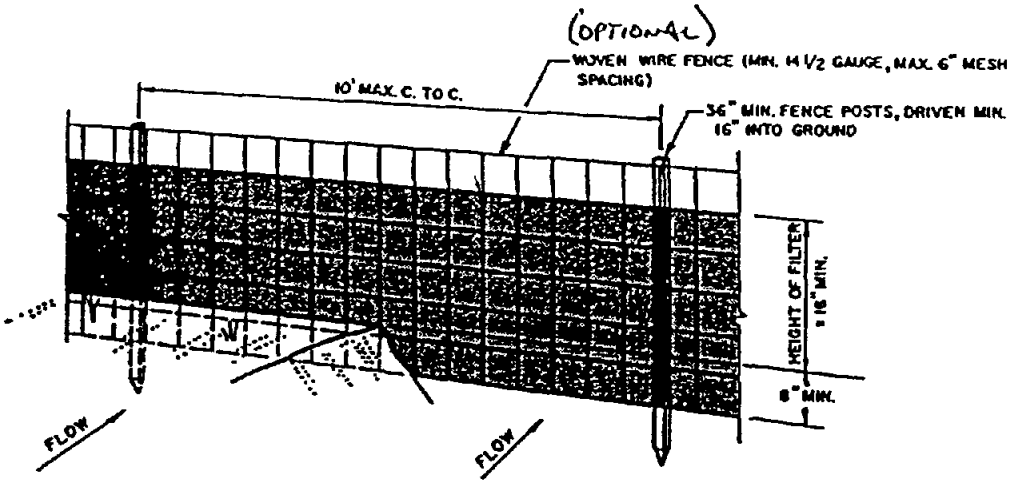
Criteria for Silt Fence Materials

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. Statewide acceptability shall depend on in field and/or laboratory observations and evaluations.

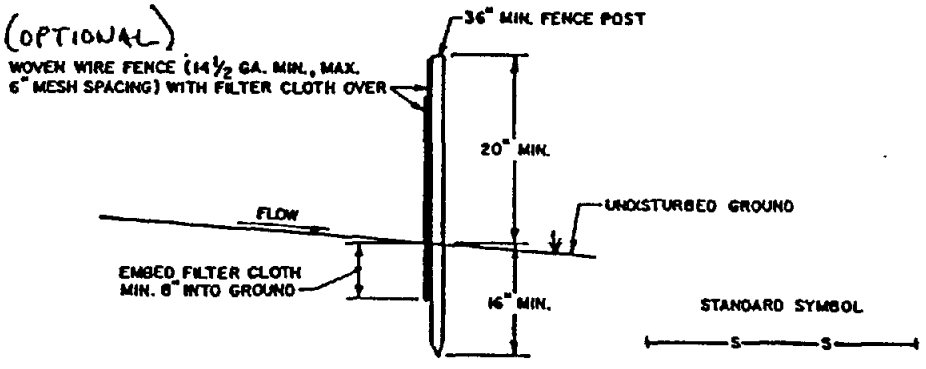
Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Sizw	40-80	US Std Sieve 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 14-1/2 gage with a maximum 6 in. mesh opening, or as approved. (OPTIONAL)
4. Prefabricated Units: Envirofence or approved equal may be used in lieu of the above method providing the unit is installed per manufacturer's instructions.

Figure 4.4
Silt Fence Details



PERSPECTIVE VIEW



SECTION

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

(OPTIONAL)

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

POSTS: STEEL EITHER T OR U TYPE OR 2" HARDWOOD

FENCE: WOVEN WIRE, 14½ GA. 6" MAX. MESH OPENING (OPTIONAL)

FILTER CLOTH: FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	SILT FENCE	STANDARD DRAWING SF-1

STANDARD AND SPECIFICATION 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 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 4.5 on page 4.14 for details.

	Swale A <5 Ac	Swale B 5-10 Ac
Drainage Area		
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% Maz.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specifications for Waterways on page 4.91.

Stabilization

Stabilization of the swale shall be completed within 10 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:

		FLOW CHANNEL	
Type of Treatment	Channel Grade	A ≤5 Ac	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 Jute or Excelsior; Sod, or lined with 2 in. stone
3	5.1-8.0%	Seed and cover with Jute or Excelsior, Sod line with 2 in. stone	Line with 4-8 in. stone or Recycled Concrete Equivalent
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[1]	Engineering Design

In highly erodible soils, as defined by local approving agency, refer to the next higher slope grade for type of stabilization.

[1] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

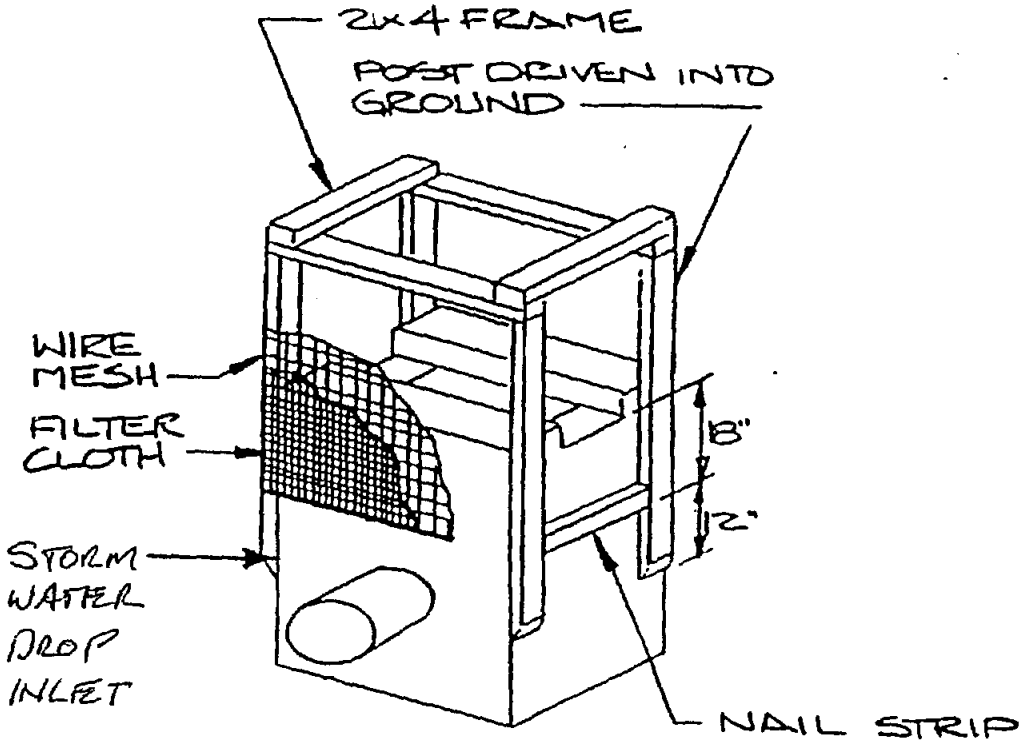
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

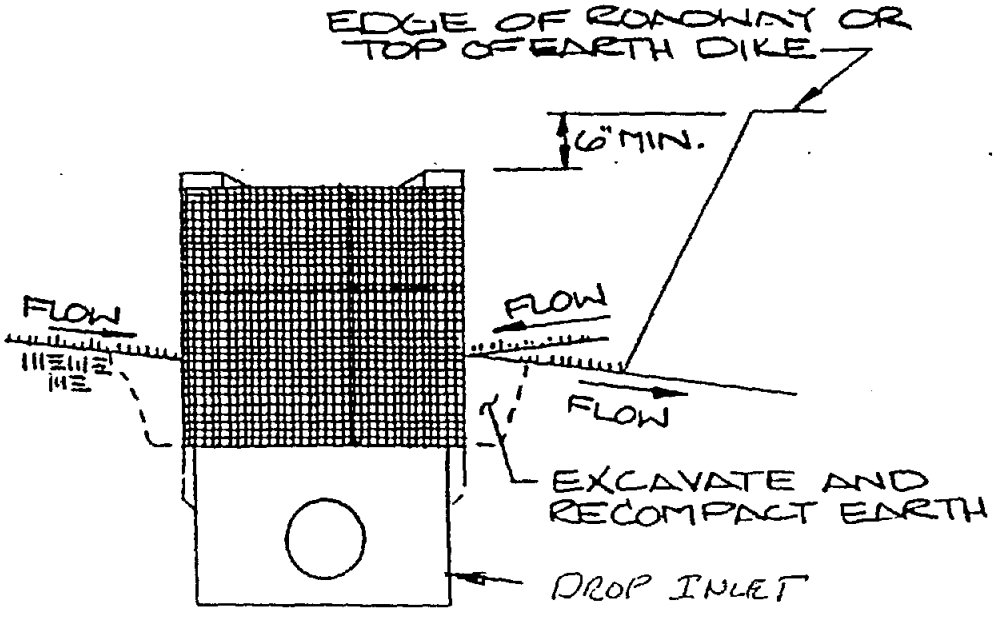
Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

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

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

SEDIMENT TRAP FOR DROP INLETS





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 4.16 on page 4.34 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from effected 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; 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.

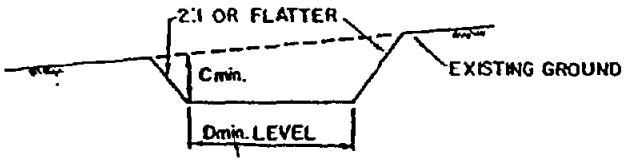
Grade - Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 20 percent.

Stabilization - The disturbed area of the dike and swale shall be stabilized within 10 days of installation, in accordance with the standard and specifications for seed and straw mulch or straw mulch only if not in the seeding season.

Outlet

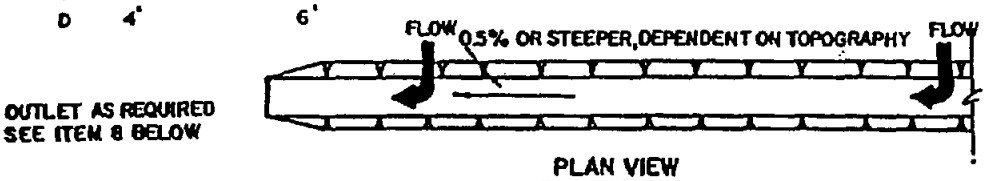
1. Perimeter dike/swale shall have an outlet that functions with a minimum of erosion.
2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.
3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping 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 4.5
Temporary Swale Detail



CROSS SECTION

	SWALE A	SWALE B
C	1'	1'
D	4'	6'



PLAN VIEW

STANDARD SYMBOL
A-2 B-3

CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES 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 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 ON CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE CHART BELOW:

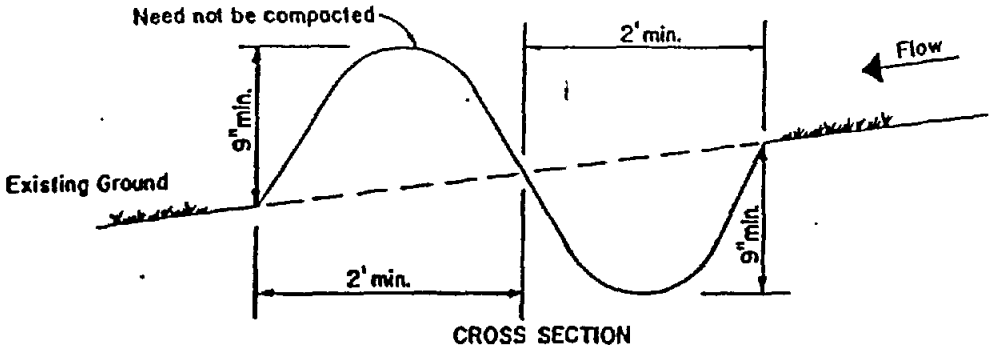
FLOW CHANNEL STABILIZATION

TYPE OF TREATMENT	CHANNEL GRADE	A (5 AC OR LESS)	B (5 AC - 10 AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED USING JUTE OR EXCELSIOR
3	5.1-8.0%	SEED WITH JUTE OR EXCELSIOR; SOD	LINED RIP-RAP 4-8" RECYCLED CONCRETE EQUIVALENT
4	8.1-20%	LINED 4-8" RIP-RAP	ENGINEERED DESIGN

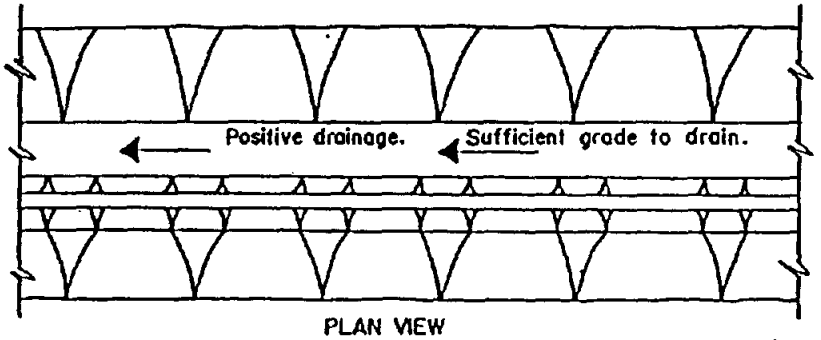
9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	TEMPORARY SWALE	STANDARD DRAWING TS-1

Figure 4.16
Perimeter Swale Dike Detail



CROSS SECTION



PLAN VIEW

STANDARD SYMBOL

CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTRUBED 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 SPECIFICATION FOR SEED AND STRAW MULCH, 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

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PERIMETER DIKE/SWALE	Standard Drawing PDS-1

ATTACHMENT C
MONITORING, INSPECTION AND MAINTENANCE PLAN

MONITORING, INSPECTION, AND MAINTENANCE PLAN

IMPLEMENTATION

A. The Contractor at this site shall at all times, properly construct, operate and maintain all erosion controls and features, as part of the closure construction activities, in accordance with regulatory requirements, and with good engineering and construction practices. Erosion control measures and activities will be in accordance with currently accepted Best Management Practices (BMPs).

B. This erosion control monitoring, inspection, and maintenance plan has been developed to achieve compliance with the requirements of this construction site storm water and erosion control plan. The key elements of the monitoring effort include the following:

- Site Inspections and Maintenance;
- BMPs Monitoring;
- Recordkeeping;
- Review and Modifications; and
- Certification of Compliance.

SITE INSPECTIONS AND MAINTENANCE PRACTICES

A. The temporary erosion control features installed by the Contractor will be maintained by the contractor until no longer needed or permanent erosion control methods are installed.

Site inspections are required every seven days or within 24 hours of a rainfall of 0.5 inches or greater. All disturbed areas, areas for material storage, locations where vehicles enter or exit the site, and all of the erosion and sediment controls that are identified as part of this site's construction storm water and erosion control plan must be inspected. Controls must be in good operating condition until the affected area they protect has been completely stabilized and the construction activity is complete. If a repair is necessary, it must be completed within seven (7) days of receipt of a report or notice, if

practical. Inspection for specific erosion and sediment controls will include the following:

- Silt fence will be inspected to determine the following:

  1) depth;

  2) condition of fabric;

  3) that the fabric is attached to the posts; and

  4) that the fence posts are firmly in the ground.

- The silt fences will be inspected weekly and within 24 hours of a 0.5 inch or greater storm event.

- Diversion berms, if used, will be inspected and any breaches promptly repaired.

- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and other potential erosion control problems.

- The Contractor shall designate individual(s) that will be responsible for erosion control, maintenance, and repair activities. The designated individual will also be responsible for inspecting the site and filling out the inspection and maintenance report.

- Personnel selected for inspection and maintenance responsibilities will receive training as directed by the Engineer. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

B. The individual inspecting the site must record any damages or deficiencies on an inspection form (attached). These forms can be used to request maintenance and repair and to document inspection and maintenance activities. Damages or deficiencies must be corrected as soon as possible after the inspection. Any changes that may be required to correct deficiencies in the Erosion Control Plan should also be made as soon as possible, but in no case later than seven days after the inspection.

C. An Inspection and Maintenance Report Form is attached to record the inspection and assessment.

D. The Contractor's erosion control inspection records must be presented to the Engineer at the site.

RECORDKEEPING

A. Records Retention

A copy of the Storm Water Management and Erosion Control Plan and inspection and maintenance records must be kept at the construction site from the time construction begins until the site is stabilized.

The Plan and related records will be made available upon request to any regulatory agency representatives or members of the public.

MODIFICATIONS TO THE STORM WATER MANAGEMENT AND EROSION CONTROL PLAN

A. During the course of construction, unanticipated changes may occur which affect this plan such as schedule changes, phasing changes, staging area modifications, offsite drainage impacts and repeated failures of designed controls. Any changes to the activities and controls identified in this plan must be documented and the Plan revised accordingly.

B. Certification of revisions to this plan shall be included at the end of the document.

CONSTRUCTION SITE STORM WATER CONTROL PLAN
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

CONSTRUCTION SITE STORM WATER CONTROL PLAN
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

COMMUNITY AIR MONITORING PLAN

REMEDIAL DESIGN WORK PLAN
APPENDIX B

COMMUNITY AIR MONITORING PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

April 2006
Revised September 2006

0107-001-100

Prepared for:

Hydro-Air Components, Inc.

REMEDIAL DESIGN WORK PLAN
APPENDIX B

COMMUNITY AIR MONITORING PROGRAM FOR REMEDIAL ACTIVITIES STEELFIELDS AREA IV SITE

TABLE OF CONTENTS

REMEDIAL DESIGN WORK PLAN
APPENDIX B

COMMUNITY AIR MONITORING PROGRAM FOR REMEDIAL ACTIVITIES STEELFIELDS AREA IV SITE

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1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) presents requirements for real-time community air monitoring and responses during brownfield cleanup activities at the Steelfields Area IV Site located in Buffalo, NY. This plan is consistent with the requirements for community air monitoring at remediation sites as established by the New York State Department of Health (NYSDOH) and the New York State Department of Environmental Conservation (NYSDEC). Accordingly, it follows procedures and practices outlined under the 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.

This CAMP requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of the site when certain remediation activities are in progress at the Site. 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 from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The community, as referenced in this document, includes off-site residences, public buildings and grounds, and commercial or industrial establishments adjacent to the site, including the Hickory Woods neighborhood (see Figure B-1). The community also includes businesses and establishments that may occupy the site as a result of partial redevelopment during the cleanup period. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, this CAMP helps to confirm that work activities did not spread contamination off-site through the air.

Community air monitoring shall be integrated with the construction worker personal exposure monitoring program contained in the site-specific Health and Safety Plan (HASP).

2.0 MONITORING AND MITIGATION REQUIREMENTS

Real-time air monitoring for VOCs and/or particulate levels at the downwind perimeter of the site will be necessary. The locations of downwind stations will be set based on the location of the work and wind direction as monitored by an on-site weather station. Where wind direction is shifting or winds are calm the downwind meter locations will default to the east to assure bias toward monitoring the residential neighborhood east of the Site. Continuous monitoring will be required for all ground intrusive activities. Ground intrusive activities include, but are not limited to, soil/fill 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/fill 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 bailing/purging, and taking a reading before 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 street curb or adjacent to residences.

2.1 Organic Vapors

VOCs must be monitored at the downwind perimeter of the site on a continuous basis or as otherwise specified throughout the site. 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 various action levels referenced in this section.

2.1.1 Vapor Emission Response Plan

If the ambient air concentration of total organic vapors at the downwind perimeter of the site 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 site 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 site 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 site, the Site Safety and Health Officer (SSHO) must be notified and work activities shut down. The SSHO will determine when re-entry of the work 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 under the Major Vapor Emission Monitoring program described below. All 15-minute readings must be recorded and be available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Routine trips will be made into the surrounding community during construction activities to check for the presence of nuisance odors. If nuisance odors are determined to be pervasive in the surrounding community, construction activities will be halted or modified until odor mitigation measures are applied before resuming work.

2.1.2 Major Vapor Emission Monitoring

If the organic vapor level is greater than 5 ppm over background 200 feet downwind from the site or half the distance to the nearest off-site receptor (residential or commercial structure), whichever is less, all work activities must be halted. If, following the cessation of the work activities or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest off-site residential or commercial structure from the site perimeter, then the air quality must be monitored within 20 feet of the perimeter of the nearest off-site receptor (20-foot zone).

If efforts to abate the emission source are unsuccessful and if 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 will automatically be placed into effect.

2.1.3 Major Vapor Emission Response Plan

Upon activation of Major Vapor Emission Response Plan, the following activities will be undertaken:

1. All Emergency Response Contacts as listed below and in the Site-Specific Health and Safety Plan will be contacted.

2. The local police authorities will immediately be contacted by the SSHO and advised of the situation.

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

4. The SSHO will determine if site workers can safely undertake source abatement measures. Abatement measures may include covering the source area with clean fill or plastic sheeting, or consolidating contaminated materials to minimize surface area. The SSHO will adjust worker personal protective equipment as necessary to protect workers from over-exposure to organic vapors.

The following personnel are to be notified by the SSHO in the listed sequence if the Major

Vapor Emission Response Plan is activated:

Contact	Phone
Police/Fire Department	911
NYSDOH	(716) 847-4502
NYSDEC	(716) 851-7220
State Emergency Response Hotline	(800) 457-7362

In addition, the SSHO will provide these authorities with a description of the apparent source of the contamination and abatement measures being taken by the contractor, if any.

2.2 Airborne Particulates

Fugitive dust suppression and airborne particulate monitoring shall be performed during any cleanup and redevelopment activities involving disturbance or handling of site soil/fill. Fugitive dust suppression techniques will include the following minimum measures:

- Excavated stockpiles will be seeded or covered with clean soil or synthetic materials (e.g., tarps, membranes, etc.) whenever stockpiling activities cease for a period of longer than 90 days.
- All fill materials leaving the site will be hauled in properly covered containers or haul trailers.

Additional dust suppression efforts may be required as discussed below.

2.2.1 Particulate Monitoring

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the site 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 (ug/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 ug/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 ug/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, such as those described in Section 2.2.3 are employed and 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.

2.2.2 Visual Assessment

In conjunction with the real-time monitoring program, the contractor will be responsible for visually assessing fugitive dust migration from the site. If airborne dust is observed leaving undeveloped portions of the site (i.e., migrating onto off-site parcels or redeveloped areas of the site), the work will be stopped until supplemental dust suppression techniques are employed.

2.2.3 Supplemental Dust Suppression

Supplemental dust suppression techniques may include but are not necessarily limited to the following measures:

- Reducing the excavation size, number of excavations or volume of material handled.

- Restricting vehicle speeds.

- Applying water on buckets during excavation and dumping.

- Wetting equipment and excavation faces.

- Wetting haul roads.
- Restricting work during extreme wind conditions.
- Using a street sweeper on paved haul roads, where feasible.

Work can resume using supplemental dust suppression techniques provided that the measures are successful in reducing the downwind particulate concentration to below 150 ug/m^3 above background, and in preventing visible dust migration off-site.

2.3 Documentation Monitoring

In addition to the real-time air monitoring provisions for VOCs and particulates at the perimeter of the site, documentation air monitoring to quantify concentrations of selected parameters will be conducted at the site perimeter based on the following implementation criteria:

- At the start of a large-scale ground intrusive cleanup task (e.g., tar soil/fill excavation), a one day documentation monitoring event will be conducted to establish air quality at the site perimeter during performance of that cleanup task
- At the start of a significantly different work task involving impacted soils handling, a one day documentation monitoring event will be conducted to establish air quality at the site perimeter during performance of that work task.
- If the real-time monitoring thresholds for VOCs of 5 ppm over background or 150 ug/m3 over background for particulates are exceeded for a fifteen minute averaging period, a one day documentation air monitoring event will be performed as soon as practicable following the threshold exceedence.
- Documentation air monitoring will be performed as necessary to address specific off-site air quality concerns.

In each case, documentation air monitoring sampling stations will be established at one to two downwind site perimeter locations (based on prevailing wind data and discussions with NYSDEC concerning station locations) and one upwind site perimeter location. Each sampling station will continuously collect composite air samples for eight hours. The samples will be analyzed in accordance with accepted NIOSH or EPA

methodologies for the parameters identified in Table B-1 based on the location of the work activity and known soil/fill constituents in the vicinity of the work activity in progress at the time.

Documentation sampling events to address real-time particulate or VOC monitoring threshold exceedences or other specific NYSDEC requests will be set up and conducted on the next consecutive working day following the exceedence or request.

The samples collected during each 8-hour period will be analyzed on a standard turnaround basis and all data obtained will be summarized and forwarded to the NYSDEC within two working days of receipt from the analytical laboratory.

