PROPOSED REMEDIAL ACTION PLAN

Haz-O-Waste (Northeast Environmental Services)
State Superfund Project
Wampsville, Madison County
Site No. 727003
February 2012

Prepared by
Division of Environmental Remediation
New York State Department of Environmental Conservation

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; (6 NYCRR) Part 375. This document is a summary of the information that can be found in the site-related reports and documents in the document repositories identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repositories:

Canastota Public Library
Attn: Liz Metzger
102 West Center Street
Canastota, NY 13032
Phone: 315-697-7030

NYSDEC Region 7
Attn: Carl Cuipylo
615 Erie Blvd West
Syracuse, NY 13204
Phone: 315-426-7525

A public comment period has been set from:

02/14/2012 to 03/16/2012

A public meeting is scheduled for the following date:

03/01/2012 at 5:00 PM

Public meeting location:

County Office Building, Board of Supervisors Meeting Room
138 N Court Street, Wampsville, NY 13163

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent through 3/16/2012 to:

Carl Cuipylo
NYS Department of Environmental Conservation
Division of Environmental Remediation
615 Erie Blvd W
Syracuse, NY 13204
cscuipyl@gw.dec.state.ny.us

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP based on new information or public comments. Therefore, the public is encouraged to review and comment on the proposed remedy identified herein. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program,

Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Former Haz-O-Waste site is located at 4123 Canal Road, in the town of Lenox, Madison County, New York.

Site Features: The site consists of four tax parcels totaling 11.98 acres. The main building is located on 3.6 acres. The combined property is bordered by farmland to the north, east, and west. Canal Road forms the southern border. The Old Erie Canal is located south of Canal Road. The on-site building is a single-story block and steel structure, and is situated on a soil-supported concrete slab. The building occupies the southeastern side of the property parcel. The site was developed in 1976 and originally consisted of a single-story concrete block building. A larger steel structure was subsequently constructed around the block building at a later date.

Current Zoning/ Use: The site is currently inactive/vacant, and is zoned for commercial use. The surrounding land is undeveloped and primarily used for agriculture. The nearest residential areas are approximately 0.5 miles to the east or west on Canal Road.

Historic Use: The site was a permitted RCRA Treatment, Storage and Disposal Facility (TSDF) which operated from the late 1970s until 2001 and treated various wastes including laboratory chemicals, industrial solvents, paint and ink residue and many other wastes prior to their off-site disposal. These wastes were frequently spilled during the course of the TSDF's operation, contaminating the site's soil and groundwater with solvents and other organic wastes. Soil vapor extraction and groundwater treatment systems were installed to address site contamination. By 2001, the TSDF had accumulated 1200 drums of hazardous wastes, many of which were bulging and leaking and in danger of igniting. According to the United States Environmental Protection Agency (USEPA) Region 2 Fact Sheet, approximately 1,179 drums and 13 tanks were removed from the container storage area, which included more than 13,000 gal of non-hazardous flammable liquids, waste inks, oxidizers, peroxides, corrosives, and waste pesticides.
In that same year the NYSDEC issued a Summary Abatement Order and the State Supreme Court ordered the TSDF's closure. In January 2002 the NYSDEC revoked the TSDF's Part 373 Hazardous Waste Management Facility permit. This site is subject to RCRA corrective action and closure requirements.

Trespass and vandalism have been documented at the site, including the emptying of a partially full diesel fuel tank from one of the abandoned trucks onsite, which required an immediate corrective action in July 2009 (Spill No.0903505).

Site Geology and Hydrogeology: Based on historical data, the geologic materials in the upper 30 -35 feet across the site are generally composed of a reddish-brown to reddish-gray fine sand and silt. This unit becomes somewhat coarser and less silty with depth. Lenses of fine to medium sand, and occasionally gravel have been identified within the fine sand unit. These lenses appear to be interconnected to some degree, but are structurally complex. Immediately underlying the

upper fine sand and silt unit is a layer of compact till. Shallow groundwater flow is in a north-northwest direction.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) are/is being evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The PRPs for the site, documented to date, include:

Environmental Services of America Inc.

Millenium Environmental Inc

ERD Environmental Inc

Haz-O-Waste Corporation

ERD Waste Corporation

The PRPs for the site declined to implement a remedial program when requested by the Department. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the Department will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Information

The analytical data collected on this site includes data for:

- groundwater
- soil

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

1,1-DICHLOROETHANE
TOLUENE

TRICHLOROETHENE (TCE)
TETRACHLOROETHYLENE (PCE)
1,2-DICHLOROETHANE
1,1,2-TRICHLOROETHANE
ACETONE
BENZENE
CHLOROBENZENE
CHLOROFORM
DICHLORODIFLUOROMETHANE
1,1,1-TRICHLOROETHANE
1,1,2 TCA
1,1,2-TRICHLORO-1,2,2-TRIFLOUROETHANE
1,1,2,2-TETRACHLOROETHANE
1,2-DICHLOROBENZENE
1,2,4-TMB
MEK
CARBON DISULFIDE
CHLOROETHENE
CYCLOHEXANE
ETHYLBENZENE
CUMENE
METHYLENE CHLORIDE
METHYL-TERT-BUTYL ETHER (MTBE)
TETRACHLOROETHANE
TRICHLOROMONOFLUOROMETHANE
VINYL CHLORIDE
XYLENE (MIXED)
DICHLOROETHYLENE

As illustrated in Exhibit A, the contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

There were no IRMs performed at this site during the RI.

