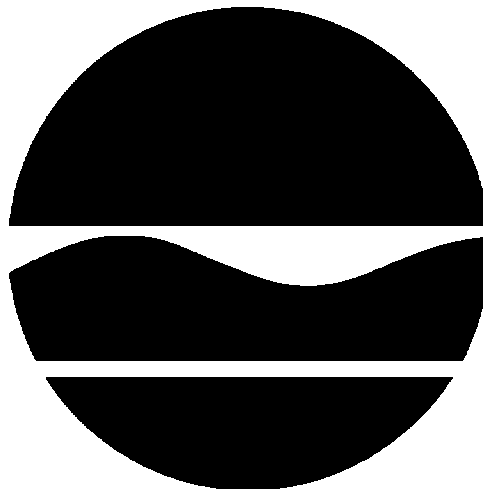


**PROPOSED REMEDIAL ACTION PLAN  
DEPEW VILLAGE LANDFILL  
Operable Unit No. 01  
Village of Depew, Erie County, New York  
Site No. 915105**

January 2008



Prepared by:

Division of Environmental Remediation  
New York State Department of Environmental Conservation

# **PROPOSED REMEDIAL ACTION PLAN**

## **DEPEW VILLAGE LANDFILL Operable Unit No. 01 Village of Depew, Erie County, New York Site No. 915105 January 2008**

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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 Depew Village Landfill, Operable Unit No. 1, which encompasses 20 acres of property. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, the operation of a former municipal solid waste incinerator and co-located landfill at the site, have resulted in the disposal of hazardous wastes, including ash material containing heavy metals. These wastes have contaminated the soils and nearby sediments at the site, and have resulted in:

- a significant threat to human health associated with the potential exposure to contaminated site soils and sediments.
- a significant environmental threat associated with the current and potential exposure of flora and fauna to contaminants and erosion of contaminants into the Cayuga Creek environment.

To eliminate or mitigate these threats, the Department proposes stream bank soil removal, stream bank stabilization, soil cover in any unpaved areas on-site, passive landfill gas controls, monitoring and institutional controls for the site.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially 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.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the 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 greater detail in the March 2007 "Remedial Investigation (RI) Report for the Depew Village Landfill Site", the July 2007, "Final Feasibility Study (FS) for the Depew Village Landfill Site Operable Unit-01", the associated amendments to these reports and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Village of Depew  
Municipal Building  
85 Manitou Street  
Depew, NY 14043  
(716) 683-1400  
Contact: Elizabeth Melock

NYSDEC Buffalo Office  
270 Michigan Avenue  
Buffalo, NY 14203  
(716) 851-7220  
Appointment requested; contact David Locey.

NYSDEC Central Office  
625 Broadway, 12<sup>th</sup> Floor  
Albany, NY 12233-7013  
(518) 402-9767  
Appointment requested; contact Randy Hough, Project Manager.

The Department seeks input from the community on all PRAPs. A public comment period has been set from January 29 to February 28, 2008, to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for February 12, 2008 at the Village of Depew, Municipal Building, 85 Manitou Street, Depew, NY beginning at 7:00 pm.

At the meeting, the results of the RI/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 to Mr. Hough at the above address through February 28, 2008.

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 all of the alternatives identified here.

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.

## **SECTION 2: SITE LOCATION AND DESCRIPTION**

The Depew Village Landfill site is located in the Village of Depew, Town of Cheektowaga, in Erie County (Figure 1). The site consists of approximately 20 acres located on a peninsula of Cayuga Creek. Zurbrick Road is located across the stream to the south, Borden Road is to the west, and the Village of Depew DPW facilities are to the north of the site. An Erie County Sewer District No.4, Overflow Retention Facility (ORF) sits in the central section of the peninsula on the site. There is a utility corridor, access road right-of-way, and a permitted SPDES outfall associated with the ORF. The site's general location is in a suburban setting. Cayuga Creek is a Class C navigable stream, which ultimately empties into Lake Erie, forms the south, east and west boundaries of the peninsula. The Village of Depew DPW and private lands are located to the north. A section of the former incinerator building is still on-site. The Land Reclamation (915070) and the Old Land Reclamation (915129) sites are located approximately one-half mile downstream and adjacent to the stream and the NL Industries (V00353) site is located approximately one and one-half miles to the north. The peninsula, including all of the site is located in the 100 year flood plain.

The site is underlain by fractured and jointed Onondaga limestone, which also forms the bed of Cayuga Creek in areas. The depth to bedrock on-site varies from approximately 7 to 25 feet. The bedrock is overlain by a silty, clayey till unit, which in turn is overlain by lenses of alluvial sand and gravel deposits from

Cayuga Creek. Above these deposits, lies fill material consisting of black and gray ash residue, glass, metal, and other municipal solid waste. The fill thickness on the site ranges from 1 to 19 feet, and is typically encountered 2 feet below the ground surface. There are portions of the site where the fill is in the near surface soils, particularly on the sides of the ORF and on the southern peninsula tip. There are significant sections of the creek banks on the site where the fill material is exposed from erosion. The former landfill footprint encompasses much of the peninsula area.

Surface water collects in low lying areas in the northeast portion of the site. Most precipitation infiltrates the site soils / fill material, however, the steep western and some segments of the eastern sides of the landfill, and the covered areas in the northwest part of the site all promote localized surface runoff.

Groundwater occurs in the overburden / fill material at depths between 8 and 15 feet below the ground surface. Local groundwater flow at the site is from north to south and then radially towards the creek on the peninsula area.

Operable Unit (OU) No. 01, which is the subject of this document, consists of approximately 20 acres of area contained within the banks of the Cayuga Creek on the peninsula south of the Village of Depew DPW (Figure 2). The northern boundary (extending west to east) is identified as a combination of the southern perimeter of the DPW parking lot across to the tree-line that abuts the mowed fields in the northeast, continuing to the bank of Cayuga Creek. The OU includes the footprint of the former landfill excluding the Erie County ORF facility and associated structures. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. The remaining operable unit for this site is: Operable Unit No. 02, which includes the adjacent Cayuga Creek environment (surface water and sediments) and a segment of stream bank soils located below Zurbrick Road to the south. A limited amount of remedial investigation work was performed on the Cayuga Creek environment and Zurbrick Road soils during the RI of OU-01. A complete RI/FS for this operable unit is expected to be completed in 2008.

### **SECTION 3: SITE HISTORY**

#### **3.1: Operational/Disposal History**

The Depew Village Landfill was operated by the Village of Depew between 1940 and 1961. During operations the landfill received approximately 10,000 tons per year of municipal solid waste and/or other unknown waste streams. Much of the wastes were processed through the incinerator located on-site, with the resulting ash disposed of in the landfill. Site hazardous waste contamination, including heavy metals and in particular lead, was concentrated in the ash residue. The former landfill was not lined. Spent foundry sand was reportedly utilized as daily cover for a time, at the site.

#### **3.2: Remedial History**

In 1983, the Department first listed the site as a Class 2a site in the Registry of Inactive Hazardous Waste Disposal Sites in New York (the Registry). Class 2a was a temporary classification assigned to a site that had inadequate and/or insufficient data for inclusion in any of the other classifications. Also in 1983, Erie County acquired 14.5 acres of the peninsula area for the ORF project. During ORF construction approximately 60,000 yd<sup>3</sup> of fill was removed from the site and disposed of in the BFI Landfill in Tonawanda, New York. No chemical analysis was performed. Following ORF construction, the County re-conveyed 9.5 acres back to the Village of Depew.

