Final
Feasibility Study for the
Depew Village Landfill Site
Operable Unit - 01
Site No. 9-15-105
Depew, New York

July 2007

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
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List of Abbreviations and Acronyms

ARAR	applicable or relevant and appropriate
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
COPC	contaminants of potential concern
cy	cubic yards
DER	Department of Environmental Remediation
DPT	direct push technology
DPW	Depew Department of Public Works
EEEPC	Ecology and Environment Engineering, P.C.
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FWIA	Fish and Wildlife Impact Assessment
GRAs	General Response Actions
HW	hazardous waste
MCL	maximum contaminant levels
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NHP	National Heritage Program

List of Abbreviations and Acronyms (cont.)

NYCRR	New York Code of Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
ORF	Overflow Retention Facility
OSWER	Office of Solid Waste and Emergency Response
OU	operable unit
PAH	polynuclear aromatic hydrocarbon
PanAmerican	PanAmerican Environmental, Inc.
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo dioxins
PCDF	polychlorinated dibenzo furan
PID	photoionization detector
PP	priority pollutant
PPE	personal protective equipment
ppm	parts per million
PRAP	Proposed Remedial Action Plan
RAO	remedial action objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SCG	standards, criteria, and guidance
SCO	soil cleanup objectives
SI	site investigation
SMP	Site Management Plan
SVE	soil vapor extraction

List of Abbreviations and Acronyms (cont.)

SVOC	semivolatile organic compound
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TCLP	toxicity characteristic leaching procedure
TOGS	Technical and Operational Guidance Series
URS	URS Corporation, Inc.
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VCP	Voluntary Cleanup Program
VOC	volatile organic compound

1 Introduction

Ecology and Environment Engineering, P.C. (EEEPC), under contract to the New York State Department of Environmental Conservation (NYSDEC), was tasked to perform a remedial investigation (RI) and feasibility study (FS) at the Depew Village Landfill Site (Site No. 9-15-105) located in the village of Depew, Erie County, New York. The RI investigation was completed between October 2005 and August 2006 with a final RI report, *Remedial Investigation Report for the Depew Village Landfill Site*, submitted to NYSDEC in March 2007 (EEEPC March 2007). The FS is the subject of this current report.

1.1 Purpose of the Feasibility Study

The purpose of an on-site FS is to identify and evaluate technologies that are applicable to remediating the on-site areas identified in the RI as requiring remedial actions. The technologies most appropriate for the site conditions are then developed into remedial action alternatives that are evaluated based on their environmental benefits and cost. The information presented in a FS report is typically used by NYSDEC to select on-site remedial action(s). The on-site remedial action(s) selected would then be summarized by NYSDEC in a Proposed Remedial Action Plan (PRAP), which would be released for public comment. After receipt of public comment, NYSDEC would issue a Record of Decision (ROD).

The development of this FS follows the NYSDEC goal to be protective of human health and the environment. The FS was conducted in general accordance with the following documents:

- NYSDEC Division of Environmental Remediation, *Technical Guidance for Site Investigation and Remediation* (December 2002);
- U.S. Environmental Protection Agency, *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (1988);
- NYSDEC Final Technical Administrative Guidance Memorandum No. 4030, *Selection of Remedial Actions at Inactive Hazardous Waste Sites* (1990); and

- The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] 300).

Incorporating the guidance provided by NYSDEC, the FS process includes the following:

- Establishing the remedial goals and remedial action objectives (RAOs) (Section 2 of this report);
- Identifying general response actions (Section 2);
- Identifying and screening appropriate technologies (Section 3);
- Developing and assembling remedial alternatives (Section 3);
- Analyzing the remedial alternatives (Section 4); and
- Recommending a remedy (Section 5).

1.2 Site Background

1.2.1 Site Description

The Depew Village Landfill has been also known as the "Depew Department of Public Works (DPW)/Cayuga Creek" site and the "Zurbrick Road" site. These names were used when this site was in the Voluntary Cleanup Program (VCP) and during the United States Army Corps of Engineers (USACE) activities at the site, respectively. The site was listed previously (in the 1980s) and is currently listed on NYSDEC's Registry of Hazardous Waste Sites as the "Depew Village Landfill," Hazardous Waste (HW) Number 9-15-105. As in the RI, this FS refers to the site as the Depew Village Landfill.

The portion of the Depew Village Landfill identified in the early 1980s as Site Number 9-15-105 (registry site) consisted of approximately 1.3 acres located on a peninsula of an oxbow of Cayuga Creek (see Figure 1-1). Cayuga Creek, which ultimately empties into Lake Erie, is the surface waterbody closest to the site and creates the peninsula, which is bounded on the south, east, and west by the creek. The Overflow Retention Facility (ORF) for Erie County Sewer District Number 4 is located in the central part of the site, with some wooded areas along the creek banks. The peninsula encompasses the southern tip of the former landfill area. Across Cayuga Creek to the south of the landfill lies Zurbrick Road (see Figure 1-2).

The exact dimensions of the entire Depew Village Landfill are not known because the locations of landfilled material or debris were not recorded. As determined by NYSDEC, the study area comprised 32 acres, including the peninsula (which contains the Registry site itself) and portions of the landfill (north) and Zurbrick Road (south) sides of Cayuga Creek (see Figure 1-2). The defined boundaries include the following:

- The northern study area boundary includes the Village of Depew DPW parking lot bordering Rutherford Place and extends east along a tree line to Cayuga Creek abutting properties and mowed fields.

- The western, southern, and eastern study area boundaries follow the southern shore of Cayuga Creek. A narrow strip of land along the southern bank of Cayuga Creek that parallels the peninsula shoreline and extends up to Borden Road was also included.

The current site registry area consists of 20 acres within the site study area. Approximately 25% of the study area is covered by buildings, roads, and the ORF. The ORF occupies approximately 1.6 acres, and while it is located within the study area, sampling in the area of the ORF was not conducted because subsurface soil contamination below the facility is not anticipated (ORF construction documents indicate that the fill within the ORF footprint was excavated prior to construction); and the facility is active and has extensive subsurface utility lines, making investigation difficult. Most of the remaining area is covered by unmanaged brush and trees.

Following development of the RI and NYSDEC's review of the data and site concerns, the site boundaries (as noted above) were slightly adjusted and the site was split into two geographic operable units (OUs). The first, OU-1, includes approximately 20 acres contained within the banks of the peninsula from the median water's edge with a north boundary (extending west to east) identified as a combination of the southern perimeter of the DPW parking lot, the bordering road, Apple Lane, and the tree line that abuts mowed fields to the north and continues to Cayuga Creek. This FS focuses on this 20-acre area, which will be referred to as the "Site" from hereon.

The second, OU-2, includes Cayuga Creek (surface water and sediment) and both the creek embankment and adjacent shoreline along Zurbrick Road (see Figure 1-2). Discussions with NYSDEC indicate that additional investigation may be completed at OU-2 and a separate FS would be completed in the future.

1.2.2 Site History/Previous Site Investigations

The Depew Village Landfill was operated by the Village of Depew between 1940 and 1961. As previously noted, the exact dimensions of the landfill are unknown. Anecdotal data in previous site assessments (see Engineering Science, Inc. and Dames & Moore, Inc. 1988) indicate that the landfill may have originally consisted of approximately 20 acres and that during operation the landfill received approximately 10,000 tons per year of municipal waste. In addition to bulk waste, municipal waste was also reportedly incinerated on the site; the resulting ash was disposed of at the landfill. Spent foundry sand from Dresser Industries was reportedly used as daily cover material at the landfill.

The following is a chronological regulatory history of the site:

- Approximately 1983: The site was listed as a Class 2a site in the Registry of Inactive Hazardous Waste Sites.
- 1983: Erie County acquired 14.5 acres from the Village of Depew, including the 1.3-acre registry area, for the ORF project. During subsequent ORF construction activities, approximately 60,000 cubic yards (cy) of waste were removed from the middle of the peninsula and disposed of in the BFI landfill in Tonawanda, New York (Engineering Science, Inc. and Dames & Moore, Inc. 1988). Following ORF construction, the Village of Depew reacquired approximately 9.5 acres of the 14.5 acres sold to Erie County; the county retained the 5 acres on which the ORF is located. The 9.5-acre reacquired portion includes the registry site and much of the RI study area.
- March 1983: A site investigation of subsurface conditions was completed by Drill & Test, Inc. and Krehbiel Associates for Erie County Sewer District Number 4 in conjunction with the ORF construction. Laboratory analysis of soil samples was not conducted.
- 1985: The Erie County Department of Environment and Planning prepared a "Hazardous Waste Site Profile Report," which concluded that no hazardous material was landfilled at the site.
- January 1988: A Phase I Investigation was completed by Engineering Science, Inc. and Dames & Moore, Inc. for NYSDEC. This report recommended conducting a Phase II investigation of the site.
- October 1990: NYSDEC de-lists the site from the Registry of Inactive Hazardous Waste Disposal Sites, based upon the determination that no hazardous wastes have been identified at the site in the soils/fill samples collected.
- Fall 2001: The Village of Depew contracted with the USACE to perform a stream bank stabilization project on a section of Cayuga Creek abutted by Zurbrick Road (see Figure 1-1). During soil excavation on the creek's north side, the USACE noticed the presence of fill material. Ensuing sampling and analysis of this fill area indicated high total lead concentrations and exceedances of the U.S. Environmental Protection Agency's (EPA) toxicity characteristic leaching procedure (TCLP) regulatory limits for lead. The fill material was consequently classified as hazardous waste. USACE operations subsequently ceased.

- October 2002: Based upon the presence of hazardous waste, the Village of Depew entered into the NYSDEC VCP. The site was designated as Depew DPW/Cayuga Creek Site, VCP Number V00609-9.

- Spring 2003: The Village of Depew hired PanAmerican Environmental, Inc. (PanAmerican) of Buffalo, New York, and their teaming partner URS Corporation, Inc. (URS), as consultants to conduct a site investigation (SI).

- May 2003: The SI work plan was approved by NYSDEC.

- June 2003: SI field work was conducted.

- July 2003: Preliminary SI results were reported. The SI revealed that the vertical and areal extent of metals contamination was more widespread than anticipated.

- June 2004: The SI/Remedial Report prepared by PanAmerican for the Village of Depew under the VCP was finalized and released. This report confirmed that previously measured total lead concentrations and TCLP results exceeded regulatory criteria. It also indicated that metal contamination at the site may be extensive. Data from four surface and six subsurface soil samples analyzed for semivolatile organic compounds (SVOCs) indicated that low polynuclear aromatic hydrocarbon (PAH) concentrations were also present in site soils.

- June 2004: The Village of Depew opts out of the VCP and the Voluntary Cleanup Agreement was formally terminated. The listing package for this site is subsequently circulated and the site is later re-listed in the New York State Registry of Inactive Hazardous Waste Sites as a Class 2 site. In addition, NYSDEC's Division of Environmental Remediation (DER) refers the site for an RI/FS under the state Superfund program.

- September 2005: EEEPC received work assignment D003493-57 to conduct an RI/FS of a study area, including the registry area, extending to near the DPW buildings north of the landfill area and including the portion of the Cayuga Creek bank opposite the landfill area.

1.3 Remedial Investigation

EEEPC's RI of the Depew Village Landfill Site identified the physical and chemical characteristics of the study area. Surface water and sediment samples were collected. Surface soil sample points were hand-augered; soil borings were drilled from grade to refusal (bedrock, in most cases) with subsurface soil samples collected from each core hole; and new groundwater monitoring wells were installed, developed, and sampled. Figure 1-3 shows the locations of all the RI sample points. Soil vapor was not a targeted media. However, bubbling noticed in water from MW-06 resulted in testing groundwater for methane. Methane was identified in the groundwater, which indicates that subsurface soil may possibly contain soil vapor methane. Methane could be associated with subsurface decomposition of waste.

Analytical data was then screened to compare groundwater, surface water, soil, and sediment data to appropriate criteria, including the NYSDEC Class GA and Class C Ambient Water Standards and Guidance Values (June 1998, with updates); the New York Code of Rules and Regulations (NYCRR) Part 375-6.8(b) Restricted Use Soil Cleanup Objectives (SCOs) for Protection of Public Health - Commercial Setting, (effective December 15, 2006), and the screening criteria presented in the NYSDEC Technical Guidance for Screening Contaminated Sediments (January 1999), respectively.

Lead was determined to be the contaminant of primary concern due to its prevalence and concentration throughout the site. No other organic or inorganic analytes were used to determine cleanup objectives. However, the lead-enriched waste does not appear to be impacting site groundwater or Cayuga Creek surface water. Surface water and sediment located in an on-site depression at the northeastern corner of the site likely results from the lead leaching into this depression. Lead enters Cayuga Creek through erosion of lead-enriched soils along the banks of the creek. Eroded soils then settle among the creek sediments.

The site chemistry is such that the site groundwater at most locations is not enriched in lead. Therefore, while rain water infiltrates into the site, enters the groundwater, then flows radially outward toward the creek, RI data do not suggest lead-enriched water enters the creek. No off-site contaminant sources for any on-site elevated contaminant concentrations in any media were conclusively identified as a direct lead source.

1.3.1 Nature and Extent of Contamination

Sediment

Sediment samples were collected from ten locations: eight from Cayuga Creek and two from low-lying areas on site. No volatile organic compounds (VOCs) were present at concentrations exceeding NYSDEC's Technical Guidance for Screening Contaminated Sediments criteria. Neither pesticides nor polychlorinated biphenyls (PCBs) were detected among the eight sediment samples submitted for pesticide analysis. Thirteen SVOCs were detected among these samples; however, none of the compound concentrations exceeded sediment screening criteria. Twenty-one metals were detected among the sediment samples. The following nine metals were present at concentrations exceeding their established criteria: antimony, arsenic, copper, iron, lead, manganese, nickel, silver, and zinc. Neither of the two samples (SD01 and SD03) submitted for TCLP-lead analysis produced an extract lead concentration exceeding the EPA's threshold concentration of 5 milligrams per liter (mg/L).

Surface Water

Surface water samples were collected from eight locations directly from the landfill shore of Cayuga Creek during the first round of sampling and from two locations from ponded areas on the northeast side of the site during the second sampling round. Toluene is the only VOC present; it was identified in samples from two locations: SW01, which is upstream, and SW08, which is downstream of the site. Neither of the toluene concentrations exceeded the screening criteria. SVOCs, pesticides, and PCBs were not detected among the surface water samples that were submitted. Aluminum, copper, iron, lead, silver, thallium, and mercury were all detected in at least one sample at concentrations exceeding screening criteria. Most all of these exceedences were detected in the surface water samples collected from on-site ponding. These exceedences could be in part due to the high turbidity of the sample water.

Surface Soil

Twenty-eight original plus two duplicate samples were collected from around the study area and were submitted for priority pollutant (PP) metals analysis to determine whether surface soil exposure risk was present at the site and to characterize the general condition of surface soils. Eleven metals (antimony, arsenic, beryllium, chromium, copper, lead, mercury, nickel, silver, thallium, and zinc) were detected in the surface soil samples but at concentrations below their respective 6 NYCRR Part 375 Restricted Use SCOs for commercial sites.

Results of comparison with the 6 NYCRR Part 375 SCOs showed the following:

- Arsenic concentration in sample HAC13-01 exceeded the Restricted Use SCOs for commercial sites.
- Lead concentration in samples HAE8A-01, DL-HAF1-01, and HAG1-01 exceeded the Restricted Use SCOs for commercial sites.
- Lead concentrations in nine surface soil samples (HAG1, F1, E2, E3, E8, E9, E11, J7 and C13) exceeded the Restricted Use for Protection of Ecological Resources SCO of 63 ppm.

TCLP-lead analysis of the six hand-augered surface soil samples showed that none of the samples contained leachable lead at concentrations exceeding the EPA's regulatory threshold of 5 mg/L.

While specific testing for methane was not conducted, methane was identified in the groundwater, which indicates that subsurface soil may contain soil vapor methane. Headspace testing for methane conducted on the groundwater wells during the winter did not detect methane at concentrations greater than 0.5 parts per million (ppm), which was the detection limit of the gas vapor analyzer.