TABLE B-1

DOCUMENTATION AIR MONITORING
SUMMARY OF ACTIVITY SPECIFIC MONITORING PARAMETERS

Location/Activity Description	Sample Parameter(s)	Comments
Coke Removal	Particulates/PAHs	
Tar Soil/Fill Excavation	Particulates/VOCs	

4.0 QA/QC REQUIREMENTS

Quality assurance/quality control (QA/QC) requirements for the particulate meter and organic vapor monitoring equipment include instrument calibration, training, and documentation/record keeping.

4.1 Instrument Calibration

Instrument calibration shall be performed in accordance with the manufacturer's instructions at the beginning of each workday. For organic vapor monitoring equipment, the calibration procedure will include programming an appropriate relative response factor based on the calibration gas used. The relative response factor will be entered for the contaminant of concern having the lowest relative ionization response to that of the calibration gas compound so as to yield an appropriately conservative meter reading. Following calibration and initial (upwind) measurement of background conditions, audio alarms shall be set so as to activate at the appropriate action levels based on a 15-minute moving average (i.e., short term exposure limit) concentration.

4.2 Training

All persons responsible for calibrating, handling and/or interpreting the meters or meter output data should be experienced with such work. As a minimum, the following training and experience will be required:

- 40-hour OSHA Hazwopper Training per 29 CFR 1910.120(e)(3) and 1910.120(e)(8).
- 8 hour supervisory training, in compliance with 29 CFR 1910.120(e)(4).
- Site-specific training, as required by the Site Health and Safety Plan.
- A minimum 40 hours of field experience in the operation of same or similar equipment.

The Site Safety and Health Officer will designate the person(s) responsible for performing

3.0 MONITORING EQUIPMENT

3.1 Organic Vapor Monitoring Equipment

Organic vapor monitoring will be performed using a photoionization detector (PID) or organic vapor analyzer (OVA) capable of measuring the specific VOCs of potential concern at the site. Based on past site assessment findings, VOCs of potential concern are aromatic petroleum-based compounds, including: benzene, toluene, xylene and ethylbenzene. This list may be expanded at the discretion of the NYSDEC or Site Safety and Health Officer based on findings during the cleanup construction. The device will be calibrated and adjusted for a relative response factor suitable to the VOCs of potential concern (see Section 4.0). Minimum equipment specifications are:

Minimum Operating Range:	0.5 ppm
Accuracy:	+/- 10%, or +/- 2 ppm
Precision:	1% of calibration to 100 ppm
Response Time:	Less than 3 seconds to 90%
UV Lamp (PID):	10.6 eV
Battery Rating:	8-hour continuous operation
Operating Conditions:	
Temperature:	0-40°C
Humidity:	0-99% relative humidity

In addition, the device will be fitted with a microprocessor capable of calculating 15-minute moving average concentrations based on no less than one-minute average samples. An adjustable audible alarm will be provided to indicate exceedance of the action levels prescribed in Section 2.1.

3.2 Particulate Monitoring Equipment

Particulate monitoring will be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

Size Range:	<0.1 to 10 microns
Sensitivity:	1 ug/m^3
Range:	0.001 to 10 mg/m^3
Overall Accuracy:	+/- 10% as compared to gravimetric analysis of stearic acid or reference dust
Battery Rating:	8-hour continuous operation
Operating Conditions:	
Temperature:	0-40°C
Humidity:	0-99% relative humidity

The device will be fitted with a microprocessor capable of calculating 15-minute moving average concentrations. An adjustable audible alarm will be provided to indicate exceedance of the action levels prescribed in Section 2.2.

3.3 Weather Station Equipment

A portable meteorological station will be utilized to record wind speed, direction, temperature, relative humidity and barometric pressure. Weather station parameters will be verified on a routine basis throughout the workday.

air-monitoring work. Construction activities involving disruption or handling of site fill soils will not be performed unless a qualified individual is available on site to perform the community air monitoring specified in this document.

4.3 Documentation and Reporting

Documentation of community air monitoring information will be required to provide written record of the air monitoring results and response actions taken, and to allow for verification that the program was followed in accordance with this CAMP. Monitoring information will be recorded on forms presented in Attachment B1 or on similar loose-leaf forms to facilitate photocopying. The following documentation schedule will be followed during typical site conditions (i.e., organic vapor and particulate concentrations below action levels).

Item	Documentation Schedule
Instrument Calibration Results	Whenever calibration is performed (minimum once daily).
Background Monitoring Results	At beginning of work day and once every 4 hours thereafter.
Downwind Monitoring Results (15-minute moving average)	Hourly

In the event that organic vapor levels necessitate implementation of the Major Vapor Emission Monitoring program described in Section 2.1.2, organic vapor monitoring results in the 20-foot zone will be recorded every 30 minutes.

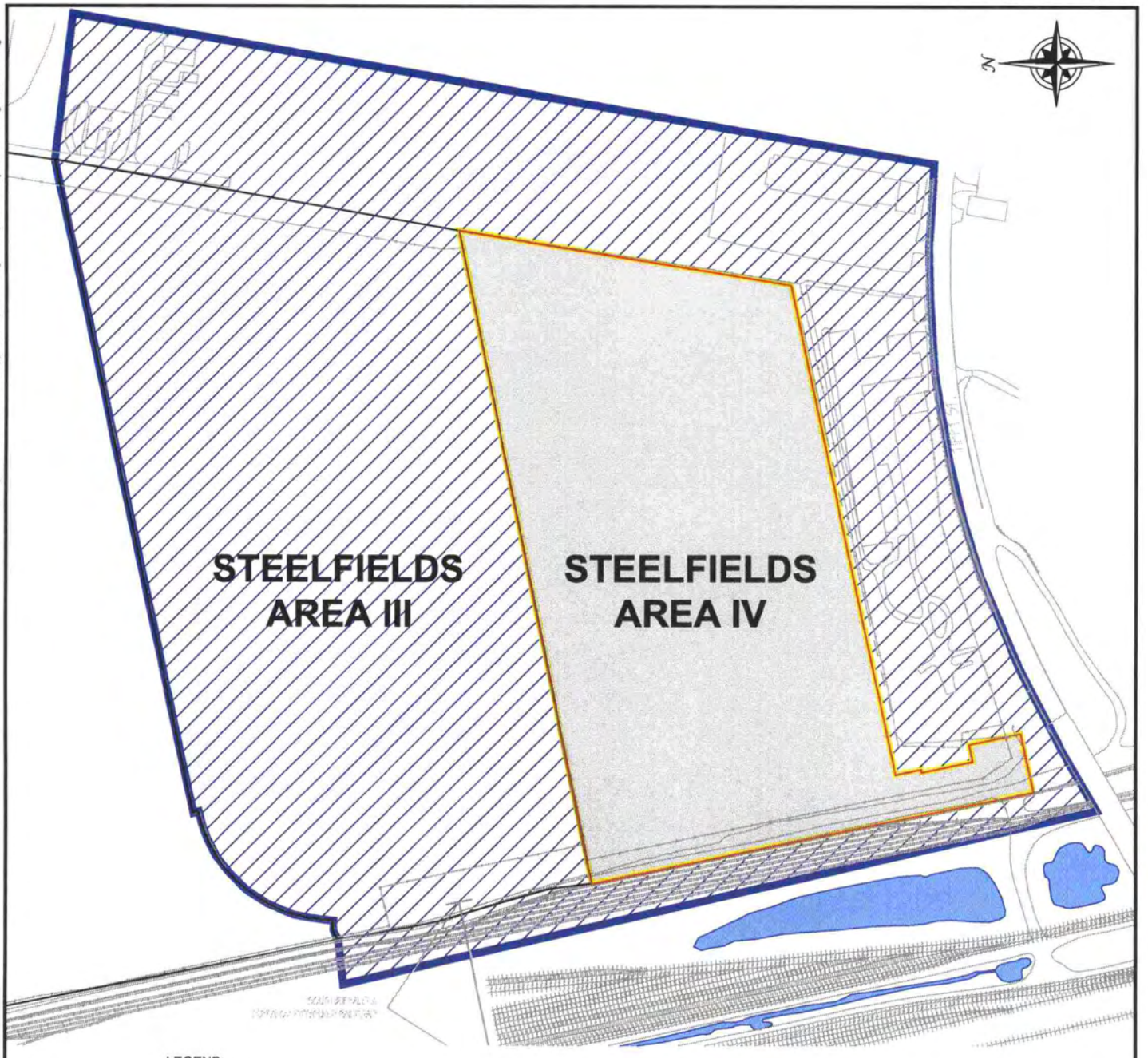
All documentation records will be maintained in the project file for inspection by the NYSDEC and/or the NYSDOH upon request. NYSDEC will be provided copies of the monitoring results recorded during cleanup activities as part of closeout reporting for the site. Monitoring results recorded during redevelopment activities will be maintained and furnished to NYSDEC upon substantial completion of the redevelopment project.

During the cleanup and redevelopment periods, NYSDEC and NYSDOH will be contacted if major vapor emissions occur as stipulated under the Major Vapor Emission Response Plan. In addition, the NYSDEC Division of Air Resources will be contacted in writing within 5 days of exceeding the 150 ug/m3 respirable dust action level. These notifications will include a description of the control measures implemented to prevent further exceedances.

FIGURES

FIGURE B-1

G:\CAD\Benchmark\Hydro-Air\RD Work Plan\Appendix B; CAMP\Figure B-1; Community Air Monitoring Site Plan.dwg



LEGEND:

- GUYPOLE
- HYDRANT
- POWERPOLE
- POWERPOLE W/ LIGHT
- STEELFIELDS AREA IV BOUNDARY
- CHAIN LINK FENCE
- STEELFIELDS PROPERTY BOUNDARY
- MONITORED OFF-SITE COMMUNITY

400' 0' 400' 800'

SCALE: 1 INCH = 400 FEET
SCALE IN FEET
(approximate)

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PROJECT NO.: 0107-001-100

DATE: APRIL 2006

DRAFTED BY: BCH

COMMUNITY AIR MONITORING SITE PLAN

APPENDIX B - COMMUNITY AIR MONITORING PROGRAM

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR
HYDRO-AIR INDUSTRIAL COMPONENTS, INC.

Attachment B1

Community Air Monitoring Document Forms

APPENDIX C

LONG-TERM GROUNDWATER MONITORING PLAN

HYDRO - AIR COMMUNITY AIR MONITORING DAILY LOG

Date:

LOCATION of ACTIVITIES/MONITORING STATIONS (Provide Sketch on Attached Map):

DESCRIPTION OF SITE ACTIVITIES:

WEATHER CONDITIONS:

Time of Day:	A.M.	P.M.
Ambient Air Temp.:		
Wind Direction:		
Wind Speed:		
Precipitation:		

PARTICULATE MONITORING	Location	Time	Value	Duration	Corrective Measures Taken (Eng Controls/Work Stoppage, etc.)
Exceedence of 100 ug/m3 [1]					
Exceedence of 150 ug/m3 [1]					
Visual Observation of Fugitive Dust			NA		
			NA		
			NA		

VOC MONITORING (site)	Location	Time	Value	Duration	Corrective Measures Taken (Eng Controls/Work Stoppage, etc.)
Exceedence of 5 ppm [1]					Temporarily halt Work and continue monitoring
Reading of 5 to 25 ppm [1]					Temporarily halt Work, abate emissions with corrective actions and continue monitoring 3
Exceedence of 25 ppm [2]					Shut Down Work Immediately and notify Site Safety & Health Officer
VOC MONITORING (community)	**Location**	**Time**	**Odors Present**		**Corrective Measures Taken (Eng Controls/Work Stoppage, etc.)**
Routine Inspection					
Routine Inspection					

1. Above background for 15 minute moving average.

2. Above background at Site perimeter (indicate location on attached sketch)

3. Work may resume when total VOC conc. 200 ft downwind or half the distance to nearest receptor (whicever is less) is below 5 ppm for 15 min.

NOTE: All exceedences are to be reported to Benchmark within 15 minutes.

Completed By:

Checked By:

WORK PLAN
for
LONG-TERM GROUNDWATER MONITORING

STEELFIELDS AREA IV (HYDRO-AIR) SITE
BUFFALO, NY

April 2006 0107-001-100
Revised September 2006

Prepared for:

Hydro-Air Components, Inc.

WORK PLAN FOR LONGTERM GROUNDWATER MONITORING

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WORK PLAN FOR LONGTERM GROUNDWATER MONITORING

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1.0 INTRODUCTION

This groundwater monitoring program has been designed to monitor the effectiveness of the source area removal, treatment, and controls to be implemented at the Steelfields Area IV (Hydro-Air) Site in accordance with the Brownfield Cleanup Agreement. Groundwater quality trends will be monitored along the perimeter of the Site.

2.0 GROUNDWATER MONITORING PROGRAM

2.1 Monitoring Network

The long-term groundwater monitoring network and monitoring frequency for this program is presented in Table C1. Figure C-1 presents the monitoring well locations. As shown on Table C1 and Figure C-1, the monitoring network for Area IV includes eight monitoring wells, of which three were destroyed during construction.

Monitoring wells (A4-MW-5, A4-MW-7, A4-MW-8, A4-MW-9, A4-MW-10, A4-ORC-1, A4-ORC-2 and A4-ORC-3) will be installed within 30 days of remedial work completion to avoid damage to the wells from heavy equipment. Construction of wells A4-MW-5, A4-MW-7, A4-MW-8, A4-MW-9 and A4-MW-10 will be similar to the existing well (i.e., 2-inch diameter PVC with 5 to 10-foot slotted screen) and will be screened within the shallow water-bearing unit. Construction of wells A4-ORC-1, A4-ORC-2 and A4-ORC-3 will be in accordance with the In-Situ Treatment Plan in Appendix F. After installation, new monitoring wells will be properly developed in accordance with NYSDEC and Benchmark standard operating procedures. Protective casings and surface seals will be installed on all new wells and on existing wells of the monitoring network that do not already have them. If any existing wells identified to be in the Groundwater Monitoring Program become damaged or unusable during remedial construction, those wells will be replaced within 30 days of completion of remedial construction.

The potential need to install additional wells or adjust the location of new wells will be determined during the remedial activities as additional field information is gathered.

2.2 Groundwater Flow and Hydrodynamics

New well installations will be surveyed to accurately determine their location and elevation. Groundwater elevation data will be collected during each sampling event and an isopotential map prepared annually.

2.3 Groundwater Sampling

2.3.1 Sampling Frequency

Each newly installed well in the Groundwater Monitoring Program will be sampled semi-annually for three consecutive events. Following semi-annual sampling events, all Monitoring Program wells will continue to be sampled annually thereafter or at the frequency identified on Table C1 until the NYSDEC determines continued sampling is unnecessary.

2.3.2 Sampling Method

The monitoring wells in the program will be sampled using USEPA Region II Low Stress (i.e. low-flow) Purging and Sampling technique. The low flow method produces samples with lower turbidity and smaller volumes of purge water than using conventional bailer techniques. Low-flow sampling also produces less agitation of the groundwater. As a result, the low-flow method provides a more representative sample, in relation to actual groundwater conditions, by not drastically altering the chemistry of the groundwater while withdrawing the sample. Benchmark's Field Operating Procedure (FOP) for the low-flow technique is provided as Attachment C1.

2.3.3 Analyses

For the first year, groundwater samples will be analyzed for the parameters and analytical methods presented in Table C2. After the first year, the parameter list will be reviewed for each monitoring well to determine whether the parameter list can be reduced based on the analytical results as well as the proposed activities for the site.

2.4 Statistical Evaluations

2.4.1 Parameters of Interest

Based upon the groundwater test results to date, the following parameters of interest will be statistically evaluated for all water quality monitoring wells in the program:

- Benzene, lead, cyanide and

- Any parameters exceeding the groundwater quality standard for two (2) consecutive events.

For each "parameter of interest", statistical tables in spreadsheet form will be generated that include parameter concentration for each sampling event number, laboratory detection limit, moving average, standard deviation, and mean. The moving average will involve averaging four sequential concentrations in succession for analytical data.

2.4.2 Data Evaluation

For each monitoring location, a graph will then be generated which has the individual sample results and moving average concentration versus sampling event (i.e. time). A trend line will be plotted of the moving average, and evaluated to assess an increasing, decreasing, or neutral trend (neutral is having no significant increasing or decreasing trend).

The results will be interpreted in the following manner:

- If an increasing trend occurs for two consecutive monitoring events and the concentrations of each of the monitoring events are above New York State Groundwater Quality Standards/Guidance Values (GWQS/GV), an evaluation will be made to determine the potential cause. The type of evaluation will depend on which parameter(s) has the increasing trend.

- If there is a neutral or decreasing trend in a monitoring well for four consecutive monitoring events (after source removal or implementation of remedial measure), the parameter list and/or frequency of sampling may be reduced subject to NYSDEC approval.

- If there is a neutral or decreasing long-term trend in a monitoring well for all parameters for eight consecutive monitoring events, that location will be considered for elimination from further monitoring subject to NYSDEC approval.

2.5 ORC In-Situ Treatment Monitoring

The progress of in-situ treatment using oxygen-releasing compounds (ORC) will be monitored through measurement of dissolved oxygen, pH, oxidation-reduction potential (ORP), temperature, alkalinity and water levels in new ORC monitoring wells designated as

A4-ORC-1, A4-ORC-2 and A4-ORC-3. The ORC wells will be sampled for the parameters listed above at the same frequency as the perimeter groundwater quality monitoring wells (see Table C1).

3.0 REPORTING

During the first two years of semi-annual monitoring described in Section 2.3.1, two reports per year will be provided to the NYSDEC. A semi-annual report summarizing the first semi-annual event that includes graphs with trend lines, sampling data, discussion of results, isopotential map, and analytical data presented as tables and maps and an annual report presenting a summary of all semi-annual analytical data collected during the calendar year as well as an engineering and geologic evaluation of all of the data. After the first two years of semi-annual monitoring described above, one annual report will be provided to the NYSDEC, Region 9 Office, by March 1 of each calendar year that includes the information listed above.

Any and all changes to the Monitoring Program will be approved by the NYSDEC prior to implementation.

TABLES

BENCHMARK
ENVIRONMENTAL
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TABLE C1

GROUNDWATER MONITORING NETWORK AND SAMPLE FREQUENCY

Steelfields Area IV (Hydro-Air) Site
Hydro-Air Components, Inc.
Buffalo, New York

Well Designation	Type of Well		Former Well Designation	Monitoring Event				
				Year 1		Year 2		Year 3
	New	Existing		1 SA	2SA	1 SA	2SA	Annually
AREA IV - Monitoring Wells								
A4-MW-5 [1]	x		--	x	x	x		x
A4-MW-7 [1]	x		--	x	x	x		x
A4-MW-8 [1]	x		--	x	x	x		x
A4-MW-9	x		--	x	x	x		x
A4-MW-10	x		--	x	x	x		x
AREA IV - In-Situ Remediation Wells								
A4-ORC-1	x		--	x	x	x		x
A4-ORC-2	x		--	x	x	x		x
A4-ORC-3	x		--	x	x	x		x

Notes:
1. These wells were previously installed, however they were destroyed due to construction activities. As such, the wells will be replaced and are identified as "new".

TABLE C2

ANALYTICAL PARAMETERS

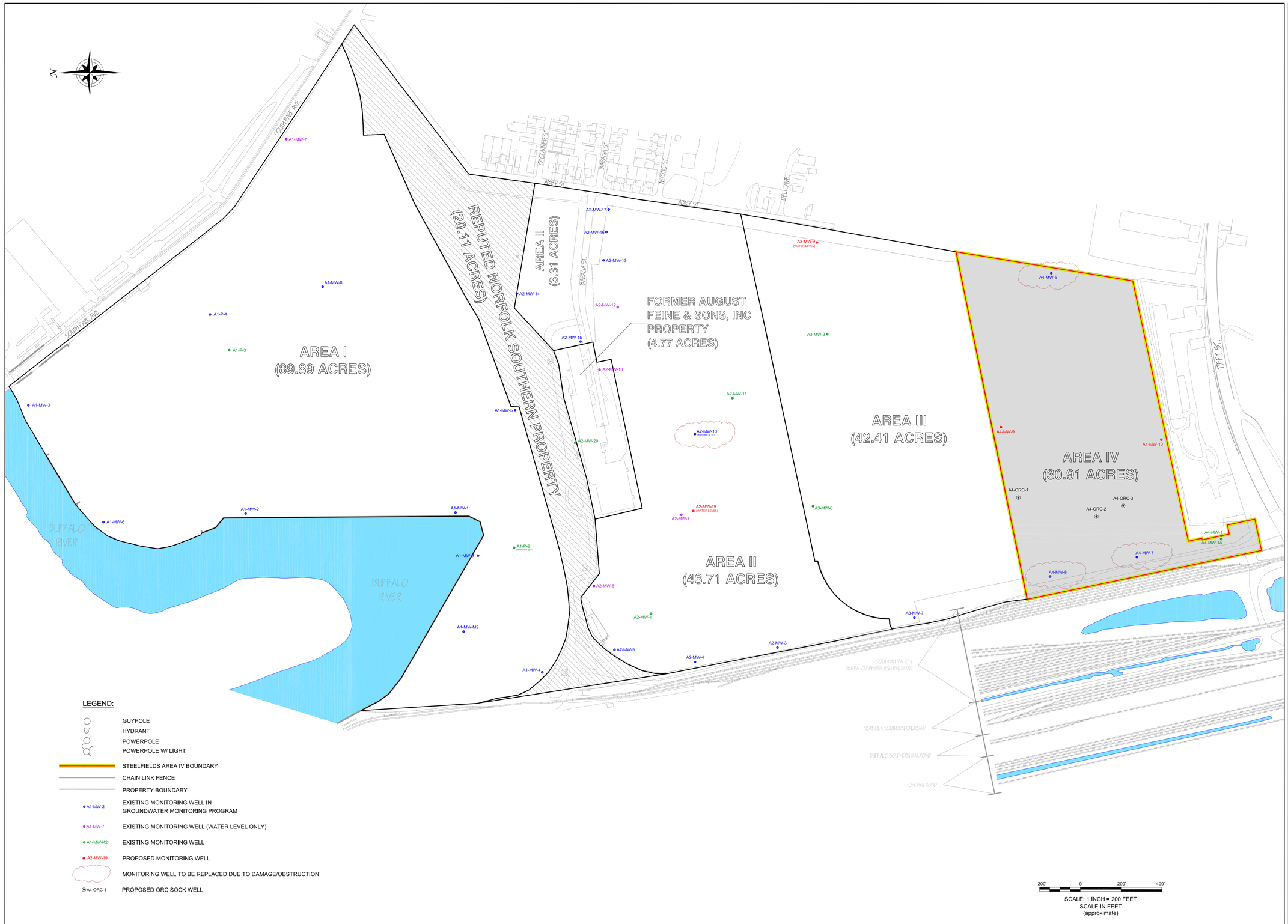
Steelfields Area IV (Hydro-Air) Site
Hydro-Air Components, Inc.
Buffalo, New York

Area IV (A4-MW-5, A4-MW-7, A4-MW-8, A4-MW-9 and A4-MW-10)
STARS List VOCs (Method 8021)[1]
Arsenic (Method 6010)
Chromium (Method 6010)
Lead (Method 6010)
Cyanide (Method 335)
Area IV ORC In-Situ Remediation Wells[2]
pH
Oxidation-Reduction Potential (ORP)
Temperature
Alkalinity
Water Level

Notes:

1. For the first semi-annual event, wells will be analyzed for "Full List" (i.e., TCL and STARS List VOCs).
2. Monitoring wells A4-ORC-1, A4-ORC-2 and A4-ORC-3.

FIGURES



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REVISIONS

NO.	BY	DATE	REMARKS

SEAL

DRAWN BY: BCH
DATE: AUGUST 2006
CHECKED BY:
APPROVED BY:

SITE PLAN

APPENDIX C - LONG-TERM GROUNDWATER MONITORING PLAN
BUFFALO, NEW YORK
STEELFIELDS AREA IV SITE

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FIGURE C-1

ATTACHMENT C1

LOW-FLOW PURGING/SAMPLING STANDARD OPERATING PROCEDURE

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

FIELD OPERATING PROCEDURES

Low-Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedure

FOP 031.0

LOW FLOW (MINIMAL DRAWDOWN) GROUNDWATER PURGING & SAMPLING PROCEDURES

PURPOSE

This procedure describes the methods used for performing low flow (minimal drawdown) purging, also referred to as micro-purging, at a well prior to groundwater sampling to obtain a representative sample from the water-bearing zone. This method of purging is used to minimize the turbidity of the produced water. This may increase the representativeness of the groundwater samples by avoiding the necessity of filtering suspended solids in the field prior to preservation of the sample.