In 1985, the Erie County Department of Environment and Planning prepared a "Hazardous Waste Site Profile Report", which concluded that no hazardous waste was disposed at the site.

In 1988, the Department conducted a Phase I Investigation at the site. This report recommended conducting a Phase II Investigation.

In 1990, the Department de-listed the site from the Registry of Inactive Hazardous Waste Disposal Sites, based upon the determination that no hazardous wastes were present.

In 2001, the Village of Depew entered into a Section 14 (1946 Flood Control Act), Project Cooperation Agreement (PCA) with the U.S. Army Corps of Engineers (USACOE) to perform an Emergency Streambank Protection Project on a section of Cayuga Creek below Zurbrick Road, south of the site. As part of this project, the design called for excavating soils on the site peninsula tip, in order to maintain the required stream bed width, and use of these soils on the opposite bank as fill. During the excavation, the USACOE contractor noticed the presence of fill materials and conducted sampling and analysis. The analysis indicated total lead concentrations as high as 86,000 parts per million in the soils and in addition the samples failed the Environmental Protection Agency's (EPA), Toxicity Characteristics Leaching Procedure (TCLP) for leachable lead, making the material hazardous. With the determination of the presence of hazardous waste and in accordance with the PCA, the USACOE ceased operations on the streambank stabilization project.

In 2002, the Village of Depew entered the Department's Voluntary Cleanup Program (VCP) and the site was designated as V00609-9.

In 2003, a Site Investigation was conducted by the Village's consultant which focused on the 1.3 acre area at the tip of the peninsula.

In 2004, the Site Investigation / Remedial Report (SI/RR) was generated. This report confirmed the presence of hazardous wastes and it also indicated that the lead contamination most likely extends to the north, beyond the registry area on the peninsula tip. Based upon the estimated volumes of hazardous material thought to be present, the Village of Depew opted out of the VCP, the Voluntary Cleanup Agreement was terminated and the Department listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health and/or the environment and action is required.

In early 2007, the Department finalized a Site Boundary Modification Package, which increased the site size from 1.3 to 20 acres in the Registry of Inactive Hazardous Waste Disposal Sites. The site boundary modification was based upon the extent of the lead contamination as determined from the RI results. The modified site boundary includes the majority of the footprint of the original landfill.

#### **SECTION 4: 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: the Village of Depew.

The PRPs declined to implement the RI/FS at the site 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 5: SITE CONTAMINATION**

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and/or the environment.

##### **5.1: Summary of the Remedial Investigation**

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between February/2006 and June/2006. The field activities and findings of the investigation are described in the RI report.

The RI involved the collection and analysis of surface and subsurface soil samples, installation of monitoring wells, and the collection and analysis of groundwater, surface water and sediment samples. The presence/absence of explosive gas was measured in various soil borings and in the headspace of the monitoring wells. Soil samples were collected both from the former landfill on the peninsula and the opposite stream bank across from the site. Surface water and sediments were collected from the Cayuga Creek environment.

#### **5.1.1: Standards, Criteria, and Guidance (SCGs)**

To determine whether the soil, groundwater, surface water, sediments, and soil vapor contain contamination at levels of concern, data from the investigation were compared to the following chemical specific SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the Department's Soil Cleanup Objectives ("6 NYCRR Part 375, Environmental Remediation Programs, Subpart 375-6").
- Sediment SCGs are based on the Department's "Technical Guidance for Screening Contaminated Sediments."
- Landfill generated methane gas in the soil vapor, measured in the monitoring well headspace, boreholes and the groundwater was evaluated on a presence / absence basis. Measurements were in terms of percentage of explosive limits and concentration of methane, in order to determine the degree of concern for general health and safety at and around the site.

Location specific SCGs must also be considered during remedy selection. Articles 15 and 16, of the Environmental Conservation Law (ECL), are location specific SCGs applicable to the site. All work within the streambed and stream banks must meet the requirements of 6NYCRR Part 608, "Use and Protection of Waters" and all work within the floodplain must meet the requirements of 6NYCRR Part 500, "Floodplain Management Regulations Development Permits".

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI report.

#### **5.1.2: Nature and Extent of Contamination**

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the RI report, many soil, groundwater, surface water and sediment samples were collected to characterize the nature and extent of contamination. As seen in Figures 3 through 5, the main category of contaminants that exceed their SCGs are inorganic metals. The primary metal contaminant of concern at the site is lead. For comparison purposes, where applicable, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for, soil, and sediment. Soil vapor samples (as methane) are reported on a presence / absence basis.

Figures 3 through 5 summarize the degree of contamination for the contaminants of concern in soils, sediments and soil vapor and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

### **Surface Soil**

Surface soil samples on and off-site were collected from a depth of 0 to 3 inches utilizing a hand auger. Figure 3 shows the locations of the surface soil samples (hand auger) and the associated area lead concentrations above SCGs.

One of fourteen surface soil results collected on-site along the stream bank, exceeded the lead Part 375, Soil Cleanup Objective (SCO) of 1,000 ppm for the Protection of Public Health - Restricted Use Commercial. Seven of fourteen surface soil results collected on-site along the stream bank, exceeded the Part 375, SCO for the Protection of Ecological Resources of 63 ppm. These contaminated surface soils are located primarily at the tip of the peninsula and along the eastern and western stream bank. There is exposed debris, fill material and ash along certain sections of the stream bank, particularly in the more erosion prone areas. The site surface soils subject to erosion appear to be the source of the lead and other metals contamination found in the Cayuga Creek sediments.

Surface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

Three of sixteen surface soil results collected off-site along the stream bank below the north side of Zurbrick Road, exceeded the lead Part 375 SCOs for both the Protection of Public Health - Restricted Use Commercial SCO and Protection of Ecological Resources SCO as shown on Figure 3. These surface soils will be addressed during the RI/FS of OU-02.

### **Subsurface Soil**

Seventy four subsurface soil samples were collected from 68 borehole locations utilizing GeoProbe technique. These locations are shown on Figure 3. One sample was collected from each borehole of the ash material if encountered, except when additional ash layers were encountered and/or an elevated field instrument reading was obtained for volatile compounds. In such cases, a second sample was collected from this region.

Figure 3 shows the nature and extent of the soil lead contamination / hot spots above the Part 375 SCOs for both the Protection of Public Health - Restricted Use Commercial SCO (1000 ppm) and Protection of Ecological Resources SCO (63 ppm) and selected surface and near surface soil results for lead and the depth of sampling. Approximately 2.8 acres of the site subsurface and near surface soils contain lead above 1000 ppm and approximately 12 acres are above 63 ppm.

The area at the tip of the peninsula is highly disturbed from the extensive test pitting and excavations performed as part of a previous SI and the U.S. Army Corps of Engineers (USACOE), Cayuga Creek Streambank Protection Project at Zurbrick Road, respectively. These contaminated soils are located primarily at the peninsula tip, west, east and northeast of the ORF and represent areas of concern at the site. Some of these subsurface soils are at depths and locations, particularly in the southern area, that could potentially be exposed and eroded into the stream. The site subsurface soils in certain areas, thus appear to be a contributing source of the lead contamination found in Cayuga Creek sediments. Lead contamination in soils north of the ORF and south of the Village DPW are primarily located at depths of 3 to 19 feet below the ground surface and are covered with sod and/or paved areas.