6.3: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

People are not drinking the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. This site is completely fenced, however, persons could contact contaminants on-site if they dig below the ground surface. Volatile organic compounds in groundwater or soil may move into the soil vapor (airspaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface in the indoor air of buildings, is referred to as soil vapor intrusion. Given the current use of the site (vacant) and surrounding properties, the inhalation of site-related contaminants due to soil vapor intrusion does not represent a current concern.

6.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OU 01.

Nature and Extent of Contamination:

The contaminants of concern in groundwater are Volatile Organic Compounds (VOCs) including: 1,1,1-trichloroethane (TCA), 1,1,2-trichlorotriflouroethane, cis-1,2-dichloroethene (cis-1,2-DCE) and trichloroethene. The depth of the contaminant plume ranges from 5 to 35 ft below ground surface. The highest VOC concentrations were found in wells located beneath the building. Concentrations of 1,1,1-trichloroethane (TCA) (Non-detect(ND) - 17,600 ppb) significantly exceed groundwater standards (5ppb), concentrations of 1,1,2-trichlorotriflouroethane (non-detect (ND)- 130 ppb) exceed groundwater standards (1 ppb), concentrations of cis-1,2-dichloroethene (cis-1,2-DCE) (Non-detect (ND) – 59,100 ppb) significantly exceed groundwater standards (5ppb), and concentrations of trichloroethene and its associated degradation products (up to 5,500 ppb) all exceed their respective groundwater standards (5 ppb).

The contaminants of concern in soil are: tetrachloroethene and trichloroethene which are both VOCs. The soil samples which exceeded SCOs were found in the 0-5 ft depth interval. The concentrations of VOCs detected in sub-surface soil generally declined with depth, which indicates slow or limited downward contaminant migration. Some tetrachloroethene concentrations (up to 190 ppm) exceed the soil cleanup objective (SCO) for commercial (150 ppm) and unrestricted use (1.3 ppm), one trichloroethene soil sample concentration (220 ppm) exceeds the soil cleanup objective (SCO) for commercial use (200 ppm) and unrestricted use (0.47 ppm).

Metals were detected in groundwater at levels consistent with concentrations of those found naturally occurring in similar glacial outwash and lake bed sedimentation. Additionally, metals were not known to have been stored in a releasable form onsite during operations and are not considered a chemical of concern. SVOCs were rarely detected at any significant levels and are not considered a chemical of concern. PCBs were not detected in groundwater or soil at the site.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

To be selected, the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the FS report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's proposed remedy is set forth at Exhibit D.

The estimated present worth cost to implement the remedy is $6,500,000. The cost to construct the remedy is estimated to be $5,600,000 and the estimated average annual cost is $100,000.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;
•Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
•Reducing direct and indirect greenhouse gas and other emissions;
•Increasing energy efficiency and minimizing use of non-renewable energy;
•Conserving and efficiently managing resources and materials;
•Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
•Maximizing habitat value and creating habitat when possible.
•Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
•Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. The building currently onsite will be demolished and transported offsite for disposal (requires demolition survey to identify potential hazardous materials). It is assumed that hazardous materials (i.e., asbestos and lead) would not be found during building survey. The source area will be temporarily fenced during treatment activities and restricted access to the site with appropriate signs would be in place.

3. In-Situ Thermal Treatment will be implemented to destroy or volatilize volatile organic compounds (VOCs) in the source area. The gases produced by the thermal treatment will be collected by vapor extraction wells and treated in an ex-situ treatment unit. Effluent vapors will be treated by thermal oxidation and scrubbing or adsorption on granular activated carbon.

4. Air sparging will be implemented following the in-situ thermal treatment of soil to address the remainder of the groundwater plume. VOCs will be removed from the groundwater by injecting air into the subsurface. As the injected air rises through the groundwater it volatilizes the VOCs from the groundwater into the injected air. Additional groundwater monitoring wells will be installed downgradient of the source area, and additional vapor monitoring points will be installed in the vicinity of the sparge wells.

5. The operation of the components of the remedy would continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

6. Imposition of an institutional control in the form of an Environmental Easement for the controlled property that:
•requires the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
•allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;

•restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH;
•prohibits agriculture or vegetable gardens on the controlled property; and
•requires compliance with the Department approved Site Management Plan.

7. A Site Management Plan is required, which includes the following:

a. An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: Environmental Easement as discussed in item 4 above.

Engineering Controls: Restricted access to the site and air sparge system.

This plan includes, but may not be limited to:
•descriptions of the provisions of the Environmental Easement including any groundwater use restrictions;
•a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
•provisions for the management and inspection of the identified engineering controls;
•maintaining site access controls and Department notification; and
•the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b. A Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
•monitoring of groundwater to assess the performance and effectiveness of the remedy;
•a schedule of monitoring and frequency of submittals to the Department;
•monitoring for vapor intrusion for any buildings occupied or developed on the site, as may be required by the Institutional and Engineering Control Plan discussed in item one (1), above.

c. An Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:
•compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
•maintaining site access controls and Department notification; and
•providing the Department access to the site and O&M records.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation (RI) for all environmental media that were evaluated. As described in Section 6.1.2, samples were collected from various environmental media to characterize the nature and extent of contamination. Figure 2 depicts groundwater sample results and locations and figure 3 depicts soil sample results and locations.