Well purging is typically performed immediately preceding groundwater sampling. The sample should be collected as soon as the parameters measured in the field (i.e., pH, specific conductance, dissolved oxygen, Eh, temperature, and turbidity) have stabilized.

PROCEDURE

1. Water samples should not be taken immediately following well development. Sufficient time should be allowed to stabilize the groundwater flow regime in the vicinity of the monitoring well. This lag time will depend on site conditions and methods of installation but may exceed one week.

2. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark's Groundwater Level Measurement FOP and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark's Non-disposable and Non-dedicated Sampling Equipment Decontamination FOP. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

3. Calibrate all sampling devices and monitoring equipment in accordance with manufacturer's recommendations, the site Quality Assurance Project Plan (QAPP) and/or Field Sampling Plan (FSP). Calibration of field

instrumentation should be followed as specified in Benchmark's Calibration and Maintenance FOP for each individual meter.

4. Inspect the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Well Purge & Sample Collection Log form (sample attached). Specifically, inspect the integrity of the following: concrete surface seal, lock, protective casing and well cover, well casing and J-plug/cap. Report any irregular findings to the Project Manager.

5. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

6. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging.

7. Lower the e-line probe slowly into the monitoring well and record the initial water level in accordance with the procedures referenced in Benchmark's Groundwater Level Measurement FOP. Refer to the construction diagram for the well to identify the screened depth.

8. Decontaminate all non-dedicated pump and tubing equipment following the procedures referenced in the Benchmark's Non-disposable and Non-dedicated Sampling Equipment Decontamination FOP.

9. Lower the purge pump or tubing (i.e., low-flow electrical submersible, peristaltic, etc.) slowly into the well until the pump/tubing intake is approximately in the middle of the screened interval. Rapid insertion of the pump will increase the turbidity of well water, and can increase the required purge time. This step can be eliminated if dedicated tubing is already within the well.

   Placement of the pump close to the bottom of the well will cause increased entrainment of solids, which may have settled in the well over time. Low-flow purging has the advantage of minimizing mixing between the overlying

stagnant casing water and water within the screened interval. The objective of low-flow purging is to maintain a purging rate, which minimizes stress (drawdown) of the water level in the well. Low-flow refers to the velocity with which water enters the pump intake and that is imparted to the formation pore water in the immediate vicinity of the well screen.

10. Lower the e-line back down the well as water levels will be frequently monitored during purge and sample activities.

11. Begin pumping to purge the well. The pumping rate should be between 100 and 500 milliliters (ml) per minute (0.03 to 0.13 gallons per minute) depending on site hydrogeology. Periodically check the well water level with the e-line adjusting the flow rate as necessary to stabilize drawdown within the well. If possible, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 feet or less). If the water level exceeds 2 feet below static and declining, slow the purge rate until the water level generally stabilizes. Record each pumping rate and water level during the event.

    The low flow rate determined during purging will be maintained during the collection of analytical samples. At some sites where geologic heterogeneities are sufficiently different within the screened interval, high conductivity zones may be preferentially sampled.

12. Measure and record field parameters (pH, specific conductance, Eh, dissolved oxygen (DO), temperature, and turbidity) during purging activities. In lieu of measuring all of the parameters, a minimum subset could be limited to pH, specific conductance, and turbidity or DO.

    Water quality indicator parameters should be used to determine purging needs prior to sample collection in each well. Stabilization of indicator parameters should be used to determine when formation water is first encountered during purging. In general, the order of stabilization is pH, temperature, and specific conductance, followed by Eh, DO and turbidity. Performance criteria for determination of stabilization should be based on water-level drawdown, pumping rate and equipment specifications for measuring indicator

parameters. An in-line flow through cell to continuously measure the above parameters may be used. The in-line device should be disconnected or bypassed during sample collection.

13. Purging will continue until parameters of water quality have stabilized. Record measurements for field indicator parameters (including water levels) at regular intervals during purging. The stability of these parameters with time can be used to guide the decision to discontinue purging. Proper adjustments must be made to stabilize the flow rate as soon as possible.

14. Record well purging and sampling data in the Project Field Book or on the attached Groundwater Well Purge & Sample Collection Log (sample attached). Measurements should be taken approximately every three to five minutes, or as merited given the rapidity of change.

15. Purging is complete when field indicator parameters stabilize. Stabilization is achieved after all field parameters have stabilized for three successive readings. Three successive readings should be within ± 0.1 units for pH, ± 3% for specific conductance, ± 10 mV for Eh, and ± 10% for turbidity and dissolved oxygen. These stabilization guidelines are provided for rough estimates only, actual site-specific knowledge may be used to adjust these requirements higher or lower.

    An in-line water quality measurement device (e.g., flow-through cell) should be used to establish the stabilization time for several field parameters on a well-specific basis. Data on pumping rate, drawdown and volume required for parameter stabilization can be used as a guide for conducting subsequent sampling activities.

16. Collect all project-required samples from the discharge tubing at the flow rate established during purging in accordance with Benchmark's Groundwater Sample Collection Procedures FOP. **If a peristaltic pump and dedicated tubing is used, collect all project-required samples from the discharge tubing as stated before, however volatile organic compounds should be collected in accordance with the procedure presented in the next**

section. Continue to maintain a constant flow rate such that the water level is not drawn down as described above. Fill sample containers with minimal turbulence by allowing the ground water to flow from the tubing along the inside walls of the container.

17. If field filtration is recommended as a result of increased turbidity, an in-line filter equipped with a 0.45-micron filter should be utilized.

18. Replace the dedicated tubing down the well taking care to avoid contact with the ground surface.

19. Restore the well to its capped/covered and locked condition.

20. Upon purge and sample collection completion, slowly lower the e-line to the bottom of the well/piezometer. Record the total depth to the nearest 0.01-foot and compare to the previous total depth measurement. If a significant discrepancy exists, re-measure the total depth. Record observations of purge water to determine whether the well/piezometer had become silted due to inactivity or damaged (i.e., well sand within purge water). Upon confirmation of the new total depth and determination of the cause (i.e., siltation or damage), notify the Project Manager following project field activities.

PERISTALTIC PUMP VOC SAMPLE COLLECTION PROCEDURE

The collection of VOCs from a peristaltic pump and dedicated tubing assembly shall be collected using the following procedure.

1. Once all other required sample containers have been filled, turn off the peristaltic pump. The negative pressure effects of the pump head have not altered groundwater remaining within the dedicated tubing assembly and as such, this groundwater can be collected for VOC analysis.

2. While maintaining the pressure on the flexible tubing within the pump head assembly, carefully remove and coil the polyethylene tubing from the well; taking care to prevent the tubing from coming in contact with the ground

surface and without allowing groundwater to escape or drain from the tubing intake.

3. Once the polyethylene tubing is removed, turn the variable speed control to zero and reverse the pump direction.

4. Slowly increase the pump rate allowing the groundwater within the polyethylene tubing to be "pushed" out of the intake end (i.e., positive displacement) making sure the groundwater within the tubing is not "pulled" through the original discharge end (i.e., negative displacement). Groundwater pulled through the pump head assembly CANNOT be collected for VOC analysis.

5. Slowly fill each VOC vial by holding the vial at a 45-degree angle and allowing the flowing groundwater to cascade down the side until the vial is filled with as minimal disturbance as possible. As the vial fills, slowly rotate the vial to vertical. **DO NOT OVERFILL THE VIAL, AS THE PRESERVATIVE WILL BE LOST.** The vial should be filled only enough so that the water creates a slight meniscus at the vial mouth.

6. Cap the VOC vials leaving no visible headspace (i.e., air-bubbles). Gently tap each vial against your hand checking for air bubbles.

7. If an air bubble is observed, slowly remove the cap and repeat Steps 5 and 6.

ATTACHMENTS

Groundwater Well Purge & Sample Collection Log (sample)

REFERENCES

United States Environmental Protection Agency, 540/S-95/504, 1995. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.*

Benchmark FOPs:

007 *Calibration and Maintenance of Portable Dissolved Oxygen Meter*
008 *Calibration and Maintenance of Portable Field pH/Eh Meter*
009 *Calibration and Maintenance of Portable Field Turbidity Meter*
011 *Calibration and Maintenance of Portable Photoionization Detector*
012 *Calibration and Maintenance of Portable Specific Conductance Meter*
022 *Groundwater Level Measurement*
024 *Groundwater Sample Collection Procedures*
040 *Non-Disposable and Non-Dedicated Sampling Equipment Decontamination*
046 *Sample Labeling, Storage and Shipment Procedures*

LOW FLOW (MINIMAL DRAWDOWN) GROUNDWATER PURGING & SAMPLING PROCEDURES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

LOW FLOW METHOD GROUNDWATER PURGE & SAMPLE COLLECTION LOG

Project Name:	WELL LOCATION:
Project Number:	Sample Matrix: groundwater
Client:	Weather:

WELL DATA: DATE: TIME:

Casing Diameter (inches):	Casing Material:
Screened interval (fbTOR):	Screen Material:
Static Water Level (fbTOR):	Bottom Depth (fbTOR):
Elevation Top of Well Riser (fmsl):	Ground Surface Elevation (fmsl):
Elevation Top of Screen (fmsl):	Stick-up (feet):
Standing volume in gallons: [(bottom depth – static water level) x vol calculation in table per well diameter]:	

Volume Calculation

Well Diameter	Volume gal/ft
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469

PURGING DATA: Pump Type:

Is equipment dedicated to location? yes no	Is tubing dedi…ion? yes no
Depth of Sample (i.e. Level of Intake) (fbTOR):	…roximate Pur…gal/…

Time	Water Level (fbTOR)	Accumulated Volume (gallons)	pH (units)	Temperature (degrees C	…ific	…ity	DO (mg	…V)	Appearance & Odor
	Initial								

SAMPLING DATA: DATE: START TIME: END TIME:

Method: low-flow with dedica…	Was well sampled to dryness? yes no
Initial Water Level (fbTOR):	Was well sampled below top of sand pack? yes no
Final Water Level (fbTOR):	Field Personnel:

PHYSICAL & CHEMICAL DATA:

	WATER QUALITY MEASUREMENTS					
	pH (units)	TEMP. (°C)	SC (uS)	TURB. (NTU)	DO (ppm)	ORP (mV)
Appearance:						
Color:						
Odor:						
Sediment Present?						

REMARKS:

PREPARED BY:

APPENDIX D

SITE HEALTH AND SAFETY PLAN

REMEDIAL DESIGN WORK PLAN
APPENDIX D

SITE HEALTH AND SAFETY PLAN (HASP)

STEELFIELDS AREA IV (HYDRO-AIR) SITE
BUFFALO, NEW YORK

April 2006 0107-001-100

Prepared for:

Hydro-Air Components, Inc.

REMEDIAL DESIGN WORK PLAN
APPENDIX D

HEALTH AND SAFETY PLAN FOR REMEDIAL ACTIVITIES
STEELFIELDS AREA IV (HYDRO-AIR) SITE

ACKNOWLEDGEMENT

Plan Reviewed by (initial):

Corporate Health and Safety Director: Thomas H. Forbes, P.E.

Project Manager: Thomas H. Forbes, P.E.

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

REMEDIAL DESIGN WORK PLAN
APPENDIX D

HEALTH AND SAFETY PLAN FOR REMEDIAL ACTIVITIES STEELFIELDS AREA IV (HYDRO-AIR) SITE

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HEALTH AND SAFETY PLAN FOR REMEDIAL ACTIVITIES
STEELFIELDS AREA IV (HYDRO-AIR) SITE

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APPENDICES

1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by Benchmark Environmental Engineering & Science, PLLC (Benchmark) employees during Remedial Measures (RM) activities on the Steelfields Area IV (Hydro-Air) Site located in the City of Buffalo, New York (see Figure D-1). This HASP presents procedures for Benchmark employees who will be involved with RD field activities; it does not cover the activities of other contractors, subcontractors or other individuals on the site. These firms will be required to develop and enforce their own HASP as discussed in Section 2.0. Benchmark accepts no responsibility for the health and safety of contractors, subcontractors or other personnel.

This HASP presents information on known site health and safety hazards using available historical information, 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.

1.2 Background

Steelfields Ltd. owns approximately 214 acres of vacant industrial property located on in Buffalo, New York (See Figure D-1) bordered by the Buffalo River to the north, South Park Ave and Abby Street to the east, Tifft Street to the south and active rail yards (Norfolk & Southern, CSX and South Buffalo Railroads) to the west. The property is subdivided into four parcels, shown on Figure D-2, based on the operational and ownership history of each parcel. In October 2002, Steelfields entered into a Voluntary Cleanup Program (VCP) agreement with the NYSDEC for the entire site. Since 2003, Steelfields has performed remediation of the site in accordance with an approved Remedial Design/Remedial Action RD/RA Work Plan (September 2002) under the VCP. The remediation has progressed more or less sequentially from Area I to Area IV. To date, the Area IV parcel (Former Donner-Hanna Coke Yard Parcel) cleanup has been partially completed by Steelfields in

accordance with the 2002 approved RD/RA Work Plan.

Steelfields is currently negotiating an agreement for the sale of the 30.9 acre Area IV parcel to Hydro-Air Components Inc. (Hydro-Air), which is contemplating the development of the parcel for a new manufacturing facility. Hydro-Air is seeking approval from the NYSDEC to enter into the Brownfields Cleanup Program (BCP) related to the redevelopment of the Area IV parcel. Ownership of the remaining three parcels (Area I through III) will remain with Steelfields.

For the purposes of this HASP, Area IV may also be referred to throughout this report as the Hydro-Air Site or the Site. The Site was historically utilized by Donner-Hanna Coke for storage of coke product. Tar and tar byproducts from the coke plant (Area II) were also disposed of on the western portion of the Site. The Site was listed as Class 3 inactive hazardous waste site (Site No. 915017) on the NYSDEC inactive hazardous waste site registry prior to it's acquisition by Steelfields and entry into the Voluntary Cleanup Program. The Site totals 30.9 acres in area, more or less, as shown on Figure D-3. Additional site history information is presented in Reference 1.

1.3 Parameters of Interest

Significant environmental sampling has been performed at the site in support of voluntary cleanup site assessment activities. These analyses show that soil/fill constituents detected across the Site at elevated concentrations are the common byproducts of manufactured gas plant and coke processing, coal handling, and steel manufacturing operations. These soil constituents or parameters of interest are:

- **Volatile Organic Compounds (VOCs)** – VOCs present in site soils/fill at elevated concentrations relative to background levels are limited to benzene, toluene, ethylbenzene and xylene (i.e., BTEX). These VOC's are typically associated with coke byproducts and tar handling and disposal. As such they have been detected at elevated concentrations in Area IV soil/fill.

- **Semi-Volatile Organic Compounds (SVOCs) –** SVOCs detected at the site are almost exclusively limited to poly-aromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products. As such, they are commonly found in urban soil environments. They are present at concentrations that are elevated compared to "background" across the entire site.

The elevated concentrations in Area IV appear to be related to the storage, handling or disposal of coke and tar byproducts.

In addition, groundwater in contact with the soil/fill materials described above also exhibits elevated concentrations of the corresponding organic parameters-of-interest, including BTEX and to a lesser extent the semi-volatile organic compounds.

1.4 Overview of Cleanup Activities

Benchmark personnel will be on-site to coordinate and oversee the remedial construction activities. Planned voluntary clean-up activities are more fully described in the Remedial Design Work Plan for the site (Ref. 2).

1. **Tar Material Removal:** Approximately 4,000 to 9,000 cubic yards of tar material and related soil/fill exceeding SSALs, near the western boundary of Area IV, remains to be excavated and transported off-site for hazardous or non-hazardous (depending on TCLP test results) landfill disposal or energy recovery. Verification testing will be required along all perimeters and bottoms of excavations in accordance with the Quality Assurance Plan. The excavation will then be backfilled, graded and seeded in accordance with the Soil/Fill Management Plan (S/FMP).

2. **Coke Reclamation:** Approximately 3-4 stockpiles totaling an estimated 20,000 to 30,000 cubic yards of residual coke fines, debris, and other fill materials will require transport and recycling off-site. It is currently planned that the majority of the coke residuals will be burned for energy recovery in a power plant.

3. **Final Soil Cover:** Upon completion of all remedial activities in Area IV, a minimum of 12 inches of surface cover soil will be placed, compacted, graded and seeded in accordance with the S/FMP.

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 impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors/subcontractors involved in work operations and establishes the lines of communications 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

Hydro-Air is applying for acceptance of the Steelfields Area IV (Hydro-Air) Site into the BCP, and plans on executing a Brownfield Cleanup Agreement (BCA) as a non-responsible party (volunteer). Hydro-Air shall be responsible for post-remedial soil/fill management, monitoring and reporting during and following redevelopment.

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, P.E.*** 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 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. Thomas H. Forbes, P.E.*** 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 liaison 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 C. Hann.*** The qualified alternate SSHO is ***Mr. Richard L. Dubisz.*** 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 site 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 with health and safety responsibilities include the remediation 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. Each Contractor's HASP shall cover all non-Benchmark site personnel. Each Contractor shall assign a SSHO who will coordinate with Benchmark's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

In addition to Benchmark and Contractor personnel, other individuals who may have responsibilities in the work zone include subcontractors and governmental agencies performing site inspection work (e.g., the New York State Department of Environmental Conservation). The Contractor shall be responsible for ensuring that these individuals have received OSHA-required training (29 CFR 1910.120(e)), including initial, refresher and site-specific training, and shall be responsible for the safety and health of these individuals while they are on-site.

3.0 HAZARD EVALUATION

Due to the presence of certain contaminants at the site, the possibility exists that workers will be exposed to hazardous substances during field activities. The principal points of exposure would be through direct contact with and incidental ingestion of soil/fill, and through the inhalation of contaminated particles or vapors. Other points of exposure may include direct contact with groundwater. In addition, the use of medium to large-sized construction equipment (e.g., excavators, drill rigs) will also present conditions for potential physical injury to workers. Further, since work will be performed outdoors, the potential exists for heat/cold stress to impact workers, especially those wearing protective equipment and clothing. Adherence to the medical evaluations; worker training relative to chemical hazards; safe work practices; proper personal protection; environmental monitoring; 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

As discussed in Section 1.3, historic activities related to former operations and facilities at the site have resulted in elevated concentrations of petroleum-related VOCs in site soils and groundwater. Table D-1 identifies concentration ranges for constituents of potential concern (COPCs) detected during previous investigations at the site, as identified in Section 1.4 of this HASP. Table D-2 lists exposure limits for airborne concentrations of the COPCs. Brief descriptions of the toxicology and related health and safety guidance and criteria for the prevalent COPCs are provided below.

- **Benzene (CAS #71-43-2)** poisoning occurs most commonly through inhalation of the vapor; however, benzene poisoning can also occur by penetrating the skin. Locally, benzene has a comparatively strong irritating effect, producing erythema and burning and, in more severe cases, edema and blistering. Exposure to high concentrations of the vapor (i.e., >3,000 ppm) may result in acute poisoning characterized by the narcotic action of benzene on the central nervous system. In acute poisoning, symptoms include confusion, dizziness, tightening of the leg muscles, and pressure over the forehead. Chronic exposure to benzene (i.e., long-term exposure to concentrations of <100 ppm) may lead to damage of the blood-forming system. Benzene is very flammable when exposed to heat or flame and can react vigorously with oxidizing materials.

- **Ethylbenzene (CAS #100-41-4)** is a component of automobile gasoline. Over-exposure may cause kidney, skin, liver, and/or respiratory disease. Signs of exposure may include dermatitis, irritation of the eyes and mucus membranes, and headache. Narcosis and coma may result in more severe cases.

- **Toluene (CAS #108-88-3)** is a common component of paint thinners and automobile fuel. Acute exposure predominantly results in central nervous system depression. Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposure may cause removal of lipids from the skin, resulting in dry, fissured dermatitis.

- **Xylenes (o, m, and p) (CAS #95-47-6, 108-38-3, and 106-42-3)** are colorless, flammable liquids present in paint thinners and fuels. Acute exposure may cause central nervous system depression, resulting in headache, dizziness, fatigue, muscular weakness, drowsiness, and coordination loss. Repeated exposure may also cause removal of lipids from the skin, producing dry, fissured dermatitis. Exposure to high concentrations of vapor may cause eye irritation and damage, as well as irritation of the mucus membranes.

- **Polycyclic 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. PAH's 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.

With respect to the anticipated RM activities discussed in Section 1, possible routes of exposure to the above-mentioned contaminants are presented in Table D-3. The use of proper respiratory equipment, as outlined in Section 7.0 of this HASP, will minimize the potential for exposure to airborne contaminants. Exposure to contaminants 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

RM field activities at the site may present the following physical hazards:

- The potential for physical injury during heavy construction equipment use, such as backhoes, excavators, and drill rigs.
- The potential for heat/cold stress to employees during the summer/winter months (see Section 10.0).
- The potential for slip and fall injuries due to rough, uneven terrain and/or open excavations.

These hazards represent only some of the possible means of injury that may occur at the site during RD activities. Since it is impossible to list all potential injuries, it is 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 RD activities at the site (such as, but not limited to, equipment operators and general laborers) who may be exposed to hazardous substances, health hazards, or safety hazards, including 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 certifications received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at Benchmark'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 engaging 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 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 as described in Section 5.0 of this HASP.
- The spill containment program as detailed in Section 9.0 of this HASP.
- Site control as detailed in Section 11.0 of this HASP.
- Decontamination procedures as detailed in Section 12.0 of this HASP.
- Confined space entry procedures, if required, as detailed in Section 13.0 of this HASP.
- The emergency response plan as detailed in Section 15.0 of this HASP.

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. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in site conditions (e.g., 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 (SSHO) who are directly responsible for or supervise the safety and health of workers engaged in hazardous waste operations shall receive, in addition to the appropriate level of worker training described in Section 4.1, an additional 8 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 the Emergency Response Plan appended to this HASP as Appendix D-1.

4.4 Site Visitors

Each Contractor'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 layout 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, annual, and employment termination physicals for employees involved in hazardous waste site field operations. Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, developed signs or symptoms of over-exposure to hazardous substances, or were accidentally exposed to substances at concentrations above the permissible exposure limits without the necessary PPE. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by Health Works Western New York, an occupational health care provider under contract with Benchmark. Health Work's local facility is located at the 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 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 (i.e., 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 before 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 SSHO. 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.
- Medicine and alcohol can synergize the effects of exposure to toxic chemicals. 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 workday.
- 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 Contractor's equipment (e.g., backhoes, bulldozers, excavators, drill rigs, etc.) are as follows:

- Although the Contractor and 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.

- Construction 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 construction operation 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 protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies. 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 remedial activities, the minimum required Levels of Protection for these tasks shall be as identified in Table D-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 post-remediation redevelopment construction activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PELs) established by OSHA for the individual compounds (see Table D-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 post-remediation redevelopment construction phases such as excavation, backfilling, regrading of soils, etc. The work area will be monitored at regular intervals using a photo-ionization detector (PID), or equivalent instrumentation capable of measuring total organic vapor concentrations, and a particulate meter. Additional monitoring instruments may be added if site conditions change. 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 post-remediation redevelopment construction 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 Air 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 according to the guidance provided in the S/FMP, specifically Attachment A entitled Community Air Monitoring Plan. This will provide a real-time method for determination of substantial particulate releases to the surrounding community as a result of ground intrusive work.

Ground intrusive work includes all activities involving soil/fill excavation and handling, such as trenching; installation of subgrade foundations or utilities, etc. Continuous monitoring is required for ground intrusive activities.

8.2 Monitoring Action Levels

8.2.1 On-Site Work Zone Action Levels

A MiniRae 2000 PID equipped with a 10.6 eV lamp, or other appropriate instrument(s), will be used to monitor organic vapor concentrations as specified in this HASP. In addition, fugitive dust/particulate concentrations will be monitored using a real-time particulate monitor. Sustained readings obtained in the breathing zone may be interpreted (with regard to other site conditions) as follows for Benchmark personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to 1 ppm above background on the PID) - Continue operations under Level D (see Section 7.0 of this HASP).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings from >1 ppm to 5 ppm above background on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C (see Section 7.0 of this HASP).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of >5 ppm to 50 ppm above background on the PID - Continue operations under Level B (see Section 7.0 this HASP), 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 particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities and during handling of site soil/fill. 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 (e.g., wetting of excavated soils or tools at discretion of SSHO).