Subsurface Soil

Seventy-four field and five duplicate subsurface soil samples were collected from around the site. Subsurface soil data were compared with 6 NYCRR Part 375 Restricted Use SCOs – Commercial Site, criteria based on possible future uses of the site. VOCs and SVOCs were detected, mainly in samples BHD13-01 and BHJ11-01. Most concentrations did not exceed the commercial site criteria. One SVOC, benzo(a)pyrene, exceeded criteria.

Eight field samples and one duplicate sample were submitted for Target Analyte List (TAL) metals; all other subsurface soil field and duplicate samples were submitted for PP metals. Results of comparison with commercial site criteria showed the following exceedences: arsenic, barium, cadmium, copper, lead, nickel, and zinc in various soil samples.

The two subsurface soil samples submitted for TCLP-lead analysis did not exceed the EPA's TCLP threshold extract lead concentration of 5 mg/L.

A plot of the soil lead concentration data for the site showed that, for the area investigated, approximately 2.8 acres of the site contains lead at concentrations more than 1,000 mg/kg.

Groundwater

Two rounds of groundwater samples were collected from all six newly installed monitoring wells. In addition, one groundwater sample was collected directly from core hole BHJ11 (no well had been constructed). VOCs 1,4-dichlorobenzene, benzene, and chlorobenzene were detected at concentrations exceeding NYSDEC Class GA standards in both rounds of sampling at MW-06. That same well also contained the only two SVOCs (2-methlynapthalene and naphthalene) detected. Naphthalene exceeded its respective NYSDEC drinking water standard; its source may be related to the other VOCs present. Both Aroclor 1016 and Aroclor 1260 were detected at concentrations exceeding regulatory criteria in unfiltered MW-03 groundwater. Pesticides were not detected among the groundwater samples submitted. All metals concentrations were significantly lower in the filtered sample portions as compared with the unfiltered sample portions. Between the two sampling rounds, 16 metals were detected in concentrations exceeding NYSDEC Class GA Standards. Metals whose concentration exceeded regulatory criteria in filtered samples were antimony, iron, manganese, magnesium, selenium, and sodium. Lead was detected above Class GS standards in one round of filtered groundwater from one well. Methane gas was detected in groundwater from five of the six wells.

1.3.2 Fate and Transport

Contaminant Sources

Analytical data indicate that the primary source of most elevated metal concentrations in site soils is the fill material, principally the ash. Analytical data show the fill material is rich in lead, zinc, and other metals. The original SVOC source is suspected to be the waste processed through the incinerator because SVOCs can be a product of trash combustion. They may be present in the site soils due to the burial of the incinerator ash.

Routes of Migration

Precipitation that does not exit the site as runoff or through evaporation can infiltrate areas not covered by an impermeable barrier. Infiltrating water can dissolve soluble elements and compounds present in the unsaturated zone and carry them downward to the groundwater table. The infiltrating contaminated water can then move with the groundwater flow, causing contaminant migration beneath the site. The unconsolidated overburden geology indicates groundwater flow allows both vertical and lateral migration of contaminants located within the saturated zone. While this indicates groundwater flow would enable contaminants to travel from their point of entry into the groundwater and out to Cayuga Creek via the site's radial groundwater flow pattern, surface water analytical results do not show that contaminants continuously move into the stream from the site.

Surface water of the continuously flowing Cayuga Creek passing by the Depew Village Landfill site could serve as a migration mechanism to transport dissolved contaminants off-site. However, surface water quality data does not show that appreciable concentrations of lead are being transported off-site in this manner. Field observation show the creek receives minor contaminant contribution from overland flow and from leachate seeps as it flows past the Depew Village Landfill site. However, the significant contaminant transport mechanism that seems to occur is that of erosion of contaminated soil. The eroded soil enters the creek not only by direct erosion, but also via slumping of lead-rich soil that is undermined by stream bank erosion. While contaminated soils could erode from any exposed fill areas, erosional forces are most prevalent on the Zurbrick Road hillside, which is considered part of OU-2.

Methane gas can leave the landfill through soil vapor releases. Soil vapor in the form of methane gas has been identified in the groundwater. Although evidence of the presence of methane gas exists, not enough information is known about the source. For the purpose of this FS, it is assumed that some methane gas is present and that additional investigation would be needed (possibly as part of remedial design) to better define the extent and amount of methane gas present.

1.3.3 Qualitative Human Health Risk Evaluation

Activities within and surrounding the site consist of ORF and DPW operations which include personnel mobilization, scrap metal and debris storage, and other public works activities. Also, persons may potentially traverse the site for recreational fishing. The northwestern portion of the site is fenced; however, the site is accessible via foot traffic on the northeast corner of the site. The perimeter of the peninsula is also not fenced. The site is not monitored and would be considered relatively accessible to the public or workers.

SVOCs were originally not anticipated as the primary contaminants. The major contaminants of potential concern (COPCs) identified in the sampled environmental media were benzo(a)pyrene and metals, particularly arsenic and lead. Therefore, only 10% of the field samples were submitted for SVOC analysis. Benzo(a)pyrene exceeded the commercial site risk-based concentration in three subsurface soil samples. However, detection in three samples was considered not representative of characteristics associated with the site or indicative of concentrations across the site.

The major contaminants of potential concern were present at concentrations exceeding regulatory criteria in surface and subsurface soils. Under existing conditions and use, workers at the site could potentially be exposed to contaminants in surface soils from activities that disturb the soil and from fugitive dust. Further direct contact and inhalation exposure could occur if employees of the DPW, ORF, and utility or maintenance workers were to perform subsurface work.

Because much of the contaminant concentrations exceeding risk-based screening levels were found in subsurface soils, if the soils were excavated, construction workers could be exposed to soil contaminants during excavation operations. Note that short-term exposures for some workers during site redevelopment or during utility work could be greater than the standard worker exposure assumptions. Such exposures are expected to be relatively brief and may be mitigated by appropriate monitoring, engineering controls, and using personal protective equipment (PPE).

Although the source and risk of methane gas has not been confirmed, it is included as a concern within the FS as associated with landfills. Workers in the on-site buildings could potentially be exposed to or inhale methane gas if a soil vapor pathway exists. This pathway, however, has not been confirmed and it is unknown if the levels of methane are significant enough to create a risk. Currently no methane gas has been identified in any of the buildings. Workers have been informed of the possible concerns associated with methane gas.

Exposure to surface water contaminants is limited and such exposure would not significantly contribute to the overall health risk posed to workers or visitors at the site. Exposure to contaminants in surface water and sediment through ingestion from recreational fishing would not contribute significantly to the human health risk from exposure to contaminants at the site. And because groundwater drinking wells are not located within the area, the groundwater exposure pathway is incomplete and does not pose a direct threat to users.

Fish and Wildlife Impact Assessment

A fish and wildlife impact assessment (FWIA) was conducted during the RI. Six distinct terrestrial cover types were identified during the field survey of the study area. Most of the field cover types present are essential for providing small wildlife openings and edge habitat for many bird species. Shrubs bordering these areas produce fruits important to the diets of many songbirds and provide habitat for white-tailed deer and eastern cottontail. The primary aquatic resource within a 0.5-mile radius of the site is Cayuga Creek, which is fed in part by runoff from the landfill. Cayuga Creek is classified as Class C surface water; which is water not used as potable water but that supports fish propagation and survival and can be used for fishing and fish consumption. There are no NYSDEC-classified wetlands on site.

United States Fish and Wildlife Service (USFWS) and the New York State (NYS) National Heritage Program (NHP) both indicated that two rare species categorized as impaired and critically impaired by the NYS NHP are present within a 2-mile radius of the site: the Wabash pigtoe mollusk (*Fusconaia flava*) and the northern brook lamprey (*Ichthyomyzon fossor*).

Elevated concentrations of site contaminants in soil and sediment could lead to adverse impacts, including:

- Bio-concentration in tissues of aquatic and terrestrial organisms using the site as a food source;
- Adverse effects on survival, growth, and reproduction of wildlife that use the landfill site and surrounding areas to satisfy their food and habitat needs; and
- Adverse effects on survival, growth, and reproduction on fish and benthic life in Cayuga Creek and areas downstream that may have been impacted by downstream transport of contamination.

1.3.4 Conceptual Site Model

The study area consists of a heterogeneous fill body containing lead-enriched soils located on permeable plain deposits underlain by nearly flat-lying bedrock. The northwestern horizontal extent of this lead-enriched matrix has not yet been determined. With no top liner over the landfill, precipitation may infiltrate the fill and leach site contaminants out of the fill as it migrates downward to the groundwater table. While groundwater can flow radially from the fill out to Cayuga Creek, surface water quality data does not indicate the site contributes a dissolved contaminant load to the creek. However, visual observations indicate that some minor leachate seeps flowing out of the fill and downward across the fill slope adjacent to Cayuga Creek, and ultimately flowing into the creek, appear to be enriched in iron. Groundwater may also be entering bedrock through fractures. Contaminants present in leachate seeps flowing to the creek can collect in sediments located where surface water flow is minimal. However, site data do not indicate that lead is leaching from the site along these pathways.

RI data indicate there is a solid waste mass of municipal waste mixed with incinerator ash, which is enriched with lead and other metals. It is assumed that this waste mass has been and continues to be degraded anaerobically, possibly creating pockets of methane gas. Site data indicate that the chemical characteristics of the soil and the waste are inhibiting the lead from being mobilized by dissolution to the groundwater, where it could migrate into the surface water of Cayuga Creek Minor leachate seeps may contribute soluble metals such as salts of sodium and manganese to the creek environment. Exposed waste along the creek shoreline both on- and off-site may allow the waste-containing soils to be eroded by the highly energetic Cayuga Creek and subsequent deposition of the lead contamination directly into the creek sediments.

1.3.5 Risk Summary

Based on evaluation of the RI data and the potential and/or actual risks to human health and the environment, remedial action is recommended to remove threats associated with soil, groundwater, methane gas, and sediment. Cleanup levels in 6 NYCRR Part 375, Restricted Use – commercial sites and Protection of Ecological Resources, have been deemed appropriate for this site based on the present activities, type of contaminants, and access and exposure potential.

1.3.6 RI Conclusions and Recommendations

General Conclusions

The following major conclusions were reached during this investigation:

- While metal-enriched waste exists throughout much of the site, RI data do not indicate that the lead is significantly mobilized by dissolution to the groundwater, which then flows into Cayuga Creek. The minor seeps present on-site would most likely not carry dissolved lead to the creek. The metal-rich waste in the soils is directly eroded into the creek and deposited into the sediments.

- Foundry sand from the Dresser Industries site located off of Transit Road in Depew, New York, was reportedly placed at this site. Comparison of the lead, copper, and zinc concentration ratios indicates that the foundry sand from Dresser Industries does not appear to be the source of the elevated lead concentrations at the Depew Village Landfill site.

- The presence of partially melted glass chips and ash together indicate that much fill material on-site has been processed through an incinerator. The RI data indicate the lead is contained within the ash fill and that some unknown source contributed a lead-rich waste stream, which was then incinerated.

- Waste on the Zurbrick Road hillside has the same physical appearance an similar chemical makeup as the waste on-site. These findings, as well as the proximity of the site to the hillside, collectively imply the waste along the Zurbrick Road hillside is associated with the Depew Village Landfill.

- RI analysis of subsurface soils collected in the landfill tip confirmed the elevated lead concentrations identified during previous studies. Landfill tip soil samples collected during previous site studies failed the EPA's TCLP-lead criteria of 5 mg/L, but none of the RI samples failed the TCLP criteria.

- Comparison of sediment sample lead analytical data from locations upgradient and downgradient of the landfill indicates metal-rich waste in site soils is directly eroded into the creek and deposited into the sediments.

- Elevated concentrations of copper, iron, and nickel in sediment from location SW09 indicate leachate from the fill area may collect in low-lying site areas. With no surface flow outlet, the surface water that collects in this on-site depression infiltrates into the ground or evaporates, enriching the upper site soils with metals.

- Orange iron-oxidization stains in the ash/fill layers throughout most of the landfill indicate that oxygen-bearing surface water percolates through the overburden, through the ash/fill layer, and vertically downward to the water table. This percolation process provides evidence that a mechanism for metals leaching is present.

- Well MW-06 contains a methane concentration significantly greater than that of the other wells.

- The major COPCs identified in the sampled environmental media were benzo(a)pyrene and metals, particularly arsenic and lead. Under existing site conditions, site workers could potentially be exposed to contaminants through direct contact with soil and sediment contaminants.

- TCLP-lead analysis data of sediment, surface, and subsurface soil samples shows that most site soils and sediment would not be classified as a hazardous waste

1.3.7 Data Limitations and Recommendations for Future Work
This FS addresses concerns associated with the Depew Village Landfill. However, the following data limitations must be considered when evaluating the RI data:

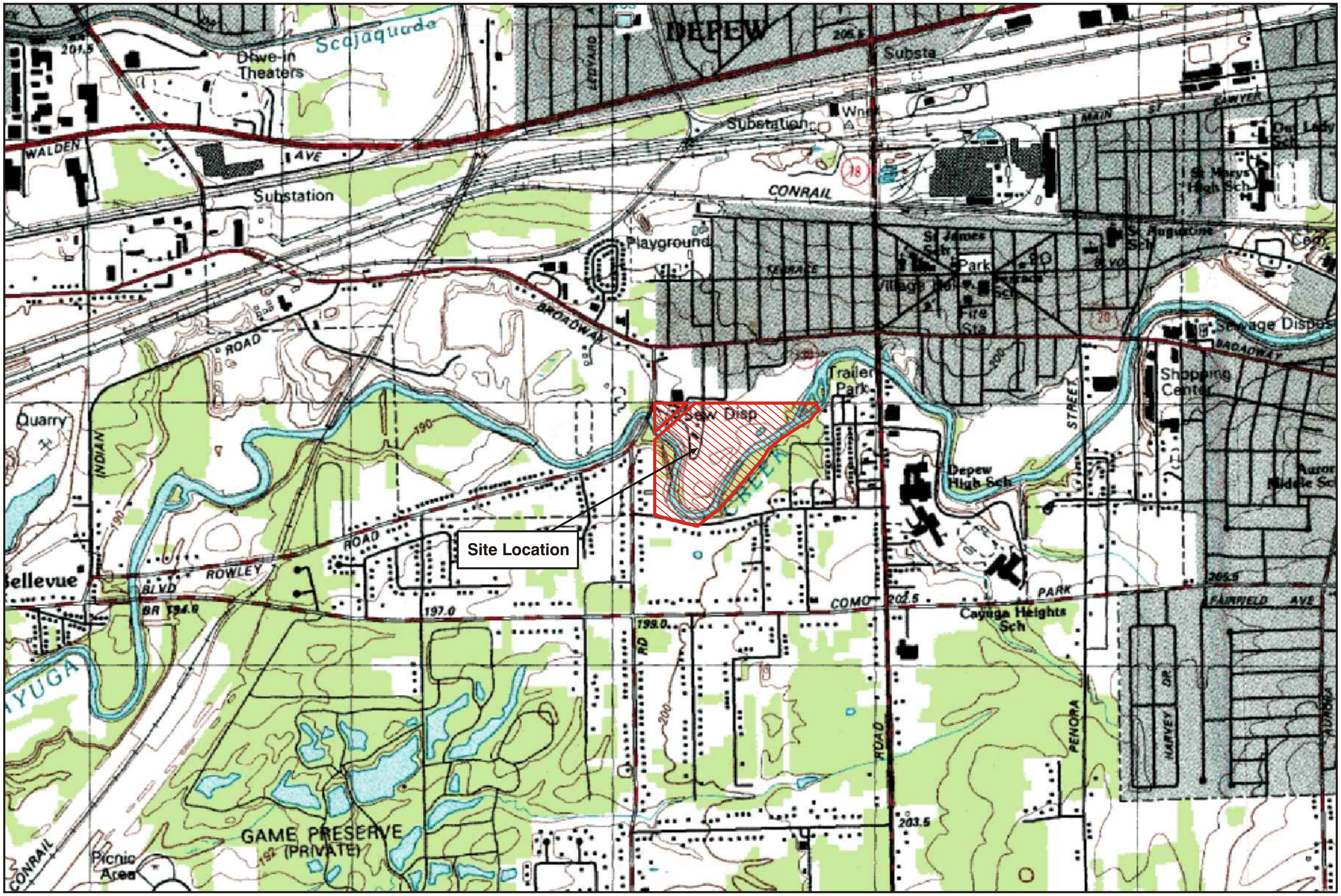
1. The groundwater wells were constructed using a pre-packed screen, which was determined to insufficiently minimize suspended clay and silt in the well bore. Therefore, the unfiltered groundwater samples are not as representative of site groundwater conditions as the filtered samples, which show which compounds are truly present.