For each medium, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, Commercial Use SCGs identified in Section 6.1.1 are also presented.

Waste/Source Areas

As described in the RI report, waste/source materials were identified at the site and are impacting groundwater and soil.

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375-1.2 (au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas identified at the site. The site treated various wastes including laboratory chemicals, industrial solvents, paint and ink residue and many other wastes prior to their off-site disposal. During the course of the TSDF's operation these wastes were frequently spilled, contaminating the building surfaces as well as the site's soil and groundwater with solvents and other organic wastes.

Analytical results from the groundwater monitoring events and soil sampling events performed during the Remedial Investigation (RI) and previous investigations reveal that the highest Volatile Organic Compounds (VOCs) concentrations are centered at monitoring wells underneath the building. The concentrations of VOCs detected in sub-surface soil generally declined with depth, which indicated slow or limited downward migration.

Refer to Figure 2 and Figure 3 for a depiction of site features, including the location of the building and delineation of the VOC plume in soil and groundwater respectively.

The waste/source areas identified will be addressed in the remedy selection process.

Groundwater

The shallow groundwater to a depth up to approximately 45 ft has been characterized. Contamination in shallow groundwater at the site exceeds the SCGs for volatile organic compounds (VOCs). The highest VOC concentrations were found in wells located underneath the building. Exceedances of groundwater SCGs were also observed in wells directly north of the building downgradient of the suspected source area. The overall geometry and area distribution of the VOC plume around the former drum staging area is consistent with groundwater flow at the site (Figure 2). The potential for migration to the deeper bedrock groundwater is unlikely due to the lack of VOCs found in deep groundwater (30 to 45 ft bgs). No exposure pathways exist for groundwater at this time. The primary groundwater contaminants are : 1,1-dichloroethane, 1,1,1-trichloroethane

(TCA), 1,1,2-trichlorotriflouroethane, cis-1,2-dichloroethene (cis-1,2-DCE) and trichloroethene, 1,1,2-trichlorotrifluoroethane, vinyl chloride, toluene, acetone and methylene chloride; all associated with operation of the former Treatment Storage and Disposal Facility (TSDF). As note on figure 2, the primary groundwater contamination is concentrated under the hazardous waste storage area and loading dock area under the building. During the course of the TSDF's operation wastes were frequently spilled, contaminating the groundwater with solvents and other organic wastes that are mainly Volatile Organic Compounds (VOCs).

Table No. 1 Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (µg/L)	Frequency Exceeding SCG
1,1-Dichloroethane	ND – 6,680	5	29/66
1,1-Dichloroethene	ND – 5,800	5	8/43
1,1,1-Trichloroethane	ND – 17,600	5	24 /66
1,1,2-Trichloroethane	ND -130	1	10 /50
1,1,2-Trichlorotrifluoroethane	ND – 20,000	5	6 /18
1,2-Dichloroethane	ND -320	0.6	12 /66
1,2-Dichloropropane	ND -54	1	2/43
1,2,4-Trimethylbenzene	ND – 9,000	5	3 /25
1,3,5-Trimethylbenzene	ND – 1,240	5	1 /16
2-Butanone	ND – 830	50	6/43
Acetone	ND – 35,000	50	12 /50
Benzene	ND -240	1	12 /43
Chlorobenzene	ND -27	5	7 /43
Chloroethane	ND -110	5	6 /43
Chloroform	ND – 2,700	7	9/43
cis-1,2-Dichloroethene	ND – 59,100	5	32 /59
Dichlorodifluoromethane	ND -880	5	32 /43
Ethylbenzene	ND – 5,200	5	20/66
Isopropylbenzene	ND – 1,040	5	6 /34
Methylene Chloride	ND – 12,000	5	10 /59
Tetrachloroethene	ND – 1,900	5	13/59
Toluene	ND – 98,700	5	27 /66
trans-1,2-Dichloroethene	ND – 130	5	8 /18
Trichloroethene	ND – 5,500	5	19 /66
Trichlorofluoromethane	ND -20	5	2 /25
Vinyl Chloride	ND – 17,400	2	32/60
m,p-Xylene	ND – 16,00	5	20 /59
σ-Xylene	ND – 5,680	5	8 /34
Xylene, Total	ND – 7,000	5	10 /32

a. ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
b. SCG: Standard Criteria or Guidance – Ambient Water Quality Standards and Guidance values (TOGs 1.1.1), 6 NYCRR Part 703, surface water and groundwater standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5)
Note: ND: Non-detect

Based on the findings of the RI, the past disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: 1,1-dichloroethane, 1,1,1-trichloroethane (TCA), 1,1,2-trichlorotriflouroethane, cis-1,2-dichloroethene (cis-1,2-DCE) and trichloroethene, 1,1,2-trichlorotrifluoroethane, vinyl chloride, toluene, acetone and methylene chloride.