Readings with the organic vapor analyzer and particulate monitor will be recorded and documented on the appropriate Project Field Forms. All instruments will be calibrated before use on a daily basis and the procedure will be documented on the appropriate Project Field Forms.

8.2.2 Community Air Monitoring Action Levels

In addition to the action levels prescribed in Section 8.2.1 for Benchmark personnel on-site, the Community Air Monitoring Plan (Attachment A of S/FMP) prepared for post-remediation development activities at Steelfields Area IV (Hydro-Air) Site shall also be adhered to for the protection of downwind receptors consistent with the NYSDOH Generic CAMP requirements.

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, Appendix A, where such materials pose the potential for release in excess of their corresponding 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 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 that could 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 decommissioning records, a hazardous material spill and/or a petroleum product spill is not likely to occur during site activities.

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 (Appendix D-1) will immediately be implemented if an emergency release occurs.

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 and NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies (e.g., USEPA) 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 Contractor 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 (NYSDEC 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 include:

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

- Op-Tech: (607) 565-8891 (Waverly, NY) or (800) 225-6750

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 it is anticipated that work activities at the site will be completed during the winter months, measures to be taken to minimize heat stress to Benchmark employees have also been included in the event that work activities extend to the spring months. The SSHO 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

PPE 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. PPE 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) **Frost Nip** - 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 Frost nip.

    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 Frost nip.

- **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 SSHO 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 area, 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 construction activities will be established on a daily basis and communicated to all employees and other site users by the SSHO. It shall be the responsibility of each Contractor's SSHO 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 PPE identified in Section 7.0.

- **Contamination Reduction Zone** - The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment and samples must remain in the Contamination 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 remedial activities involving disruption or handling of site soils or groundwater:

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

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

- **Support Zone**: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contamination Reduction Zones will be strictly controlled by the SSHO. Only personnel who are essential to the completion of the task and are wearing the prescribed PPE will be allowed access to these

areas. Entrance of all personnel must be approved by the SSHO. Construction fencing and warning symbols (i.e., construction cones and flags) will be erected around the site to alert the general public to the on-going site activities.

The SSHO will maintain a Health and Safety Logbook containing the names of Benchmark 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 that may arise at the site. All Benchmark personnel on-site shall follow the procedure below, or the Contractor's procedure (if applicable), whichever is more stringent.

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. Deposit tape and gloves in waste disposal container.

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 Exclusion 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 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 Contractor in accordance with his approved Health and Safety Plan in the Contamination Reduction Zone. At a minimum, this will include manually removing heavy soil contamination, followed by steam cleaning on an impermeable pad.

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.

Decontamination of bailers, split-spoons, spatula knives, and other tools used for environmental sampling and examination shall be as follows:

- Disassemble the equipment
- Wash with water to remove all visible foreign matter.
- Wash with detergent.
- Rinse all parts with distilled-deionized water.
- Allow to air dry.
- Wrap all parts in aluminum foil or polyethylene.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 defines a confined space as a space that 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 activities identified in Section 2.0. 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, 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 each Contractor and are required on all heavy equipment and in each field trailer. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly, 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, 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 blowtorch operation, the hot work permit presented in Appendix D-2 of this HASP 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 Appendix D-1. The hospital route map is presented as Figure D-3.

16.0 REFERENCES

1. *South Buffalo Redevelopment Plan, Steel Manufacturing Site, Voluntary Cleanup Site Assessment Report.* Malcolm Pirnie, Inc., September 1997.

2. *Voluntary Cleanup Site Assessment Report, Former Steel Manufacturing Site, Area II, III and IV.* TurnKey Environmental Restoration, LLC. April 1999.

3. *Voluntary Cleanup Site Assessment Report, Former Steel Manufacturing Site, Addendum 1, Area II, III and IV.* TurnKey Environmental Restoration, LLC. January 2000.

4. *New York State Department of Health Generic Community Air Monitoring Plan*, Appendix 1A, Draft DER-10 Technical Guidance for Site Investigation and Remediation, December 2002.

TABLES

TABLE D-1

CONSTITUENTS OF POTENTIAL CONCERN

Appendix D: Health and Safety Plan (HASP)
Steelfields Area IV (Hydro-Air) Site
Hydro-Air Industrial Components, Inc.
Buffalo, New York

Parameter	CAS No.	Maximum Detected Concentration	
		Groundwater (µg/L)	Subsurface Soil/Fill (mg/kg)
Volatile Organic Compounds (VOCs):			
Benzene	71-43-2	4900	420
Ethylbenzene	100-41-4	5	ND
Toluene	108-88-3	400	210
Xylene, total	1330-20-7	15	53
Volatile Organic Compounds (VOCs):			
Benzo(a)anthracene	56-55-3	12	2
Benzo(a)pyrene	50-32-8	10	2
Benzo(b)fluoranthene	205-99-2	12	2.2
Benzo(k)fluoranthene	207-08-9	7J	1.3
Chrysene	218-01-9	12	1.8
Indeno(1,2,3-cd)pyrene	193-39-5	4J	0.91

Notes:
1. ND-Not detected.

TABLE D-2

TOXICITY DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

Appendix D: Health and Safety Plan (HASP)
Steelfields Area IV (Hydro-Air) Site
Hydro-Air Industrial Components, Inc.
Buffalo, New York

Parameter	Synonyms	CAS No.	Code	Concentration Limits (ppm)[1]		
				PEL	TLV	IDLH
Volatile Organic Compounds (VOCs):						
Benzene	Benzol, Phenyl hydride	71-43-2	Ca	1	0.5	500
Ethylbenzene	Ethylbenzol, Phenylethane	100-41-4	*none*	100	100	800
Toluene	Methyl benzene, Methyl benzol	108-88-3	C-300	100	50	500
Xylene, Total	o-, m-, p-isomers	1330-20-7	*none*	100	100	900
Poly-Aromatic Hydrocarbons (PAHs):						
Benzo(a)anthracene	*none*	56-55-3	*none*	N/A	N/A	N/A
Benzo(a)pyrene	*none*	50-32-8	*none*	N/A	N/A	N/A
Benzo(b)fluoranthene	*none*	205-99-2	*none*	N/A	N/A	N/A
Benzo(k)fluoranthene	*none*	207-08-9	*none*	N/A	N/A	N/A
Chrysene	*none*	218-01-9	*none*	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene	*none*	193-39-5	*none*	N/A	N/A	N/A

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).

Code:

Ca = NIOSH considers constituent to be a potential occupational carcinogen.

Acronyms:

IDLH = Immediately Dangerous to Life or Health.

ND indicates that an IDLH has not as yet been determined.

TLV = Threshold Limit Value, established by American Conference of Industrial Hygienists (ACGIH), equals the maximum exposure concentration allowable for 8 hrs/day @ 40 hrs/we
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:

(1) TLV-TWA (TLV-Time-Weighted Average) which is averaged over the normal eight-hour day/forty-hour work week. (Most TLVs.)

(2) 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.

(3) 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 conconcentration allowable for 8 hours per day @ 40 hours per week

N/A - Not available. Exposure should be minimized to the extent feasible through appropriate engineering controls & PPE

TABLE D-4

REQUIRED LEVELS OF PROTECTION FOR WORK TASKS

Appendix D: Health and Safety Plan (HASP)
Steelfields Area IV (Hydro-Air) Site
Hydro-Air Industrial Components, Inc.
Buffalo, New York

Activity	Respiratory Protection [1]	Clothing	Gloves [2]	Boots [2, 3]	Other Required PPE/Modifications [2, 4]
1. Soil Excavation	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
2. Backfilling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
3. Verification Sampling	Level D (upgrade to Level C if necessary)	Work Uniform or Tyvek	L/N	outer: L inner: STSS	HH SGSS
4. Groundwater Management	Level D (upgrade to Level C if necessary)	Poly-coated Tyvek or S	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.

TABLE D-3

POTENTIAL ROUTES OF EXPOSURE TO THE CONSTITUENTS OF POTENTIAL CONCERN

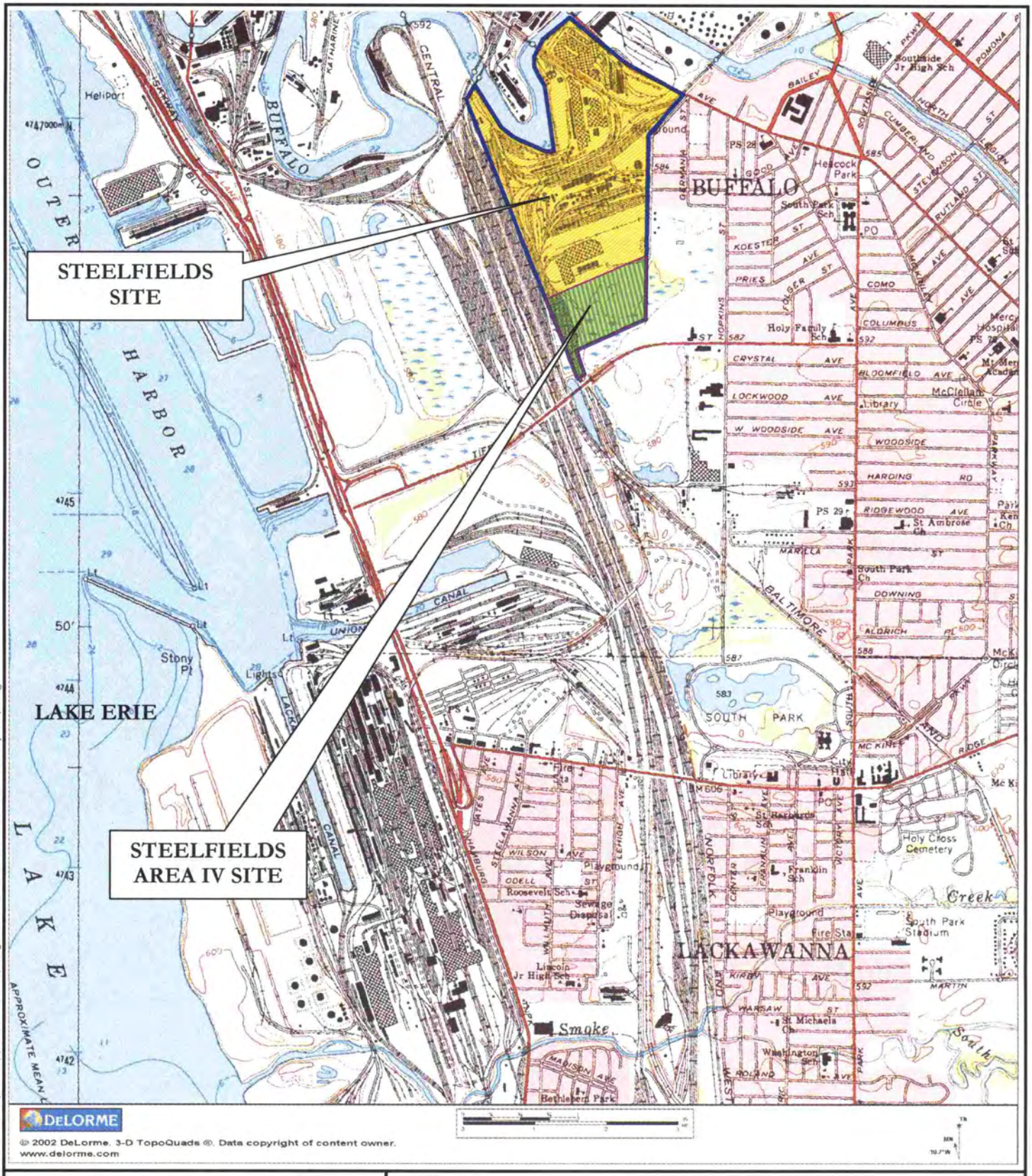
Appendix D: Health and Safety Plan (HASP)
Steelfields Area IV (Hydro-Air) Site
Hydro-Air Industrial Components, Inc.
Buffalo, New York

Activity [1]	Direct Contact with Soil/Fill	Inhalation of Vapors or Dust	Direct Contact with Groundwater
1. Soil Excavation	x	x	x
2. Backfilling	x	x	
3. Verification Sampling	x	x	x
4. Groundwater Management			x

Notes:
1. Activity as described in Section 1.4 of the Health and Safety Plan.

FIGURES

FIGURE D-1



FILEPATH=g:\cad\benchmark\hydro-air\rd work plan\appendix d\ hasp\figure d-1, site location and vicinity map.dwg

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

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

PROJECT NO.: 0107-001-100

DATE: APRIL 2006

DRAFTED BY: BCH

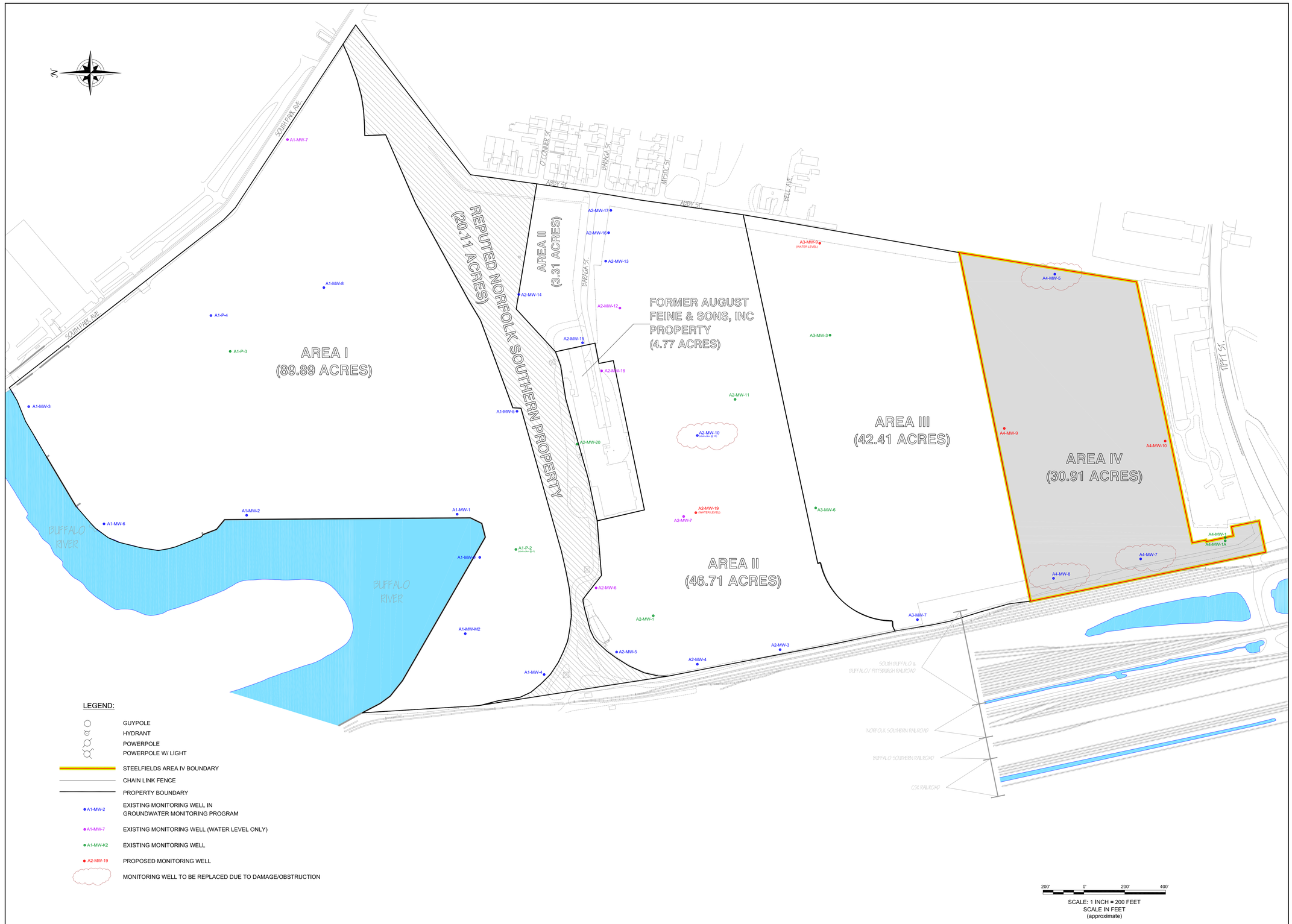
SITE LOCATION AND VICINITY MAP

APPENDIX D - HEALTH AND SAFETY PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR

HYDRO-AIR COMPONENTS, INC.



BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

JOB NO.: 0107-001-100

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

DRAWN BY: BCH
DATE: APRIL 2006
CHECKED BY:
APPROVED BY:

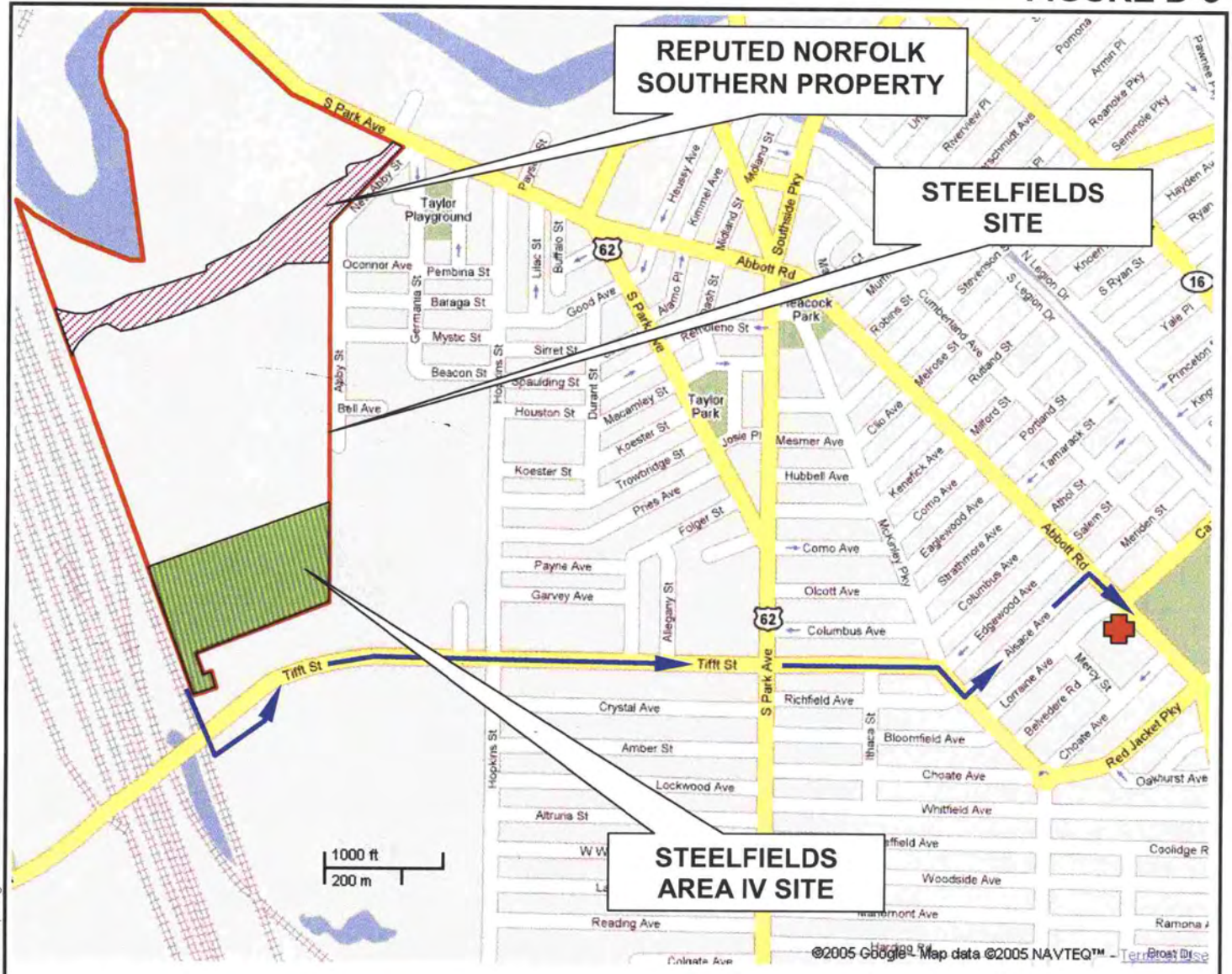
SITE PLAN

APPENDIX D - HEALTH AND SAFETY PLAN
BUFFALO, NEW YORK
STEELFIELDS AREA IV SITE

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FIGURE D-2

FIGURE D-3



Mercy Hospital (address):

565 Abbott Road
Buffalo, NY 14220
Phone: (716) 826-7000
Emergency: 911

Mercy Hospital (directions from site):

1. Leave site through south access road.
2. Go under Tifft Street Bridge and take immediate left.
3. Turn right on Tifft Street.
4. Cross South Park Avenue, turn right on McKinley Parkway.
5. Turn left on Alsace Avenue.
6. Turn right on Abbott Road.
7. Hospital is on right.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

PROJECT NO.: 0107-001-100
DATE: APRIL 2006
DRAFTED BY: BCH

HOSPITAL ROUTE MAP

APPENDIX D - HEALTH AND SAFETY PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

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APPENDIX D-1

EMERGENCY RESPONSE PLAN

REMEDIAL DESIGN WORK PLAN
APPENDIX D

SITE HEALTH AND SAFETY PLAN (HASP)
APPENDIX D-1

EMERGENCY RESPONSE PLAN

STEELFIELDS AREA IV (HYDRO-AIR) SITE
BUFFALO, NEW YORK

April 2006 0107-001-100

Prepared for:

Hydro-Air Components, Inc.

HEALTH AND SAFETY PLAN FOR REMEDIAL ACTIVITIES
APPENDIX D-1

EMERGENCY RESPONSE PLAN
STEELFIELDS AREA IV (HYDRO-AIR) SITE

Table of Contents

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 Design (RD) activities at the Steelfields Area IV (Hydro-Air) Site located in Buffalo, NY. 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

Source of Emergency:

1. Slip/trip/fall

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
Spill Response Kit	1	Field Trailer
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 Steelfields Area IV Site will be discussed 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 that could affect emergency response planning; however, the directions of prevailing winds/weather conditions have been marked on the map. The map will be posted at site-designated place of refuge and inside the Benchmark personnel field vehicle.

5.0 EMERGENCY CONTACTS

The following identifies the emergency contacts for this ERP.

Emergency Telephone Numbers:

Project Manager: ***Thomas H. Forbes***
Work: (716) 856-0599
Mobile: (716) 864-1730

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
Home: (716) 870-1165

Alternate SSHO: ***Richard L. Dubisz***
Work: (716) 856-0635
Home: (716) 655-7406

MERCY HOSPITAL:	(716) 826-7000
EMERGENCY ROOM:	(716) 828-2790
FIRE:	911
AMBULANCE:	911
POLICE:	911
STATE EMERGENCY RESPONSE HOTLINE:	(800) 457-7362
NATIONAL RESPONSE HOTLINE:	(800) 424-8802
NYS ERIE COUNTY HEALTH DEPARTMENT:	(716) 858-2929
NYSDEC:	(716) 851-7000
NYSDEC 24-HOUR SPILL HOTLINE:	(800) 457-7362

The Site location is:
Steelfields Area IV Site
324 Baraga Street
Buffalo, New York 14220
Site Phone Number: (Field Trailer): 825-1072

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 SSHO 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 SSHO to review evacuation routes and procedures as necessary and to inform all 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 ***Richard Dubisz***) 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 SSHO 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 (i.e., 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 Schuyler 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 Mercy Hospital via ambulance. The SSHO 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 Mercy Hospital (see Figure D-3 of the HASP):

The following directions describe the best route to Mercy Hospital, 565 Abbott Road, Buffalo, NY, 14220:

From the site access drive, turn left onto Hopkins St.

Proceed North on Hopkins St. approximately 0.5 miles.

Turn Right onto Tifft Street. Continue East on Tifft St., approximately 0.7 miles.

Tifft Street ends at Mckinley Parkway. Continue straight crossing over Mckinley Parkway on Edgewood Ave.

Continue on Edgewood Ave. approximately 0.3 miles. Turn right onto Abbott Rd to Mercy Hospital (on right hand side). Follow signs to emergency room. (ER).

9.0 EMERGENCY RESPONSE CRITIQUE & RECORD KEEPING

Following an emergency, the SSHO and Project Manager shall review the effectiveness of this 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.