2. The RI TCLP data conflicts with the PanAmerican data from 2003. Although potentially different soil types within soil samples may result in

differing leachability and, subsequently, TCLP data, it is reasonable to assume the site should yield similar information on the threshold lead concentration at which the soils will fail the TCLP-lead test. However, this similarity was not encountered.

In addition, stream bank erosion has been identified as a contributing factor to sediment contamination within the stream. This FS addresses removing contaminated soil from the stream banks as necessary and recommends erosion control measures as part of the remedial process for the protection of the Cayuga Creek environment. However, stream bank enhancement in terms of habitat restoration is not considered in the FS because this is beyond the scope of alternative development and typical costing for alternative comparison. During remedial design, stream bank enhancement for replacement and further development of habitat should be considered. In addition, the remedial design should consider maintaining as many trees as possible, followed by replanting in order to maintain visual screens for the ORF and public works buildings.

02:002699_ID13_09-Fig1-1.CDR-04/27/06-GRA



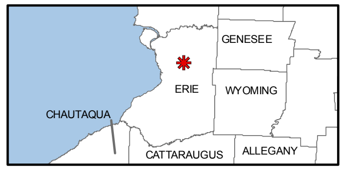
SOURCE: USGS 7.5' Topographic Map, Lancaster, NY Quadrangle (1982)

Approximate Scale

0 2,000 4,000 Feet

Figure 1-1 Site Location Map, Depew Village Landfill Site, Depew, NY

Source: NYS GIS Clearinghouse, 2002



250 125 0 250 Feet

0 50 100 200 Meters

Sewerline Access Path

Depew Village Landfill Site Study Area Boundary

Site Boundary

Initial Registry Site (1.3 acres)

Erie County ORF Property

Note: Erie County ORF Property (approximately 3.8 acres) is excluded from site.

Figure 1-2
Site Base Map
Depew Village Landfill Site
Depew, New York

LEGEND

HA-XX	HAND AUGER SAMPLE LOCATION
SW-XX	SURFACE WATER AND SEDIMENT SAMPLE LOCATION
MW-XX	MONITORING WELL LOCATION
TP-XX	TEST PIT
■	CORE HOLE LOCATION
Ⓢ	SANITARY SEWER MANHOLE
	CATCH BASIN
	SIGN
	WATER VALVE
	FIRE HYDRANT
	UTILITY POLE
E.P.	EDGE OF PAVEMENT
O.R.F.	OVERFLOW RETENTION FACILITY

NOTES

1. HORIZONTAL LOCATIONS SHOWN HEREON ARE BASED ON THE NEW YORK STATE PLANE COORDINATE SYSTEM, NAD83/96 WEST ZONE. A COMBINED SCALE FACTOR OF 0.99990788 WAS COMPUTED FOR THIS PROJECT.
2. VERTICAL LOCATIONS SHOWN HEREON ARE BASED ON TRAVERSE NO. 9012, FOUND FEBRUARY 8, 2006, SUPPLIED BY ECOLOGY AND ENVIRONMENT ENGINEERING, P.C.
3. SITE INFORMATION TAKEN FROM POPLI DRAWING 3276.03 DATED APRIL 2006.
4. TEST PITS SHOWN ON THIS FIGURE WERE EXCAVATED BY PANAMERICAN ENVIRONMENTAL, INC. IN 2003. THEY ARE SHOWN FOR REFERENCE PURPOSES ONLY.
5. EDGE OF WATER SYMBOL IS APPROXIMATE NORTH OF THE SEWER LINE ACCESS TRAIL.

DWG. NO.	DATE	DESCRIPTION
		REFERENCE DRAWINGS

NO.	DATE	DWN	APP'D	DESCRIPTION
A	–	KMK	–	–
				REVISIONS

ecology and environment engineering, p.c.

DESIGNED BY	CHECKED BY
J. NICKERSON	–
DRAWN BY	APPROVED BY
K. KRAJEWSKI	–

DEPEW LANDFILL

NYSDEC CONTRACT No. D004435

VILLAGE OF DEPEW ERIE COUNTY NEW YORK

RI SAMPLE POINT LOCATIONS

SCALE	DATE ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
1"=100'-0"	–	Figure 1-3	FIGURE – 1-3	A

F:\DEPEW LANDFILL\POPLI\Jan 07\FS Report\FIGURE 2-1.dwg
BUFFplot: 2/26/07 KMK

2 Development of Remedial Action Objectives and Definition of Contaminated Media of Concern

2.1 Introduction

Based on an evaluation of the analytical results in the RI, potential risks and exposure routes posed by site contamination were identified. This evaluation was conducted for both human and environmental receptors.

The evaluation identified the following potential risks at the site:

- Direct contact exposure to contaminated surface and subsurface soils by employees of the DPW and other persons accessing the site.
- Direct contact exposure to contaminated surface and subsurface soils by future construction workers involved in soil excavation.
- Direct contact exposure to contaminated groundwater by public works employees or future construction workers involved with site excavation.
- Direct inhalation of methane gases by public works employees, persons accessing the site, or future on-site workers.

2.2 Remedial Action Objectives

2.2.1 Development of Remedial Action Objectives

RAOs are goals set for environmental media such as soil, groundwater, sediment, and surface water (medium-specific objectives) that are intended to protect human health and the environment. These RAOs form the basis for the FS by providing overall goals for site remediation. The RAOs are considered when identifying appropriate remedial technologies and formulating alternatives for the site and, later, during the evaluation of remedial alternatives. RAOs are based on engineering judgment, risk-based information established in the risk assessment, and potentially applicable or relevant and appropriate (ARARs) standards, criteria, and guidance. To define the area or volume of each medium that must be addressed to meet the RAOs, chemical-specific cleanup goals were developed for each medium at this site. These cleanup goals were developed based on the following considerations:

- Evaluation of standards and other criteria and guidance (SCGs);
- Impacts on human health and the environment; and
- Costs.

Standards and *criteria* refer to promulgated and legally enforceable rules or regulations. *Guidance* refers to policy documents that are non-promulgated and therefore are not legally enforceable.

The SCGs presented in this report are in accordance with the following:

- Section 121(d)(2) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).
- EPA guidance values set forth in the CERCLA National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR 300) and in the two-part document *CERCLA Compliance with Other Laws Manual* (Office of Solid Waste and Emergency Response [OSWER] Directives 9234.1-01 [Draft], August 8, 1988, and 9234.1-02, August 1989) and *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA-540/G-89/004).
- NYSDEC DER–10, *Technical Guidance for Site Investigation and Remediation* (December 2002).
- NYCRR Part 375, Subpart 6, *Remedial Program Soil Cleanup Objectives*, December 14, 2006.
- NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4046, *Determination of Soil Cleanup Objectives and Cleanup Levels* (NYSDEC 1994).
- NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1, *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (NYSDEC 1998).

There are three types of SCGs:

- **Chemical-Specific SCGs.** Usually health- or risk-based numerical values or methodologies that establish an acceptable amount or concentration of a chemical in the ambient environment. They are used to assess the extent of remedial action required and to establish cleanup goals for a site. Chemical-specific SCGs may be directly used as actual cleanup goals or as a basis for establishing appropriate cleanup goals for the contaminants of concern at a site.

- **Action-Specific SCGs.** Usually technology- or activity-based requirements that guide how remedial actions are conducted. These may include record-keeping and reporting requirements; permitting requirements; design and performance standards for remedial actions; and treatment, storage, and disposal requirements.

- L**ocation-Specific SCGs.** Restrictions placed on the concentration of hazardous substances or the conduct of activity solely because the activities occur in special locations. Examples of location-specific SCGs include building code requirements and zoning requirements. Location-specific SCGs are commonly associated with features such as wetlands, floodplains, sensitive ecosystems, or historic buildings that are located on or close to the site.

2.2.2 Proposed Cleanup Goals

Cleanup goals are established by evaluating the available SCGs for each contaminant. In general, this process uses standards as preliminary screening values. If no standards exist for a given contaminant, the most appropriate criterion or guidance value is selected as a preliminary screening value. The preliminary screening values are compared with site-specific background values, if available, to ensure that no preliminary screening value is set below background concentrations. If the site-specific background concentration is higher than the SCG-based preliminary screening value, then the background concentration is selected as the preliminary screening value instead. These preliminary screening values then are compared with site data to identify which contaminants may require cleanup. These contaminants are then considered with regard to other factors influencing the need for cleanup, including comparison with regional background levels and an evaluation of contamination. The cleanup goals set by this process are compared again with site data in order to identify areas that must be addressed in the FS.

This process is completed for each medium. Soils and soil vapor have been identified as the media of concern at the Depew Village Landfill. SCGs applicable to the media of concern are presented in the section below. This section describes and presents illustrations showing the extent of contamination exceeding the cleanup goals. These areas and volumes form the basis for the remedial technology selection and alternative development sections in this FS.

2.2.3 Remedial Action Objectives

This section presents the objectives for on-site remedial actions that will be considered to protect human health and the environment. The RAOs were developed based on the nature and extent of contamination, consideration of qualitative human health risk evaluation, and potentially applicable or relevant and appropriate SCGs. The following RAOs have been established for soil and groundwater:

- Soil
  - Eliminate, to the extent practicable, direct contact with or ingestion of surface and subsurface soil by humans and animals.
  - Eliminate, to the extent practicable, direct contact with or ingestion by humans and animals of on-site sediment that may be found in ponded water across OU-01.
  - Eliminate, to the extent practicable, erosion or discharge of contaminants to surface water and sediments of Cayuga Creek.
  - Eliminate, to the extent practicable, soil gas migration and possible vapor intrusion to surrounding municipal buildings, structures, and utilities.

- Groundwater
  - Minimize, to the extent practicable, the potential leaching of contaminants into groundwater and surface water.
  - Minimize, to the extent practicable, the potential human or animal exposure to contaminated groundwater and surface water.

2.2.3.1 Soils

Standards and Criteria

There are no standards or criteria identified for cleanup of lead in soils.

Guidance Values

Criteria and objectives are established by 6 NYCRR Part 375 for Restricted Use – commercial sites, and have been included in Tables 2-1 through 2-4 along with the analytical data for subsurface soil samples. Tables 2-7 and 2-8 summarize the frequency of detections and exceedances of the screening criteria for these media. Although the 6 NYCRR Part 375 values were developed to be health protective, they do not necessarily indicate the actual or potential health risks posed by site soil contamination. Often the more stringent values listed for organic chemicals are based on protecting groundwater that might be used as a drinking water source. Most of the remaining soil cleanup objectives for organic chemicals are risk-based values based on potential soil ingestion in a residential setting and assume a magnitude of exposure considerably greater than would reasonably be expected at this site.

Surface Soil

Twenty-eight original and two duplicate samples were collected from around the study area to determine whether surface soil exposure risk was present at the site and to characterize the general condition of surface soil.

Eleven PP metals and mercury were detected among the 28 original and two duplicate soil samples (see Table 2-1). Lead concentrations ranged from 11.6 milligrams per kilogram (mg/kg) to 2,160 mg/kg. Soil data were compared with the 6

NYCRR Part 375 Restricted Use SCOs – commercial site. This comparison showed most soil lead concentrations were below these regulatory criteria. Five general areas located on the main landfill contained lead at concentrations exceeding the criteria. These areas included surface and/or subsurface soils, depending on the location. However, only one on-site surface soil sample (HAE8) contained lead concentrations higher than 1,000 ppm.

In addition to lead, only arsenic in sample HAC13-01 was found at a concentration exceeding the 6 NYCRR Part 375 commercial site criteria (see Table 2-1).

Surface soil data was also compared with the 6 NYCRR Part 375 SCOs - Protection of Ecological Resources because site surface soils, particularly soils located along the creek bank, are eroding and directly contributing to impacts on creek sediment. Six on-site surface soil samples exceeded this SCO of 63 ppm.

TCLP Analysis

Five surface soil samples and one duplicate sample were collected and submitted for total lead analysis in addition to TCLP analysis (see Table 2-2). Lead concentrations in all six samples were less than the 6 NYCRR Part 375 commercial site criteria of 1,000 mg/kg. None of the TCLP extract concentrations from these four hand-augered surface soil samples exceeded the EPA regulatory threshold of 5 mg/L.

Subsurface Soil

Seventy-four field and five duplicate subsurface soil samples were collected from 68 borehole locations. One sample was collected from each borehole except for when an additional ash layer was encountered and/or an elevated photoionization detector (PID) reading was obtained. In such cases, a second sample was collected for laboratory analysis. In addition to the borehole samples collected via direct push technology (DPT), three subsurface soil samples were collected via hand auger.

Subsurface soil data were compared with 6 NYCRR Part 375 commercial site criteria based on possible future uses of the site (see Tables 2-3 and 2-4). Because site soils are eroding and directly contributing to impacts on creek sediment, the data were also compared with the 6 NYCRR Part 375 SCOs - Protection of Ecological Resources. (Figure 3-1 shows the area of the site where subsurface lead concentrations exceeded 63 ppm.) The following results were found:

VOCs. Eighteen VOCs were identified in the samples (see Table 2-4). Most of the VOCs were found in BHF4-02 and BHJ11-01. There were no VOCs present at concentrations exceeding 6 NYCRR Part 375 commercial site criteria.

SVOCs. Twenty-two SVOCs were detected in the soil samples (see Table 2-4). The majority of these compounds were present only in the samples from

BHD13-01 and BHJ11-01. Only one SVOC was present at a concentration exceeding 6 NYCRR Part 375 commercial site regulatory criteria: benzo(a)pyrene in BHD13-01, and BHJ11-01.

Pesticides. Four pesticides were detected in three soil samples: BHD13-01, BHD13-01/D, and BHI10-01. Pesticides were not detected in any of the other samples (see Table 2-4). None of the pesticide concentrations exceeded 6 NYCRR Part 375 commercial site regulatory criteria.

PCBs. One PCB (Aroclor 1254) was detected in the soil sample collected from MW-04-01. PCBs were not detected in the subsurface soil samples from the other borings (see Table 2-4). The concentration did not exceed 6 NYCRR Part 375 commercial site regulatory criteria.

Priority Pollutant Metals Analysis. Most of the samples were submitted for PP metals because the focus of the RI was primarily on lead and other PP metals. However, to obtain a general assessment of the concentrations of TAL metals not on the PP metals list (aluminum, barium, calcium, cobalt, iron, magnesium, manganese, potassium, sodium, and vanadium), nine samples were also submitted for TAL metals analysis. Seven TAL metals were present at concentrations exceeding their respective commercial site SCOs: barium (1 sample); copper (7 samples); lead (15 samples); arsenic (7 samples); cadmium (5 samples); nickel (1 sample) and zinc (1 sample) (see Table 2-3).

Numerous subsurface soil samples exceeded the 6 NYCRR Part 375 - Protection of Ecological Resources SCO. Some of these soils are located along and at depths which could potentially erode into the creek.

Total Lead. One sample, HAE8A-02, was re-collected and submitted for total lead analysis. Its concentration exceeded the commercial site SCO of 1,000 mg/kg (see Table 2-3).

TCLP Lead. Three subsurface soil samples were submitted for analysis of TCLP lead. Analysis showed none of these samples exceeded the EPA's TCLP threshold extract lead concentration of 5 mg/L.

2.2.3.2 Groundwater

Standards and Criteria

Standards identified for groundwater are the NYSDEC Class GA MCLs taken from the NYSDEC Division of Water TOGS 1.1.1. All NYS groundwater is considered Class GA by NYSDEC.