Soil

Surface and subsurface soil samples were collected at the site during the RI. Surface soil samples were collected from a depth of 0-2 inches to assess direct human exposure. Subsurface soil samples were collected from a depth of 2 - 31 feet to assess soil contamination impacts to groundwater. The results indicate that soils at the site exceed the unrestricted use and commercial use SCG for volatile organic compounds.

Concentrations of VOCs detected in soil suggest that a significant source area exists underneath the building and will continue to release COCs to groundwater. A depiction of the source area based on results of the RI is presented in Figure 3. The most significantly impacted soil is concentrated underneath the northern corner of the building. The concentrations of VOCs detected in sub-surface soil generally declined with depth, which indicates slow or limited downward migration.

Table No. 2 Soil

Detected Constituent	Concentration Range Detected (ppm)[a]	Restricted Use SCG[c] (ppm)	Frequency of Exceeding Commercial SCG	Frequency of Exceeding Protection of Groundwater Use SCG[d]	Frequency of Exceeding Unrestricted Use SCG
VOCs					
Acetone	ND -27	500	0/76	0.05	32/76
Chloroform	ND -6.8	350	0/76	0.37	2/76
Ethylbenzene	ND -35	390	0/76	1	19/76
Methylene Chloride	ND -12	500	0/76	0.05	9/76
Toluene	ND -300	500	0/76	0.7	29/76
Xylene (mixed)	ND -122	500	0/76	0.26	35/76
Tetrachloroethene	ND -190	150	1/76	1.3	7/76
Trichloroethene	ND -220	200	1/76	0.47	15/76
Vinyl Chloride	ND -2.4	13	0/76	0.02	19/76
2-Butanone (MEK)	ND -13	500	0/76	0.12	9/76
1,1-Dichloroethane	ND -13	240	0/76	0.27	6/76
1,1-Dichloroethene	ND -280	500	0/76	0.33	3/76
1,1,1-Trichloroethane	ND -320	500	0/76	0.68	9/76
1,2-Dichloroethane	ND -0.11	30	0/76	0.02	2/76
cis-1,2-Dichloroethene	ND -350	500	0/76	0.25	41/76
Trans-1,2-Dichloroethene	ND -2.1	500	0/76	0.19	2/76

a. ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b. SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives
c. SCG: Part 375-6.8(b), Commercial Use Soil Cleanup Objectives for the Protection of Public Health for Commercial Use, unless otherwise noted.
d. SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater

The soil contaminants are Volatile Organic Compounds (VOCs). As noted on Figure 3, the primary soil contamination is associated with the TSDF's operation and releases during the operation within the building.

Based on the findings of the remedial investigation, the past disposal of hazardous waste has resulted in the contamination of soil above the protection of groundwater SCOs. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addresses by the remedy selection process are: tetrachloroethene, trichloroethene, 1,1- dichloroethene, 1,1,1- trichloroethene, cis-1,2-dichloroethene, xylene (mix), acetone and toluene.

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see section 6.5) to address the contaminated media identified at the site as described in Exhibit A. Note that the alternatives described below consider the entire site (groundwater and site soil together) rather than presenting two discrete sets of alternatives for the two medias:

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

Alternative 2: Restoration to Pre-Disposal or Unrestricted Conditions

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil cleanup objectives listed in Part 375-6.8 (a). This alternative would include: the excavation of all soils contaminated at concentrations exceeding unrestricted SCOs, including saturated soils, and off-site disposal at a properly permitted facility. This alternative also includes demolition of the on-site building in order to access contaminated soils beneath the building slab.

The volume of waste and contaminated fill is estimated to be approximately 11,000 cubic yards for underneath the building and discrete areas. Figure 3 shows the approximate location of the excavation area. In the excavation area, contamination extends to a depth of approximately fifteen (15) feet below the building's concrete slab. Following removal of the contaminated soil, the excavation would be backfilled with clean fill from an approved source meeting 375-6 requirements. Prior to placement into the excavations, a fabric would be placed in the excavations to serve as a demarcation between soil left in place and the material used as backfill.

It is expected that it would take approximately one (1) year to design and to implement this alternative. Costs are based on demolition of the on-site building in order to access contaminated soils beneath the building slab, removal and disposal of the concrete slab within the building, soil excavation, backfilling of the excavation, engineering controls related to excavation of saturated soils at approximately 15 to 20 ft deep, a dewatering system on site and the collection of confirmation soil samples. For purposes of estimating cost; this alternative assumes to take approximately 0 years to complete.

Present Worth: $20,000,000
Capital Cost: $20,000,000
Annual Costs (0 years): $0

Alternative 3: In-Situ Soil Mixing, Monitored Natural Attenuation, and Zero-Valent Iron Wall

In-situ soil mixing consists of using a rotary tiller to mix a chemical oxidant with the soil to encourage reactions to breakdown the COCs into less toxic components. While a variety of chemical oxidants are commercially available that can be used at the site, a commonly used, commercially available product was used for costing purposes for the FS. Alternate materials may be selected during the remedial design. If this alternative is selected, bench scale and pilot tests are required to identify the appropriate oxidant for this site.