Subsurface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

### **Groundwater**

Six monitoring wells were installed during the RI, and two rounds of groundwater samples were collected. The RI data indicates that the contaminant of concern, lead, is bound up physically and chemically in the on-site soils and is not being significantly dissolved and mobilized by the groundwater. Thus, no site-related groundwater contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for groundwater.

### **Surface Water**

A total of 10 surface water samples were collected and analyzed during the RI. Two of these samples were collected from highly turbid on-site pond water and 8 were from Cayuga Creek. No on-site-related surface water contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for on-site surface water. The nature and the extent of the contamination in the Cayuga Creek surface waters will be further investigated during the RI/FS of OU-02.

### **Sediments**

Sediments in Cayuga Creek adjacent to and downstream have been impacted by metals migrating from the site primarily due to erosional forces. Figure 4 shows the sediment sample locations, their associated lead concentrations and the applicable SCGs. Lead exceeds the Lowest Effect Level (LEL), which is the level that can be tolerated by the majority of benthic organisms, in six out of seven stream samples. Lead exceeds the Severe Effect Level (SEL), the level at which pronounced disturbance of the sediment dwelling community can be expected, in four of seven stream locations sampled. Although lead is the primary contaminant of concern, sediment SCGs were also exceeded to a lesser extent for antimony, arsenic, copper, nickel, silver and zinc. The nature and extent of the sediment impacts and the need for, and type of, remedial action required, will be addressed during the RI/FS of OU-02.

### **Soil Vapor**

Landfill gas as methane (CH<sub>4</sub>) was present in all of the groundwater samples collected from the monitoring wells, with the exception of the up-gradient well (MW-05), located in the northeast section of the site. It was also detected in the open holes of several of the soil borings. Thus, it can be assumed that it is dispersed throughout the fill material layer and presents a health and safety hazard if allowed to accumulate in site buildings, structures and utilities. The highest concentration of methane was present in the headspace and groundwater at monitoring well MW-06, which corresponds to the area of the site containing the deepest deposits of fill material. Figure 5 shows the estimated extent of the methane gas in the subsurface soils based upon the fill material and thickness.

Soil vapor identified during the RI/FS will be addressed in the remedy selection process.

## **5.2: 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 completion of the RI/FS.

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

## **5.3: Summary of Human Exposure Pathways:**

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 7 of the RI report. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.



The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Contamination is generally limited to the site, with additional impacts to the sediments of Cayuga Creek along the site and immediately downstream. The existing cover of the site varies; the overflow retention facility (ORF) occupies a large portion of the site and is fenced, thus controlling site access in that area, the Depew department of public works (DPW) uses portions of the site north of the ORF for equipment and material storage, while the remainder of the site is overgrown with trees and emergent shrubs. There is no evidence of trespassing on the site.

Currently, workers at the ORF or DPW could be exposed to surficial soil contamination if they enter portions of the site where insufficient cover may be present. Any excavation on the site would expose workers to lead contaminated fill materials through dermal contact and inhalation of contaminated dust particles. Methane gas is also present in the landfill and presents an inhalation hazard. Recreational users of Cayuga Creek could be exposed to contaminated materials through direct contact with sediments.

The proposed remedy will eliminate potential routes of exposure to site-related contamination by workers at the DPW and ORF, and will prevent the migration and erosion of site-related contamination to Cayuga Creek, thus eliminating routes of exposure to recreational users of the stream.

#### **5.4: Summary of Environmental Assessment**

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

The following environmental exposure pathways and ecological risks have been identified:

- Terrestrial wildlife direct contact / ingestion with the contaminants present in the surface and subsurface soils;
- Sediments in the adjacent Cayuga Creek contain elevated levels of lead up to 23 times above the Severe Effect Level (SEL) screening criteria. These levels are known to affect the survival of benthic organisms and to bioaccumulate in biota. This results in reduced availability of food for forage species and in reproductive effects, in fish, terrestrial wildlife, and birds.

In addition to the ecological resource of the adjacent Cayuga Creek, other habitats and cover types in the site area include emergent wetland, beech-maple forest/successional woods, natural stream cover types, successional old fields and public works.

In the vicinity of the site, Cayuga Creek has several areas of bank erosion. The evidence of erosion

includes exposed tree roots along the northern bank, and earth slides and suspended outfalls along the southern bank. Although channel meandering is normal within a stream floodplain, human influence on stream flow and channel restriction can result in local areas of intense bank scour. Since the stream banks were backfilled with contaminated landfill soils at the site, the bank scour has caused contaminated soils to erode into the active stream channel.

Samples from the stream surface water receiving drainage and erosional deposition from the site contained detectable levels of lead, but were below SCGs. Stream flow conditions at the time of surface water sample collection were unusually high (1,700 ft<sup>3</sup>/sec, compared to the average flowrate of 110 ft<sup>3</sup>/sec for the stream, as recorded at a upstream gaging station) and thus the measured lead concentrations may not represent typical potential exposures of biota to the dissolved contaminants in the surface water. The Cayuga Creek environment will be further investigated as part of the planned RI for OU-02.

## **SECTION 6: SUMMARY OF THE REMEDIATION GOALS**

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to contaminants in surface and subsurface soils;
- environmental exposures of flora or fauna to contaminants in surface and subsurface soils;
- the release of contaminants from the site into the surface water and sediments of Cayuga Creek through erosion;
- soil gas migration and potential vapor intrusion / buildup of methane gas in surrounding buildings, structures and utilities, which could cause a health and safety concern;

Further, the remediation goals for the site include attaining to the extent practicable:

- the Department's Soil Cleanup Objectives (SCOs) for: Protection of Ecological Resources in the surface, subsurface, and bank soils along Cayuga Creek from the stream bed to the bankfull flow elevation (the site-specific riparian habitat) ("NYSDEC Regulations 6 NYCRR Subpart 375-6, Remedial Program Soil Cleanup Objectives").
- the Department's Soil Cleanup Objectives (SCOs) for: Restricted Use - Commercial on the landfill portion of the site above the bankfull flow elevation ("NYSDEC Regulations 6 NYCRR Subpart 375-6, Remedial Program Soil Cleanup Objectives").
- control of the health and safety concerns caused by the continued generation of methane gas.

## **SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES**

The selected 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. Potential remedial alternatives for the Depew Village Landfill, Operable Unit-01, were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

The use of a NYSDEC Part 360 landfill cap (consisting of : 12 inch gas venting layer, impermeable membrane, drainage layer, 24 inch barrier protection layer, and 6 inch topsoil layer) was considered for the site in the preliminary feasibility study scoping. This remedial alternative was screened out, based upon the fact that the contaminants of concern are not being mobilized to groundwater and therefore stormwater infiltration does not need to be controlled. Also, leachate doesn't need to be collected and treated. The use of a Part 360 capping system would not be any more protective in preventing on-site erosion of contaminants into Cayuga Creek. In addition, because of the thickness of this type of cap, it may be in contravention of the floodplain regulations, in that the base flood elevation may be increased more than what is allowable in the area.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth 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.

**7.1: Description of Remedial Alternatives**

The following potential remedies were considered to address the contaminated soils and soil vapor at the site.