Guidance Values

The NYSDEC Class GA water guidance values were also taken from TOGS 1.1.1. The guidance values (June 1998, with updates) were used for compounds for which NYSDEC Class GA standards have not been established. With respect to human exposure, these values are protective of groundwater as a drinking water source.

The following method was used to select the preliminary clean-up values presented in the table:

- The NYSDEC Class GA standard, if it existed, was selected as the preliminary cleanup value;

- If a groundwater standard did not exist for a constituent, the NYSDEC Class GA guidance value, if it existed, was used;

- The preliminary clean-up values were then compared with the maximum observed concentrations of each compound to determine which compounds may require cleanup; and

- Finally, the contaminants identified for cleanup were reviewed to determine whether they are site-related and whether cleanup actually is warranted.

The proposed clean-up goal screening process for groundwater is included in Tables 2-5 and 2-6. Tables 2-9 summarize the frequency of detections and exceedances of the proposed cleanup goals for groundwater.

Based on their presence and magnitude, COPCs identified in groundwater include three VOCs (1,4-dichlorobenzene, benzene, and chlorobenzene), one SVOC (naphthalene), two PCBs (Aroclor 1016 and Aroclor 1268), and 15 metals, primarily present in the highly turbid unfiltered samples (antimony, arsenic, beryllium, cadmium, chromium, copper, iron, lead, magnesium, manganese, nickel, sodium, thallium, zinc and mercury). The dissolved metals present above applicable standards were iron, manganese, magnesium, and sodium.

The Depew Village Landfill site and surrounding area are served by municipal water provided by the DPW, which uses the Erie County Water Authority's system, which draws its supply from Lake Erie. Under existing site conditions, the only pathway for direct contact with contaminated groundwater would be through seeps that emerge to the surface. Thus, neither surface water nor groundwater are included as media of concern related to OU-1 at this time, and the 6 NYCRR Part 376 Protection of Groundwater SCOs are not applicable to the site soils. Therefore, RAOs will not be considered for groundwater.

2.2.3.3 Soil Vapor

Standards and Criteria

There are no standards or criteria identified for methane in soil gas vapor or ambient air. However, the presence of landfill gas does present a potential safety hazard.

Guidance Values

There are no guidance values for methane in soil gas vapor or ambient air that can be used to establish compliance with soil gas vapor criteria. NYSDOH has released a draft guidance document for public comment, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (February 2005). This document provides guidance for screening soil and sub-slab vapor and indoor and outdoor air samples against databases of typical background concentrations, air guidelines for selected contaminants, and decision matrices for a few specific contaminants. However, based on the lack of methane detections during the latest monitoring (on January 22, 2007), soil gas recommendations will be based on NYCRR Part 360, Subpart 2 as well as applicable engineering controls.

During the RI investigation, methane gas was detected in groundwater from five of the six wells. It is believed that the methane may be related to soil vapor release, the mechanism by which methane gas leaves the landfill. While the likely source of the methane is the decaying landfill material itself, what is not identified is a mechanism for the methane to enter the groundwater.

Prior to development of the FS, the headspace in each of the wells was monitored, as were some of the outfalls associated with the site features. Four constituents (methane, carbon dioxide, oxygen, and any balance gases) were measured as a percentage of the ambient air concentration. Methane was not detected in any of the wells or at the outfalls. This does not indicate that methane is not present, but possibly that the air concentrations were less than the detection limit of the meter. This may indicate that off-gassing has occurred within the well areas and that significant methane concentrations do not exist in the subsurface but are related to small localized pockets of landfill waste.

It is expected that ongoing waste decomposition and, thus, methane generation may continue. However, not enough information is known to determine the actual source, the media transfer mechanism, or the physical threats to human health and the environment. Soil gas vapor will be considered during this FS to ensure that any proposed alternatives do not exacerbate the situation. However, further investigation may be necessary during any remedial design phase.

Table 2-1 Summary of Positive Results for Inorganic Analytes in Surface Soils, Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) Screening Criteria (1)	DL-HAB15-01 0 - 0.25 02/17/2006	DL-HAC12-01 0 - 0.25 02/16/2006	DL-HAC13-01 0 - 0.25 02/17/2006	DL-HAC6-01 0 - 0.25 02/16/2006	DL-HAD10-01 0 - 0.25 02/16/2006	DL-HAD11-01 0 - 0.25 02/16/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	**7.6 J-**	**5.8 J**	**10.9 J-**	**7.0 J**	**7.9 J**	**4.6 J**
Arsenic	16 f	**5.8 J**	**3.1**	**37.4 J**	**4.0**	**5.5**	**2.7**
Barium	400						
Beryllium	590	**0.33 J**	**0.24 J**	**0.48 J**	**0.28 J**	**0.35 J**	**0.20 J**
Cadmium	9.3	0.07 U	0.07 U	0.08 U	0.07 U	0.07 U	0.06 U
Calcium	NA						
Chromium	1500	**10.8**	**8.1 J**	**11.8**	**8.9 J**	**11.1 J**	**6.3 J**
Cobalt	NA						
Copper	270	**26.8**	**16.7**	**51.4**	**13.1**	**23.9**	**13.9**
Iron	NA						
Lead	1000	**46.8**	**13.7 J**	**420**	**20.6 J**	**24.9 J**	**32.6 J**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**18.3 J-**	**12.1 J**	**18.7 J-**	**11.7 J**	**20.9 J**	**9.7 J**
Potassium	NA						
Selenium	1500	0.15 U	0.26 U	0.15 U	0.38 U	0.94 U	0.29 U
Silver	1500	**0.72 J**	0.48 U	**2.4 J**	0.50 U	0.78 U	0.42 U
Sodium	NA						
Thallium	NA	0.15 U	**1.1**	0.15 U	0.13 U	**0.26**	**0.31**
Vanadium	NA						
Zinc	10000 d	**72.5**	**46.6 J**	**143**	**41.2 J**	**67.6 J**	**50.5 J**
Mercury	2.8 j	**0.078**	**0.051 J**	**0.121**	**0.050 J**	**0.072 J**	**0.038 J**

Table 2-1 Summary of Positive Results for Inorganic Analytes in Surface Soils, Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) Screening Criteria (1)	DL-HAD4-01 0 - 0.25 02/17/2006	DL-HAD8-01 0 - 0.25 02/16/2006	DL-HAD9-01 0 - 0.25 02/16/2006	DL-HAE11-01 0 - 0.25 02/17/2006	DL-HAE2-01 0 - 0.25 02/16/2006	DL-HAE3-01 0 - 0.25 02/17/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	**1.6 J**	**6.0 J**	**4.3 J**	**4.2 J-**	**6.1 J**	**6.3 J**
Arsenic	16 f	**3.9 J**	**3.2**	**2.7**	**5.1 J**	**6.5**	**7.8 J**
Barium	400						
Beryllium	590	**0.21 J**	**0.24 J**	**0.19 J**	**0.28 J**	**0.22 J**	**0.27 J**
Cadmium	9.3	0.06 UJ	0.07 U	0.06 U	0.07 U	0.08 U	0.07 UJ
Calcium	NA						
Chromium	1500	**6.6 J**	**7.9 J**	**5.6 J**	**28.5**	**15.8 J**	**19.2 J**
Cobalt	NA						
Copper	270	**17.0 J**	**15.2**	**12.1**	**24.4**	**69.9**	**78.7 J**
Iron	NA						
Lead	1000	**26.3**	**17.2 J**	**20.7 J**	**80.9**	**879 J**	**200**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**12.3 J**	**12.3 J**	**9.7 J**	**14.7 J-**	**10.6 J**	**28.1 J**
Potassium	NA						
Selenium	1500	0.12 U	0.56 U	0.35 U	0.14 U	0.81 U	0.14 U
Silver	1500	**0.48 J**	0.52 U	0.41 U	**0.62 J**	**1.4**	**0.99 J**
Sodium	NA						
Thallium	NA	0.12 UJ	0.13 U	0.12 U	0.14 U	0.16 U	0.14 UJ
Vanadium	NA						
Zinc	10000 d	**46.3 J**	**37.4 J**	**37.2 J**	**71.2**	**393 J**	**185 J**
Mercury	2.8 j	**0.058 J**	**0.061 J**	**0.036 J**	**0.058**	**0.080 J**	**0.182 J**

Table 2-1 Summary of Positive Results for Inorganic Analytes in Surface Soils, Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) Screening Criteria (1)	DL-HAE8A-01 0 - 0.25 02/17/2006	DL-HAE9-01 0 - 0.25 02/17/2006	DL-HAF1-01 0 - 0.25 02/16/2006	DL-HAG1-01 0 - 0.25 02/16/2006	DL-HAH2-01 0 - 0.25 02/16/2006	DL-HAI4-01 0 - 0.25 02/16/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	**7.3 J**	**4.7 J-**	**18.8 J**	**17.3 J**	**0.23 J**	**10.9 J**
Arsenic	16 f	**6.0 J**	**5.0 J**	**9.8**	**7.6**	**5.5**	**5.7**
Barium	400						
Beryllium	590	**0.19 J**	**0.32 J**	**0.38 J**	**0.29 J**	**0.38 J**	**0.42 J**
Cadmium	9.3	**0.20 J**	0.09 U	**0.50**	0.07 U	0.08 U	0.08 U
Calcium	NA						
Chromium	1500	**13.8 J**	**10.7**	**35.6 J**	**18.7 J**	**10.2 J**	**12.3 J**
Cobalt	NA						
Copper	270	**124 J**	**27.5**	**95.4**	0.33 U	**23.9**	**27.5**
Iron	NA						
Lead	1000	**1190**	**97.2**	**2160 J**	**1430 J**	**20.1 J**	**19.5 J**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**17.9 J**	**17.3 J-**	**20.5 J**	**17.6 J**	**20.5 J**	**21.5 J**
Potassium	NA						
Selenium	1500	0.13 U	0.18 U	1.2 U	1.3 U	0.81 U	0.82 U
Silver	1500	**1.9 J**	**0.68 J**	**2.0**	**2.0**	0.79 U	**0.84**
Sodium	NA						
Thallium	NA	0.13 UJ	0.18 U	0.13 U	0.13 U	0.16 U	0.16 U
Vanadium	NA						
Zinc	10000 d	**599 J**	**76.4**	**1160 J**	**982 J**	**57.4 J**	**66.8 J**
Mercury	2.8 j	**0.093 J**	**0.103**	**0.305 J**	**0.520 J**	**0.059 J**	**0.064 J**

Table 2-1 Summary of Positive Results for Inorganic Analytes in Surface Soils, Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) Screening Criteria [1]	DL-HAJ5-01 0 - 0.25 02/16/2006	DL-HAJ5-01-D 0 - 0.25 02/16/2006	DL-HAJ7-01 0 - 0.25 02/17/2006	DL-HAK7-01 0 - 0.25 02/16/2006	DL-HAK8-01 0 - 0.25 02/17/2006	DL-HAL10-01 0 - 0.25 02/17/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	**2.7 J**	**3.2 J**	**7.4 J**	0.805 UJ	**5.7 J**	**2.5 J**
Arsenic	16 f	**2.0**	**1.9**	**4.8 J**	**5.290**	**3.9 J**	**4.7 J**
Barium	400						
Beryllium	590	**0.13 J**	**0.13 J**	**0.26 J**	**0.298 J**	**0.22 J**	**0.28 J**
Cadmium	9.3	0.06 U	0.06 U	**0.46 J**	0.067 U	**0.03 J**	0.07 UJ
Calcium	NA						
Chromium	1500	**5.8 J**	**5.9 J**	**10.8 J**	**10.4 J**	**8.6 J**	**8.8 J**
Cobalt	NA						
Copper	270	**8.8**	**8.7**	**40.3 J**	**25.5**	**17.9 J**	**21.7 J**
Iron	NA						
Lead	1000	**11.6 J**	**14.5 J**	**91.3**	**16.4 J**	**22.0**	**17.8**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**7.0 J**	**6.9 J**	**16.4 J**	**18.6 J**	**12.8 J**	**16.1 J**
Potassium	NA						
Selenium	1500	0.11 UJ	0.11 UJ	0.14 U	1.580 U	0.14 U	0.14 U
Silver	1500	0.35 U	0.33 U	**0.94 J**	0.553 U	**0.50 J**	**0.61 J**
Sodium	NA						
Thallium	NA	0.13 U	0.12 U	0.14 UJ	0.134 U	**0.60 J-**	0.14 UJ
Vanadium	NA						
Zinc	10000 d	**25.5 J**	**25.6 J**	**155 J**	**76.2 J**	**62.5 J**	**59.9 J**
Mercury	2.8 j	**0.028 J**	**0.033 J**	**0.080 J**	**0.940 J**	**0.068 J**	**0.043 J**

Table 2-1 Summary of Positive Results for Inorganic Analytes in Surface Soils, Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) Screening Criteria (1)	DL-HAM9-01 0 - 0.25 02/16/2006	DL-HAN11-01 0 - 0.25 02/17/2006	DL-HAN11-01-D 0 - 0.25 02/17/2006	DL-HAO10-01 0 - 0.25 02/16/2006	DL-HAP12-01 0 - 0.25 02/17/2006	DL-HAR12-01 0 - 0.25 02/16/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	0.79 UJ	**3.5 J**	**1.5 J**	**5.0 J**	**2.9 J**	**4.8 J**
Arsenic	16 f	**2.7**	**5.6 J**	**5.4 J**	**3.3**	**4.0 J**	**3.3**
Barium	400						
Beryllium	590	**0.16 J**	**0.31 J**	**0.29 J**	**0.21 J**	**0.24 J**	**0.24 J**
Cadmium	9.3	0.07 U	0.07 UJ	0.07 UJ	0.07 U	0.07 UJ	0.07 U
Calcium	NA						
Chromium	1500	**6.4 J**	**10.3 J**	**9.4 J**	**6.9 J**	**8.3 J**	**6.7 J**
Cobalt	NA						
Copper	270	**13.5**	**24.2 J**	**22.8 J**	**14.6**	**19.0 J**	**12.0**
Iron	NA						
Lead	1000	**32.3 J**	**33.9**	**31.7**	**13.9 J**	**20.7**	**11.6 J**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**9.5 J**	**18.9 J**	**17.6 J**	**12.0 J**	**14.2 J**	**9.2 J**
Potassium	NA						
Selenium	1500	0.07 UJ	0.14 U	0.14 U	0.05 UJ	0.13 U	0.15 U
Silver	1500	0.37 U	**0.73 J**	**0.67 J**	0.44 U	**0.55 J**	0.35 U
Sodium	NA						
Thallium	NA	**0.31**	0.14 UJ	0.14 UJ	**0.48**	0.13 UJ	0.15 U
Vanadium	NA						
Zinc	10000 d	**41.1 J**	**109 J**	**100 J**	**41.6 J**	**55.9 J**	**33.2 J**
Mercury	2.8 j	**0.044 J**	**0.075 J**	**0.076 J**	**0.049 J**	**0.046 J**	0.014 UJ

(1) New York State Department of Environmental Conservation, Part 375-6.8 Restricted Use Soil Cleanup Objectives Protection of Public Health, Commercial , December 14, 2006
d) The SCOs for metals were capped at a maximum value of 10,000 ppm.
f) For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.
j) This SCO is the lower of the values for mercury (elemental or mercury(inorganic salts).

Bold values indicate detection

Shading indicates values above screening level

Key:

mg/Kg = Miligrams per kilogram.

J = Estimated.

J- = Estimated low

J+ = Estimated high.