Natural attenuation with monitoring allows natural processes to achieve site-specific remedial objectives without enhancement or aggressive treatment. The "natural attenuation processes" that are at work in such a remediation approach include physical, chemical, or biological processes, that under favorable conditions, reduce the mass, toxicity, mobility, volume, or concentration of contaminants in the groundwater. Natural attenuation processes that could occur include biodegradation (aerobic or anaerobic), abiotic transformation (e.g., hydrolysis), adsorption, dispersion, or dilution.

A zero-valent iron (ZVI) wall allows water to pass while prohibiting the passage of contaminants. The treatment wall may degrade the contaminants or may remove the contaminants from the plume by binding them to the wall. This helps prevent contaminated water from migrating offsite. This alternative is aimed at treating the contaminated soil in the source area, both saturated and unsaturated, at the site. Once the source is treated, groundwater would be monitored for natural attenuation. Long-term monitoring of groundwater COCs would be conducted to ensure the contamination footprint and contaminant concentrations are stable or decreasing. Additionally, a ZVI wall would be constructed downgradient of the source area to prevent contaminated groundwater from migrating offsite.

This alternative is expected to take approximately 4 months to construct; the iron wall will remain active for approximately 10 years, and monitoring will continue until the Department determines it is no longer needed. For purposes of estimating cost; this alternative is assumed to take approximately 11 years to complete.

Present Worth:.....*$2,108,000*
Capital Cost:.....*$1,900,000*
Annual Costs (11 years): *$25,000*

Alternative 4: In-Situ Soil Mixing of the Source Area and In-Situ Groundwater Plume Treatment

In-situ treatment would be conducted by applying a product to the soil and/or groundwater. The product could be a chemical that reacts with the COCs to degrade them down to a less harmful constituent, or it could be a product that creates a better environment for microbes that consume and breakdown the COCs.

This alternative consists of treatment of soil in the source area through *in-situ* mixing and *in-situ* treatment of the contaminated sub-surface soil and groundwater through product injections. A bench scale study would be conducted to evaluate the effectiveness of enhanced bioremediation versus chemical oxidation for the *in-situ* injection treatment of the subsurface. *In-situ* soil mixing consists of using an auger to mix a chemical oxidant with the soil to encourage reactions to break the COCs into less toxics components. While a variety of chemical oxidants are commercially available that can be used at the site, for the Feasibility Study, a commonly used, commercially available product was used for costing purposes. Alternate materials may be selected during the

remedial design. If this alternative is selected, bench scale and pilot tests are required to identify the appropriate oxidant for this site.

This alternative is expected to take approximately 10 months to construct, with active remediation completed within one (1) year of injection completion. This will be followed by groundwater monitoring.

For purposes of estimating cost; this alternative assumes to take approximately 2 years to complete.

Present Worth:.....*$5,180,000*
Capital Cost:.....*$5,130,000*
Annual Costs (2 years): *$25,000*

Alternative 5: In-Situ Thermal Treatment of the Source Area and In-Situ Groundwater Plume Treatment

This alternative would use heat to destroy or volatilize VOCs in the source area followed by use of a selected additive to address the remainder of the groundwater plume not treated by the thermal treatment. For costing purposes, a commonly used, commercially available reducing agent was used. The gases produced by the thermal treatment would be collected by collection wells and treated in an *ex-situ* treatment unit.

Direct-push injection would be used to deliver the selected additives to the contaminated zones of soil and groundwater downgradient of the thermal treatment area. The area to be treated is approximately 210 ft × 240 ft with a depth of 26 ft. Injections would be spaced approximately 10 ft apart. The building will not be demolished as part of the remedy.

This alternative is expected to take approximately 18 months to install followed by monitoring. For purposes of estimating cost; this alternative assumes to take approximately 6 years to complete.

Present Worth:.....*$11,030,000*
Capital Cost:.....*$10,900,000*
Annual Costs (6 years): …… .....……..……*$25,000*

Alternative 6: In-Situ Thermal Treatment of the Source Area and Air Sparging for Groundwater Plume Treatment.

This alternative would use heat to destroy or volatilize VOCs in the source area followed by air sparging to address the remainder of the groundwater plume not treated by the thermal treatment. The gases produced by the thermal treatment would be collected by collection wells and treated in an *ex-situ* treatment unit.

Air injection wells would be installed downgradient of the source area using direct-push injection. To make sure the injection wells intersects the migrating contaminated groundwater; the wells would be spaced such that the influenced area would be 240-ft long × 40-ft wide. SVE would not be performed in conjunction with air sparging since earlier work done at the site concluded that SVE was not practical and there are no nearby receptors. Additional groundwater monitoring wells would be installed downgradient of the source area, and vapor monitoring points would be installed in the vicinity of the sparge wells.

This alternative is expected to take approximately 18 months to install followed by approximately 10 years of operation; monitoring would continue for 11 years after the start of air sparging. For purposes of estimating cost; it is assume that this Alternative will take 11 years to complete.