**Alternative 1: No Action**

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

<i>Present Worth:</i> .....	<i>\$197,000</i>
<i>Capital Cost:</i> .....	<i>\$0</i>
<i>Annual Costs:</i>	
<i>(Years 1-15):</i> .....	<i>\$17,000</i>

**Alternative 2: Institutional Controls with Continued Monitoring**

<i>Present Worth:</i> .....	<i>\$240,000</i>
<i>Capital Cost:</i> .....	<i>\$44,000</i>
<i>Annual Costs:</i>	
<i>(Years 1-15):</i> .....	<i>\$17,000</i>

Under this alternative site soils would not be actively addressed and the site conditions would remain the same. Currently access to the site is controlled and limited to Village DPW and Erie County ORF workers, this limited access would continue. Institutional controls in the form of an environmental easement would be put in place which would require continued commercial use of the property, development and compliance with an approved site management plan which restricts soil excavations at the site, restricts groundwater use, and requires continued monitoring of site media, as well as biannual site inspections. This alternative is readily implementable, and would be completed in 6 to 9 months after selection of the remedy.

**Alternative 3: Contaminated Soil Removal to Pre-disposal Conditions, Off-site Disposal, Bank Stabilization and Continued Monitoring**

<i>Present Worth:</i> .....	\$9,900,000
<i>Capital Cost:</i> .....	\$9,700,000
<i>Annual Costs:</i>	
<i>(Years 1-15):</i> .....	\$20,400

This alternative would involve the excavation of all soils that contain lead contamination above the Part 375, Unrestricted Use SCO of 63 ppm (which also corresponds to the Protection of Ecological Resources SCO for this contaminant). The excavation of lead contaminated soils to this concentration would prevent exposures and eliminate the source of the lead contamination at the site, which would also eliminate the migration and deposition of contaminants into the adjacent Cayuga Creek environment. The excavated soils would be transported and disposed off-site at a permitted landfill facility. The area requiring excavation is approximately 12 acres, down to an average depth of 5.5 feet, which equates to roughly 106,000 yds<sup>3</sup> of contaminated soils. The excavation area would be backfilled with clean material and the site would be graded and restored. Stream bank stabilization and restoration measures would be performed in the excavated areas along the stream to provide natural erosion protection and to provide for the re-establishment of the stream's riparian habitat.

Various types of erosion controls would be installed along areas of the stream shoreline as part of the bank stabilization and restoration in those areas exposed to these forces. Controls would be designed to dissipate the creek energy at bankfull flow as opposed to transferring it downstream. The backfilled areas and erosion controls would be tied together. Erosion control measures would include combinations of non-structural measures (slope grading and re-vegetating), bioengineering (brush matting, tree root wads), biotechnical (erosion control mats, vegetated structures), and structural (riprap, boulders, weirs) features where applicable.

Excavation of the fill material would result in a reduction of the waste mass available for anaerobic degradation and subsequent generation of landfill gas (methane), thus reducing and/or eliminating this health and safety hazard.

Figure 6 shows the approximate extent of the excavation area.

Continued monitoring of site media to include groundwater, surface water and sediment would be conducted to insure the effectiveness of the remedy.

The design and complete implementation of the alternative would take approximately 24 to 36 months from the selection of the remedy. The remediation goals for the site would be met once the remedy is implemented and completed.

#### **Alternative 4: Contaminated Soil Removal and Off-site Disposal, Erosion Control, Institutional Controls and Continued Monitoring**

<i>Present Worth:</i> .....	\$3,400,000
<i>Capital Cost:</i> .....	\$3,100,000
<i>Annual Costs:</i>	
<i>(Years 1-15):</i> .....	\$20,400

Under this alternative, the six hot spots containing elevated lead concentrations above the SCO of 1,000 ppm including the northern stream bank would be excavated, transported and disposed off-site at a permitted disposal facility. The hot spots comprise a total surface area of approximately 2.84 acres and would be excavated to an average depth of 6.1 feet, which equates to a soil volume of roughly 27,950 yd<sup>3</sup> for disposal.

This alternative would restore the site to the commercial use SCO, which is consistent with its current use. The excavation areas would be backfilled with clean material and the site would be graded and restored. It is anticipated that the excavation of the hot spots would also reduce the generation of landfill gas. However,

the need for methane gas control would be evaluated subsequent to completion of the excavations.

Refuse, municipal solid waste and ash that is exposed throughout the site including along the stream banks would also be excavated and disposed off-site. Stream bank stabilization and restoration measures would be performed in the excavation areas along the stream to provide natural erosion protection and to provide for the re-establishment of the stream’s riparian habitat in these areas.

Erosion control measures would be installed along selected areas of the stream banks as part of the stabilization and restoration in those areas which are exposed to strong erosional forces. Controls would be designed to dissipate the stream energy as opposed to transferring it downstream. The backfilled areas and erosion controls would be tied together. Erosion control measures would include combinations of non-structural measures (slope grading and re-vegetating), bioengineering (brush matting, tree root wads), biotechnical (erosion control mats, vegetated structures), and structural (riprap, boulders, weirs) features where applicable.

Figure 7 shows the approximate extent of the excavation areas and the locations of the erosion controls.

Institutional controls in the form of an environmental easement will be put in place which would require continued commercial use of the property; development and compliance with an approved site management plan which restricts soil excavations at the site, restricts groundwater use, and requires continued monitoring of site media including groundwater, surface water and sediment, as well as biannual site inspections. The design and complete implementation of the alternative would take approximately 24 to 36 months from the selection of the remedy.

**Alternative 5: Stream Bank Soil Removal, Bank Stabilization, Soil Cover, Passive Landfill Gas Control, Institutional Controls and Continued Monitoring**

<i>Present Worth:</i> .....	\$2,300,000
<i>Capital Cost:</i> .....	\$2,000,000
<i>Annual Costs:</i>	
<i>(Years 1-15):</i> .....	\$26,000

Under this alternative, all contaminated soils above the Protection of Ecological Resources SCO of 63 ppm located on the stream bank between the bankfull flow elevation and the stream bed would be removed. The bankfull flow elevation is equivalent to the point of transition between the stream channel and the flood plain (top of bank) as determined by regionalized hydraulic-geometry equations and actual stream flow data and conditions. Remediation of the contamination to the bankfull flow elevation, would result in the removal of approximately 14,000 yd<sup>3</sup> of contaminated soils and fill material from this zone. The extent of stream bank to be remediated is approximately 2,100 linear feet around the peninsula extending inland up to approximately 25 feet from the stream bed and with an average depth of 7 feet. Excavated soils would be moved to the upland part of the site, spread and placed under the proposed soil cover. All excavated material would be replaced with clean fill. Stream bank stabilization and restoration measures would be performed in the remediated area to provide natural erosion protection and to provide for the re-establishment of the riparian habitat. Bank stabilization and restoration would be designed to protect the stream bank without reducing floodwater conveyance consistent with 6 NYCRR Part 608.

Various types of erosion controls would be installed along areas of the stream shoreline as part of the bank stabilization and restoration in those areas exposed to strong erosional forces. Controls would be designed to dissipate the creek energy at bankfull flow as opposed to transferring it downstream. The backfilled areas and erosion controls would be tied together. Erosion control measures would include combinations of non-structural measures (slope grading and re-vegetating), bioengineering (brush matting, tree root wads), biotechnical (erosion control mats, vegetated structures), and structural (riprap, boulders, weirs) features where applicable.

The soils inland of the bankfull flow elevation to the south, east and west of the ORF, in those areas not paved, and the spread soils from the excavations along the stream bank would be covered with 1-foot of medium permeability soil to provide a cohesive, stabilized containment area that would prevent human exposure to the contamination in accordance with the Restricted Use - Commercial SCO of 1,000 ppm for lead. The area to be covered would comprise approximately 7.0 acres of surface area. Prior to covering, the area would be grubbed, graded and sloped. This would eliminate the mounds of fill and depressions on the peninsula caused by the extensive historical test pitting and aborted excavations, and would provide control of surface water drainage. The covered area would be restored by hydro-seeding except along the top of the bank where other vegetation (e.g. small shrubs, meadow grasses) would be planted within a 10 foot wide buffer to protect the restored bank. The buffer area would be managed to preclude growth of large trees or other deep rooted vegetation.