R = Rejected data

U = Not detected

UJ = Estimated/Not Detected

Table 2-2 TCLP Analytical Data for Soil Samples, Depew Landfill site, Depew, New York

Sample ID:	DL-HAC13-RE	DL-HAE2-RE	DL-HAE3-RE	DL-HAE8A-02-RE	DL-HAF1-RE	DL-HAF1-RE/D	DL-HAG1-RE	DL-BHH11-01	DLBHK11-01
Depth (feet)									
Analyte	7/17/2006	7/17/2006	7/17/2006	7/17/2006	7/17/2006	7/17/2006	7/17/2006	2/28/2006	2/23/2006
TCLP Lead 6010B (mg/L)									
Sample Result	**0.674 J**	**1.020 J**	0.0218 U	**3.010 J**	**0.370 J**	**0.449 J**	**1.260 J**	**0.825 J**	0.0218 U
TCLP Regulatory Level[1]	5	5	5	5	5	5	5	5	5

(1) EPA SW-846, Chapter 7 Characteristics Introduction and Regulatory Definitions, Revision 4, November 2004

Key:

U = Not detected
UJ = Estimated/Not detected
J = Estimated
mg/L = mg/L: miligram per liter

Bold indicates detection
Shading indicates values above screening criteria

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria (1)	DL-BHC14-01	DL-BHD13-01	DL-BHD13-01D	DL-BHD14-01	DL-BHD14-02
	Depth (feet)	7.2 - 8.0	0.9 - 3.8	0.9 - 3.8	3.0 - 4.0	1.7 - 2.4
		02/20/2006	02/27/2006	02/27/2006	02/24/2006	02/24/2006
Metals 6010B/7471A (mg/Kg)						
Aluminum	NA		**5160 J**	**4260 J**	**8290**	
Antimony	NA	**4.7 J-**	**9.7**	7.6 U	**50.8 J**	**0.712 R**
Arsenic	16 f	**2.9 J**	**2.3**	**3.9**	**13.7 J**	**5.970 J**
Barium	400		**26.5**	**23.8 J**	**1090**	
Beryllium	590	**0.13 J**	**0.25 J**	**0.17 J**	**0.322 J**	**0.338 J**
Cadmium	9.3	0.06 U	0.62 U	0.63 U	**3.060**	**1.110**
Calcium	NA		**46300 J**	**39500 J**	**56100 J**	
Chromium	1500	**12.2**	**21.1**	**18.8**	**91.7 J**	**25.7 J**
Cobalt	NA		**3.6 J**	**2.4 J**	**16.7 J**	
Copper	270	**24.6**	**47.2**	**43.1**	**680**	**58.8**
Iron	NA		**32000 J**	**30500 J**	**46700 J**	
Lead	1000	**98.9**	**24.9 J**	**23.5 J**	**6400 J**	**795 J**
Magnesium	NA		**798 J-**	**994 J-**	**3130**	
Manganese	10000 d		**320**	**311**	**1630**	
Nickel	310	**10.0 J-**	**14.4**	**13.8**	**19.6 J**	**13.4 J**
Potassium	NA		**550 J**	**505 J**	**2470**	
Selenium	1500	0.12 U	0.97 UJ	**2.5 J-**	0.124 U	0.119 U
Silver	1500	**0.88 J**	**1.4**	**1.4**	**0.124 R**	**0.119 R**
Sodium	NA		**297 J**	633 UJ	**5170 J**	
Thallium	NA	0.12 U	1.2 U	1.3 U	**0.095 J**	**0.514**
Vanadium	NA		**10.5**	**9.9**	**19.0**	
Zinc	10000 d	**58.7**	**24.1 J**	**24.5 J**	**5330**	**397**
Mercury	2.8 j	**0.052**	0.012 U	**0.011 J**	**0.055**	**0.105**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) / Screening Criteria (1)	DL-BHD5-01 4.4 - 5.7 02/14/2006	DL-MW01-01 8.2 - 10.0 02/20/2006	DL-BHE13-01 4.0 - 8.0 02/20/2006	DL-BHE4-01 1.9 - 3.5 02/14/2006	DL-BHE5-01 4.0 - 6.2 02/14/2006
Metals 6010B/7471A (mg/Kg)						
Aluminum	NA					
Antimony	NA	**0.65 J**	**3.0 J-**	**46.3 J-**	**5.3 J-**	**4.1 J-**
Arsenic	16 f	**4.7 J**	**2.2 J**	**25.7 J**	**6.6 J**	**7.1 J**
Barium	400					
Beryllium	590	**0.26**	**0.31 J**	**0.24 J**	**0.32**	**0.25**
Cadmium	9.3	**0.04 J**	**0.01 J**	**10.8**	**0.72 J**	0.06 UJ
Calcium	NA					
Chromium	1500	**10.9**	**7.9**	**36.2**	**16.0**	**14.6**
Cobalt	NA					
Copper	270	**23.5 J**	**19.9**	0.33 U	**64.0 J**	**44.6 J**
Iron	NA					
Lead	1000	**102 J**	**27.1**	**4230**	**1370 J**	**308 J**
Magnesium	NA					
Manganese	10000 d					
Nickel	310	**15.0**	**17.1 J-**	**22.8 J-**	**17.9**	**17.5**
Potassium	NA					
Selenium	1500	0.76 U	0.14 U	0.13 U	1.1 U	1.5 U
Silver	1500	0.78 UJ	**0.42 J**	**1.6 J**	1.2 UJ	**1.6 J**
Sodium	NA					
Thallium	NA	0.14 U	0.14 U	0.13 U	0.13 U	0.13 U
Vanadium	NA					
Zinc	10000 d	**115 J**	**118**	**2350**	**295 J**	**103 J**
Mercury	2.8 j	**0.050**	**0.107**	**0.062**	**0.453**	**0.185**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria (1)	DL-BHE6-01	DL-BHE7-01	DL-BHE8-01	DL-BHF10-01	DL-BHF11-01
	Depth (feet)	11.8 - 12.0	8.0 - 9.2	14.7 - 16.0	0.3 - 2.0	0.2 - 1.5
		02/14/2006	02/15/2006	02/14/2006	02/16/2006	02/16/2006
Metals 6010B/7471A (mg/Kg)						
Aluminum	NA					
Antimony	NA	**0.79 R**	**11.8 J-**	**0.21 J**	**33.0 J-**	**6.2 J-**
Arsenic	16 f	**2.0 J**	**6.9 J**	**3.0 J**	**13.6 J**	**8.0 J**
Barium	400					
Beryllium	590	**0.25**	**0.17**	**0.26**	**0.19**	**0.14**
Cadmium	9.3	0.07 UJ	**6.7 J**	0.06 UJ	0.07 UJ	0.06 UJ
Calcium	NA					
Chromium	1500	**6.6**	**31.1**	**9.1**	**25.7**	**13.5**
Cobalt	NA					
Copper	270	**15.0 J**	0.31 UJ	**31.1 J**	0.35 UJ	**59.9 J**
Iron	NA					
Lead	1000	**18.6 J**	**1430 J**	**63.4 J**	**46.2 J**	**800 J**
Magnesium	NA					
Manganese	10000 d					
Nickel	310	**14.0**	**52.8**	**14.2**	**25.6**	**13.9**
Potassium	NA					
Selenium	1500	0.45 U	1.3 U	0.88 U	**3.9**	0.74 U
Silver	1500	0.43 UJ	**3.4 J**	0.96 UJ	**3.8 J**	1.1 UJ
Sodium	NA					
Thallium	NA	0.13 U	0.12 U	0.13 U	0.14 U	0.12 U
Vanadium	NA					
Zinc	10000 d	**70.4 J**	**2810 J**	**194 J**	**281 J**	**65.6 J**
Mercury	2.8 j	**0.019**	**0.280**	**0.261**	**1.1**	**0.099**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) / Screening Criteria [1]	DL-BHF12-01 0.3 - 4.0 02/20/2006	DL-BHF13-01 2.0 - 3.0 02/20/2006	DL-BHF14-01 0.7 - 1.7 02/24/2006	DL-MW03-01 5.3 - 7.8 02/15/2006	DL-MW03-01D 5.3 - 7.8 02/15/2006
Metals 6010B/7471A (mg/Kg)						
Aluminum	NA					
Antimony	NA	**409 J-**	**14.0 J-**	**0.720 R**	**1.5 J-**	**0.47 J**
Arsenic	16 f	**27.5 J**	**6.1 J**	**6.250 J**	**3.2 J**	**3.7 J**
Barium	400					
Beryllium	590	**0.30 J**	**0.42 J**	**0.400 J**	**0.24**	**0.28**
Cadmium	9.3	**26.2**	0.06 U	**0.722**	0.06 UJ	0.06 UJ
Calcium	NA					
Chromium	1500	**35.9**	**24.2**	**19.4 J**	**7.8**	**8.5**
Cobalt	NA					
Copper	270	0.33 U	**15.1**	**32.0**	**18.3 J**	**30.8 J**
Iron	NA					
Lead	1000	0.07 U	**29.7**	**355 J**	**19.7 J**	**20.9 J**
Magnesium	NA					
Manganese	10000 d					
Nickel	310	**27.9 J-**	**16.6 J-**	**14.4 J**	**14.9**	**17.1**
Potassium	NA					
Selenium	1500	0.13 U	0.12 U	0.120 U	0.68 U	0.93 U
Silver	1500	**2.0 J**	**0.69 J**	**0.120 R**	0.56 UJ	0.68 UJ
Sodium	NA					
Thallium	NA	0.13 U	0.12 U	**0.175**	0.12 U	0.12 U
Vanadium	NA					
Zinc	10000 d	**4750**	**46.2**	**195**	**99.1 J**	**66.4 J**
Mercury	2.8 j	**2.4**	**0.069**	**0.334**	**0.053**	**0.047**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) / Screening Criteria (1)	DL-BHF4-01 2.5 - 4.0 02/14/2006	DL-BHF4A-01 1.1 - 4.0 02/20/2006	DL-BHF8-01 5.2 - 8.0 02/16/2006	DL-BHF9-01 3.3 - 4.0 02/16/2006	DL-BHG10-01 4.5 - 6.0 02/20/2006	DL-BHG12-01 8.8 - 12.0 02/16/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA	**2040 J**		**12900 J**			
Antimony	NA	**19.5 J-**	**61.9 J-**	**0.733 R**	**4.7 J-**	**3.2 J-**	**10.2 J-**
Arsenic	16 f	**13.5 J**	**16.3 J**	**5.960 J**	**3.7 J**	**3.1 J**	**4.5 J**
Barium	400	**332 J**		**373 J**			
Beryllium	590	0.08 U	**0.09 J**	**0.138**	0.08 U	**0.16 J**	**0.34**
Cadmium	9.3	**12.2 J**	**11.4**	**2.670 J**	0.05 UJ	0.07 U	**0.76 J**
Calcium	NA	**50700 J**		**23200 J**			
Chromium	1500	**74.7**	**51.4**	**141**	**34.3**	**181**	**21.2**
Cobalt	NA	**11.3 J-**		**6.700 J-**			
Copper	270	0.36 UJ	**675**	**299 J**	**48.2 J**	**27.4**	**34.8 J**
Iron	NA	1.4 U		**26300**			
Lead	1000	**8160 J**	**21000**	**1080 J**	**1110 J**	**68.9**	**187 J**
Magnesium	NA	**1930**		**2950**			
Manganese	10000 d	0.22 UJ		**482 J**			
Nickel	310	**53.6**	**66.3 J-**	**937**	**10.1**	**9.1 J-**	**22.1**
Potassium	NA	**181 J**		**969 J**			
Selenium	1500	0.14 U	6.0 U	**2.210**	**9.6**	0.13 U	**7.4**
Silver	1500	0.14 UJ	**3.8 J**	0.122 UJ	0.76 UJ	**0.77 J**	0.78 UJ
Sodium	NA	344 U		**4790**			
Thallium	NA	0.14 U	0.12 U	0.122 U	**8.5**	0.13 U	0.14 U
Vanadium	NA	**7.2**		**8.090**			
Zinc	10000 d	**654 J**	**537**	**33500 J**	**194 J**	**48.5**	**454 J**
Mercury	2.8 j	**1.2**	**1.3**	**0.211**	**0.057**	**0.104**	**0.145**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria (1)	DL-BHG13-01	DL-BHG14-01	DL-BHG3-01	DL-BHG4-01	DL-MW06-01	DL-BHH11-01
	Depth (feet)	3.1 - 4.0	0.5 - 1.7	5.2 - 5.6	9.9 - 12.0	4.5 - 6.0	16.0 - 20.0
		02/24/2006	02/23/2006	02/14/2006	02/14/2006	02/20/2006	02/28/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	**0.704 R**	**5.1 J**	**16.8 J-**	**143 J-**	**0.69 R**	**4.7 J**
Arsenic	16 f	**5.960 J**	**7.0 J**	**27.5 J**	**13.3 J**	**2.1 J**	**6.2**
Barium	400						
Beryllium	590	**0.521 J**	**0.40 J**	0.07 UJ	**0.17**	**0.03 J**	**0.14 J**
Cadmium	9.3	**0.447**	0.06 U	**17.3 J**	0.11 UJ	0.06 U	**1.5**
Calcium	NA						
Chromium	1500	**10.2 J**	**33.2 J**	**32.1**	**38.6**	**12.9**	**75.7**
Cobalt	NA						
Copper	270	**32.3**	**23.5**	**113 J**	**179 J**	**21.9**	**170**
Iron	NA						
Lead	1000	**16.4 J**	**130 J**	**681 J**	**2150 J**	**38.2**	**1360 J**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**24.4 J**	**14.8 J**	**79.0**	**38.9**	**7.1 J-**	**161**
Potassium	NA						
Selenium	1500	0.117 U	0.12 U	1.8 U	**3.2**	0.11 U	**4.1 J-**
Silver	1500	**0.117 R**	**0.78 J**	0.63 UJ	**4.3 J**	**0.97 J**	**2.2 J**
Sodium	NA						
Thallium	NA	**0.780**	**0.23**	0.18 U	0.23 U	0.11 U	2.5 U
Vanadium	NA						
Zinc	10000 d	**55.2**	**62.2**	**1730 J**	**320 J**	**49.6**	**1380 J**
Mercury	2.8 j	**0.059**	**0.092**	**1.9**	**1.1**	**0.019**	**0.588**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria (1)	DL-BHH11-02	DL-BHH4-01	DL-BHI10-01	DL-BHI11-01	DL-BHI12-01	DL-BHI13-01
	Depth (feet)	22.3 - 22.7	9.0 - 9.8	7.5 - 9.0	10.6 - 11.5	3.6 - 4.2	7.0 - 8.0
		02/28/2006	02/14/2006	02/22/2006	02/20/2006	02/22/2006	02/22/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA			**2400 J**			
Antimony	NA	**5.8 J**	**0.33 J**	**7.4 J**	**36.0 J-**	**0.65 J**	**21.0 J**
Arsenic	16 f	**5.6**	**2.4 J**	**2.6 J**	**12.9 J**	**5.6 J**	**16.0 J**
Barium	400			**23.2**			
Beryllium	590	**0.44 J**	**0.18**	**0.18 J**	**0.19 J**	**0.26 J**	**0.15 J**
Cadmium	9.3	0.72 U	0.06 UJ	0.06 UJ	0.07 U	0.06 UJ	**6.7 J**
Calcium	NA	**2340 J**		**121000**			
Chromium	1500	**12.3**	**8.4**	**86.6**	**66.6**	**9.7**	**46.0**
Cobalt	NA			**2.4 J-**			
Copper	270	**28.7**	**13.6 J**	**12.4 J-**	**851**	**20.0 J-**	**131 J-**
Iron	NA			**11100 J**			
Lead	1000	**29.3 J**	**16.7 J**	**24.9 J**	**3250**	**35.0 J**	**140 J**
Magnesium	NA			**6300**			
Manganese	10000 d			**2510**			
Nickel	310	**37.2**	**10.4**	**5.6 J-**	**42.4 J-**	**7.5 J-**	**33.4 J-**
Potassium	NA			**632 J**			
Selenium	1500	1.8 UJ	0.63 U	**0.09 J**	0.14 U	0.12 U	0.15 U
Silver	1500	0.26 UJ	0.46 UJ	**0.63 J**	**7.8 J**	**0.43 J**	**0.15 R**
Sodium	NA			**355 J+**			
Thallium	NA	1.4 U	0.12 U	**1.6 J**	0.14 U	0.12 UJ	0.15 UJ
Vanadium	NA			**14.5 J-**			
Zinc	10000 d	**75.7 J**	**35.8 J**	**27.4**	**4790**	**34.1**	**168**
Mercury	2.8 j	**0.017**	**0.039**	**0.027**	**0.299**	**0.065**	**0.450**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) Screening Criteria [1]	DL-BHI14-01 6.4 - 7.8 02/23/2006	DL-BHI14-02 12.0 - 13.0 02/23/2006	DL-BHI5-01 4.6 - 5.2 02/17/2006	DL-BHI6-01 6.8 - 8.0 02/17/2006	DL-BHI7-02 2.6 - 4.0 02/17/2006	DL-BHI9-01 4.0 - 6.3 02/17/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA	**2420**					
Antimony	NA	**2.3 J**	**5.7 J**	**8.7 J**	**12.3 J**	**16.2 J**	**33.1 J**
Arsenic	16 f	**2.7 J**	**6.6 J**	**4.7 J**	**17.0 J**	**5.9 J**	**13.4 J**
Barium	400	**24.2**					
Beryllium	590	**0.15 J**	**0.49 J**	**0.36 J**	**0.07 J**	**0.44 J**	**0.29 J**
Cadmium	9.3	0.06 U	0.07 U	0.06 UJ	**9.1 J**	**0.67 J**	**5.7 J**
Calcium	NA	**5240 J**					
Chromium	1500	**8.2 J**	**12.2 J**	**10.8 J**	**83.0 J**	**67.1 J**	**120 J**
Cobalt	NA	**2.3 J**					
Copper	270	**15.3**	**28.3**	**24.0 J**	**150 J**	**119 J**	**878 J**
Iron	NA	**13800 J**					
Lead	1000	**38.8 J**	**24.3 J**	**57.1**	**90.2**	**402**	**4100**
Magnesium	NA	**1600**					
Manganese	10000 d	**265**					
Nickel	310	**7.7 J**	**18.4 J**	**19.1 J**	**48.3 J**	**20.2 J**	**64.5 J**
Potassium	NA	**268**					
Selenium	1500	0.11 U	0.14 U	0.13 U	1.9 U	0.13 U	0.13 U
Silver	1500	**0.67 J**	**0.72 J**	**0.78 J**	**0.19 R**	**3.1 J**	**15.9 J**
Sodium	NA	**21.2 J**					
Thallium	NA	0.11 U	0.14 U	0.13 UJ	0.19 UJ	0.13 UJ	0.13 UJ
Vanadium	NA	**6.4**					
Zinc	10000 d	**33.7**	**63.0**	**85.9 J**	**452 J**	**282 J**	**2550 J**
Mercury	2.8 j	**0.051**	**0.069**	**0.065 J**	**0.210 J**	**0.793 J**	**0.192 J**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) / Screening Criteria (1)	DL-BHI9-01D 4.0 - 6.3 02/17/2006	DL-BHJ10-01 13.0 - 13.3 02/17/2006	DL-BHJ10-02 20.9 - 23.5 02/17/2006	DL-BHJ11-01 4.9 - 6.0 02/23/2006	DL-BHJ12-01 15.4 - 16.2 02/23/2006	DL-BHJ12-01D 15.4 - 16.2 02/23/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA				**1860**		
Antimony	NA	**32.2 J**	**9.7 J**	**5.7 J**	**1.8 J**	**3.6 J**	**0.761 R**
Arsenic	16 f	**12.8 J**	**5.0 J**	**2.6 J**	**3.0 J**	**3.3 J**	**3.180 J**
Barium	400				**31.5**		
Beryllium	590	**0.27 J**	**0.20 J**	**0.30 J**	**0.13 J**	**0.41 J**	**0.433 J**
Cadmium	9.3	**6.5 J**	**1.6 J**	0.06 UJ	**0.72**	0.06 U	**0.480**
Calcium	NA				**101000 J**		
Chromium	1500	**115 J**	**33.5 J**	**8.6 J**	**36.2 J**	**9.7 J**	**12.0 J**
Cobalt	NA				**2.0 J**		
Copper	270	**455 J**	**127 J**	**14.1 J**	**58.6**	**20.2**	**27.2**
Iron	NA				**13900 J**		
Lead	1000	**2240**	**255**	**10.0**	**117 J**	**11.8 J**	**14.9 J**
Magnesium	NA				**14300**		
Manganese	10000 d				**264**		
Nickel	310	**52.7 J**	**20.4 J**	**14.8 J**	**11.1 J**	**19.8 J**	**23.7 J**
Potassium	NA				**420**		
Selenium	1500	0.13 U	0.12 U	0.12 U	0.12 U	0.13 U	0.127 U
Silver	1500	**22.4 J**	**1.3 J**	**0.46 J**	**0.68 J**	**0.56 J**	**0.127 R**
Sodium	NA				**419 J**		
Thallium	NA	0.13 UJ	0.12 UJ	0.12 UJ	0.12 U	0.13 U	**0.197**
Vanadium	NA				**6.8**		
Zinc	10000 d	**2670 J**	**519 J**	**39.9 J**	**154**	**52.6**	**64.9**
Mercury	2.8 j	**0.196 J**	**0.073 J**	**0.023 J**	**0.069**	**0.040**	**0.046**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) / Screening Criteria [1]	DL-BHJ13-01 8.2 - 9.0 02/21/2006	DL-BHJ13-01-D 8.2 - 9.0 02/21/2006	DL-BHJ14-01 8.5 - 9.5 02/23/2006	DL-BHJ15-01 13.0 - 14.7 02/23/2006	DL-BHJ8-01 3.1 - 4.0 02/17/2006	DL-BHJ9-01 4.2 - 5.0 02/17/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	**9.0 J-**	**5.9 J-**	**1.4 J**	**7.1 J**	**21.3 J**	**0.776 R**
Arsenic	16 f	**5.5 J**	**5.7 J**	**7.6 J**	**8.0 J**	**8.5 J**	**5.810 J**
Barium	400						
Beryllium	590	**0.44 J**	**0.45 J**	**0.68 J**	**0.58 J**	**0.22 J**	**0.259 J**
Cadmium	9.3	0.06 U	0.06 U	0.06 U	0.06 U	0.06 UJ	**1.990 J**
Calcium	NA						
Chromium	1500	**11.2**	**11.6**	**14.1 J**	**13.0 J**	**130 J**	**90.7 J**
Cobalt	NA						
Copper	270	**17.1**	**18.4**	**28.1**	**26.7**	**153 J**	**152 J**
Iron	NA						
Lead	1000	**13.8**	**19.2**	**17.5 J**	**13.2 J**	**397**	**318**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**18.8 J-**	**19.5 J-**	**24.0 J**	**24.7 J**	**43.3 J**	**33.5 J**
Potassium	NA						
Selenium	1500	0.12 U	0.12 U	0.13 U	**0.72**	0.12 U	0.129 U
Silver	1500	**0.76 J**	**0.79 J**	**0.98 J**	**0.99 J**	**3.1 J**	**0.129 R**
Sodium	NA						
Thallium	NA	0.12 U	0.12 U	0.13 U	**1.8**	0.12 UJ	0.129 UJ
Vanadium	NA						
Zinc	10000 d	**45.0**	**49.2**	**62.3**	**60.2**	**187 J**	**927 J**
Mercury	2.8 j	**0.052**	**0.048**	**0.075**	**0.033**	**0.353 J**	**0.119 J**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria (1)	DL-BHK10-01	DL-BHK11-01	DL-BHK12-01	DL-BHK13-01	DL-BHK14-01	DL-BHL10-01
	Depth (feet)	1.0 - 2.0	4.2 - 4.6	9.0 - 10.0	7.2 - 8.0	11.0 - 12.0	1.4 - 3.5
		02/23/2006	02/23/2006	02/23/2006	02/21/2006	02/23/2006	02/22/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	**4.6 J**	**1.3 J**	**4.4 J**	**3.2 J-**	**0.71 R**	**7.0 J**
Arsenic	16 f	**4.3 J**	**4.7 J**	**7.5 J**	**4.7 J**	**3.3 J**	**5.7 J**
Barium	400						
Beryllium	590	**0.27 J**	**0.20 J**	**0.42 J**	**0.34 J**	**0.24 J**	**0.33 J**
Cadmium	9.3	0.06 U	**0.44**	0.06 U	0.06 U	0.06 U	**0.10 J**
Calcium	NA						
Chromium	1500	**10.0 J**	**17.1 J**	**12.6 J**	**9.3**	**5.6 J**	**21.7**
Cobalt	NA						
Copper	270	**19.0**	**31.6**	**27.7**	**18.3**	**12.6**	**52.5 J-**
Iron	NA						
Lead	1000	**23.8 J**	**154 J**	**36.3 J**	**11.2**	**8.3 J**	**296 J**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**18.8 J**	**38.7 J**	**22.4 J**	**18.8 J-**	**11.3 J**	**18.3 J-**
Potassium	NA						
Selenium	1500	0.12 U	0.12 U	0.13 U	0.12 U	0.12 U	0.13 U
Silver	1500	**0.45 J**	**0.69 J**	**0.88 J**	**0.63 J**	**0.39 J**	**1.7 J**
Sodium	NA						
Thallium	NA	0.12 U	0.12 U	0.13 U	0.12 U	0.12 U	0.13 UJ
Vanadium	NA						
Zinc	10000 d	**56.7**	0.23 U	**57.0**	**40.6**	**35.0**	**636**
Mercury	2.8 j	**0.034**	**0.105**	**0.079**	**0.031**	**0.021**	**0.106**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria (1)	DL-BHL11-01	DL-BHL12-01	DL-MW05-01	DL-BHL14-01	DL-BHL9-01	DL-BHM11-01
	Depth (feet)	1.2 - 3.5	3.0 - 4.0	0.6 - 2.5	6.5 - 8.0	3.6 - 4.0	4.0 - 4.9
		02/22/2006	02/22/2006	02/21/2006	02/21/2006	02/22/2006	02/22/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	**0.83 R**	**0.77 R**	**8.3 J-**	**0.733 R**	**9.6 J**	**0.05 J**
Arsenic	16 f	**4.7 J**	**3.8 J**	**5.0 J**	**4.340 J**	**5.1 J**	**5.0 J**
Barium	400						
Beryllium	590	**0.24 J**	**0.29 J**	**0.39 J**	**0.407 J**	**0.34 J**	**0.36 J**
Cadmium	9.3	0.07 UJ	0.06 UJ	0.06 U	**0.515**	0.07 UJ	0.07 UJ
Calcium	NA						
Chromium	1500	**16.5**	**7.2**	**10.3**	**12.4**	**16.9**	**9.9**
Cobalt	NA						
Copper	270	**36.4 J-**	**13.4 J-**	**20.2**	**22.0**	**31.9 J-**	**17.7 J-**
Iron	NA						
Lead	1000	**200 J**	**9.9 J**	**9.9**	**12.3**	**25.6 J**	**37.4 J**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**21.7 J-**	**15.0 J-**	**20.0 J-**	**22.7 J-**	**19.5 J-**	**19.7 J-**
Potassium	NA						
Selenium	1500	0.14 U	0.13 U	0.11 U	0.122 U	0.14 U	0.13 U
Silver	1500	**3.2 J**	**0.54 J**	**0.68 J**	**0.122 R**	**1.1 J**	**0.70 J**
Sodium	NA						
Thallium	NA	0.14 UJ	0.13 UJ	0.11 U	**0.330**	**3.6 J**	0.13 UJ
Vanadium	NA						
Zinc	10000 d	**250**	**29.4**	**42.3**	**78.4**	**117**	**41.8**
Mercury	2.8 j	**0.197**	**0.020**	**0.032**	**0.027**	**0.152**	**0.033**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Depth (feet) / Screening Criteria (1)	DL-BHM12-01 1.1 - 2.7 02/23/2006	DL-BHM13-01 5.0 - 6.0 02/22/2006	DL-BHN12-01 0.6 - 3.1 02/22/2006	DL-BHN13-01 0.5 - 1.5 02/22/2006	DL-BHO12-01 0.3 - 1.5 02/22/2006	DL-BHO13-01 4.8 - 5.2 02/23/2006
Metals 6010B/7471A (mg/Kg)							
Aluminum	NA						
Antimony	NA	**1.5 J**	**0.796 R**	**0.77 R**	**1.3 J**	**0.69 R**	**2.4 J**
Arsenic	16 f	**4.8 J**	**5.040 J**	**4.4 J**	**4.4 J**	**3.5 J**	**5.2 J**
Barium	400						
Beryllium	590	**0.28 J**	**0.466 J**	**0.29 J**	**0.29 J**	**0.20 J**	**0.36 J**
Cadmium	9.3	0.06 U	**0.536 J**	0.06 UJ	0.06 UJ	0.06 UJ	0.06 U
Calcium	NA						
Chromium	1500	**7.0 J**	**13.2**	**20.4**	**7.3**	**5.7**	**8.8 J**
Cobalt	NA						
Copper	270	**15.1**	**29.0 J-**	**15.6 J-**	**14.6 J-**	**11.3 J-**	**15.8**
Iron	NA						
Lead	1000	**12.7 J**	**16.7 J**	**98.3 J**	**12.6 J**	**16.8 J**	**14.8 J**
Magnesium	NA						
Manganese	10000 d						
Nickel	310	**13.7 J**	**26.1 J-**	**14.7 J-**	**15.7 J-**	**9.7 J-**	**17.0 J**
Potassium	NA						
Selenium	1500	0.12 U	0.133 U	0.13 U	0.12 U	0.12 U	0.13 U
Silver	1500	**0.52 J**	**0.133 R**	**0.56 J**	**0.57 J**	**0.39 J**	**0.61 J**
Sodium	NA						
Thallium	NA	0.12 U	**0.580 J**	0.13 UJ	0.12 UJ	0.12 UJ	0.13 U
Vanadium	NA						
Zinc	10000 d	**42.7**	**81.8**	**48.8**	**32.7**	**25.4**	**58.3**
Mercury	2.8 j	**0.036**	**0.074**	**0.049**	**0.036**	**0.029**	**0.048**