APPENDIX D-2

NYSDOH GENERIC COMMUNITY AIR MONITORING PROGRAM

APPENDIX D-2

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.

APPENDIX D-3

HOT WORK PERMIT FORM

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:

Prepared By: _____

APPENDIX E

CITIZEN PARTICIPATION PLAN

REMEDIAL DESIGN WORK PLAN
APPENDIX E

CITIZEN PARTICIPATION (CP) PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

April 2006 0107-001-100
Revised September 2006

Prepared for:

Hydro-Air Components, Inc.

REMEDIAL DESIGN WORK PLAN
APPENDIX E

CITIZEN PARTICIPATION PLAN FOR REMEDIAL ACTIVITIES
STEELFIELDS AREA IV SITE

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REMEDIAL DESIGN WORK PLAN
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CITIZEN PARTICIPATION PLAN FOR REMEDIAL ACTIVITIES
STEELFIELDS AREA IV SITE

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1.0 INTRODUCTION

What is a Citizen Participation Plan?

This Citizen Participation Plan, or CP Plan, establishes a framework for upcoming public information and community outreach activities related to remedial activities at the Steelfields Area IV Site located in Buffalo, New York (see Figure E-1). The CP activities are designed to keep adjacent residents, businesses and the public in general, informed of the planned remediation, or clean-up of the site.

This CP Plan includes:

- Background information about the site.
- A description of planned remedial activities.
- A list of citizen participation activities that will be conducted during the remedial activities.
- Information on whom to contact and where to get more information about the site and the remedial activities.
- A glossary of terms and acronyms.

The plan will be periodically updated to include new information concerning the cleanup work. All citizen participation activities shall be coordinated with and approved by the New York State Department of Environmental Conservation (NYSDEC) prior to implementation.

2.0 SITE BACKGROUND INFORMATION

2.1 Site Description and Operational History

Steelfields Ltd. owns approximately 214 acres of vacant industrial property located on in Buffalo, New York (see Figure 1-1) bordered by the Buffalo River to the north, South Park Ave and Abby Street to the east, Tifft Street to the south and active rail yards (Norfolk & Southern, CSX and South Buffalo Railroads) to the west . The property is subdivided into four parcels, shown on Figure 1-2, based on the operational and ownership history of each parcel. In October 2002, Steelfields entered into a Voluntary Cleanup Program (VCP) agreement with the NYSDEC for the entire site. Since 2003, Steelfields has performed remediation of the site in accordance with an approved Remedial Design/Remedial Action RD/RA Work Plan (September 2002) under the VCP. The remediation has progressed more or less sequentially from Area I to Area IV. To date, the Area IV parcel (Former Donner-Hanna Coke Yard Parcel) cleanup has been partially completed by Steelfields in accordance with the RD/RA Work Plan for the VCP as approved by NYSDEC in 2002.

Steelfields is currently negotiating an agreement for the sale of the 30.9 acre Area IV parcel (see Figure E-2) to Hydro-Air Components Inc. (Hydro-Air), which is contemplating the development of the parcel for a new manufacturing facility. Hydro-Air is seeking approval from the NYSDEC to enter into the Brownfields Cleanup Program (BCP) related to the redevelopment of the Area IV parcel. Ownership of the remaining three parcels (Area I through III) will remain with Steelfields.

For the purposes of this Citizen Participation Plan, Area IV may also be referred to throughout this report as the Hydro-Air Site or the Site. The Site was historically utilized by Donner-Hanna Coke for storage of coke product. Tar and tar byproducts from the coke plant (Area II) were also disposed of on the western portion of the Site. The Site was listed as Class 3 inactive hazardous waste site (Site No. 915017) on the NYSDEC inactive hazardous waste site registry prior to it's acquisition by Steelfields and entry into the Voluntary Cleanup Program.

2.2 Site Investigation History

The Site has been extensively investigated and characterized through a series of environmental site assessments and investigations performed over several decades on the parcel. The major documented assessments and investigations include:

- *Phase I/Phase II Investigation, Donner-Hanna Coke Site No. 915017.* Recra Environmental, Inc. and Lawler, Matusky & Skelly Engineers. July 1990.
- *Phase I/Phase II Environmental Site Assessment (ESA), Former Republic Steel Plant Area ("Steel Manufacturing Site").* Malcolm Pirnie, Inc. September 1997.
- *South Buffalo Redevelopment Plan, Steel Manufacturing Site, Voluntary Cleanup Site Assessment Report.* Malcolm Pirnie, Inc. September 1997.
- *Voluntary Cleanup Site Assessment Report, Former Steel Manufacturing Site, Area II, Area III, and Area IV.* TurnKey Environmental Restoration, LLC. April 1999.
- *Voluntary Cleanup Site Assessment Report, Former Steel Manufacturing Site, Addendum 1, Area II, Area III, and Area IV.* TurnKey Environmental Restoration, LLC. January 2000.

2.3 Parameters of Interest

Significant environmental sampling has been performed at the site in support of voluntary cleanup site assessment activities. These analyses show that soil/fill constituents detected across the Site at elevated concentrations are the common byproducts of manufactured gas plant and coke processing, coal handling, and steel manufacturing operations. These soil constituents or parameters of interest are:

- **Volatile Organic Compounds (VOCs)** – VOCs present in site soils/fill at elevated concentrations relative to background levels are limited to benzene, toluene, ethylbenzene and xylene (i.e., BTEX). These VOCs are typically associated with coke byproduct operations. VOCs have been detected at elevated concentrations in tar materials disposed at the Site.

- **Semi-Volatile Organic Compounds (SVOCs) –** SVOCs detected at the Site are almost exclusively limited to polynuclear aromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products. Accordingly, they are commonly found in urban soil environments.

PAHs are present at concentrations that are elevated compared to "background" across the Site. The highest concentrations appear to be related to the storage, handling or disposal of coke and tar byproducts.

In addition, VOCs, SVOCs, and inorganic compounds (i.e., cadmium, lead, chromium and cyanide) were detected in the groundwater collected from the northern and western portions of the Site at concentrations exceeding the NYSDEC groundwater quality standards. There are no known uses of the groundwater. Neighboring residences and businesses are supplied with municipal water from the City of Buffalo. Groundwater is migrating toward the Buffalo River and Lake Erie, away from nearby houses. The quality and volumetric flow of groundwater is such that it is not likely in the future to adversely impact Buffalo River water quality.

3.0 THE CLEANUP PLAN

3.1 Description of Cleanup Objectives

Site-specific action levels (SSALs) were established and used under the approved VCP Work Plan for subsurface soil/fill on the Site. The SSALs established under the VCP will continue to be used by Steelfields to complete the remediation and for post-remediation redevelopment performed under the BCP RD Work Plan. These values are derived from remedial goals accepted by the NYSDEC on other restricted use brownfield redevelopment sites, and are generally consistent with NYSDEC Technical Assistance and Guidance Memorandum (TAGM) HWR-94-4046 "Determination of Soil Cleanup Objectives and Cleanup Levels." These action levels are designed to be target values that will be used in determining, with the NYSDEC, the need for and/or continuation of remedial measures. Such decisions will consider the practicality and benefit of remedial construction in light of the restricted use of the site and other planned remedial measures designed to prevent contact with constituents of concern (e.g., vapor barrier, cover material). Table 1 summarizes the SSALs established for surficial and subsurface soil/fill on the Site.

Existing surficial and subsurface soil/fill on the Site with constituent concentrations less than or equal to these SSALs will not require excavation or cleanup. As such, on-site soil/fill with constituent concentrations below these SSALs is deemed suitable for grading, backfilling excavations, raising grades or other on-site uses during remediation, predevelopment, and development phases of the project. Prior to occupancy and public or private use of redeveloped parcels or subparcels of the Site, the entire surface of the redeveloped parcel or subparcel shall be covered by: structures, paved roads, sidewalks, parking lots or vegetated cover.

Protection of the off-site community, which includes surrounding residents and businesses as well as potential future commercial and public users of the site during the redevelopment period, will be addressed through a Community Air Monitoring Plan (CAMP) contained in the Soil/Fill Management Plan (Appendix A). The CAMP establishes specific requirements for air monitoring and procedures to mitigate off-site migration of airborne particulates during the post-remediation redevelopment period. The SFMP provides

requirements for handling of soils/fill excavated during redevelopment (i.e., for foundation and subsurface utilities) and for placement of final, clean vegetated cover material or paving over exposed soil/fill in all redeveloped areas of the site.

TABLE 1
Site Specific Action Levels – Steelfields Area IV (Hydro-Air Site)

PARAMETER	MAXIMUM CONCENTRATION IN SOIL/FILL (mg/kg)
Individual VOC	1
Total VOCs	10
Total SVOCs	500
Arsenic	75
Barium	1,000
Cadmium	15
Chromium	1,000
Lead	1,000
Mercury	10
Selenium	61
Silver	10
Cyanide (Total Amenable)	1,600

3.2 Description of Remedial Tasks Remaining

As previously noted, Steelfields Ltd. performed and continues to perform a substantial portion of the previously approved remedial cleanup at the Site under the VCP in 2005 and through early 2006. The remaining remediation work required under the VCP approved Work Plan and planned for completion by Steelfields under the VCP is summarized below:

- **Tar Material Removal:** Approximately 6,000 cubic yards (8,000 tons) of tar material and related soil/fill exceeding SSALs, near the western boundary of Area IV, remains to be excavated and transported off-site for hazardous or non-hazardous (depending on TCLP test results) landfill disposal or energy recovery. Verification testing will be required along all perimeters and bottoms of excavation in accordance with the Quality

Assurance Plan. The excavation will then be backfilled, graded and seeded in accordance with the Soil/Fill Management Plan.

- **Coke Reclamation:** Approximately 3-4 stockpiles totaling an estimated 22,000 cubic yards of residual coke fines, debris, and other fill materials will require transport and disposal off-site. It is currently planned that the majority of the coke residuals will be burned for energy recovery in a power plant.

- **Final Soil Cover:** Upon completion of all remedial activities in Area IV (concentrated within the remaining 23 Acres), a minimum of 12" of surface cover soil will be placed, compacted, graded, and seeded in accordance with the Soil/Management Plan.

- **Groundwater Monitoring:** A network of four groundwater monitoring wells will be monitored after all operable units have been remediated to monitor potential releases from the site due to groundwater conditions.

3.3 Cleanup Schedule

The remedial activities shall be completed within approximately three months of the execution of the Brownfield Cleanup Agreement (BCA). Details of the remediation schedule are contained in the RD Work Plan.

4.0 WHO TO CONTACT & WHERE TO GO FOR MORE INFORMATION

4.1 NYSDEC and NYSDOH Contacts

The list below identifies names, addresses and phone numbers of contact people within the NYSDEC and NYSDOH who can answer questions and address public concerns about the site.

Mr. Maurice Moore
Project Engineer
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203
(716) 851-7220

Mr. Cameron O'Conner
New York State Department of Health
584 Delaware Avenue
Buffalo, New York 14202
(716) 847-4501

4.2 Document Repositories

Documents related to the Former Steel Manufacturing Site Voluntary Cleanup are available for public review at the document repositories that NYSDEC has established at the following locations:

Buffalo & Erie County Public Library
JP Dudley Branch
2010 South Park Avenue
Buffalo, New York 14220
(716) 823-1854

Hours of Operation:
M/F/S 10:00 am - 6:00 pm
Tue: 12:00 pm - 8:00 pm
W: Closed
Th: 12:00 pm - 8:00 pm
Sun: 1:00 pm - 5:00 pm

NYSDEC
Region 9 Offices
270 Michigan Avenue
Buffalo, New York 14203
(716) 851-7220
Contact: Mr. Maurice Moore, Project Engineer

Hours of Operation:
M-F, 8:30 am - 4:45 pm
(by appointment only)

5.0 LIST OF PLANNED CITIZEN PARTICIPATION ACTIVITIES

Listed below are the citizen participation activities that will be performed during the cleanup at this site. The adjacent time line indicates when each activity should be completed.

Citizen Participation Activities for Remedial Design and Construction

Activity:	Activity Should Be Completed at This Point:
Mail a fact sheet to the mailing list	At least 7 days prior to public meeting and at least 30 days prior to VCA approval by NYSDEC
Mail a fact sheet to the mailing list	Before start of construction
Provide updates to mailing list contacts (see Section 6.0)	As needed during construction
Mail a fact sheet announcing completion of the project	When construction is complete

Additional citizen participation activities may be conducted based on the amount of citizen interest shown at the site. Community involvement is important to ensure that the remedial activities do not impose a negative impact on people living and working near/on the site. Any additional reports or documentation related to remedial activities will be made available at the document repositories.

6.0 MAILING LIST

The mailing list is used to provide information to area residents, elected officials, media and other interested parties who want to be kept informed about the remedial activities at the Site. The mailing list, presented as Attachment E1, does not contain the names of the adjacent residents/property owners to protect their privacy. If you would like to request your name be added to the list, please contact Ms. Megan Gollwitzer, Citizen Participation Specialist in the DEC Region 9 Office at (716) 851-7220.

FIGURES

FIGURE E-1

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

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

PROJECT NO.: 0107-001-100

DATE: APRIL 2006

DRAFTED BY: BCH

SITE LOCATION AND VICINITY MAP

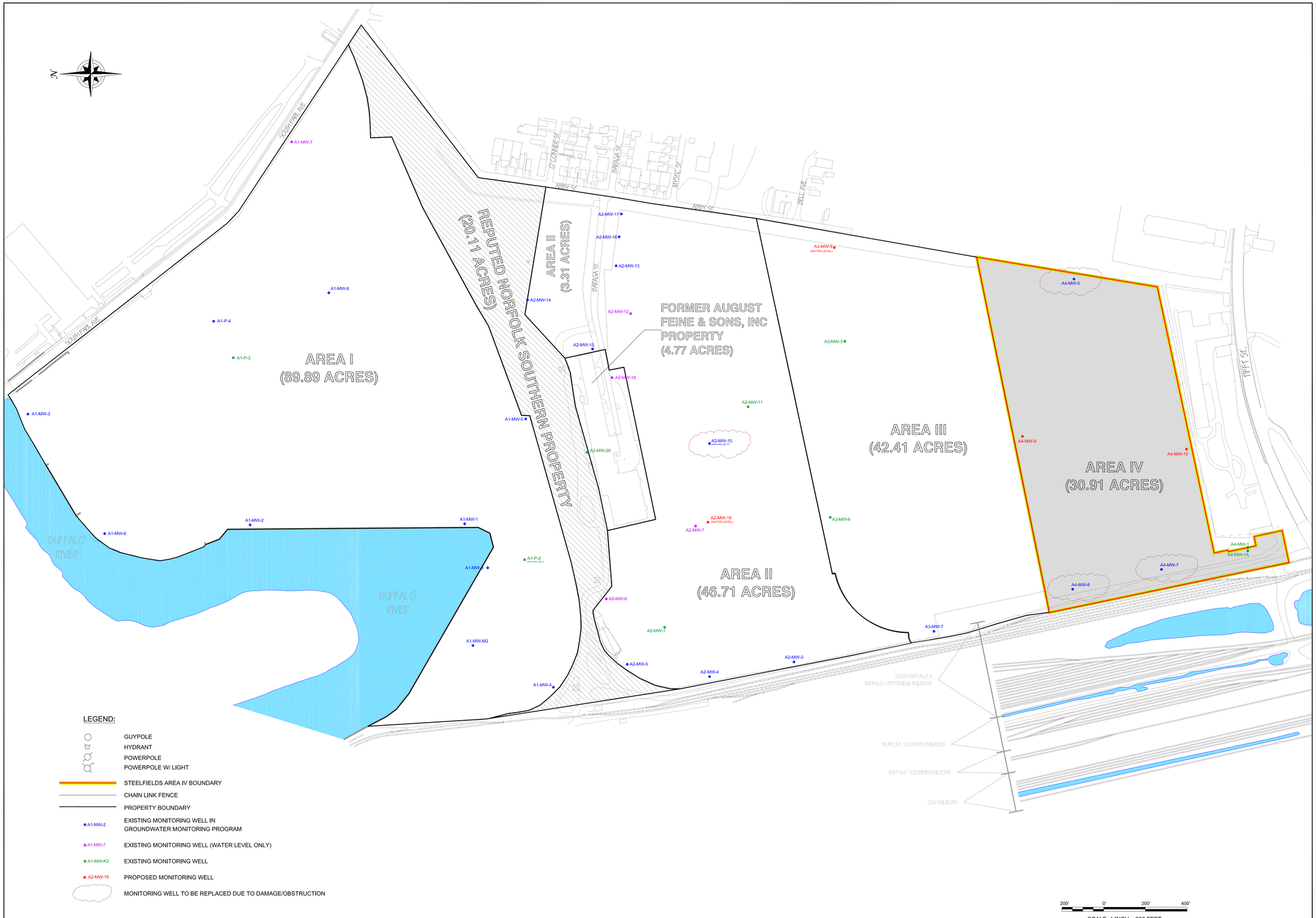
APPENDIX E - CITIZEN PARTICIPATION PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FILEPATH=g:\caa\benchmark\hydro-air\rd work plan\appendix e; cp plan\figure e-1; site location and vicinity map.dwg

F:\GIS\Benchmark\Projects\AREE Work Plan\Appendix E\ CP Plant\Figure E-2 Site Plan.mxd



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

JOB NO.: 0107-001-100

REVISIONS

NO.	BY	DATE	REMARKS

SEAL

DRAWN BY: BCH
DATE: APRIL 2006
CHECKED BY:
APPROVED BY:

SITE PLAN

APPENDIX E - CITIZEN PARTICIPATION PLAN
BUFFALO, NEW YORK
STEELFIELDS AREA IV SITE

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FIGURE E-2

ATTACHMENT E1

MAILING LIST

ATTACHMENT E1 – CONTACT LIST

The following is the contact list information for the Site:

New York State Contacts:

Director Abby Snyder
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Mr. Martin Doster
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Mr. Maurice Moore
NYSDEC, Region 9
270 Michigan Avenue
Buffalo, NY 14203

Ms. Meaghan Boice-Green
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, NY 14203

Ms. Megan Gollwitzer
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, N.Y 14203

Community Outreach File
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, NY 14203

Mr. Cameron O'Connor
NYSDOH
584 Delaware Avenue
Buffalo, NY 14202

Mr. Matt Forcucci
NYSDOH
584 Delaware Avenue
Buffalo, NY 14202

Senator William Stachowski
58th District, N.Y.S. Senate
2030 Clinton Street
Buffalo, NY 14206

Senator Charles Schumer
U.S. Senate, Suite 660
130 South Elmwood Avenue
Buffalo, NY 14202

The Honorable Brian M. Higgins
Congressional District 27
726 Exchange Street, Suite 601
Buffalo, NY 14210

Assemblyman Jack Quinn
District 146
3812 South Park Ave.
Buffalo, NY 14219

Assemblyman Mark J.F. Schroeder
District 145
2019 Seneca St.
Buffalo, NY 14210

ATTACHMENT E1 – CONTACT LIST

Erie County Contacts:

Mr. Timothy Kennedy
Legislator-District 2
1928 South Park Ave.
Buffalo, NY 14220

Supplier of Potable Water:

Erie County Water Authority
350 Ellicott Square Building
295 Main Street
Buffalo, NY 14203

City of Buffalo Contacts:

Mayor Byron W. Brown
City Hall
Buffalo, NY 14202

Timothy Wannamaker
Office of Strategic Planning
City of Buffalo
920 City Hall
Buffalo, New York 14202

Zoning Board:

James Lewis, III
Chairman
Room 1801, City Hall
Buffalo, NY 14202

Local News Media:

The Buffalo News
1 News Plaza
Buffalo, NY 14240

WBEN News Radio 930
Entercom Radio of Buffalo
500 Corporate Pkwy
Suite 200
Buffalo, NY 14226

WKBW-TV
7 Broadcast Plaza
Buffalo, NY 14202

Document Repository:

Buffalo & Erie County Public Library
JP Dudley Branch
2010 South Park Ave.
Buffalo, NY 14220

Nearby School:

South Park High School
155 Southside Pkwy
Buffalo, NY 14304
Attn: Ms. Patricia Thomas

ATTACHMENT E1 (Cont.)
Hydro-Air Residential Contact List

LAST NAME	No.	STREET	CITY, STATE, ZIP
Resident/Occupant	195	Abby St	Buffalo, NY 14220
Resident/Occupant	221	Abby St	Buffalo, NY 14220
Resident/Occupant	227	Abby St	Buffalo, NY 14220
Resident/Occupant	233	Abby St	Buffalo, NY 14220
Resident/Occupant	237	Abby St	Buffalo, NY 14220
Resident/Occupant	249	Abby St	Buffalo, NY 14220
Resident/Occupant	259	Abby St	Buffalo, NY 14220
Resident/Occupant	263	Abby St	Buffalo, NY 14220
Resident/Occupant	281	Abby St	Buffalo, NY 14220
Resident/Occupant	285	Abby St	Buffalo, NY 14220
Resident/Occupant	289	Abby St	Buffalo, NY 14220
Resident/Occupant	293	Abby St	Buffalo, NY 14220
Resident/Occupant	297	Abby St	Buffalo, NY 14220
Resident/Occupant	311	Abby St	Buffalo, NY 14220
Resident/Occupant	315	Abby St	Buffalo, NY 14220
Resident/Occupant	317	Abby St	Buffalo, NY 14220
Resident/Occupant	323	Abby St	Buffalo, NY 14220
Resident/Occupant	327	Abby St	Buffalo, NY 14220
Resident/Occupant	329	Abby St	Buffalo, NY 14220
Resident/Occupant	343	Abby St	Buffalo, NY 14220
Resident/Occupant	347	Abby St	Buffalo, NY 14220
Resident/Occupant	353	Abby St	Buffalo, NY 14220
Resident/Occupant	359	Abby St	Buffalo, NY 14220
Resident/Occupant	365	Abby St	Buffalo, NY 14220
Resident/Occupant	84	Amelia St	Buffalo, NY 14220
Resident/Occupant	88	Amelia St	Buffalo, NY 14220
Resident/Occupant	90	Amelia St	Buffalo, NY 14220
Resident/Occupant	263	Baraga St	Buffalo, NY 14220
Resident/Occupant	267	Baraga St	Buffalo, NY 14220
Resident/Occupant	269	Baraga St	Buffalo, NY 14220
Resident/Occupant	272	Baraga St	Buffalo, NY 14220
Resident/Occupant	273	Baraga St	Buffalo, NY 14220
Resident/Occupant	274	Baraga St	Buffalo, NY 14220
Resident/Occupant	276	Baraga St	Buffalo, NY 14220
Resident/Occupant	278	Baraga St	Buffalo, NY 14220
Resident/Occupant	282	Baraga St	Buffalo, NY 14220
Resident/Occupant	284	Baraga St	Buffalo, NY 14220
Resident/Occupant	288	Baraga St	Buffalo, NY 14220
Resident/Occupant	326	Baraga St	Buffalo, NY 14220
Resident/Occupant	327	Baraga St	Buffalo, NY 14220
Resident/Occupant	330	Baraga St	Buffalo, NY 14220
Resident/Occupant	337	Baraga St	Buffalo, NY 14220
Resident/Occupant	338	Baraga St	Buffalo, NY 14220
Resident/Occupant	341	Baraga St	Buffalo, NY 14220
Resident/Occupant	345	Baraga St	Buffalo, NY 14220
Resident/Occupant	346	Baraga St	Buffalo, NY 14220

ATTACHMENT E1 (Cont.)
Hydro-Air Residential Contact List

LAST NAME	No.	STREET	CITY, STATE, ZIP
Resident/Occupant	351	Baraga St	Buffalo, NY 14220
Resident/Occupant	355	Baraga St	Buffalo, NY 14220
Resident/Occupant	355	Baraga St	Buffalo, NY 14220
Resident/Occupant	356	Baraga St	Buffalo, NY 14220
Resident/Occupant	362	Baraga St	Buffalo, NY 14220
Resident/Occupant	67	Beacon St	Buffalo, NY 14220
Resident/Occupant	67	Beacon St	Buffalo, NY 14220
Resident/Occupant	16	Bell St	Buffalo, NY 14220
Resident/Occupant	19	Bell St	Buffalo, NY 14220
Resident/Occupant	22	Boone	Buffalo, NY 14220
Resident/Occupant	267	Germania St	Buffalo, NY 14220
Resident/Occupant	271	Germania St	Buffalo, NY 14220
Resident/Occupant	275	Germania St	Buffalo, NY 14220
Resident/Occupant	276	Germania St	Buffalo, NY 14220
Resident/Occupant	278	Germania St	Buffalo, NY 14220
Resident/Occupant	290	Germania St	Buffalo, NY 14220
Resident/Occupant	292	Germania St	Buffalo, NY 14220
Resident/Occupant	301	Germania St	Buffalo, NY 14220
Resident/Occupant	306	Germania St	Buffalo, NY 14220
Resident/Occupant	308	Germania St	Buffalo, NY 14220
Resident/Occupant	309	Germania St	Buffalo, NY 14220
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Resident/Occupant	312	Germania St	Buffalo, NY 14220
Resident/Occupant	324	Germania St	Buffalo, NY 14220
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Resident/Occupant	332	Germania St	Buffalo, NY 14220
Resident/Occupant	336	Germania St	Buffalo, NY 14220
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Resident/Occupant	346	Germania St	Buffalo, NY 14220
Resident/Occupant	349	Germania St	Buffalo, NY 14220
Resident/Occupant	351	Germania St	Buffalo, NY 14220
Resident/Occupant	358	Germania St	Buffalo, NY 14220
Resident/Occupant	360	Germania St	Buffalo, NY 14220
Resident/Occupant	362	Germania St	Buffalo, NY 14220
Resident/Occupant	370	Germania St	Buffalo, NY 14220
Resident/Occupant	372	Germania St	Buffalo, NY 14220
Resident/Occupant	374	Germania St	Buffalo, NY 14220
Resident/Occupant	378	Germania St	Buffalo, NY 14220
Resident/Occupant	394	Germania St	Buffalo, NY 14220
Resident/Occupant	401	Germania St	Buffalo, NY 14220
Resident/Occupant	248	Mystic St	Buffalo, NY 14220
Resident/Occupant	258	Mystic St	Buffalo, NY 14220
Resident/Occupant	259	Mystic St	Buffalo, NY 14220
Resident/Occupant	262	Mystic St	Buffalo, NY 14220
Resident/Occupant	318	Mystic St	Buffalo, NY 14220
Resident/Occupant	331	Mystic St	Buffalo, NY 14220

ATTACHMENT E1 (Cont.)
Hydro-Air Residential Contact List

LAST NAME	No.	STREET	CITY, STATE, ZIP
Resident/Occupant	331	Mystic St	Buffalo, NY 14220
Resident/Occupant	332	Mystic St	Buffalo, NY 14220
Resident/Occupant	332	Mystic St	Buffalo, NY 14220
Resident/Occupant	338	Mystic St	Buffalo, NY 14220
Resident/Occupant	72	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	79	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	81	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	82	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	86	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	87	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	90	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	91	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	94	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	95	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	100	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	101	O'Connor Ave	Buffalo, NY 14220
Resident/Occupant	108	O'Connor Ave	Buffalo, NY 14220

ATTACHMENT E2

REMEDIATION PROGRAM GLOSSARY

Citizen's Glossary of Environmental Terms

This glossary lists common terms related to New York State Department of Environmental Conservation's voluntary cleanup, brownfield, and inactive hazardous waste disposal site programs. It includes some terms used by the United States Environmental Protection Agency's (EPA) Superfund program. Glossary explanations should help you understand various environmental concepts. Some words within the definitions are in bold, which indicates that they are defined elsewhere in the glossary.