Present Worth:.....$6,430,000
Capital Cost:.....$5,600,000
Annual Costs (11 years): $100,000

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
No Action	0	0	0
Restoration to Pre-Disposal or Unrestricted Conditions	20,000,000	0	20,000,000
In-Situ Soil Mixing, Monitored Natural Attenuation, and Zero Valent Iron Wall	1,900,000	25,000	2,108,000
In-Situ Soil Mixing of the Source Area and In-Situ Groundwater Plume Treatment	5,130,000	25,000	5,180,000
In-Situ Thermal Treatment of the Source Area and In-Situ Groundwater Plume Treatment	10,900,000	25,000	11,030,000
In-Situ Thermal Treatment of the Source Area and Air Sparging for Groundwater Plume Treatment.	5,600,000	100,000	6,430,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 6, In-Situ Thermal Treatment of the Source Area and Air Sparging for groundwater plume Treatment as the remedy for this site. Alternative 6 would achieve the remediation goals for the site by destroying the source area impacting soils and groundwater and treating the groundwater plume. The elements of this remedy are described in Section 7.2. The selected remedy is depicted in Figure 4.

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined on 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment. Alternatives 5 and 6 satisfied this criterion by destroying the source of the soil and groundwater contamination and treating the groundwater plume. Alternative 1 (No Action) does not provide any protection to public health and the environment and is not considered further. Alternatives 2, 3, and 4 meet this criterion although the latter two may not be as protective as Alternatives 5, 6 and 2; meaning that they will comply with this criterion but to a lesser degree or with lower certainty. Technology limitations due to the hydrogeological characteristics of the site are expected. For Alternatives 3 and 4, bench scale testing is required.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy would meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

Alternative 6 complies with the SCGs to the extent practicable. It addresses the source area of contamination and also creates the conditions necessary to restore groundwater quality to the extent practicable. Alternatives 2, 3, 4 and 5 also comply with SCGs but with less certainty for the latter 3 alternatives compared to Alternatives 6 and 2 due the potential technology limitations discussed above.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain onsite after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

Since most of the contamination is underneath the building and the upper fifteen feet of the east yard, Alternative 2 results in removal of almost all of the chemical contamination at the site and removes the need for property use restrictions and long-term monitoring which ensures long term effectiveness and permanence. Alternatives 5 and 6 achieve long term effectiveness and permanence via thermal treatment, the majority of the contaminated soil at the site and almost all of the contaminated soil below the water table, but also rely on an environmental easement and long-term monitoring for long term effectiveness due to expected residual contamination. The effectiveness of alternatives 3 and 4 is uncertain for this site due to potential technology limitations. These technology limitations are related to soil characteristics and shallow groundwater at the site.

4. Reduction of Toxicity, Mobility, or Volume of Contamination. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the site. Alternative 2 significantly reduces the toxicity, volume and mobility of contamination on site via removal. Alternatives 5 and 6 also achieve a significant reduction of toxicity, mobility and volume of contamination on-site via in-situ treatment of the source area and plume. Alternatives 3 and 4 would also reduce toxicity, mobility and volume of contamination via treatment but the degree to which these are achieved is questionable due to potential technology limitations discussed above.

5. Short-term Impacts and Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the works and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives. Alternatives 2 would have significant impacts due to volume of material being removed and final disposed. Alternative 3 through 6 all have short-term impacts common to construction sites which could easily be controlled. Alternative 6 would have the smallest impact. The time needed to achieve the remediation goals is the shortest for Alternative 2 and longest for Alternative 3 and 6 to achieve the remediation goals.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

Alternatives 5 and 6 are favorable in that; they are readily implementable. Alternative 2 is also implementable, but the volume of soil excavated under this alternative would necessitate increased truck traffic on local roads for several months, engineering controls related to excavation of saturated soil at approximately 15 ft deep, and a dewatering system on site is required. Implementability of alternatives 3 and 4 is uncertain for this site due to potential technology limitations. Soil characteristics (fine to medium sands and discontinuous till layer) and shallow groundwater at the site (0.5 to 2 feet) make these technologies least predictable; furthermore bench scale testing for these alternatives will be required.

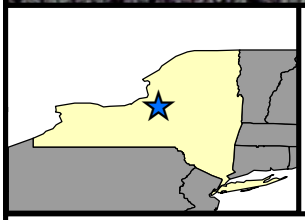
7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria it can be used as the basis for the final decision.
The costs of the alternatives vary significantly. Alternatives 3 and 4 have the lowest estimated present worth costs but their effectiveness is uncertain based on potential technology limitations due the on-site conditions. With its

large volume of soil to be handled, Alternative 2 has the highest present worth cost. Alternative 6 is less expensive than 5 and significantly less expensive than Alternative 2 (which has the highest present worth cost among alternatives considered).

8. **Land Use.** When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.
The current and anticipated future uses of the site are considered. Alternatives 2, 3, 4, 5 and 6 readily allow for the anticipated future commercial site use. Each alternative except 2, incorporate institutional controls in the form of an environmental easement to ensure the site is protective for commercial use. Although whether pre-release conditions are feasible to achieve is uncertain, as presented, Alternative 2 does not include institutional controls.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

9. **Community Acceptance.** Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised.