Table 2-3 Summary of Positive Results for Inorganic Analytes in Subsurface Soils
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria [1]	DL-HAC13-02	DL-HAD11-02	DL-HAE8A-02	DL-MW02-01	DL-MW04-01
	Depth (feet)	1.3 - 1.6	1.5 - 2.0	1.2 - 2.0	10.0 - 11.2	0.8 - 4.0
		02/17/2006	02/16/2006	02/17/2006	02/15/2006	02/21/2006
Metals 6010B/7471A (mg/Kg)						
Aluminum	NA					**8550 J**
Antimony	NA	**96.2 J-**	**2.0 J**	**15.9 J**	**0.831 R**	**31.9 J**
Arsenic	16 f	**17.1 J**	**2.4**	**21.7 J**	**4.800 J**	**13.6 J**
Barium	400					**513**
Beryllium	590	**0.38 J**	**0.16 J**	**0.23 J**	**0.272**	**0.21 J**
Cadmium	9.3	**0.54**	0.06 U	**2.8 J**	0.069 UJ	**2.9 J**
Calcium	NA					**25700**
Chromium	1500	**43.8**	**6.1 J**	**39.1 J**	**6.670**	**67.2**
Cobalt	NA					**9.5 J-**
Copper	270	**203**	**10.4**	**274 J**	**17.6 J**	0.37 UJ
Iron	NA					**148000 J**
Lead	1000	**6.4**	**20.4 J**	**4600**	**15.8 J**	**1120 J**
Magnesium	NA					**3390**
Manganese	10000 d					**628**
Nickel	310	**23.9 J-**	**7.9 J**	**106 J**	**13.6**	**63.2 J-**
Potassium	NA					**1300 J**
Selenium	1500	0.16 U	0.10 UJ	0.14 U	1.670 U	0.15 U
Silver	1500	**6.3 J**	0.34 U	**12.8 J**	0.629 UJ	**13.5 J**
Sodium	NA					**718 J+**
Thallium	NA	0.16 U	0.11 U	0.14 UJ	0.139 U	**1.8 J**
Vanadium	NA					**18.9 J-**
Zinc	10000 d	**4220**	**43.2 J**	**2180 J**	**43.3 J**	**3141.05**
Mercury	2.8 j	**0.085**	**0.029 J**	**0.381 J**	**0.027**	**0.615**

(1) New York State Department of Environmental Conservation, Part 375-6.8 Restricted Use Soil Cleanup Objectives Protection of Public Health, Commercial , December 14, 2006

d) The SCOs for metals were capped at a maximum value of 10,000 ppm.

f) For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.

j) This SCO is the lower of the values for mercury (elemental or mercury(inorganic salts).