The following do not constitute the state's official use of terms and phrases for regulatory purposes, and nothing in this document should be construed to alter or supplant any other state document. The glossary includes brief definitions of some contaminants frequently found at remediation sites. However, not all contaminants found at remediation sites are included, nor are the listed contaminants found at every site.

Acid — Chemicals that have a high concentration of hydroge n ions. Acids have a **pH** of less than 7 on a scale of 0 to 14. Strong acids, closer to 0 on the scale are corrosive, and weak acids, with a pH closer to 7, are not. An acid is the opposite of a **base**.

Activated carbon — A highly absorbent form of carbon, formed primarily from coal and lignite, that absorbs organic compounds. "Activated carbon treatment systems" are used to remove odors and toxic substances from liquid or gaseous emissions.

Acute effects — Health effects that have a rapid onset, a short course, and pronounced symptoms and termination. A reaction that occurs shortly after exposure to a chemical.

Acute exposure — A single, short contact with a chemical. It may last a few seconds or a few hours, but no longer than a day.

Administrative order on consent — See **Consent order**

Administrative record — Part of a site's **Record of Decision** (ROD) which lists and defines documents used in the development of DEC's decision about selection of a **remedial action**.

Adsorb/ Adsorption — Molecules of gas, liquid, or dissolved solids that adhere or "stick" to the surfaces they come in contact with. Some chemicals adsorb strongly to soil particles. This differs from *absorb*: "to take up or make part of the existing whole," like a sponge absorbs (sucks up) water.

Air sparging — Injecting air or oxygen into an **aquifer** to strip or flush **volatile** contaminants as air bubbles up through the ground water. The air is captured by a vapor extraction system. (See **soil vapor extraction system**).

Air stripping — A treatment system that removes or "strips" **volatile organic compounds** from contaminated groundwater or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Ambient — The surrounding environment. A mbient usually refers to the surrounding outdoor air, water, or land.

Anaerobic — Absence of oxygen. Some organisms, such as certain soil bacteria, thrive under anaerobic conditions in soil.

Arsenic	An element used in wood preservatives and pesticides.
Applicable or Relevant and Appropriate Requirements (ARARs)	Any state or federal statute that pertains to protection of human life and the environment in addressing specific conditions or use of a particular cleanup technology at a **Superfund** site.
Aquifer	An underground water-bearing formation of soil or rock commonly used for drinking water.
Aquifer recharge	See **Recharge**
Attenuation	The process by which a compound is reduced in concentration over time, through absorption, adsorption, degradation, dilution, and/or transformation.
Availability session	A scheduled gathering of program staff and members of the public in a casual setting, with or without a formal presentation or agenda but usually focusing on a specific aspect of a site's remedial process.
Background, Background level	The **concentration** of a substance in air, water, or soil that occurs naturally or is the result of human activities not related to a hazardous waste site; conditions in the area near, but not affected by, a hazardous waste site. "Background samples" are often taken to compare an area's natural or pre-existing conditions to conditions at a hazardous waste site.
Barrier protection layer	A layer of soil covering a **geomembrane** designed to protect the geomembrane from wear and tear caused by the weather, animals, etc.
Base	Bases are chemicals that have a large concentration of hydroxyl (one hydrogen plus one oxygen atom) ions. A basic compound has a **pH** of more than 7 on a scale of 0 to 14. Strong bases, pH closer to 14, are corrosive. Weak bases, with pH closer to 7, are not. An **acid** can neutralize the effects of a base.
Bedrock	The continuous solid rock of the continental crust. Bedrock can be found anywhere from the surface to hundreds of feet below ground. Bedrock can be solid or it can contain numerous cracks (fractures). Groundwater and chemicals can move through fractured bedrock.
Bentonite	A very fine clay, expansible when moist, commonly used to provide a tight seal around a monitoring well. Also used in **slurry walls**.
Bioaccumulation	The build-up of toxic materials in body tissues of fish and animals.
Bioavailability	The extent to which a substance can readily be absorbed by an organism or is ready to interact in an organism's metabolism.
Bioremediation	The **degradation** (breakdown) or stabilization of contaminants in the environment by microorganisms. There are many **remedial** techniques that use microorganisms, such as bacteria, to break down contaminants. Any of these techniques may be called bioremediation.
Biota	All the living organisms in a given area.
Borehole	Hole made with drilling equipment.

Boring	See **Soil boring**
Brownfield	Abandoned, idled, or under-used properties where expansion or redevelopment is complicated by real or perceived environmental contamination. Brownfield sites can pose environmental, legal, and financial burdens on a community and its taxpayers. New York State provides funds through the **1996 Clean Water/Clean Air Bond Act** to help municipalities that own brownfields but are not responsible for the contamination to investigate and clean up these sites. Brownfields cleaned up using Bond Act funds are also called Environmental Restoration Projects. The U.S. Environmental Protection Agency has a similar brownfield initiative.
Cap	See **Landfill cap/ Landfill cover system**
Carbon adsorption	A process by which contaminants are removed from groundwater or surface water when the water is forced through tanks containing **activated carbon**, a material that attracts the contaminants.
Carbon tetrachloride	A colorless, nonflammable liquid with a characteristic odor used as a solvent and in the synthesis of fluorocarbons.
Carcinogen	A cancer-producing substance.
Carcinogenic	Capable of producing or inciting cancer.
CERCLA	See **Comprehensive Environmental Response, Compensation, and Liability Act**
Chlorinated hydrocarbons	Chemicals containing only chlorine, carbon, and hydrogen. These include some pesticides, such as DDT and heptachlor, and solvents such as **trichloroethene** and **chloroform**.
Chlorinated organics	See **Chlorinated Solvents**
Chlorinated solvents	A group of organic (carbon-containing) solvents which contain chlorine as a part of their molecular structure. Chlorinated solvents are widely used for metal parts cleaning, chemical processing, and photographic film making. Common chlorinated solvents include **chloroform, methylene chloride, carbon tetrachloride, trichloroethene, tetrachloroethene, and 1,1,1-trichloroethane**.
Chloroform	A clear, colorless liquid with a characteristic odor. Chloroform was one of the earliest general anesthetics but this use was abandoned due to toxic effects. Now it is widely used as a solvent in the production of lacquer, pharmaceuticals, fluorocarbons, and plastics.
Chronic effects	A long-term or repeated reaction that occurs after an exposure to a chemical. Chronic effects are the opposite of **acute effects**.
Citizen participation (CP)	A process to inform and involve citizens in the decision-making process during identification, assessment and **remediation** of **inactive hazardous waste sites**. This process helps to assure that sound decisions are made from environmental, human health, economic, social and political perspectives.

Citizen participation plan

A document that describes the site-specific citizen participation activities that will take place to complement the investigation and clean-up activities at a hazardous waste site. A plan may be updated or altered as public interest or the technical aspects of the program change.

Citizen participation record

A series of documents prepared at a major remedial stage which describes the citizen participation activities required at that stage. A CP record also directs a scoping process to determine if additional citizen participation activities are appropriate and feasible.

Citizen participation specialist

A DEC staff member within the Division of Public Affairs and Education who provides guidance, evaluation and assistance to help the project manager carry out the site-specific citizen participation program.

Classification

See **Site classification**

1996 Clean Water/ Clean Air Bond Act

Provides $1.75 billion for priority environmental programs to ensure further protection of New York's air, water and natural resources, $200 million of which funds the Environmental Restoration Program, also known as the **Brownfield** Program, to provide financial assistance to municipalities for the investigation and /or cleanup of municipally-owned potentially contaminated properties. The municipality may then return these properties to productive use or can market them for redevelopment.

Cleanup

Action taken to respond to a hazardous material release or threat of a release that could affect humans and/or the environment. Also called **remedial action, removal action**, response action, or corrective action.

Combustion

Burning.

Comment period

A time period for the public to review and comment on various documents and **Division of Environmental Remediation** (DER) actions. For example, a 30 day comment period is provided when DER issues a **Proposed Remedial Action Plan** (PRAP).

Community relations

The Environmental Protection Agency's program to inform and involve the public in the **Superfund** process and respond to community concerns.

Community Relations Plan (CRP)

The formal plan for Environmental Protection Agency community relations activities at a **Superfund** site. The CRP is designed to ensure citizen opportunities for public involvement and allow citizens the opportunity to learn about a site.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)

A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. CERCLA created a special tax that goes into a trust fund, commonly known as **Superfund**, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program, EPA can either pay for site cleanup when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work; or take legal action to force parties responsible for site contamination to clean up the site or pay back the federal government for the cost of cleanup.

Cone of depression/ Cone of influence

A depression in the **water table** that develops around a pumped well.

Concentration

The amount of one substance in another substance. For example, a concentration of 10

milligrams per liter means there are 10 milligrams of	a substance in 1 liter of another substance.
Conceptual design	The general outline of planned actions that will be taken to address a hazardous waste site, such as building a **landfill cover system**. The conceptual design is incorporated into detailed design documents during **Remedial Design**.
Consent order	A legal and enforceable negotiated agreement between DEC and responsible parties where **responsible parties** agree to undertake investigation and cleanup or pay for the costs of investigation and cleanup work at a site. Also called an "Order on Consent."
Construction and demolition (C&D) debris/ waste	Waste building materials, dredging materials, tree stumps, and rubble resulting from construction, remodeling, repair, and demolition of homes, commercial buildings and other structures and pavements.
Contact list	Names, addresses and/or telephone numbers of individuals, groups, organizations and media interested and/or affected by a particular hazardous waste site. The DEC mails site-related information to the contact list, also called a mailing list.
Contaminant	Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.
Contamination	Microorganisms, chemicals, toxic substances, wastes, or wastewater introduced into water, air, or soil in a concentration that makes the **medium** unfit for its next intended use. Objects such as building surfaces can also contain contamination.
Contaminant mass	The volume and area of contaminants in a polluted material, such as soil or groundwater. The goal of waste cleanup is to reduce the contaminant mass (e.g., reduce the amount and area of contaminants in soil).
Contaminant plume	see **Plume**
Contract Laboratory Program (CLP)	The Environmental Protection Agency's program that approves laboratories that provide chemical testing services of known quality using a wide range of standard methods and maintaining consistent quality control.
Corrosive	Having the power to degrade or wear away a material by chemical action.
Cost recovery	A legal process where **potentially responsible parties** can be required to pay back the federal or state government for money spent on cleanup actions. Cost recovery actions usually begin after the government has completed a site cleanup.
Cover material	(1) Soil used to cover compacted solid waste in a sanitary landfill. (2) See **Landfill cap/landfill cover system**.
Cover system	See **Landfill cap/landfill cover system**
Deed notification	A notice placed on a property deed to alert future buyers about contamination on a property.
Deed restriction	A legal restriction placed on a property deed to restrict future uses of a contaminated property. For example, a deed restriction may prohibit future housing development on a contaminated industrial site, or prohibit use of contaminated groundwater on a piece of property.

Degradation products	**Chlorinated solvents**, when released in the environment, will naturally degrade by microbial and physical processes in soil and/or groundwater into similar compounds that have fewer chlorine atoms. These new compounds are known as degradation products. For instance, **tetrachloroethylene**, which has 4 chlorine atoms, degrades to **trichloroethylene**, which has only 3 chloride atoms.
Degreaser	Chemical used to remove grease, usually from metal or plastic.
Delist/delisted/ delisting	Many sites that have been cleaned up are delisted, meaning they are removed from the **State's Registry of Inactive Hazardous Waste Disposal Sites**. Sites that are delisted can fall into one of three categories: **D1**: No consequential amount of hazardous waste was confirmed at the site. **D2**: **Remedial actions** have been completed at the site and no further action is required. **D3**: Site was combined with another site on the **Registry of Inactive Hazardous Waste Disposal Sites**.
Dense Non-Aqueous Phase Liquid (DNAPL)	Liquids denser than water that represent a special class of soil and groundwater contaminants with unique behavior and problems. Since they are denser than water, DNAPLs can sink deeper into the ground and can act as a continuing source of groundwater contamination, as small amounts of the material can dissolve in groundwater.
Density	The mass of a substance per unit of volume. Substances with a density greater than 1.0 are denser than water; substances with a density less than 1.0 are lighter than water.
Dermal	By or through the skin. "Dermal contact" refers to a substance coming in contact with skin.
Desorption	The opposite of **adsorption** or absorption; molecules detach from a surface (such as soil particles).
Detection limit	The lowest concentration of a chemical that can be reliably measured by a testing method.
Dewater	(1) Remove a portion of the water in soil or sludge to dry the soil/ sludge so it can be treated or disposed of. (2) Remove or drain the water from a tank or trench.
1,1-Dichloroethane (1,1-DCA) and 1,2-Dichloroethane (1,2-DCA)	Chemicals with similar molecular structures used to produce a variety of consumer and industrial products, such as specialty chemicals and cleaning products. These chemicals are sometime found at hazardous waste sites as the **degradation** products of other chemicals, such as **trichloroethane**.
Dichloroethene or 1,1-Dichloroethene (DCE) and 1,2-Dichloroethene	Chemicals with similar molecular structures used to make specialty chemicals and pharmaceuticals. These chemicals are sometimes found at hazardous waste sites as the **degradation products** of **trichloroethene**.
Diffusion	Movement of a substance from an area of high concentration to an area of low concentration. Diffusion can also refer molecules of gas or vapor moving from a source, such as a bottle, to a receptor, such as a human nose.
Division of Environmental	**Enforcement**

A unit within the DEC which works with the **Division of Environmental Remediation** to negotiate agreements with responsible parties for the investigation and remediation of hazardous waste sites. A negotiated agreement is contained in a **consent order**.

Division of Environmental Remediation

Formerly the Division of Hazardous Waste Remediation, a major unit within the DEC created to manage the hazardous waste site remedial program from site discovery through **Operation and Maintenance** activities. Staff include: engineers, geologists, chemists, attorneys, citizen participation specialists, environmental program specialists and support staff.

Document Repository

Typically, a DEC regional office and/or a public building, such as a library, near a particular site, at which documents related to **remedial** and **citizen participation** activities at the site are available for public review. Environ-mental Management Councils (EMCs), Conservation Advisory Committees (CACs) and active local groups can also serve as document repositories.

Downgradient

The direction that groundwater flows; similar to "downstream" for surface water.

Drainage Swale

See **Swale**

Drum

A metal or plastic container, usually with a 55 gallon capacity.

Dual-Phase Vacuum Extraction System

A treatment system designed to remove both contaminated groundwater and **soil gas** from a common groundwater well or wells. By removing ground-water, the system lowers the groundwater level around the well, allowing a strong vacuum to be applied to remove contaminated soil gas. The contaminated water and air can then be removed or treated and released.

Effluent

Treated or untreated wastewater that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged to **surface waters**.

Enforcement

DEC's efforts, through legal action if necessary, to compel a responsible party to perform or pay for site remedial activities.

Engineered/ engineering controls

Method of managing environmental and health risks by placing a barrier between the contamination and the rest of the site, thus limiting exposure pathways.

Environmental Notice Bulletin

A weekly DEC publication used to announce a variety of DEC activities. The ENB announces proposals to **delist** or change the **site classification** of **hazardous waste sites**, as well as **voluntary cleanup agreements**.

Environmental Restoration Program/ Project

See **Brownfield**

1986 Environmental Quality Bond Act

An act passed in 1986 that gives New York State bonding authority of up to $1.2 billion to fund the State's share of the total cost of remediating hazardous waste sites in New York State.

Epidemiology

The study of diseases as they affect population, including the distribution of disease, the factors (e.g., age, sex, occupation) that influences this distribution; and the application of this study to control health problems.

EP Tox Test	See **Extraction Procedure**
Explanation of Significant Differences (ESD)	A document prepared by the **Division of Environmental Remediation** explaining changes to a cleanup plan called for in a **Record of Decision** and the reason for those changes.
Explosive limits	The amounts of **vapor** in air which form explosive mixtures. Explosive limits are expressed as "lower explosive limits" and "upper explosive limits;" these give the range of **vapor** concentrations in air that will explode if heat is added. Explosive limits are expressed as percent of vapor in air.
Exposure	Contact. No matter how dangerous a substance or activity, without exposure, it cannot harm you.
Exposure routes	A means by which a toxic substance can come into contact with or enter the body. The three major exposure routes are: inhalation (breathing), direct contact (touching), and ingestion (swallowing).
Ex-situ	Outside the original location. For example, contaminated that soil is dug up and removed before it is treated is being treated *ex-situ*. This is the opposite of **in-situ**.
Exceedance	Violation of the pollutant levels permitted by environmental protection standards.
Extraction procedure (EP Tox Test)	Determining toxicity by a procedure which simulates leaching; if a certain concentration of a toxic substance can be leached from a waste, that waste is considered hazardous, i.e., "EP Toxic."
Extraction well	A discharge well used to remove contaminated groundwater or air.
Feasibility Study (FS)	A report examining the pros and cons of alternative methods to address contamination at a hazardous waste site. The feasibility study usually recommends a certain alternative. The FS is usually based on the results of a **remedial investigation**; together, they are commonly referred to as the RI/FS.
Federal Register	A weekly publication covering federal government activity including rule making, proposed plans, response to public comments, etc.
Fill	Man-made deposits of natural soils or rock products and waste materials.
Fish and wildlife impact analysis	Part of a **remedial investigation** that looks at the effects or potential effects of contamination on fish and wildlife.
Flammable	Catches on fire easily and burns rapidly.
Flash point	The lowest temperature at which the **vapor** of a substance will catch on fire, even momentarily, if heat is applied. Provides an indication of how **flammable** a substance is.
Gas venting system	A system of pipes and vents installed in a **landfill** to prevent the build up of **landfill gases**, such as methane, that could potentially explode. Sometimes the gas vents have flares on them to burn the gas as it is released into the atmosphere. At some very large landfills, the gas is collected and used to generate electricity.
Geomembrane	A low **permeability** plastic sheet that is placed over a landfill to deter rain and snow from entering a landfill's waste. Geomembranes are often made from a plastic called

HDPE (high density polyurethane). The	geomembrane is covered with soil (**barrier protection layer**) and top soil to protect it.
Geophysical surveys	Techniques used to characterize the subsurface without having to dig up large areas. Examples include seismic refraction (commonly used to determine depth to bedrock), ground-penetrating radar (used to define sub-surface structures and buried objects), and **magnetometry** (used to detect buried iron objects).
Geoprobe	A special machine used to make **soil borings** and to create temporary **groundwater monitoring wells**.
Gram *(g)*	The unit of mass in the metric system. An ounce is about 28 grams, and a pound is approximately 450 grams.
Granular activated carbon treatment	A filtering system often used in small water systems and individual homes to remove **organic compounds**. See **activated carbon**.
Groundwater	Water found beneath the earth's surface that fills pores between soil particles such as sand, clay, and gravel or that fills cracks in bedrock. Precipitation that does not evaporate or runoff to surface waters **percolates** downward through soil and becomes groundwater. Groundwater flows from areas of high elevation to low elevation at generally low velocities (usually ranging from 10-1000 feet/year) and eventually discharges into surface waters such as rivers, lakes, and wetlands. Groundwater often provides a source of drinking water via wells. The chemical composition of the groundwater reflects the soil or bedrock through which it passes; groundwater dissolves minerals in the soil and bedrock. If a source of contamination exists at or below the earth's surface, percolating rainfall or snowmelt can transport contaminants downward where they can migrate with the groundwater.
Groundwater collection/ extraction and treatment system	A system of wells or trenches fitted with pumps and piping used to pump out or extract contaminated groundwater from the subsurface. Properly designed and operated systems can effectively contain a groundwater contaminant **plume** and prevent further contaminant migration.
Groundwater table	See **Water Table**
Half-life	(1) The time required for a pollutant to lose half its effect on the environment. (2) The time required for half of the atoms of a radioactive element to undergo decay. (3) The time required for the elimination of one half a total dose from the body.
Hammer mill	A high-speed machine that uses hammers and cutters to crush, grind, chip, or shred solid waste.
Hazardous ranking system (HRS)	A scoring system used to evaluate potential relative risks to public health and the environment from releases or threatened releases of hazardous materials. EPA and States use the HRS to calculate a site score (0 to 100) based on the actual or potential release of hazardous materials from a site through air, surface water, or groundwater. This score is the primary factor used to decide if a hazardous waste site should be placed on the **National Priorities List**.
Hazardous Substances	(1) Under the **Comprehensive Environmental Response, Compensation, and Liability Act**, a hazardous substance is any element, compound, mixture, solution, or substance that, when released to the environment, may present a substantial danger to the public health or welfare or to the environ-ment, including, but not limited to, toxic and certain other pollutants under the Federal Water Pollution Control Act, **Resource Conservation and Recovery Act**, hazardous air pollutants regulated by parts of the

Clean Air Act, and **Toxic Substance Control Act**. The term is much broader than the term **hazardous waste**. Sites that contain only hazardous substances are excluded from New York's **Superfund** program. (2) Any substance designated reportable by the EPA if a designated quantity of the substance is spilled in the waters of the United States or if it is otherwise emitted to the environment.

Hazardous waste(s) — By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. To be considered hazardous waste, the waste must possess at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appear on special EPA lists.

Hazardous Waste Site — A place where **hazardous wastes** have been dumped, buried or improperly stored. Sites range from a crest of land containing thousands of tons of chemical wastes to a few drums of solvents dumped in a vacant lot. See also **inactive hazardous waste disposal site**.