Legend

Property Boundary

Feet

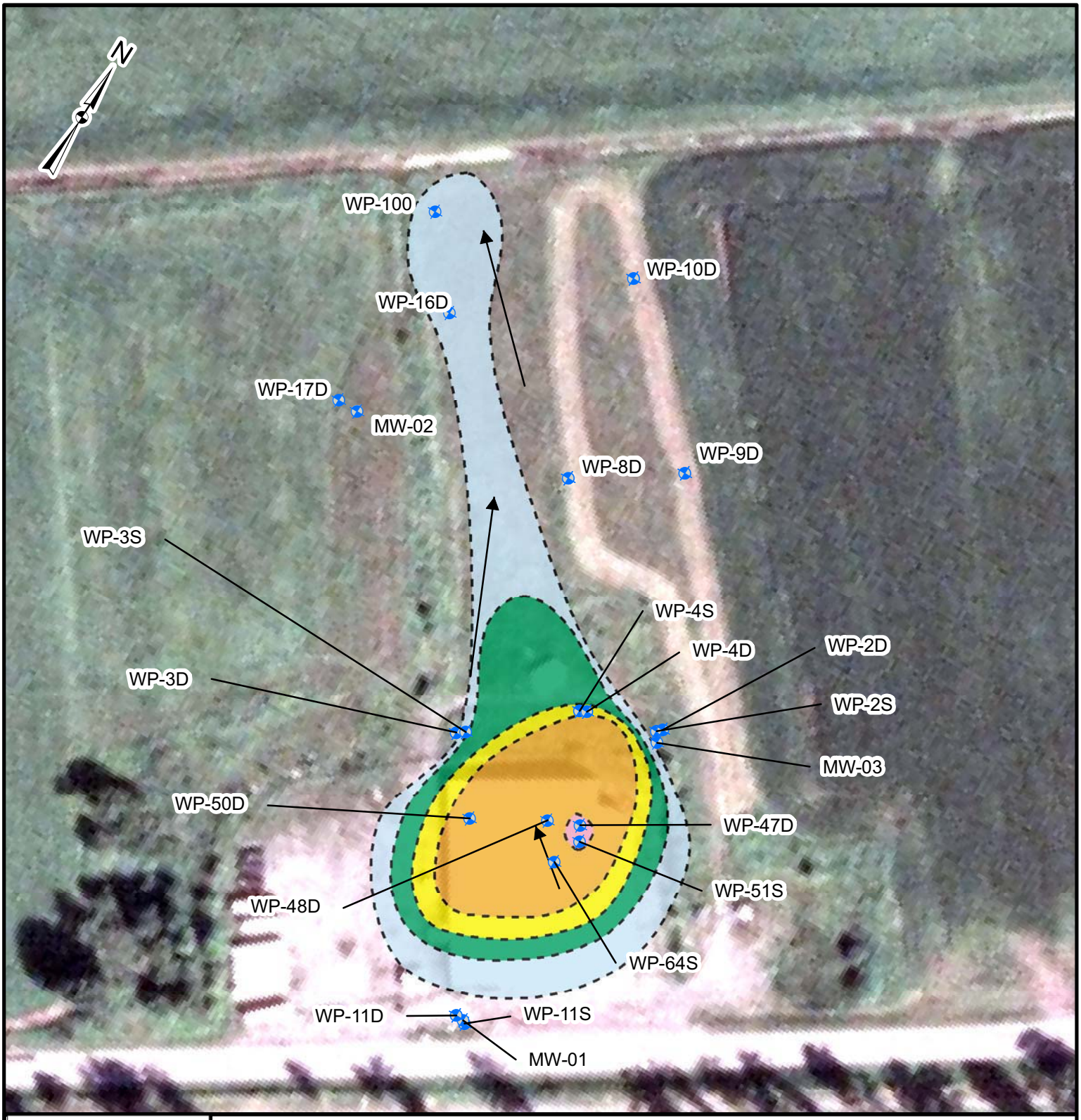
0 250 500 1,000

Source: United States Geologic Survey (USGS)

HAZ-O-WASTE SITE (7-27-003)
REMEDIAL INVESTIGATION REPORT
LENOX, NEW YORK

FIGURE 1
SITE LOCATION

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
CJS	MJS	SAB	SLG	AS SHOWN	JULY 2010	1436836	GIS/PROJECTS/ FIGURE1-2.MXD



Total VOC Concentration

- 20-200
- 200-2,000
- 2,000-20,000
- 20,000-200,000
- > 200,000

Groundwater Monitoring Well

Groundwater Flow Direction

Feet

0 60 120 180 240

Source: NYSGIS Clearinghouse, Strategic Environmental Management (2002, 2004)

HAZ-O-WASTE SITE (7-27-003)
FEASIBILITY STUDY REPORT
LENOX, NEW YORK

FIGURE 2
ESTIMATED GROUNDWATER PLUME
(TOTAL VOCs - 2009)

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
CJS	CJS	CJS	JCH	AS SHOWN	APRIL 2011	1436836	FIGURE 3.MXD

Legend

Groundwater Monitoring Well

Note:
The source area was determined during the remedial investigation and was based on unrestricted cleanup levels.