Bold values indicate detection

Shading indicates values above screening criteria

key:

mg/Kg: miligram per **kilogram**

J: Estimated

J-: Estimated low

J+: Estimated high

R: Rejected data

U: Not detected

UJ: Estimated/Not detected

Table 2-4 Summary of Positive Results for Organic Analytes in Subsurface Soils, Depew Village Landfill Site, Depew, New York

Analyte	Depth (ft) / Screening Criteria [1]	DL-BHD13-01 0.9 - 3.8 02/27/2006	DL-BHD13-01D 0.9 - 3.8 02/27/2006	DL-BHD14-01 3.0 - 4.0 02/24/2006	DL-BHF4-02 7.2 - 8.0 02/14/06
Volatiles 8260B (µg/Kg)					
1,2-Dichlorobenzene	500000 b	4.3 U	5.1 UJ	6.7 UJ	**7.4**
1,4-Dichlorobenzene	130000	4.3 U	5.1 UJ	6.7 UJ	**26**
2-Butanone	500000 b	22 U	26 UJ	33 UJ	**42 J+**
4-Methyl-2-Pentanone	NA	22 U	26 UJ	33 UJ	27 U
Acetone	500000 b	22 UJ	26 UJ	33 UJ	**170**
Benzene	44000	4.3 U	5.1 UJ	6.7 UJ	**2.9 J**
Carbon disulfide	NA	4.3 UJ	5.1 UJ	6.7 UJ	**5.1 J**
Carbon Tetrachloride	22000	4.3 U	5.1 UJ	6.7 UJ	5.5 U
Chlorobenzene	500000 b	4.3 U	5.1 UJ	6.7 UJ	**29**
Chloroform	350000	4.3 U	5.1 UJ	6.7 UJ	**1.8 J**
Cyclohexane	NA	4.3 UJ	5.1 UJ	6.7 UJ	**2.6 J**
Ethyl Benzene	390000	4.3 U	5.1 UJ	6.7 UJ	5.5 U
Isopropylbenzene	NA	4.3 U	5.1 UJ	6.7 UJ	**27**
m/p-Xylenes	500000 b	8.7 U	10 UJ	13 UJ	**3.0 J**
Methylcyclohexane	NA	4.3 U	5.1 UJ	6.7 UJ	**6.3**
Methylene Chloride	500000 b	4.3 U	5.1 UJ	6.7 UJ	**11**
o-Xylene	500000 b	4.3 U	5.1 UJ	6.7 UJ	**2.9 J**
Toluene	500000 b	4.3 U	5.1 UJ	6.7 UJ	**1.8 J**
Semivolatiles 8270C (µg/Kg)					
2,4-Dinitrophenol	NA	**1000 R**	1100 U	1000 U	1300 U
2-Methylnaphthalene	NA	**140 J**	420 U	410 U	510 U
4,6-Dinitro-2-methylphenol	NA	**1000 R**	1100 U	1000 U	1300 U
Acenaphthene	500000 b	**330 J**	420 U	410 U	510 U
Acenaphthylene	500000 b	410 UJ	420 U	410 U	**89 J**
Anthracene	500000 b	**810 J**	420 U	410 U	**260 J**
Benzo(a)anthracene	5600	**2200 J**	**74 J**	410 U	**530**
Benzo(a)pyrene	1000 f	**1600 J**	420 U	410 U	**300 J**
Benzo(b)fluoranthene	5600	2400 UJ	**80 J**	410 U	**480 J**
Benzo(g,h,i)perylene	500000 b	**540 J**	420 U	410 U	510 U
Benzo(k)fluoranthene	56000	**1300 J**	420 U	410 U	**200 J**
bis(2-Ethylhexyl)phthalate	NA	780 UJ	420 UJ	410 U	**900**
Butylbenzylphthalate	NA	410 U	420 U	410 U	510 U

Table 2-4 Summary of Positive Results for Organic Analytes in Subsurface Soils, Depew Village Landfill Site, Depew, New York

Analyte	Depth (ft) Screening Criteria [1]	DL-BHD13-01 0.9 - 3.8 02/27/2006	DL-BHD13-01D 0.9 - 3.8 02/27/2006	DL-BHD14-01 3.0 - 4.0 02/24/2006	DL-BHF4-02 7.2 - 8.0 02/14/06
Carbazole	NA	**630 J**	420 U	410 U	510 U
Chrysene	56000	**2200 J**	**77 J**	410 U	**430 J**
Dibenz(a,h)anthracene	560	**67 J**	420 U	410 U	510 U
Dibenzofuran	NA	**360 J**	420 U	410 U	510 U
Di-n-butylphthalate	NA	410 UJ	420 U	410 U	**330 J**
Fluoranthene	500000 b	**5400**	**170 J**	410 U	**1200**
Fluorene	500000 b	**340 J**	420 U	410 U	**120 J**
Hexachlorocyclopentadiene	NA	**410 R**	420 U	410 U	510 U
Indeno(1,2,3-cd)pyrene	5600	**160 J**	420 U	410 U	**83 J**
Naphthalene	500000 b	**270 J**	420 U	410 U	510 U
Phenanthrene	500000 b	**5800**	**230 J**	410 U	**1100**
Pyrene	500000 b	**4800**	**160 J**	410 U	**910**
Pesticides 8081B (µg/Kg)					
4,4'-DDD	92000	3.7 U	3.8 U	3.7 U	4.6 UJ
alpha-Chlordane	24000	**3.7 J**	3.8 U	3.7 U	4.6 UJ
Endrin ketone	NA	**22 J**	**6.7 J**	3.7 U	4.6 UJ
Methoxychlor	NA	**58**	**10 J**	3.7 U	4.6 UJ
PCBs 8082 (µg/Kg)					
AROCLOR 1254	1000	21 U	22 U	21 U	26 U

Table 2-4 Summary of Positive Results for Organic Analytes in Subsurface Soils, Depew Village Landfill Site, Depew, New York

Analyte	Depth (ft) Screening Criteria [1]	DL-BHF8-01 5.2 - 8.0 02/16/2006	DL-BHI10-01 7.5 - 9.0 2/22/2006	DL-BHI14-01 6.4 - 7.8 2/23/2006	DL-BHJ11-01 4.9 - 6.0 2/23/2006	DL-MW04-01 0.8 - 4.0 2/21/2006
Volatiles 8260B (µg/Kg)						
1,2-Dichlorobenzene	500000 b	3.6 U	4.0 UJ	3.3 UJ	4.1 UJ	5.9 UJ
1,4-Dichlorobenzene	130000	3.6 U	4.0 UJ	3.3 UJ	4.1 UJ	5.9 UJ
2-Butanone	500000 b	18 U	**190 J**	**10 J**	**110**	30 UJ
4-Methyl-2-Pentanone	NA	18 U	20 UJ	16 UJ	**3.8 J**	30 UJ
Acetone	500000 b	18 UJ	**350 J**	**4.1 J**	**160**	30 UJ
Benzene	44000	**0.70 J**	**1.3 J**	3.3 UJ	**0.42 J**	**1.3 J**
Carbon disulfide	NA	3.6 U	**3.1 J**	3.3 UJ	**7.6**	5.9 UJ
Carbon Tetrachloride	22000	3.6 U	4.0 UJ	3.3 UJ	**5.2**	5.9 UJ
Chlorobenzene	500000 b	3.6 U	4.0 UJ	3.3 UJ	4.1 UJ	5.9 UJ
Chloroform	350000	3.6 U	4.0 UJ	3.3 UJ	4.1 U	5.9 UJ
Cyclohexane	NA	3.6 U	**3.2 J**	3.3 UJ	**3.4 J**	5.9 UJ
Ethyl Benzene	390000	3.6 U	4.0 UJ	3.3 UJ	**0.50 J**	**4.6 J**
Isopropylbenzene	NA	**0.55 J**	4.0 UJ	3.3 UJ	4.1 U	5.9 UJ
m/p-Xylenes	500000 b	7.1 U	**1.7 J**	6.5 UJ	**1.2 J**	**7.7 J**
Methylcyclohexane	NA	**1.4 J**	**5.7 J**	3.3 UJ	**4.3**	5.9 UJ
Methylene Chloride	500000 b	3.6 U	4.0 UJ	3.3 UJ	4.1 UJ	5.9 UJ
o-Xylene	500000 b	**0.44 J**	**0.75 J**	3.3 UJ	**0.71 J**	**3.3 J**
Toluene	500000 b	**0.42 J**	**1.0 J**	**0.40 J**	**0.67 J**	**2.6 J**
Semivolatiles 8270C (µg/Kg)						
2,4-Dinitrophenol	NA	1000 U	930 U	950 UJ	960 UJ	1200 U
2-Methylnaphthalene	NA	400 U	370 U	380 U	380 U	490 U
4,6-Dinitro-2-methylphenol	NA	1000 U	930 U	950 UJ	960 U	1200 U
Acenaphthene	500000 b	400 U	370 U	380 UJ	**170 J**	490 U
Acenaphthylene	500000 b	400 U	**67 J**	380 U	380 U	490 U
Anthracene	500000 b	400 U	**190 J**	380 U	**520**	490 U
Benzo(a)anthracene	5600	400 U	**460**	380 U	**1800**	**71 J**
Benzo(a)pyrene	1000 f	400 U	**510 J**	380 U	**2000**	**270 J**
Benzo(b)fluoranthene	5600	**48 J**	**690 J**	380 U	**3700**	**140 J**
Benzo(g,h,i)perylene	500000 b	400 UJ	**130 J**	380 UJ	**370 J**	**190 J**
Benzo(k)fluoranthene	56000	400 U	**390 J**	380 U	**1400**	490 UJ
bis(2-Ethylhexyl)phthalate	NA	**200 J**	**170 J**	380 U	**690**	**160 J**
Butylbenzylphthalate	NA	400 U	370 U	380 U	**110 J**	490 U

Table 2-4 Summary of Positive Results for Organic Analytes in Subsurface Soils, Depew Village Landfill Site, Depew, New York

Analyte	Depth (ft) Screening Criteria [1]	DL-BHF8-01 5.2 - 8.0 02/16/2006	DL-BHI10-01 7.5 - 9.0 2/22/2006	DL-BHI14-01 6.4 - 7.8 2/23/2006	DL-BHJ11-01 4.9 - 6.0 2/23/2006	DL-MW04-01 0.8 - 4.0 2/21/2006
Carbazole	NA	400 U	370 U	380 U	**360 J**	490 U
Chrysene	56000	400 U	**500**	380 U	**2000**	**120 J**
Dibenz(a,h)anthracene	560	400 UJ	370 UJ	380 U	**50 J**	490 UJ
Dibenzofuran	NA	400 U	**91 J**	380 U	**77 J**	490 U
Di-n-butylphthalate	NA	400 U	370 U	380 U	380 U	490 U
Fluoranthene	500000 b	400 U	**740**	**65 J**	**4500**	**75 J**
Fluorene	500000 b	400 U	**190 J**	380 U	**200 J**	490 U
Hexachlorocyclopentadiene	NA	400 U	370 U	380 UJ	380 U	490 U
Indeno(1,2,3-cd)pyrene	5600	400 UJ	**47 J**	380 UJ	380 U	**320 J**
Naphthalene	500000 b	400 U	370 U	380 U	380 U	490 U
Phenanthrene	500000 b	400 U	**760**	380 U	**2400**	490 U
Pyrene	500000 b	400 U	**2200**	380 U	**3300**	**100 J**
Pesticides 8081B (µg/Kg)						
4,4'-DDD	92000	3.6 UJ	**2.1 J**	3.4 U	3.5 U	4.4 U
alpha-Chlordane	24000	3.6 UJ	3.3 U	3.4 U	3.5 U	4.4 U
Endrin ketone	NA	3.6 UJ	3.3 U	3.4 UJ	3.5 U	4.4 U
Methoxychlor	NA	3.6 UJ	3.3 U	3.4 UJ	3.5 U	4.4 U
PCBs 8082 (µg/Kg)						
AROCLOR 1254	1000	21 U	19 U	19 U	20 U	**290**

(1) New York State Department of Environmental Conservation, Part 375-6.8 Restricted Use Soil Cleanup Objectives Protection of Public Health, Commercial , December 14, 2006
b) The SCOs for commercial use were capped at a maximum value of 500 ppm.
f) For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.

Bold values indicate detection
Shading indicates values above screening criteria

Key:
mg/L: miligram per liter
ug/L: microgram per liter
J: Estimated
J-: Estimated low
J+: Estimated high
R: Rejected data
U: Not detected
UJ: Estimated/Not detected

Table 2-5 Summary of Positive Results for Inorganic Analytes in Groundwater, Depew Village Landfill, Depew, New York

Analyte	Screening Criteria [(1)]	DL-BH11-W-O Filtered 02/22/2006	DL-BH11-W-O 02/22/2006	DL-MW01-01 03/03/2006	DL-MW01-01-D 03/03/2006	DL-MW01-01 Filtered 03/03/2006
Metals 6010B/7470A (µg/L)						
Aluminum	NA	**109 J**	**285000**	**19900 J**	**17900 J**	200 U
Antimony	3	60.0 U	60.0 U	22.7 UJ	8.1 UJ	60.0 U
Arsenic	25	10.0 U	**108**	**18.1 J**	**12.4 J**	10.0 U
Barium	1000	**124 J**	**3590**	**311 J-**	**270 J-**	**72.5 J**
Beryllium	3	**0.120 J**	**21.2**	**1.2 J**	**1.0 J**	5.0 U
Cadmium	5	5.000 U	**19.4**	**3.9 J**	**3.1 J**	**0.47 J**
Calcium	NA	**140000**	**412000**	**333000 J**	**356000 J**	**135000 J**
Chromium	50	10.0 U	**439**	**34.3 J-**	**29.5 J-**	2.0 UJ
Cobalt	NA	**4.350 J**	**326**	**12.9 J**	**14.1 J**	**4.5 J**
Copper	200	25.0 U	**1230**	**114 J-**	**91.6 J-**	**5.3 J**
Iron	300	**147**	**565000**	**50300 J**	**49800 J**	**100**
Lead	25	5.000 U	**758**	**2060 J**	**1770 J**	**6.5 J**
Magnesium	35000	**21200**	**149000**	**70200 J**	**73300 J**	**17800 J**
Manganese	300	**1260**	**13400**	**3410 J**	**3370 J**	**1770 J**
Nickel	100	**4.300 J**	**1000**	**83.0 J-**	**80.2 J-**	**9.4 J**
Potassium	NA	**2780 J**	**18600**	**21900 J**	**20100 J**	**16300**
Selenium	10	**10.0**	**10.0**	**3.5 J**	10.0 U	10.0 UJ
Silver	50	**10.0**	**10.0**	**2.2 J**	10.0 UJ	10.0 UJ
Sodium	20000	**170000**	**187000**	**354000 J**	**335000 J**	**355000**
Thallium	0.5	**5.830 J**	**10.2**	10.0 UJ	10.0 UJ	10.0 U
Vanadium	NA	50.0 U	**571**	**44.8 J**	**39.3 J**	50.0 U
Zinc	2000	**20.0 J**	**2690**	**1150 J-**	**821 J-**	**43.1 J-**
Mercury	0.7	0.2000 U	**1.649**	**1.23 J+**	**1.04 J+**	0.0500 UJ

Table 2-5 Summary of Positive Results for Inorganic Analytes in Groundwater, Depew Village Landfill, Depew, New York