Health and safety plan — A plan included in investigation or **cleanup** work plans which outlines protective measures for site workers and the community during investigation or cleanup activities.

Health hazard — Anything which can have harmful effects on health. There can be both acute and chronic health hazards.

Health risk assessment — A process which estimates the likelihood that people who could be exposed to chemicals may have health effects. The four steps of a risk assessment are: (1) hazard identification (Can this substance damage health?), (2) dose-response assessment (What dose causes what effect?), (3) **exposure** assessment (How and how much do people contact it?), and (4) risk characterization (combining the other three steps to estimate **risk**).

Heavy metals — Metals with high atomic weights, such as mercury, chromium, cadmium, arsenic, and lead. They can damage living things at low concentrations and tend to accumulate in the food chain.

Herbicide — A chemical used to control, suppress, or kill plants, or to severely interrupt their normal growth process.

Heterogeneous — Consisting of dissimilar ingredients or constituents.

Homogeneous — Having a uniform consistency or ingredients; composed of similar ingredients.

Hydraulic — Operated, moved or effected by means of water.

Hydraulic conductivity — The rate at which water can move through a **permeable medium**.

Hydraulic gradient — In general, the direction of **groundwater** flow due to changes in the depth of the **water table**. Just as water flows downhill, water in the ground moves from areas of high elevation to areas of low elevation. The slope of the water table is the hydraulic gradient. The hydraulic gradient determines the speed of groundwater flow. A steep gradient causes groundwater to mover faster than a nearly horizontal gradient.

Hydrocarbon — Any of a series of chemical compounds that consist entirely of carbon and hydrogen.

Hydrogeologic testing — Physical tests performed to obtain specific groundwater and geologic data. A pump test, for example, is used to determine the permeability (a measure of how readily

groundwater flows) and storage capacity (a measure of the amount of water available) of an **aquifer**.	
Hydrogeology	The geology of **groundwater**, with particular emphasis on the chemistry and movement of water.
Hydrology	The study of the movement and properties of water on the earth's surface, underground and in the atmosphere.
Impermeable	Unable to be penetrated, as by liquids. For example, an "impermeable membrane" can be a thin plastic sheet through which rainwater cannot move.
Inactive hazardous waste disposal site	A hazardous waste site where disposal of hazardous wastes has been confirmed and wastes are no longer being disposed of there ("inactive" site).
Incineration	Burning of certain types of solid, liquid, or gaseous materials under controlled conditions to destroy hazardous wastes.
Infiltration	The penetration of water through the ground surface into sub-surface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls. (See: **percolation**.)
Influent	Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant. The opposite of **effluent**.
Ingestion	Swallowing. This is one way a person can be exposed to chemicals.
Inhalation	Breathing. This is one way a person can be exposed to chemicals.
Inorganic chemicals/ compounds	Chemicals that do not contain carbon. **Metal**s are inorganic chemicals.
In-Situ	In the original place. *In-situ* treatment is carried out at a hazardous waste site without having to dig up and move the contaminated material. In-situ is the opposite of **ex-situ**.
Insoluble	Incapable of being dissolved in water or another liquid.
Institutional controls	A variety of methods used to control access to a contaminated site and/or exposure to contaminants at a site. Examples of institutional controls include fencing or **deed notifications/ restrictions**.
Interim remedial measures (IRM)	Action(s) that can be conducted at a site relatively quickly to reduce the risk to people's health and the environment from a well-defined hazardous waste problem. An IRM can involve removing contaminated soil and drums, providing alternative water supplies or securing a site to prevent access.
Landfill	Any place where wastes were disposed of by dumping waste and covering it. There are three main kinds of landfills: (1) Sanitary landfills are disposal sites for nonhazardous solid wastes at which the waste is spread in layers, compacted to the smallest practical volume, and covered with material at the end of each operating day. (2) Secure chemical landfills are disposal sites for hazardous waste. They are selected and designed to minimize the chance of release of hazardous substances into the environment. (3) Old landfills were built without modern day protections; these may contain hazardous wastes. Many of these landfills are being investigated and cleaned

up under the State's	remediation program.
Landfill cap/ landfill cover system	A layering of material over a landfill to deter rain and snowmelt from moving through the waste pile. A typical landfill cover will include a **geomembrane** or a layer of clay covered with a layer of low **permeability** soil, which in turn is covered by a layer of topsoil and seeded to encourage grass to grow. Landfill cover systems can also include gas vents to prevent gases such as **methane** from building up inside the landfill. The cover system is designed so rain and snowmelt is directed into a drainage ditch or **swale.**
Landfill gas	As organic wastes within a landfill break down, gases such as methane and hydrogen sulfide are produced. The production of these gases drops off over time.
Leachate	Surface or groundwater that is contaminated while moving through a landfill's wastes.
Leachate collection system	A system that gathers leachate and pumps it to the surface for treatment.
Light non-aqueous phase liquid (LNAPL)	Liquids lighter than water that represent a special class of soil and groundwater contaminants with unique behavior and problems. See also **NAPL.**
Liner	A relatively **impermeable** barrier designed to keep **leachate** inside a landfill. Liner materials include plastic and dense clay.
List / listing	When DEC adds a hazardous waste site to the **Registry of Inactive Hazardous Waste Disposal Sites**, this is called "listing" a site.
Liter	The unit of volume in the metric system. A liter is about the same as a quart.
Magnetometer / magnetometer survey	A magnetometer is an instrument that can detect metal objects buried underground. When this instrument is used to look for buried drums or other metal objects at a hazardous waste site, this is called a magnetometer survey.
Maximum contaminant level	The maximum permissible level of a contaminant in water delivered to any user of a public water system. MCLs are enforceable standards.
Media/medium	Specific environments that can contain contaminants. Air, water, sediment and soil are media.
Metals	A number of chemical elements that share certain special characteristics. Many metals can be toxic in high doses and can **bioaccumulate** in the food chain. Metals sometimes found at **hazardous waste sites** include: arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc.
Methane	An odorless gas produced in newer landfills as organic material (previously living things or material derived from living things) breaks down. Methane production drops off as a landfill gets older.
Methylene chloride	A colorless nonflammable liquid, with a pleasant aromatic odor, used as a solvent, paint remover, and **degreaser.**
Micrograms per kilogram (ug/kg)	A way of expressing dose: micrograms (ug) of a substance per kilogram (kg) of body weight or soil.

Micrograms per liter (ug/l)

A unit of measure: the number of micrograms of one substance in a liter of liquid. One microgram per liter means one microgram of chemical per liter of water, and is essentially equivalent to one **part per billion** (ppb). Theoretically one ug/l of a substance equals one part per billion of the substance multiplied by its **density**.

Milligrams per kilogram (mg/kg)

A way of expressing dose: milligrams (mg) of a substance per kilogram (kg) of body weight or soil.

Milligrams per liter (mg/l)

A unit of measure: the number of milligrams of one substance in a liter of liquid. One milligram per liter means one milligram of chemical per liter of water, and is essentially equivalent to one **part per million** (ppm) at very low concentrations. Theoretically one mg/l of a substance equals one part per million of the substance multiplied by its **density**.

Monitoring well

(1) A well used to obtain water quality samples or measure groundwater levels. (2) A well drilled to collect groundwater samples for testing to determine the amounts, types, and distribution of contaminants in the groundwater beneath the site. The well enables samples of groundwater to be collected at a specific horizontal and vertical location for chemical analysis. Sometimes soil samples are also collected as the well is being drilled.

National Priorities List (NPL)

The U.S. Environmental Protection Agency's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term **remedial** response using money from a special trust fund (**Superfund**).

New York State Department of Health

Agency within the executive branch of New York State government which: determines potential risk from environmental exposure at hazardous waste sites; conducts health-related community outreach around sites; and reviews remedial actions to assure that public health concerns are addressed.

New York State Department of Law

Agency within the executive branch of New York State government which takes the lead on hazardous waste site litigation. Litigation can involve negotiations and court action with responsible parties to clean up sites; natural resources damage claims, and recovery of remedial costs.

New York State Registry of Inactive Hazardous Waste Disposal Sites

See **Registry of Inactive Hazardous Waste Disposal Sites in New York State**

Non-aqueous phase liquids (NAPL)

Liquids, commonly a mixture of several different chemicals, that are either denser or less dense than water. **Dense NAPL** (DNAPL), such as chlorinated solvents, will sink if it enters groundwater; less dense, or **light NAPL** (LNAPL), such as gasoline, will float on the water table. NAPL in the subsurface can be a persistent source of groundwater contamination due to its low **solubility** and **viscosity**.

Occupational exposure limits

Maximum allowable concentrations of toxic substances in workroom air for workers.

Odor threshold

The lowest concentrations of a substance's **vapor**, in air, that can be smelled. Odor thresholds are highly variable, depending on the individual who breathes the substance and the nature of the substance.

Operable unit

An administrative term used to identify a portion of a site that can be addressed by a distinct investigation and/or cleanup approach. For example, groundwater

contamination at a site may be considered as one operable unit, and soil contamination at the same site may be dealt with as a second operable unit. An operable unit can receive specific investigation, and a particular remedy may be proposed. A **Record of Decision** is prepared for each operable unit.	
Operation and maintenance (O&M)	The period following construction of a **remedy** during which elements of the remedy must be operated and maintained. For example, after a groundwater collection and treatment system is installed (the **remedial construction** phase), operation of the groundwater collection system and treatment of the water would be part of the "Operation and Maintenance" phase of the remedial program. Activities could also include site inspections, groundwater well monitoring and other sampling.
Order on Consent	See **Consent Order**
Organic	(1) In chemistry, any compound containing carbon. (2) Referring to or derived from living organisms.
Organic compounds	Chemicals that contain carbon.
Overburden	The rock and soil in the ground above **bedrock**.
Oxidizer	A material which may cause combustible materials to ignite without the aid of an external ignition source (such as flame) or which, when mixed with combustible materials, increases the rate of burning of these materials.
Part 375	The portion of New York State regulations governing **inactive hazardous waste disposal sites**.
Part 360	New York State landfill regulations, including some regulations related to old landfills that contain hazardous waste.
Particulates	Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions.
Parts per billion (ppb)	The concentration of a substance of air, water or soil. One ppb means that there is one part of a substance for every billion parts of the air, water or soil in which it is measured. One ppb is about one drop of dye in 18,000 gallons of water or about one second in 32 years. One ppb is 1,000 times less than one **part per million**.
Parts per million (ppm)	The concentration of a substance in air, water or soil. One ppm means that there is one part of a substance for every million parts of the water or soil in which it is measured. One ppm is about one drop of dye in 18 gallons of water, about the one inch in 16 miles, or one penny in $10,000.
Parts per trillion (ppt)	The concentration of a substance in air, water or soil. One ppt means that there is one part of a substance for every trillion parts of the water or soil in which it is measured. One ppt is 1,000 times less than one **part per billion**.
PCBs (polychlorinated biphenyls)	A group of toxic, persistent chemicals used in transformers for insulating purposes, in gas pipeline systems as a lubricant, and in some florescent light ballasts. The sale of PCBs was banned by law in 1979, but many old transformers still contain them.
Perchloroethene	See **Tetrachloroethene**
Percolate/	**percolation**

The movement of water through a porous substance such as soil.

Permeable/ permeability — The rate at which liquids pass through soil or other materials in a specified direction. Water moves easily through a "high permeability" soil (such as gravel) and very slowly through a "low permeability" soil (such as clay).

Pesticide — Substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Some pesticides can accumulate in the food chain and/or contaminate the environment if misused.

pH — A measure of the acidity or alkalinity (how basic) of a liquid or solid material. It is related to the number of hydrogen ions in a substance.

Photo ionization detector (PID) — A hand-held instrument used to measure the overall level of **volatile organic compounds** in air.

Piezometer — An instrument used to measure the elevation of the **water table**, i.e. how far below the surface groundwater is located.

Plume — An area of chemicals moving away from its source in a feather-like (hence the name, plume) shape. A plume, for example, can be a column of smoke drifting away from a chimney. An area of dissolved chemicals moving with groundwater is called a "groundwater contaminant plume."

Polychlorinated biphenyls — See **PCBs**

Polycyclic aromatic hydrocarbons (PAHs) — See **polynuclear aromatic hydrocarbons**

Polynuclear aromatic hydro-carbons (PAHs) — A group of over 100 different chemicals that form during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture con-taining two or more of these compounds, such as soot. Some PAHs are manufactured. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides. Most do not dissolve easily in water and stick tightly to soil particles.

Porosity — The percentage of the total volume of a given body of rock that is pore space. It is the portion of void (air) space in rock, soil, or sediment.

Potable — Drinkable.

Potentially responsible party (PRP) — Persons identified by the EPA under **CERCLA** or by New York State law as being responsible for the contamination at a hazardous waste site. By law, PRPs may be generators, present or former owners or operators of a site, or transporters of the hazardous substances.

PRAP — See **Proposed Remedial Action Plan**

Precipitation — (1) Rain or snow. (2) Removal of solids from liquid waste so that the hazardous solid portion can be disposed of safely.

Preliminary site assessment (PSA) — A PSA is the **Division of Environmental Remediation**'s first investigation of a site. A PSA is performed to determine if a site meets New York State's definition of an **inactive hazardous waste disposal site** by confirming the presence of hazardous

waste and determining if the site poses a significant	threat to public health or the environment.
Presumptive remedy	Cleanup technique(s) that can be applied to hazardous waste sites with common characteristics. For example, old municipal landfills built without a liner often have similar characteristics. The presumptive remedy for these sites is a cover system.
Project manager	A DEC staff member within the **Division of Environmental Remediation** (usually an engineer, geologist, or hydrogeologist) responsible for the **remedial program** at a hazardous waste site. The project manager works with the Division of Public Affairs and Education as well as fiscal and legal staff to accomplish site-related goals and objectives.
Proposed Remedial Action Plan (PRAP)	A document outlining alternatives considered by the Division of Environmental Remediation for the **remediation** of a hazardous waste site and highlighting the alternative preferred by DEC. The PRAP is based on information developed during the site's **Remedial Investigation** and **Feasibility Study**. The PRAP is reviewed by the public and other state agencies.
Public hearing	A formal hearing at which the public has the opportunity to submit comments and testimony on proposed actions for the public record.
Public meeting	A scheduled gathering of DEC staff and the public to give and receive information, ask questions and discuss concerns.
Publicly owned treatment works (POTW)	A wastewater system, owned by a municipality, state, or tribe that is used for the collection, treatment, and/or disposal of sewage. Usually POTW refers specifically to the sewage treatment plant.
Pump and treat	A method used to collect and treat contaminated groundwater. Typically, groundwater is collected in a well or trench and pumped to a treatment system
Quality assurance (QA)/ quality control (QC)	A system of procedures, checks, audits, and corrective actions to ensure that environmental sampling and testing are of the highest achievable quality.
Reactivity	The ability of a substances to undergo change, usually by combining with another substance or by breaking down. Certain conditions, such as heat and light, may cause a substance to become more reactive. Highly reactive substances may explode.
Real-time monitoring	During construction or investigation activities, continuous monitoring of air with equipment that gives immediate read-outs; that is, samples don't need to be sent to a laboratory to obtain results.
Recharge	The replenishment of **groundwater** by infiltration of rain and snow through the soil.
Reclassification	A process by which the Division of Environmental Remediation redefines the threat posed by a hazardous waste site to public health and the environment by developing and assessing site information and, based on findings and conclusions, assigning the site a new classification code (see **Site Classification**).
Record of decision (ROD)	A document which provides the definitive record of the cleanup alternative that will be used to **remediate** a hazardous waste site. The ROD is based on the **Remedial Investigation / Feasibility Study** and public comment.
Registry of	**Inactive Hazardous Waste Disposal Sites in New York State**

Often referred to as "the Registry," this is a compilation of all known and suspected hazardous waste sites (meeting certain criteria) in New York State. The Registry is compiled in a series of documents published every spring and can be purchased by the public. The document included a one page description and map of each site.

Remedial/ remediate/ remediation

Refers to any procedures or strategies used to address a hazardous waste site. For example, a Remedial Investigation determines what areas of a site need to be addressed (cleaned up or remediated), a **proposed remedial action plan** describes remedial actions (cleanup methods or corrective actions) that have been recommended for a specific site; remediation of a site could include removing contaminated soil.

Remedial action (RA)

Action taken to remove, destroy, reduce, or prevent the spread of contamination at a hazardous waste site.

Remedial alternatives report (RAR)

In New York State's **Brownfield** program, a RAR is the equivalent of a **feasibility study**.

Remedial construction

The physical development, assembly and implementation of the alternative selected to **remediate** a site. For example, remedial construction could include installing a groundwater collection and treatment system. Construction follows a **remedial design** stage.

Remedial design (RD)

The process following finalization of a **Record of Decision** in which plans and specifications are developed for the implementation of the alternative selected to remediate (clean up) a site.

Remedial investigation (RI)

Studies designed to gather the data necessary to determine the type (nature) and extent (location) of contamination at a **hazardous waste site.** The RI is usually performed at the same time as a **Feasibility Study** in a process known as the "RI/FS." This process is designed to:

- Establish criteria for cleaning up the site.
- Identify and screen cleanup alternatives for remedial action; and
- Analyze in detail the technology and costs of the alternatives.

Remedial program

DEC's efforts to investigate and clean up **inactive hazardous waste disposal sites**. A remedial program is designed to correct or "cure"(remedy) releases or potential releases of hazardous materials into the environment. DEC takes several steps as part of each site's remedial program: it investigates contamination (**Remedial Investigation**), analyzes different methods to address threats posed by the site (**Feasibility Study**), proposes a cleanup plan (**Proposed Remedial Action Plan**), selects a final plan (**Record of Decision**), and designs and implements the plan (**Remedial Design** and **Remedial Construction**).

Remediation

See **remedial**

Remedy

Actions taken to prevent or mitigate the release of hazardous materials into the environment at **hazardous waste sites** and **brownfield** sites. The word "remedy" is used in the sense of a "cure" or "corrective action."

Removal action

Often less burdensome and extensive than **remedial actions**, a removal action is

intended to be a quick, temporary response to a release or the threat of release of a hazardous	material at a hazardous waste site. A removal action could involve removing drums of hazardous material, contaminated soil or contaminated sediment and taking these items to a proper disposal facility.
Residual / residue	The quantity of a substance, its degradation products, and/or its metabolites remaining on or in the soil or groundwater. "Residual contamination" usually refers to low levels of chemicals that may be left in soil, bedrock or groundwater after cleanup of hazardous wastes.
Resource Conservation and Recovery Act (RCRA)	Federal law governing the treatment, storage, handling, disposal, and overall management of solid and hazardous wastes.
Responsible parties	See **Potentially responsible parties**
Responsiveness summary	A formal or informal written summary and response by the DEC to public questions and comments. A responsiveness summary is prepared following a public meeting about a **Proposed Remedial Action Plan** and may also be prepared after other public meetings. The responsiveness summary may list and respond to each question, or summarize and respond to questions in categories.
Reverse osmosis	A type of pressurized filtration system in which water is forced through a semipermeable membrane that allows the passage of water but restricts many contaminants.
Risk **Risk assessment**	The chance of an injury, illness, or death caused by exposure to a hazard. The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health and/or the environment by the presence or potential presence and/or use of specific pollutants.
ROD	See **Record of Decision**
Sampling	Small amounts of air, water, or soil are obtained and tested to determine the levels of different hazardous chemicals contained in them.
Sanitary landfill	See **Landfill**
Saturated zone	A subsurface area in which all pores and cracks in rock and/or soil are filled with water.
Scrubber	A device for removing unwanted gases or particles from an air stream by spraying the air with liquid (usually water) or forcing air through a series of baths. Scrubbers are often put on smoke stacks.
Sediment	Soil, sand, and minerals washed by rain from land into water that accumulates on the bottom of ditches, streams, rivers and lakes.
Selected alternative	(1) The cleanup alternative selected by the state as the most feasible. (2) The cleanup alternative selected for a site on the **National Priorities List** based on technical feasibility, permanence, reliability, and cost.
Semi-volatile organic compounds (SVOCs)	Chemicals similar to **volatile organic compounds** but that do not evaporate as readily. **Polynucleated aromatic hydrocarbons** are semi-volatile compounds.

Site classification

DEC assigns **inactive hazardous waste disposal sites** classifications established by state law, as follows:

- Class1 - A site causing or presenting an imminent danger of causing irreversible or irreparable damage to the public health or environment - immediate action required.
- Class 2 - A site posing a significant threat to the public health or environment - action required.
- Class 2a - A temporary classification for a site that has inadequate and/or insufficient data for inclusion in any of the other classes.
- Class 3 - Site does not present a significant threat to the public health or the environment - action may be deferred.
- Class 4 - A site which has been properly closed - requires continued management.
- Class 5 - A site which has been properly closed, with no evidence of present or potential adverse impact - no further action required.

Site Investigation/ Remedial Alternatives Report (SI/RAR)

In New York's **Brownfield** program, this is the equivalent of a **Remedial Investigation / Feasibility Study** report. The site investigation is similar to a Remedial Investigation, and the Remedial Alternatives Report is similar to a Feasibility Study.

Sludge

A semi-solid residue from any of a number of industrial processes or air or water treatment processes. Sludge can be a hazardous waste.

Slurry

A watery mixture that does not contain a significant amount of dissolved materials.

Slurry Wall

An underground wall designed to stop groundwater flow; constructed by digging a trench and backfilling it with a **slurry** rich in bentonite clay.

Soil boring

A circular hole made in the ground by an auger or mechanical drill rig to collect soil samples deep in the ground. Representative samples are collected for testing to see if the subsoil has been contaminated. Sometimes these borings are converted into groundwater monitoring wells.

Soil gas

Air in the spaces between soil particles. Contaminants can be trapped in this air.

Soil gas survey

A method for investigating underground distributions of **volatile organic compounds** (VOCs) by looking for their vapors in the shallow **soil gas**. A small amount of soil gas is pumped out of the ground through a hollow probe driven into the ground and tested for the presence of contaminants. The presence of VOCs in shallow soil gas indicates the VOCs may be in the unsaturated (dry) soil or in the groundwater below the probe. This survey is used to trace the outline of a groundwater contaminant **plume** and help determine the best location to install groundwater monitoring wells.

Soil Vapor Extraction System (SVE)

An **in-situ** remediation technique that applies a vacuum to a series of wells ("vapor extraction wells") and induces air flow through contaminated soil. As the air migrates through the soil, **volatile organic compounds** (VOCs) volatilize (evaporate) and move with the air to the extraction wells where they are removed from the subsurface. If the concentration of VOCs in the extracted air is high, the air maybe treated by a carbon adsorption system before being released to the atmosphere. In some cases, **dual phase vacuum extraction** is used to treat both groundwater and the overlying soil.

Solid waste

Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex, and sometimes hazardous, substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues.