Feet

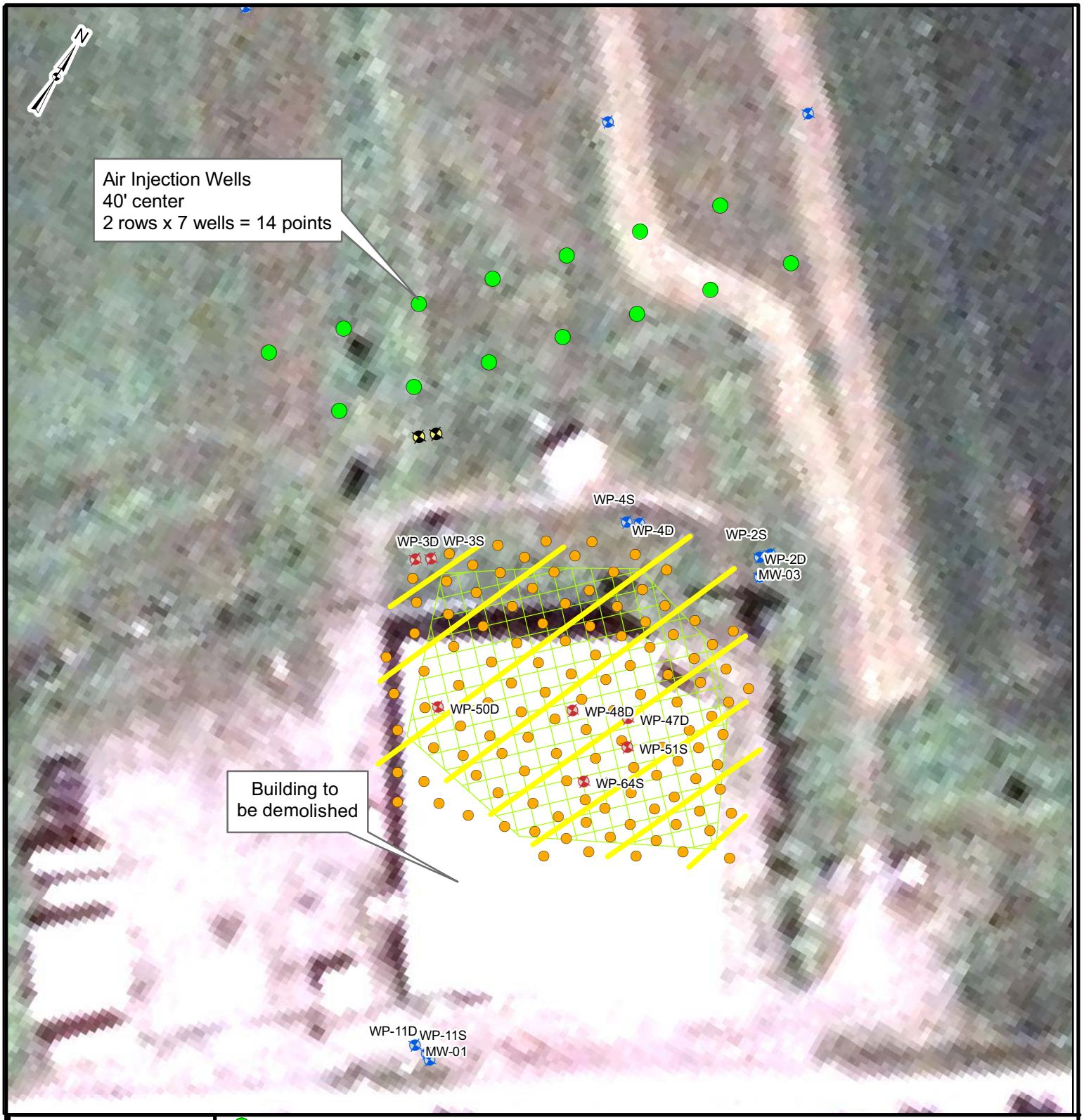
0 30 60 120 180 240

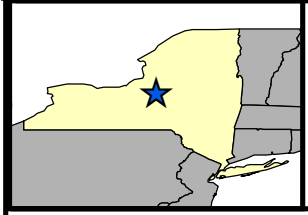
Source: NYSGIS Clearinghouse, Strategic Environmental Management (2002, 2004)

HAZ-O-WASTE SITE (7-27-003)
REMEDIAL INVESTIGATION REPORT
LENOX, NEW YORK

FIGURE 3
APPROXIMATE AREA
OF IMPACTED SOIL

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
CJS	CJS	CJS	SLG	AS SHOWN	APRIL 2011	1436836	GIS/PROJECTS/ FIGURE4.MXD





Air Injection Wells
Groundwater Monitoring Well
Groundwater Monitoring Wells To Be Abandoned
Horizontal SVE well
Heater Boring
Proposed Groundwater Monitoring Well
Thermal Treatment

Feet
0 12.5 25 50 75 100

Source: NYSGIS Clearinghouse,
Strategic Environmental Management (2002, 2004)

HAZ-O-WASTE SITE (7-27-003)
FEASIBILITY STUDY REPORT
LENOX, NEW YORK

FIGURE 4
ALTERNATIVE 6

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
CJS	CJS	SAB	JCH	AS SHOWN	AUGUST 2011	1436836	GIS/PROJECTS/ FIGURE1-4.MXD