This alternative would include the installation of isolated passive vents to control the landfill gas. The vents would be installed in the cover area and would extend approximately to the bottom of the fill depth below the ground surface. The number and location of the vents would be designed to provide overlapping zones of influence. No further treatment of the low level methane would be required. The installation of passive vents would minimize the potential health and safety concerns associated with the build-up of gas in nearby structures.

Figure 8 shows the approximate location of the bankfull flow elevation, extent of the soil cover and the locations of gas vents.

Institutional controls in the form of an environmental easement will be put in place which would require continued commercial use of the property, development and compliance with an approved site management plan which restricts excavation into and below the soil cover, pavement, or buildings, including the areas within the site boundary north of the soil cover where lead contamination above the Commercial SCO is located at depth; restricts groundwater use, and requires continued monitoring of site media to include groundwater, surface water, sediment and biota as well as biannual site inspections.

The design and complete implementation of the alternative would take approximately 24 to 36 months from the selection of the remedy.

## **7.2 Evaluation of Remedial Alternatives**

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York 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.
2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will 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.

The next five “primary balancing criteria” are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the

community, the workers, 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.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site 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.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

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.

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 for each alternative are presented in Table #1.

This final criterion 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.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports 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. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

## **SECTION 8: SUMMARY OF THE PROPOSED REMEDY**

The Department is proposing Alternative #5, Stream Bank Soil Removal, Soil Cover, Bank Stabilization, Passive Landfill Gas Control, Institutional Controls and Continued Monitoring as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS.

Alternative 5 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site for human health by limiting direct contact exposure of humans to the surface and subsurface soils by utilizing a soil cover. Alternative 5 would also eliminate further release of contaminants into Cayuga Creek by removing contaminated soils and waste from the stream bank and installing stream bank stabilization and restoration measures in the riparian zone. It would provide control of the landfill generated methane gas, thus reducing this health and safety hazard. Alternative 5, to a greater degree than Alternative 4, eliminates to the extent practical, terrestrial wildlife exposure to contaminated surface and subsurface soils on the site. The placement of the 1 foot of soil and management of the area as landfill cover would meet the Protection of Public Health SCO for commercial use in this area and would be consistent with the operations on-going at the site (DPW and ORF). Alternative 3, total landfill excavation, would completely comply with the threshold selection criteria. Alternative 4, by leaving contaminated soils above the Protection of Ecological Resources SCO both on-site and along the stream bank, would comply to a

considerably lesser degree than Alternatives 3 and 5.

Alternatives 1 and 2 ( the No Action and Institutional Controls / Monitoring Alternatives) do not include actions to contain, remove, or treat contaminants that pose a current or potential threat to human health and the environment. While Alternative 2 would monitor the various site and stream media and would provide some measure of reduction of the potential for direct contact through the institutional controls, it would not fully meet the remedial objectives for the site.

The five balancing criteria are particularly important in selecting a final remedy for the site.

Alternatives 3 and 4 (excavation and removal), and 5 (stream bank soil excavation and soil cover) all have short-term on-site impacts which could be mitigated through the use of engineering controls. Short term impacts for the on-site area and surrounding community would include increased construction traffic and its associated noise and dust generation. Based upon the volume of materials to be excavated under Alternative 3 and the corresponding volume of backfill materials needed, this action would have the greatest short term impacts at the site and the surrounding community, followed by Alternatives 4 then 5.

Short term impacts to the stream may be associated with the construction of the stabilization and restoration measures and the erosion controls, and include such things as increased turbidity levels and minor impacts to the biota during bank relocation and/or stream diversion if required. These short-term impacts can be minimized by protecting all excavated slopes as soon as practicable, controlling storm water runoff, limiting the use of construction equipment in the waterway and using sediment traps, all of which would be part of the remedy construction erosion and sediment control plan. The short-term impacts associated with the erosion controls in Alternatives 3, 4 and 5 are expected to be minor and/or controllable and the recovery of the stream environment would occur in a reasonable time. Construction work associated with Alternatives 3, 4, and 5 would not result in the interruption of any DPW or ORF activities.

Long-term effectiveness and permanence at the site would be best achieved with the restoration of the site to pre-disposal conditions (Unrestricted Use SCOs) as outlined in Alternative 3. However, Alternative 3 would involve excavation of 12 acres of the landfill footprint, with a volume of approximately 106,000 yds<sup>3</sup>, containing a heterogeneous mixture of wastes, composed of municipal solid waste, co-disposed with the lead containing incinerator ash and contaminated soils. Based upon the volume and type of wastes present, Alternative 5, represents the presumptive remedial method for the site (containment, in lieu of complete landfill excavation), which has been successfully utilized at other Class 2 municipal landfills.

Alternative 3 would provide long-term effectiveness and permanence by removing all the waste. The long-term effectiveness and permanence of Alternative 5 is less certain than for Alternative 3 because burrowing wildlife exposure to lead contaminated soils on the landfill may not be completely eliminated by the 1 foot soil cover. However, the use of a soil cover and the stream bank stabilization in Alternative 5 would provide a balanced approach to long-term effectiveness and permanence in terms of wildlife exposures, by restoring the natural riparian and buffer zone habitats at the site. On-site biota monitoring would be performed in order to assess the effectiveness of Alternative 5 at eliminating to the extent practical, adverse impacts to burrowing wildlife in the long-term. Like Alternative 3, Alternative 5 will provide a stable restored stream bank that will increase the long-term effectiveness of the remedy by eliminating lead migration into Cayuga Creek.

Alternative 4, would provide long-term effectiveness and permanence to a lesser degree than Alternative 5, in that some contaminated site soils at concentrations between 63 ppm and 1000 ppm would be left exposed to possible erosion both on the upland portion of the site and near the stream. In addition, Alternative 4 would depend solely on erosion control measures to stabilize the eroding stream bank which is less likely to provide the long-term effectiveness in permanently reducing the erosion pathway into Cayuga Creek.

Alternatives 3 and 4 rely on the availability of permitted and operating hazardous waste disposal facilities



to accept waste from the site. Depending on the facility utilized for upland disposal under these alternatives, the waste may have to be pre-treated. Alternative 3 and 4 would provide an on-site reduction in the volume of contamination and the associated reductions in mobility and toxicity. Alternative 5, would not reduce toxicity or volume, but would reduce the on-site mobility of the contaminants, particularly along the stream bank, to a greater extent than Alternative 4.

Alternatives 3, 4, and 5 are all readily implementable on a technical basis. One of the technical aspects which had to be taken into consideration in the analysis of the various alternatives is the fact that the site is located in a FEMA Zone A4 (100 year flood plain). Flood plain regulations dictate that any development in the flood plain should demonstrate “no adverse effects”, which is interpreted as no physical damage to an adjoining or other property. In addition, floodways receive extended protection. Any development in this zone must create no rise in base flood elevation. Alternatives 3 and 4, because they would maintain the same existing site elevations, would have no adverse effects on the flood plain. In the case of Alternative 5, the majority of the proposed soil cover is located above the designated floodway. For that portion of the alternative within the designated floodway (stream bank stabilization / restoration area and buffer zone) the remedy would be designed to meet the no rise criteria and/or would incorporate techniques to mitigate these effects in order to maintain floodwater conveyance capacity. In general, the bank stabilization / restoration and buffer strip, proposed in Alternative 5, would aid in flood mitigation in that natural conditions would be restored and drainage patterns improved. Any remedial work along the stream bank would comply with 6 NYCRR Part 608. The stabilization and restoration of the stream bank in Alternatives 3 and 5 are more likely to meet the substantive requirements of this location specific SCG than the erosion control measures in Alternative 4. Alternatives 3 and 4 involve off-site activities, thus the implementability of these alternatives from an administrative basis, is greater than that of Alternative 5.