Solubility	The amount of a substance that can be dissolved in water or (sometimes) another substance.
Solvent	A substance (usually a liquid) capable of dissolving one or more other substances. For example, paint remover is a paint solvent.
Sorb	To take up and hold by either **adsorption** or absorption.
Source area	An area from which groundwater contamination is believed to originate. For example, Company A spilled a 55 gallon drum of **trichloroethene** (TCE) onto the ground near a loading dock at their facility. The TCE spread through the soil and contaminated groundwater around the facility. Because the contamination originated in the loading dock area, this area is the "source area." Over time, the highly concentrated TCE in the source area would continue to slowly spread through groundwater and soil, acting as a continuous "source" of groundwater contamination.
SPDES permit (pronounced **SPEEDIES**)	See **State Pollution Discharge Elimination System**
Split samples	A soil sample from a hazardous waste site that is divided between the **potentially responsible parties (PRPs)** and the DEC or the Health Department. It functions as a system of checks and balances since both the PRPs and the DEC analyze their half of the sample. The results of the two analyses can then be compared.
Split-spoon Sample	A sample of **unconsolidated** material taken by driving a sampling device (split spoon) into the soil ahead of a drill bit in a **soil boring**. A split-spoon sampler is typically driven into the soil by repeatedly dropping a weight.
Standards, criteria and guidance values	Values that indicate acceptable or normal levels of various contaminants in the environment. These values are used to establish cleanup goals at hazardous waste sites. Depending on the chemical, the values are developed by the U.S. Environmental Protection Agency, DEC and/or the New York State Department of Health.
State assistance contract (SAC)	In DEC's **brownfield** program, the official agreement between a municipality and the state that outlines both party's responsibility for a brownfield investigation and/or cleanup.
State Pollution Discharge Elimination System (SPDES) permit	A permit issued by the DEC as part of the SPDES program, which is designed to maintain New York's waters with reasonable standards of purity. State law requires a SPDES permit before construction or use of an outlet or discharge pipe for wastewater discharging into **surface water** or **groundwater**, and for construction or operation of disposal systems such as sewage treatment plants.
Sump	A pit or tank that catches liquid runoff for drainage or disposal.
Superfund	Federal and state programs to investigate and clean up inactive hazardous waste disposal sites. The federal program gives the U.S. Environmental Protection Agency the funding and authority to investigate, rank and conduct or supervise cleanup of sites on the **National Priority List**. New York State's program gives the DEC the same authority to deal with sites that do not qualify for the federal superfund list, but meet certain other qualifications.
Superfund	**Amendments and Reauthorization Act (SARA)**

Modifications to **CERCLA** enacted in 1986. Sometimes referred to as the "Right to Know Law," it requires, among other things, that industry provide the government with information on the use and release of certain chemicals into the environment. This information is then made available to the public.	
Surface water	All water naturally open to the atmosphere. Refers to water in rivers, lakes, reservoirs, streams, impoundments, seas, estuaries, and so on.
Swale	A slight depression, sometimes swampy, in the midst of generally level land.
Technical and Administrative Guidance Memorandum (TAGM)	An official internal **Division of Environmental Remediation** document that outlines divisional policies or recommended guidance for topics such as determining cleanup goals at **hazardous waste sites**.
Technical Assistance Grant Program (TAG Program)	A federal grant program that provides funds for qualified citizens' groups to hire independent technical advisors to help them understand and comment on technical decisions relating to federal **Superfund** cleanup actions.
Technical and Operational Guidance Series (TOGs)	DEC Division of Water's documents listing water quality standards and guidance values.
Terraprobe	A van-mounted, **hydraulically**-operated earth probe that pushes or hammers rods and specialized rod tips into soil. It is used to obtain samples of soil gas, soil, and groundwater relatively rapidly and in tight quarters.
Test pit	A small excavation at a hazardous waste site. Investigators dig test pits to get an idea of subsurface conditions at hazardous waste sites.
Tetrachloroethene (Perchloroethene)	A clear, colorless, non-flammable liquid with a characteristic odor. It is a widely used solvent, especially as a dry cleaning agent and as a **degreaser**.
Threshold	A dose or exposure below which there is no measurable adverse effect.
Title 3 program/ project	Part of New York State's Superfund program whereby the State pays 75 percent of eligible costs for **remediation** of municipally owned hazardous waste sites and the municipality pays 25 percent.
Toxicity	The degree of danger posed by a substance to animal or plant life.
Toxic substances	A chemical or mixture that may present an unreasonable risk of injury to health or the environment.
Toxic Substances Control Act (TSCA) of 1976	A federal law that provides for testing of manufactured substances to determine toxic or otherwise harmful characteristics and regulation of the manufacture, distribution, use, and disposal of regulated substances.
Treatability studies	(1) Tests of potential cleanup technologies conducted in a laboratory. (2) Pilot-scale type tests conducted at hazardous wastes sites to determine if a treatment technology will work for that site's particular set of environmental conditions.
Treatment, storage, and disposal	**facility (TSDF)**

A site where a hazardous substance is treated, stored or disposed of. TSDF	facilities are regulated by EPA and states under the **Resource Conservation and Recovery Act**.
1,1,1-Trichloroethane (1,1,1 TCA)	Colorless, non-flammable, man-made liquid **solvent** used as a **degreaser**, a dry-cleaning agent, and a propellant.
Trichloroethene *or* Trichloroethylene (TCE)	A colorless, man-made liquid used primarily as a solvent for removing grease from metal. It has a variety of other uses such as a dry cleaning solvent and in the production of other chemicals. It generally gets into drinking water by improper waste disposal.
Unconfined aquifer	An **aquifer** in which water is not contained by an **impermeable** layer of rock or soil. The water level in the aquifer may rise or fall according to the volume of water stored, which varies according to seasonal cycles of natural recharge.
Unsaturated zone	The area of soil and rock between the land surface and the **water table**. The spaces between soil particles (pore spaces) in the unsaturated zone contain mostly air, but water occurs there as soil moisture.
Vadose zone	The underground zone between the land surface and the water table; essentially the **unsaturated zone**.
Vapor	The gas given off by a solid or liquid substance at ordinary temperatures.
Vinyl chloride	A colorless gas used in the manufacture of polyvinyl chloride and other resins, and as a chemical intermediate and as an industrial solvent. Vinyl chloride is a **carcinogen**.
Viscosity	The property of a fluid describing its resistance to flow.
Volatile	Description of any substance that evaporates easily.
Volatile organic compounds (VOCs)	Carbon-containing chemicals which readily evaporate (cleaning solvents, gasoline, etc.). Many common industrial chemicals are VOCs, including **trichloroethene**, **1,1,1-trichloroethane**, and **tetrachloroethene**.
Voluntary cleanup agreement	A legal document signed by DEC and another party (volunteer) for investigation and/or cleanup of a contaminated site. The volunteer is a party that is not legally responsible for the waste at a site. In return for cleaning up the site, the volunteer receives a limited liability release for past environmental contamination of the site.
Voluntary cleanup program	A program designed to promote voluntary cleanup of contaminated sites including inactive hazardous waste sites, petroleum contaminated sites and solid waste disposal sites, whereby the volunteer enters into a **Voluntary Cleanup Agreement** with the DEC.
Waste	(1) Unwanted materials left over from a manufacturing process. (2) Refuse from places of human or animal habitation.
Water table	The level of groundwater; the boundary between the **unsaturated zone** and the **saturated zone**. The water-table generally reflects surface topography and varies with changes in land surface elevations.
Wetlands	An area that is regularly saturated by surface water or groundwater. Examples of wetlands include swamps, bogs, fens, marshes, and estuaries.

References

This glossary and list of acronyms was assembled from various EPA sources, in addition to the following:

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This glossary was compiled for DEC by Stacie E. Cornelius, DEC Citizen Participation Office Intern with assistance from Region 8 Citizen Participation staff. November, 1998.

ATTACHMENT E3

REMEDIATION PROGRAM ACRONYMS

Guide to Environmental Acronyms

This list of acronyms includes abbreviations for agency names, chemicals, units of measure, and various documents and technical terms used by the NYSDEC Department of Environmental Remediation.

AG	Attorney General
AOC	Area of Concern
ARARs	Applicable or Relevant and Appropriate Requirements
AST	Above-Ground Storage Tank
ATSDR	Agency for Toxic Substances and Disease Registry *(Federal)*
C&D	Construction & Demolition
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980 *(Federal)*
CO	Consent Order
COC(s)	Contaminant(s) of Concern
CP	Citizen Participation
CPP	Citizen Participation Plan
CPS	Citizen Participation Specialist
DDT	Dichloro-diphenyltrichloroethane (pesticide)
DEC	Department of Environmental Conservation *(New York State)*
DEE	Division of Environmental Enforcement (*within DEC*)
DEP	Division of Environmental Permits *(within DEC)*
DER	Division of Environmental Remediation *(within DEC)*
DNAPL	Dense Non-Aqueous Phase Liquid
DOD	Department of Defense*(Federal)*
DOH	Department of Health *(New York State)*
DOL	Department of Law *(New York State)*
DOW	Division of Water *(within DEC)*
EIS	Environmental Impact Statement
ENB	Environmental Notice Bulletin
EPA	United States Environmental Protection Agency
EQBA	1986 Environmental Quality Bond Act *(New York State "Superfund")*
ESD	Explanation of Significant Differences *(DEC document)*
F&W	Division of Fish & Wildlife *(within DEC)*
FOIA	Freedom of Information Act *(Federal)*
FOIL	Freedom of Information Law *(New York State)*
FS	Feasibility Study
FSF	Federal Superfund
FY	Fiscal Year
GPM	Gallons Per Minute
HDPE	High Density Polyurethane (plastic)
HRS	Hazard Ranking System
IIWA	Immediate Investigation Work Assignment
IRM	Interim Remedial Measure
LEL	Lowest Effect Level
LNAPL	Light Non-aqueous Phase Liquid
mg/kg	Milligrams per Kilogram
MW	Monitoring Well

NAPL	Non-Aqueous Phase Liquid
ND	Non-detect (not detected)
NIOSH	National Institutes of Occupational Safety and Health
NPL	National Priorities List
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation & Maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PAH	Polynucleated Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PCE	Perchloroethene (Tetrachloroethene)
PID	Photoionization Detector
POTW	Publicly Owned Treatment Works
ppb	Parts per Billion
ppm	Parts per Million
ppt	Parts per Trillion
PRAP	Proposed Remedial Action Plan *(DEC document)*
PRP	Potentially Responsible Party
PRS	Priority Ranking System
PSA	Preliminary Site Assessment
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RAR	Remedial Alternatives Report
RCRA	Resource Conservation and Recovery Act *(Federal)*
RD	Remedial Design
RHWRE	Regional Hazardous Waste Remediation Engineer
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision *(DEC document)*
RP	Responsible Party
SAC	State Assistance Contract
SARA	Superfund Amendments and Reauthorization Act
SCGs	Standards, Criteria and Guidance Values
SI	Site Investigation
SI/RAR	Site Investigation/Remedial Alternatives Report
SPDES	State Pollution Discharge Elimination System
SSMB	State Superfund Management Board
SVOCs	Semi-volatile Organic Compounds
2,4,5-T	2,4,5-trichlorophenoxyacetic acid (pesticide)
TAG	Technical Assistance Grant *(Federal)*
TAGM	Technical and Administrative Guidance Memorandum *(DEC)*
TCA	Trichloroethane
TCE	Trichloroethene or Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TLV	Threshold Limit Value
TOGS	Technical and Operational Guidance series *(DEC)*

TSCA	Toxic Substances Control Act *(Federal)*
TSDF	Treatment, Storage and Disposal Facility
TWA	Time-weighted Average
ug/l	Micrograms per Liter
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

APPENDIX F

SUB-AREAS G&E IN-SITU TREATMENT PLAN

JUL 3 1 2006

New York State Department of Environmental Conservation
Regional Engineer, Region 9
270 Michigan Avenue, Buffalo, New York, 14203-2999
Phone: (716) 851-7070 • **FAX:** (716) 851-7009
Website: www.dec.state.ny.us

Denise M. Sheehan
Commissioner

July 28, 2006

Mr. Paul H. Werthman, P.E.
Steelfields LTD/Turnkey Environmental Restoration, LLC
726 Exchange Street
Suite 624
Buffalo, New York 14210

Dear Mr. Werthman:

This is in response to the July 27 letter from Mr. Walter Meisner to Mr. Maurice Moore of my staff. The letter confirms their discussions earlier this week concerning the remediation strategy to be used for Subareas G & E on Area IV of the current Steelfields property.

As described in the letter, we agree that the use of oxygen release compounds (ORC) is an appropriate technology to address the remaining contamination in that area. As suggested in the letter, a description of this work and of the continued monitoring of the results should be incorporated into the Hydro Air's Long-Term Groundwater Monitoring Plan.

Finally, we agree that as long as the treatment system is installed and continues to be monitored as described, it will not affect the issuance of the Certificate of Completion to Hydro Air. Please feel free to call me if you have additional questions or comments.

Sincerely,

Daniel R. David, P.E.
Regional Engineer for
Environmental Quality

July 27, 2006

Mr. Maurice Moore
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 9
270 Michigan Avenue
Buffalo, NY 14203-2999

Re: Steelfields Area IV, Subareas G & E - Proposed In-Situ Treatment of Residual Soil & Groundwater

Dear Mr. Moore:

I have prepared this correspondence to document our preliminary discussions and proposed approach to complete remediation of Subareas G & E within Area IV at the above-referenced site. As you are aware, excavation of tar-impacted soil/fill within Area IV is substantially complete with all sidewall and most floor verification sampling results meeting SSALs. The only exceptions are three floor samples from Subareas G & E that exhibit benzene, toluene and xylene (BTEX) in the native lacustrine silty-clay soils on the bottom of the excavations. The analytical results are attached (Sample A4-TAR E- FLOOR- W/S is mislabeled by the lab and should be A4- TAR G- FLOOR-W/S) as is Figure 1 showing the approximate locations where the samples were collected. The SSALs for these BTEX parameters are 1.0 mg/kg for each compound. All other parameters in the native soil at the base of the excavations meet SSALs. We are also awaiting analytical results for two additional floor samples in Subareas C & D.

The native soils in the bottom of the excavation were overlain by approximately 12-28 inches of sandy silt deposits that contained high concentrations of BTEX and were just recently excavated for treatment and disposal. The (now removed) sandy silt deposits are believed to be beach deposits that are not contiguous or laterally extensive. Apparently benzene from the overlying blue-stained fill deposits in Subarea G Area III had penetrated the sandy silt native soils and migrated laterally into Area IV.

Continued verification sampling and excavation of the subgrade native soil/fill with such low residual BTEX concentrations is impractical and is significantly delaying backfilling operations. Given the relatively low concentrations of benzene in subgrade native silty-clay soils, and the susceptibility of benzene to natural aerobic biodegradation by indigenous microbes, we propose to use oxygen release compounds (ORC®) to enhance the natural biodegradation process. More specifically, we propose to apply the ORC at these locations following backfill placement by installing three-inch diameter in-situ treatment wells with 5-foot screens that will extend to a depth approximately 24-inches into the native soils. One such in-situ treatment well would be installed by Steelfields in the general vicinity of each of the above-referenced floor sample locations that exceeded SSALs (i.e. minimum of three). ORC "socks" will be suspended in each of the wells to slowly release oxygen to the shallow water column

and saturated soils. Attached Figure 1 shows the proposed locations of ORC in-situ treatment wells. Attached Figure 2 illustrates the proposed in-situ treatment well construction details. For clarity and consistency, it may be advisable to incorporate this in-situ treatment task into Section 3.0 of the HydroAir BCP Work Plan.

This proposed in-situ treatment process, similar to that employed by Steelfields in Subareas D, K & L of Area 1 and planned to be installed by Steelfields in Subareas G & H of Area III, is expected to eventually achieve SSALs in Area IV native soils. Due to the relatively low contaminant concentrations and depth below grade of the native soils (i.e. 6-8 feet), they are not expected to have any material impact on future site use and related exposure potential. We propose that Hydro Air monitor the progress of in-situ treatment through measurement of dissolved oxygen, pH, ORP, temperature, alkalinity and water levels in the additional wells proposed herein at the same frequency as sampling and analysis is planned in the perimeter groundwater quality monitoring wells as specified in Hydro Air's Long-Term Groundwater Monitoring Plan (See Appendix C to the BCP Work Plan). No additional base soil verification samples beyond those already analyzed will be collected in Area IV. Again, for clarity and consistency, it may be advisable to incorporate the monitoring and reporting of this in-situ treatment task into Hydro Air's Long-Term Groundwater Monitoring Plan.

Finally, we assume if this proposal is deemed acceptable by your Department that, following the installation of the in-situ treatment wells and ORC socks, the issuance of Hydro Air's Certificate of Completion by the Department will not be delayed as a result of this additional remediation task.

Please contact us if you have any questions or wish to discuss details further.

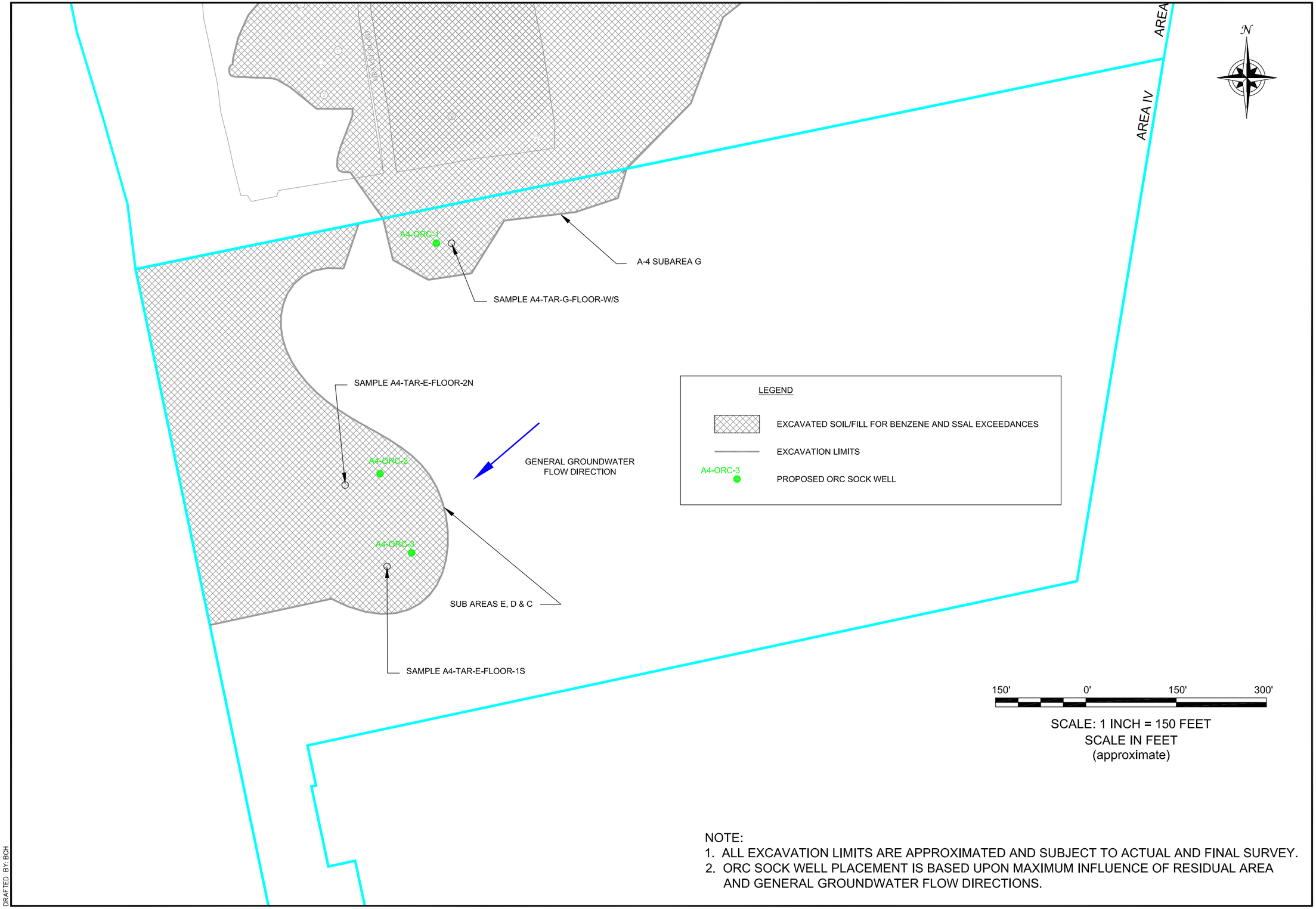
Sincerely,
TurnKey Environmental Restoration, LLC

Walter Meisner, P.E.
Resident Engineer

C: 0062-008-404

NYSDEC/ Buffalo- James Tuck
Steelfields- G. Smith, R. Palumbo
Hydro Air- K. Koch
Hiscock & Barclay- T. Warth, E. Daniels
Modern- J. Plewniak

F:\CAD\Benchmark\Hydro-Air\RD Work Plan\Appendix F- Subareas G&E In-Situ Treatment Plan\Figure F-1- ORC Sock Well Location Map.dwg



NOTE:
1. ALL EXCAVATION LIMITS ARE APPROXIMATED AND SUBJECT TO ACTUAL AND FINAL SURVEY.
2. ORC SOCK WELL PLACEMENT IS BASED UPON MAXIMUM INFLUENCE OF RESIDUAL AREA AND GENERAL GROUNDWATER FLOW DIRECTIONS.

DATE: AUGUST 2006
DRAFTED BY: BCH

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BUFFALO, NEW YORK 14210
(716) 856-0599
BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

JOB NO.: 0107-001-100

ORC SOCK WELL LOCATION MAP

APPENDIX F - SUBAREAS G&E IN-SITU TREATMENT PLAN

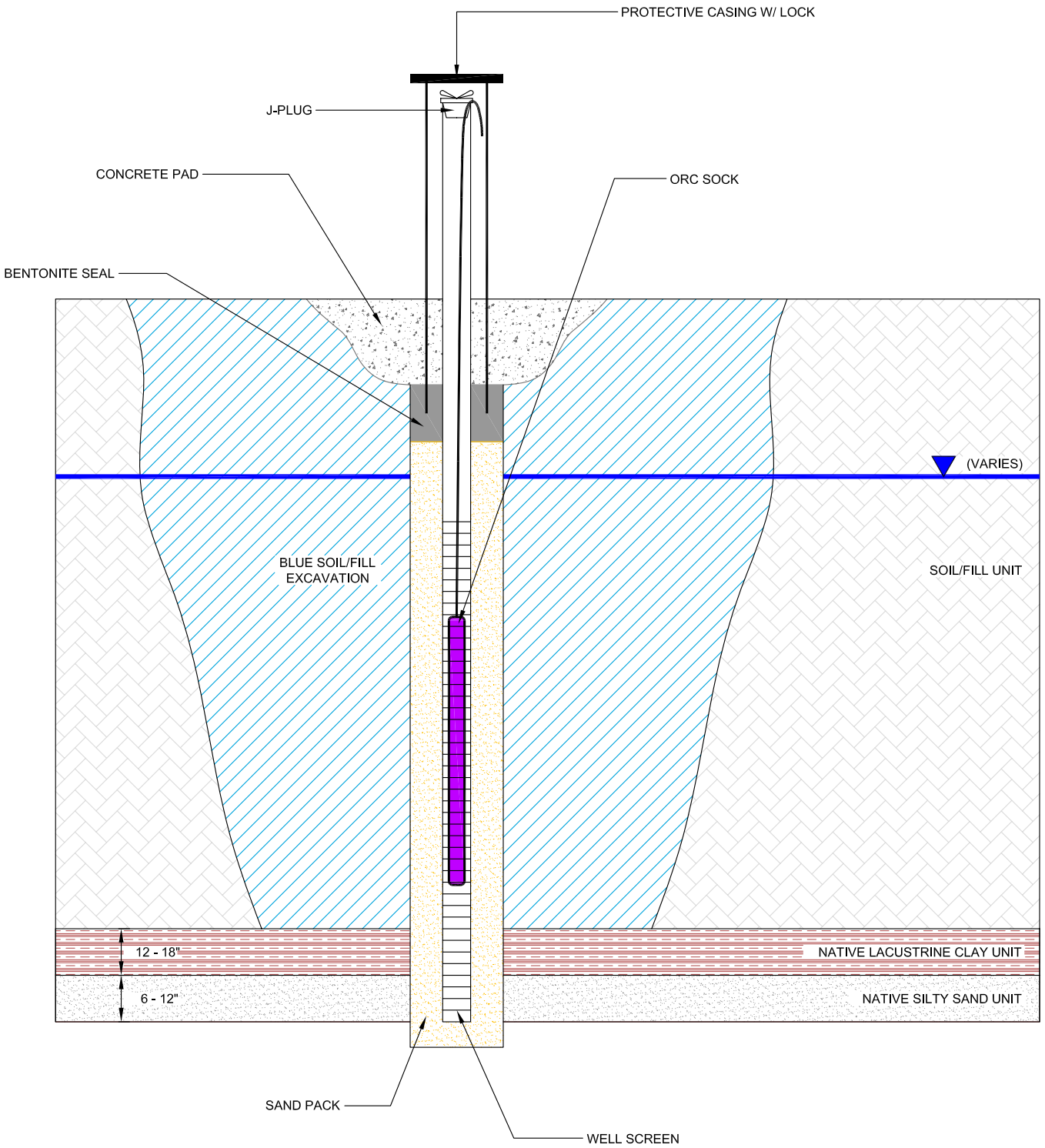
STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.

FIGURE F-1

FIGURE F-2

F:\CAD\Benchmark\Hydro-Air\RD Work Plan\Appendix F; Subareas G&E In-Situ Treatment Plan\Figure F-2; ORC Sock Well Detail.dwg



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PROJECT NO.: 0107-001-100

DATE: AUGUST 2006

DRAFTED BY: BCH

ORC SOCK WELL DETAIL

APPENDIX F - SUBAREAS G&E IN-SITU TREATMENT PLAN

STEELFIELDS AREA IV SITE
BUFFALO, NEW YORK

PREPARED FOR
HYDRO-AIR COMPONENTS, INC.