The implementation of Alternative 5 would allow for some degree of flexibility in remediating OU-02 of the site, if required. For example, contaminated soils and stream sediments may be able to be consolidated under the soil cover of OU-01.

The cost of the alternatives vary significantly. Alternative 3, excavation to pre-disposal conditions (Unrestricted Use SCOs) is the most expensive, followed by Alternative 4, hot spot removal and then Alternative 5, stream bank soil removal and soil cover. All three of these alternatives include stream bank restoration or erosion controls and Alternatives 4 and 5 both have continued monitoring, thus the costs for these aspects of the remedies are roughly the same for each. Waste disposal, backfill materials and construction management are substantial costs associated with Alternative 3 and to a lesser degree with Alternative 4. It is anticipated that there would be no waste disposal costs associated with Alternative 5. Although Alternatives 3 and 5 would be protective to different degrees (unrestricted versus commercial) as evaluated above, consideration is given to the cost differential in utilizing Alternative 5 for remediating the site, based upon the presumptive remedy and current site use.

The estimated present worth cost to implement the remedy is \$2,300,000. The cost to construct the remedy is estimated to be \$2,000,000 and the estimated average annual costs for 15 years is \$26,000.

The elements of the proposed remedy are as follows:

1. A remedial design program including a hydrologic and hydraulic analysis, would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.
2. The soils/wastes/fill in the areas along the stream bank up to the bankfull flow elevation would be excavated and backfilled with clean soil. The stream bank would be restored and stabilized including erosion controls, in accordance with 6 NYCRR Part 608. In addition, a one foot thick soil cover as depicted in Figure 8, would be constructed over vegetated areas on-site above the bankfull flow elevation. The excavated material from along the stream bank would be integrated under the cover system. The top six inches of soil would be of sufficient quality to support

vegetation. Clean soil would constitute soil that meets the Division of Environmental Remediation's criteria for backfill or local site background. Non-vegetated areas (buildings, roadways, parking lots, etc.), would be covered by a paving system or concrete at least 6 inches thick.

3. Imposition of an institutional control in the form of an environmental easement that would require (a) limiting the use and development of the property above the bankfull flow elevation and the buffer strip to commercial use, which would also permit industrial use; (b) compliance with the approved site management plan; (c) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.
4. Development of a site management plan which would include the following institutional and engineering controls: (a) management of the final cover systems to restrict excavation into and below the soil cover, pavement, or buildings, including the areas within the site boundary north of the soil cover where lead contamination above the Commercial SCO is located at depth; (b) continued evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified; (c) monitoring of groundwater, surface water, sediments and biota (pre-remedial and long term); (d) identification of any use restrictions on the site; (e) fencing to control site access; and (f) provisions for the continued proper operation and maintenance of the components of the remedy.
5. The property owner would provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal would: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.
6. Since the remedy results in untreated hazardous waste remaining at the site, a pre-remedial and long-term monitoring program would be instituted. Site groundwater and biota and the adjacent Cayuga Creek surface water and sediments would be monitored. The monitoring would insure that the contamination is not being mobilized to the Cayuga Creek environment via dissolution in the groundwater and/or by direct erosion of the soils. This program would allow the effectiveness of the soil cover system, stream bank stabilization and restoration measures to be monitored and would be a component of the long-term management for the site.

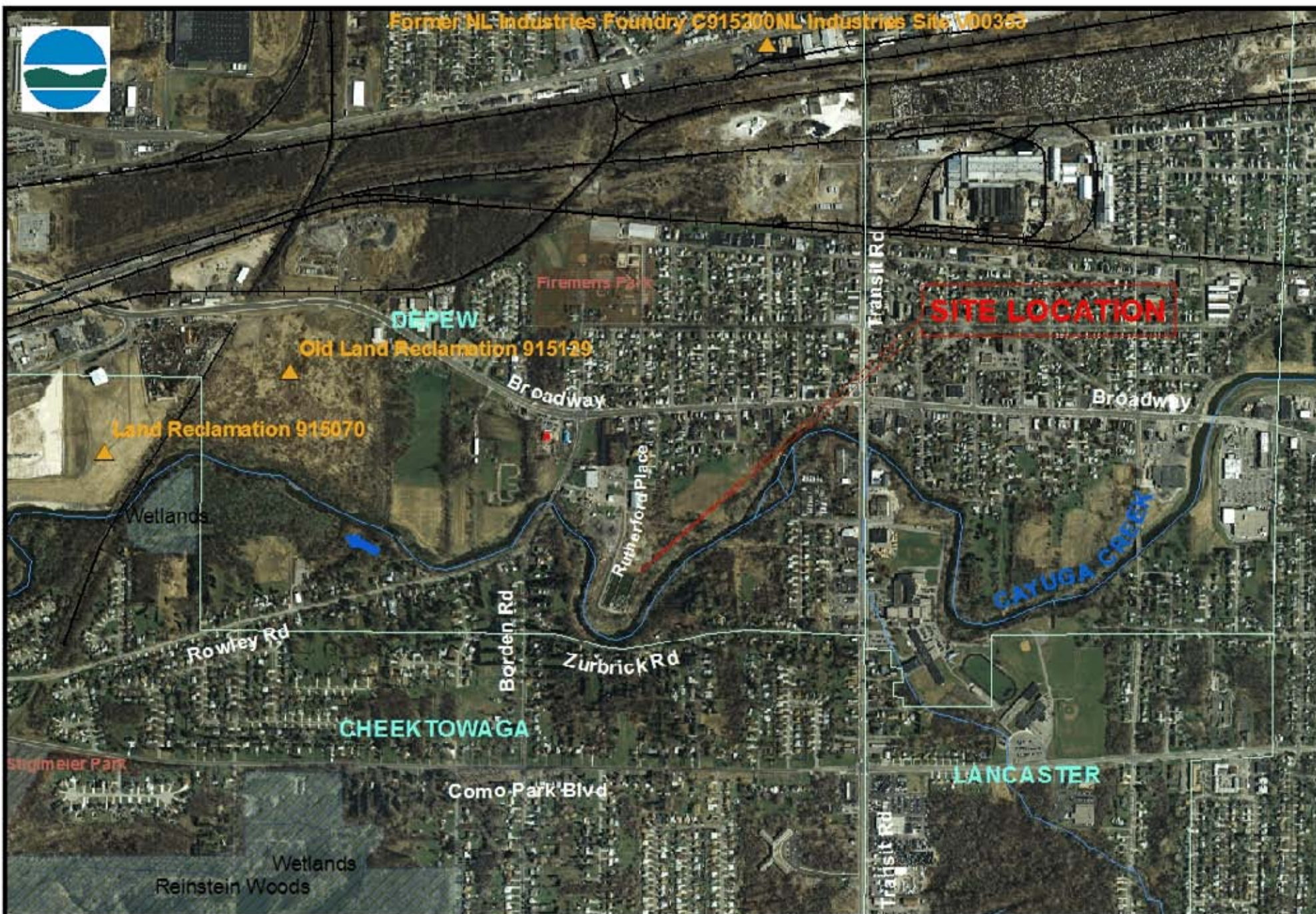
**Table 1**  
**Remedial Alternative Costs**

<b>Remedial Alternative</b>	<b>Capital Cost (\$)</b>	<b>Annual Costs (\$)</b>	<b>Total Present Worth (\$)</b>
Alternative 1: No Action	\$0	\$17,000	\$197,000
Alternative 2: Institutional Controls with Continued Monitoring	\$44,000	\$17,000	\$240,000
Alternative 3: Contaminated Soil Removal to Pre-disposal Conditions , Off-site Disposal, Bank Stabilization and Continued Monitoring	\$9,700,000	\$20,400	\$9,900,000
Alternative 4: Contaminated Soil Removal and Off-site Disposal, Erosion Control, Institutional Controls and Continued Monitoring	\$3,100,000	\$20,400	\$3,400,000
Alternative 5: Stream Bank Soil Removal, Soil Cover, Bank Stabilization, Passive Landfill Gas Control, Institutional Controls and Continued Monitoring	\$2,000,000	\$26,000	\$2,300,000





Former NL Industries Foundry C915200NL Industries Site V00353



DEPEW VILLAGE LANDFILL  
#915105 OU-01  
SITE LOCATION MAP



0 500 1,000 2,000 3,000 4,000  
Feet

FIGURE 1





DEPEW VILLAGE LANDFILL  
 SITE #915105  
 OPERABLE UNIT-01

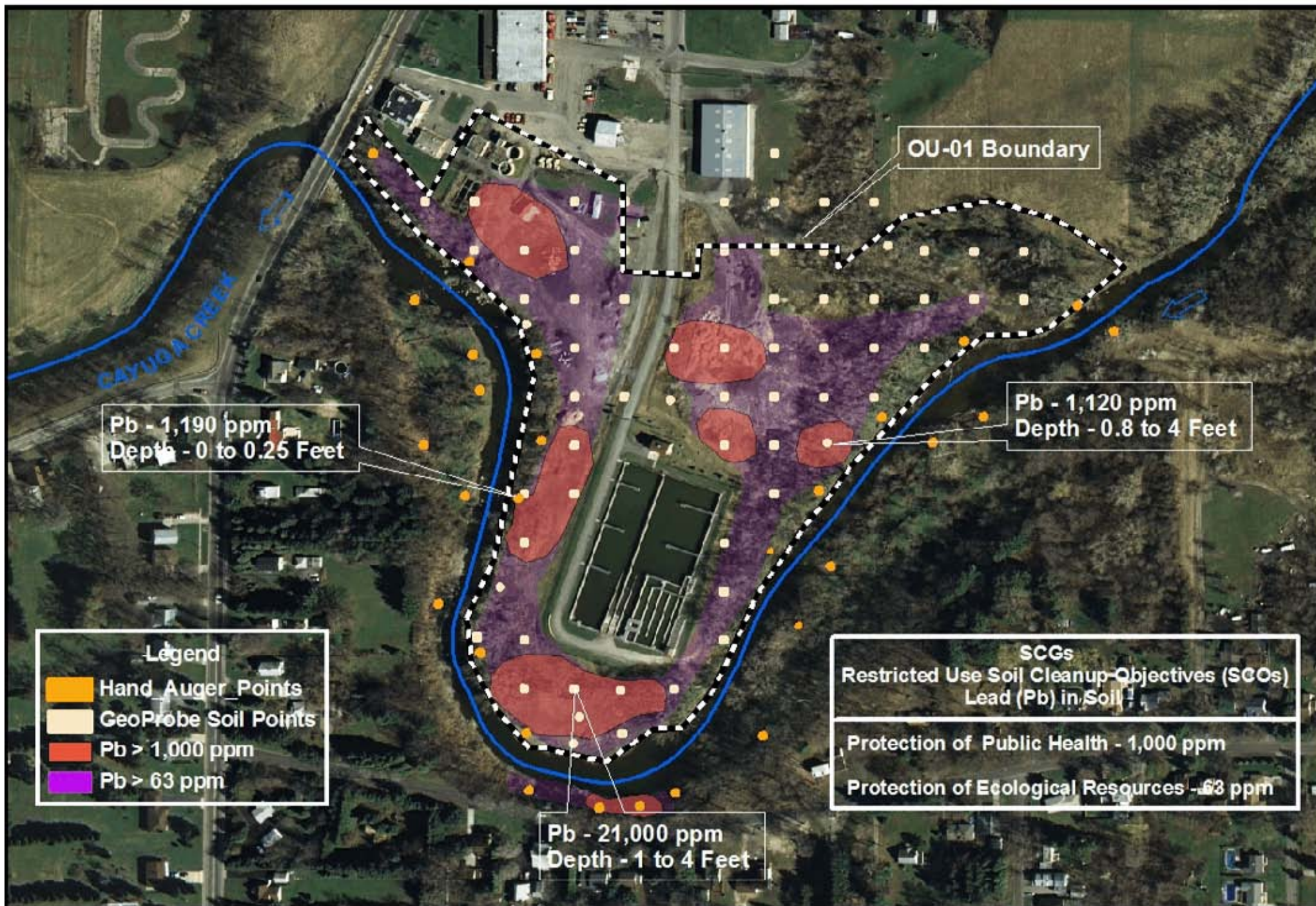
DEPEW VILLAGE LANDFILL  
 OPERABLE UNIT - 01 BOUNDARY



0 75 150 300 450 600  
 Feet

FIGURE 2





DEPEW VILLAGE LANDFILL  
SITE #915105  
OPERABLE UNIT-01

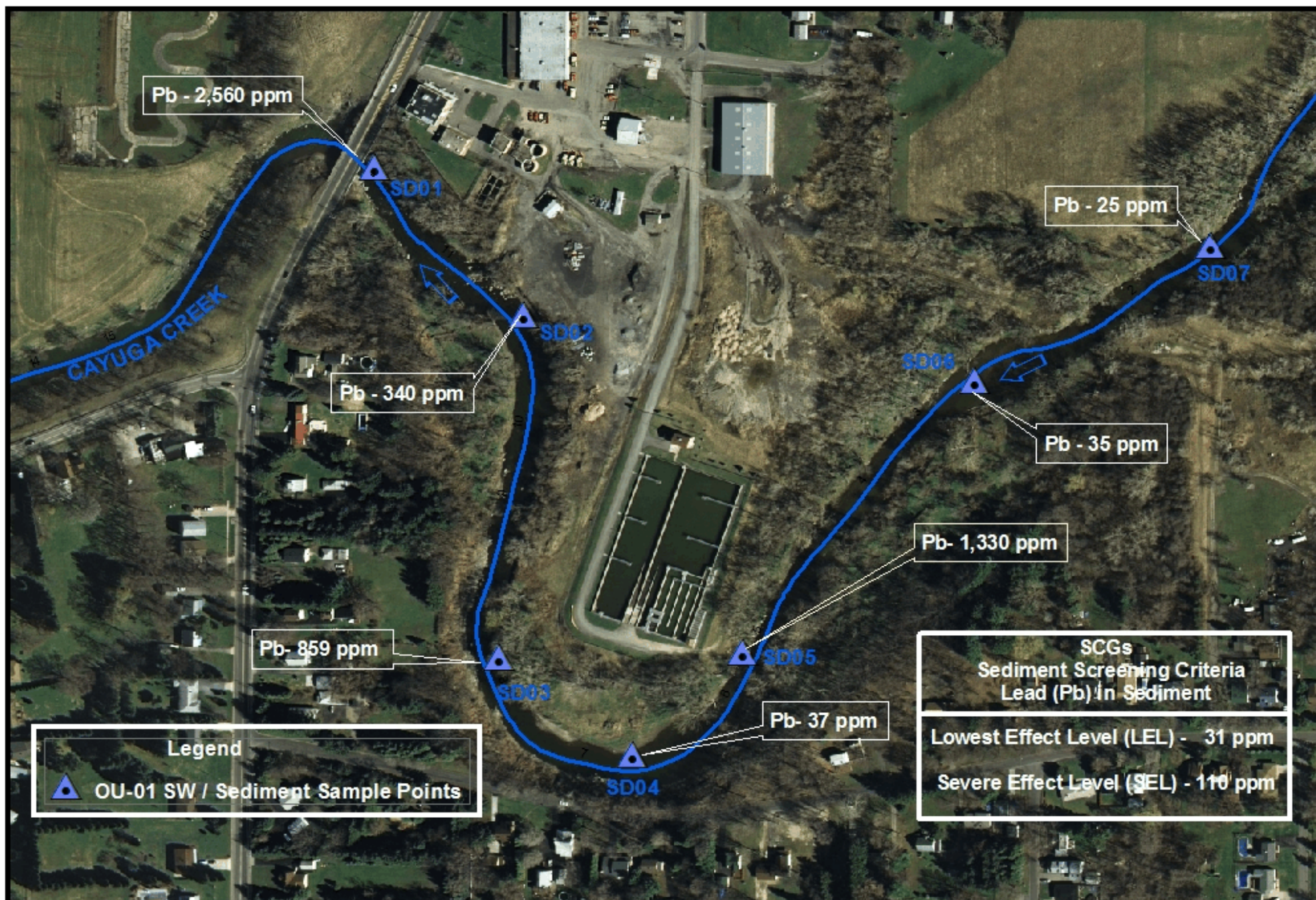
NATURE AND EXTENT OF CONTAMINATION  
LEAD (Pb) IN SOILS - FEB 2006



0 40 80 160 240 320 400  
Feet

**FIGURE 3**





DEPEW VILLAGE LANDFILL  
 SITE #915105  
 OPERABLE UNIT-01

NATURE AND EXTENT OF CONTAMINATION  
 LEAD (Pb) IN SEDIMENTS - FEB 2006



0 40 80 160 240 320 400  
 Feet

**FIGURE 4**





DEPEW VILLAGE LANDFILL  
SITE #915105  
OPERABLE UNIT-01

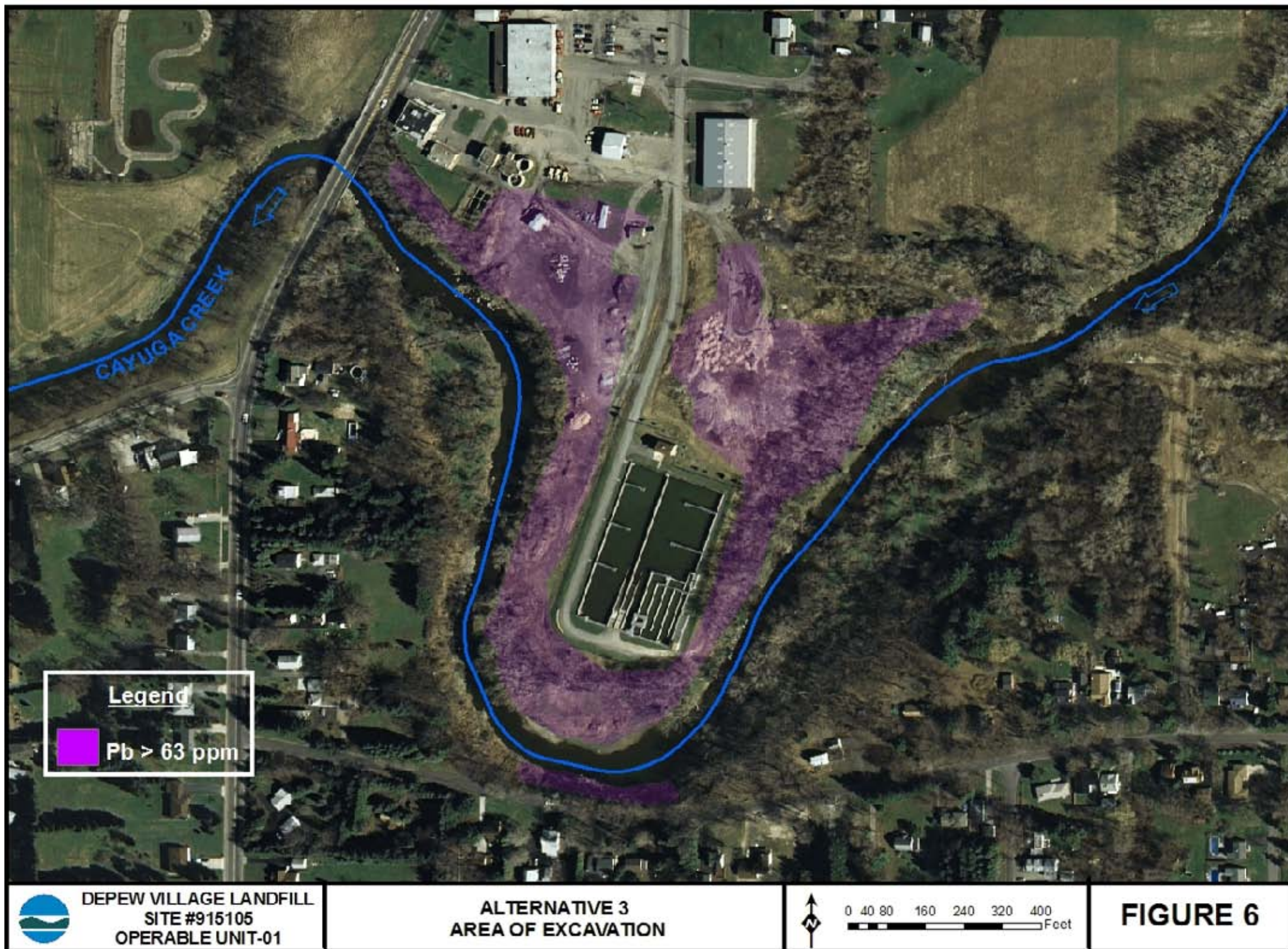
NATURE AND EXTENT OF CONTAMINATION  
EXTENT OF LFG IN SOIL VAPOR - FEB 2006



0 40 80 160 240 320 400  
Feet

FIGURE 5









DEPEW VILLAGE LANDFILL  
SITE #915105  
OPERABLE UNIT-01

ALTERNATIVE 4  
AREAS OF EXCAVATION - EROSION CONTROL



0 40 80 160 240 320 400  
Feet

FIGURE 7





DEPEW VILLAGE LANDFILL  
SITE #915105  
OPERABLE UNIT - 01

ALTERNATIVE 5  
CREEK BANK SOIL REMOVAL, BANK STABILIZATION,  
SOIL COVER, PASSIVE GAS CONTROL,  
INSTITUTIONAL CONTROLS AND MONITORING



0 50 100 200 300 400  
Feet

**FIGURE 8**