Analyte	Screening Criteria [1]	DL-MW01-01-D Filtered 03/03/2006	DL-MW01-02 06/01/2006	DL-MW01-02 Filtered 06/01/2006	DL-MW01-02-D 06/01/2006	DL-MW01-02-D Filtered 06/01/2006
Metals 6010B/7470A (µg/L)						
Aluminum	NA	200 U	**23700**	25.4 UJ	**19300**	11.8 UJ
Antimony	3	**14.3 J**	8.360 UJ	5.380 UJ	60.0 UJ	60.0 U
Arsenic	25	10.0 U	**29.5**	10.0 U	**23.3**	10.0 U
Barium	1000	**82.5 J**	**838 J**	**125 J**	**752 J**	**121 J**
Beryllium	3	**0.10 J**	**1.810 J**	0.310 UJ	**1.540 J**	0.310 UJ
Cadmium	5	**0.77 J**	**10.7**	3.160 UJ	**8.780**	2.770 UJ
Calcium	NA	**151000 J**	**212000 J**	**173000**	**187000 J**	**163000**
Chromium	50	2.7 UJ	**116**	**7.630 J**	**94.8**	**4.780 J**
Cobalt	NA	**5.1 J**	**30.5 J**	**7.100 J**	**25.9 J**	**7.680 J**
Copper	200	**4.8 J**	**577**	**20.4 J**	**461**	**14.9 J**
Iron	300	**100**	**49100 J**	**31.3 J**	**41700 J**	100 U
Lead	25	**5.8 J**	**4270 J-**	**4.030 J**	**3260 J-**	5.000 U
Magnesium	35000	**19700 J**	**38200 J**	**23000**	**33000 J**	**21700**
Manganese	300	**2120 J**	**2880**	**2430**	**2630**	**2480**
Nickel	100	**12.8 J**	**190 J-**	**94.6**	**168 J-**	**80.7**
Potassium	NA	**18600**	**23200 J**	**22000 J**	**20400 J**	**20900 J**
Selenium	10	10.0 UJ	10.0 U	10.0 U	10.0 U	10.0 U
Silver	50	10.0 UJ	10.0 U	10.0 U	10.0 U	**2.390 J**
Sodium	20000	**403000**	**503000 J**	**609000 J**	**458000 J**	**576000 J**
Thallium	0.5	10.0 U	**6.740 J**	10.0 U	10.0 U	10.0 U
Vanadium	NA	50.0 U	**77.8**	2.060 UJ	**63.5**	2.280 UJ
Zinc	2000	**44.4 J-**	**3130**	**450**	**2520**	**382**
Mercury	0.7	0.0700 UJ	**0.0700 J**	0.2000 U	**0.0500 J**	0.2000 U

Table 2-5 Summary of Positive Results for Inorganic Analytes in Groundwater, Depew Village Landfill, Depew, New York

Analyte	Screening Criteria [1]	DL-MW02-01 03/03/2006	DL-MW02-01 Filtered 03/03/2006	DL-MW02-02 06/01/2006	DL-MW02-02 Filtered 06/01/2006	DL-MW03-01 03/03/2006
Metals 6010B/7470A (µg/L)						
Aluminum	NA	**61600 J**	200 U	**3310**	20.5 UJ	**40500 J**
Antimony	3	**103 J-**	60.0 U	60.0 UJ	60.0 U	**38.1 J**
Arsenic	25	**84.6 J**	6.6 UJ	**7.550 J**	10.0 U	**29.7 J**
Barium	1000	**826 J-**	**101 J**	**224 J**	**151 J**	**510 J-**
Beryllium	3	**5.5 J-**	5.0 U	0.450 UJ	0.260 UJ	**2.3 J**
Cadmium	5	5.0 U	5.0 U	0.900 UJ	0.670 UJ	5.0 U
Calcium	NA	**221000 J**	**96000 J**	**117000 J**	**121000**	**215000 J**
Chromium	50	**272 J-**	10.0 UJ	**15.2**	**3.720 J**	**83.1 J-**
Cobalt	NA	**73.2 J-**	50.0 UJ	**4.100 J**	1.570 UJ	**37.1 J**
Copper	200	**888 J-**	**4.8 J**	**82.1**	**6.280 J**	**191 J-**
Iron	300	**256000 J**	**3200 J**	**23800 J**	100 U	**115000 J**
Lead	25	**728 J**	**5.6 J**	**102 J-**	5.000 U	**472 J**
Magnesium	35000	**585000 J**	**18100 J**	**23800 J**	**22900**	**57100 J**
Manganese	300	**5570 J**	**630 J**	**969**	**916**	**1440 J**
Nickel	100	**235 J-**	**4.9 J**	**12.1 J**	**5.010 J**	**152 J-**
Potassium	NA	**26500 J**	**14300**	**14000 J**	**15900 J**	**19700 J**
Selenium	10	10.0 U	7.6 UJ	10.0 U	10.0 U	10.0 U
Silver	50	**10.8 J-**	10.0 UJ	10.0 U	10.0 U	**5.1 J**
Sodium	20000	**49400 J**	**46300**	**60400 J**	**70800 J**	**49700 J**
Thallium	0.5	10.0 UJ	10.0 U	10.0 U	10.0 U	10.0 UJ
Vanadium	NA	**252 J-**	50.0 U	**9.190 J**	0.830 UJ	**86.4 J-**
Zinc	2000	**967 J-**	**2.7 J**	**124**	**30.3**	**514 J-**
Mercury	0.7	**2.009 J+**	0.0500 UJ	**0.0400 J**	0.2000 U	**0.8600 J+**

Table 2-5 Summary of Positive Results for Inorganic Analytes in Groundwater, Depew Village Landfill, Depew, New York

Analyte	Screening Criteria [(1)]	DL-MW03-01 Filtered 03/03/2006	DL-MW03-02 06/01/2006	DL-MW03-02 Filtered 06/01/2006	DL-MW04-01 03/03/2006	DL-MW04-01 Filtered 03/03/2006
Metals 6010B/7470A (µg/L)						
Aluminum	NA	200 U	**9240**	11.8 UJ	**25000**	200 U
Antimony	3	**7.0 J**	6.690 UJ	60.0 U	60.0 U	60.0 U
Arsenic	25	10.0 U	10.0 U	10.0 U	7.6 UJ	10.0 U
Barium	1000	**160 J**	**255 J**	**179 J**	**575 J-**	**229 J-**
Beryllium	3	5.0 U	0.880 UJ	0.270 UJ	**1.6 J**	5.0 U
Cadmium	5	5.0 U	1.230 UJ	0.750 UJ	5.0 U	5.0 U
Calcium	NA	**143000 J**	**131000 J**	**148000**	**914000 J**	**157000 J**
Chromium	50	1.9 UJ	**24.7**	**23.2 J**	**156 J-**	2.9 UJ
Cobalt	NA	50.0 UJ	**10.1 J**	1.320 UJ	**20.9 J**	50.0 UJ
Copper	200	**4.1 J**	**48.8**	**5.690 J**	**124 J-**	**9.0 J**
Iron	300	**1350 J**	**29500 J**	**94.2 J**	**91200 J**	**100**
Lead	25	**6.9 J**	**111 J-**	5.000 U	**147 J**	**30.6 J**
Magnesium	35000	**26700 J**	**26500 J**	**25900**	**198000 J**	**38600 J**
Manganese	300	**330 J**	**533**	**378**	**2530 J**	**624 J**
Nickel	100	**5.9 J**	**32.6 J**	**11.0 J**	**109**	**16.8 J**
Potassium	NA	**17100**	**13600 J**	**17000 J**	**22400**	**13700**
Selenium	10	10.0 UJ	10.0 U	10.0 U	10.0 UJ	**76.3 J**
Silver	50	10.0 UJ	10.0 U	10.0 U	**3.5 J**	10.0 UJ
Sodium	20000	**50400**	**68300 J**	**92300 J**	**76600**	**13800**
Thallium	0.5	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Vanadium	NA	50.0 U	**22.0 J**	1.760 UJ	**126**	50.0 U
Zinc	2000	**2.6 J**	**211**	**37.2**	**385 J-**	**36.0 J-**
Mercury	0.7	0.0500 UJ	**0.0600 J**	**0.1000 J**	**0.7100**	0.2000 U

Table 2-5 Summary of Positive Results for Inorganic Analytes in Groundwater, Depew Village Landfill, Depew, New York

Analyte	Screening Criteria [1]	DL-MW04-02 06/01/2006	DL-MW04-02 Filtered 06/01/2006	DL-MW05-01 03/03/2006	DL-MW05-01 Filtered 03/03/2006	DL-MW05-02 06/01/2006
Metals 6010B/7470A (µg/L)						
Aluminum	NA	**9350**	19.7 UJ	**17700**	200 U	**397**
Antimony	3	**26.5 J**	60.0 U	**16.3 J**	60.0 U	60.0 UJ
Arsenic	25	**4.720 J**	10.0 U	10.9 U	10.0 U	10.0 U
Barium	1000	**141 J**	**430 J**	**152 J**	**32.0 J**	**374 J**
Beryllium	3	1.010 UJ	0.260 UJ	**1.4 J**	5.0 U	0.310 UJ
Cadmium	5	1.440 UJ	0.750 UJ	5.0 U	5.0 U	0.740 UJ
Calcium	NA	**109000 J**	**193000**	**145000 J**	**93600 J**	**163000 J**
Chromium	50	**23.8**	**5.860 J**	**29.6 J-**	10.0 UJ	3.300 UJ
Cobalt	NA	**8.550 J**	0.970 UJ	**14.7 J**	50.0 UJ	1.360 UJ
Copper	200	**41.9**	**6.340 J**	**67.9 J-**	**6.8 J**	**3.780 J**
Iron	300	**17600 J**	100 U	**42600 J**	**100**	**7380 J**
Lead	25	**14.6 J-**	5.000 U	**44.5 J**	5.0 UJ	**2.800 J**
Magnesium	35000	**21800 J**	**60300**	**28500 J**	**11600 J**	**49900 J**
Manganese	300	**1210**	**313**	**1360 J**	**39.3 J**	**271**
Nickel	100	**42.2 J-**	**8.470 J**	**72.9**	**4.2 J**	**5.190 J**
Potassium	NA	**2720 J**	**22000 J**	**4700 J**	**761 J**	**16400 J**
Selenium	10	10.0 U	10.0 U	10.0 UJ	6.7 UJ	10.0 U
Silver	50	10.0 U	10.0 U	10.0 UJ	10.0 UJ	10.0 U
Sodium	20000	**12300 J**	**133000 J**	**14200**	**11400**	**99400 J**
Thallium	0.5	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Vanadium	NA	**20.6 J**	50.0 U	**39.7 J**	50.0 U	3.230 UJ
Zinc	2000	**135**	**58.5**	**113 J-**	**12.6 J**	**59.0**
Mercury	0.7	**0.0400 J**	0.2000 U	**0.2900**	0.2000 U	0.2000 U

Table 2-5 Summary of Positive Results for Inorganic Analytes in Groundwater, Depew Village Landfill, Depew, New York

Analyte	Screening Criteria (1)	DL-MW05-02 Filtered 06/01/2006	DL-MW06-01 03/03/2006	DL-MW06-01 Filtered 03/03/2006	DL-MW06-02 06/01/2006	DL-MW06-02 Filtered 06/01/2006
Metals 6010B/7470A (µg/L)						
Aluminum	NA	**90.5 J**	**24900 J**	200 U	**12000**	19.1 UJ
Antimony	3	60.0 U	8.1 UJ	**15.5 J**	**25.2 J**	60.0 U
Arsenic	25	10.0 U	**11.6 J**	7.8 UJ	**5.950 J**	10.0 U
Barium	1000	**36.5 J**	**426 J-**	**151 J**	**370 J**	**120 J**
Beryllium	3	0.260 UJ	**1.5 J**	5.0 U	0.880 UJ	0.310 UJ
Cadmium	5	0.880 UJ	5.0 U	5.0 U	1.110 UJ	0.850 UJ
Calcium	NA	**99600**	**321000 J**	**81900 J**	**320000 J**	**61200**
Chromium	50	2.620 UJ	**43.3 J-**	2.5 UJ	**46.5**	**25.7 J**
Cobalt	NA	0.630 UJ	**22.3 J**	**4.2 J**	**16.7 J**	**5.190 J**
Copper	200	**3.980 J**	**76.6 J-**	**5.8 J**	**46.0**	**3.900 J**
Iron	300	**97.1 J**	**113000 J**	**24800 J**	**57000 J**	**223**
Lead	25	5.000 U	**171 J**	**10.4 J**	**57.6 J-**	5.000 U
Magnesium	35000	**14000**	**90300 J**	**24200 J**	**97100 J**	**26500**
Manganese	300	**242**	**2370 J**	**77.0 J**	**849**	**85.2**
Nickel	100	**6.650 J**	**94.7 J-**	**10.2 J**	**50.0 J-**	**17.0 J**
Potassium	NA	**1030 J**	**23200 J**	**19800**	**36500 J**	**34800 J**
Selenium	10	10.0 U	10.0 U	10.0 UJ	10.0 U	10.0 U
Silver	50	10.0 U	**6.4 J**	10.0 UJ	10.0 U	10.0 U
Sodium	20000	**14400 J**	**112000 J**	**132000**	**152000 J**	**163000 J**
Thallium	0.5	10.0 U	10.0 UJ	10.0 U	10.0 U	10.0 U
Vanadium	NA	1.600 UJ	**53.0 J-**	**0.83 J**	**30.3 J**	1.880 UJ
Zinc	2000	**34.5**	**124 J-**	**1.8 J**	**200**	**35.9**
Mercury	0.7	0.2000 U	**0.7500 J+**	0.0700 UJ	**0.0400 J**	**0.0600 J**

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance #1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, 1998 Table 1, Class GA, Source of Drinking Water

Bold values indicate detections
Shading indicates values above screening criteria

Key:
mg/L = Milligram per liter.
ug/L = Microgram per liter.
J = Estimated.
J- = Estimated low.
J+ = Estimated high.
U = Not detected.
UJ = Estimated/Not detected.

Table 2-6 Summary of Positive Results for Organic Analytes in Groundwater
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria [(1)]	DL-BH11-W-O 02/22/2006	DL-MW01-01 03/03/2006	DL-MW01-01-D 03/03/2006	DL-MW01-02 06/01/2006	DL-MW01-02D 05/31/2006 / 06/01/2006
Voatiles 8260B (µg/L)						
1,2-Dichlorobenzene	3	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	3	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide	60	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dichlorodifluoromethane	5	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Isopropylbenzene	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m/p-Xylenes	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Semivolatiles 8270C (µg/L)						
2-Methylnaphthalene	NA	10 U	10 U	10 U	10 UJ	10 UJ
Naphthalene	10	10 U	10 U	10 U	10 U	10 U
PCBs 8082 (ug/L)						
AROCLOR 1016	0.09	0.52 U	0.51 U	0.51 U	0.52 U	0.56 U
AROCLOR 1260	0.09	0.52 U	0.51 U	0.51 U	0.52 U	0.56 U
Pesticides 8081B (µg/L)						
All Analytes ND		ND	ND	ND	ND	ND

Table 2-6 Summary of Positive Results for Organic Analytes in Groundwater
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria [1]	DL-MW02-01 03/03/2006	DL-MW02-02 05/31/2006 / 06/01/2006	DL-MW03-01 03/03/2006	DL-MW03-02 05/31/2006 / 06/01/2006	DL-MW04-01 03/03/2006
Voatiles 8260B (µg/L)						
1,2-Dichlorobenzene	3	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	3	1.0 U	1.0 U	1.0 U	**0.32 J**	1.0 U
Benzene	1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide	60	1.0 U	**1.2**	1.0 U	**1.1**	1.0 UJ
Chlorobenzene	5	1.0 U	1.0 U	**2.0**	**2.6**	1.0 U
Dichlorodifluoromethane	5	1.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 U
Isopropylbenzene	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m/p-Xylenes	5	1.0 U	1.0 U	**0.53 J**	**0.62 J**	1.0 U
o-Xylene	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Semivolatiles 8270C (µg/L)						
2-Methylnaphthalene	NA	10 U	11 UJ	10 U	10 UJ	10 U
Naphthalene	10	10 U	11 U	10 U	10 U	10 U
PCBs 8082 (ug/L)						
AROCLOR 1016	0.09	0.51 U	0.51 U	0.51 U	**2.0**	0.52 U
AROCLOR 1260	0.09	0.51 U	0.51 U	0.51 U	**1.5 J**	0.52 U
Pesticides 8081B (µg/L)						
All Analytes ND		ND	ND	ND	ND	ND

Table 2-6 Summary of Positive Results for Organic Analytes in Groundwater
Depew Village Landfill Site, Depew, New York

Analyte	Screening Criteria [1]	DL-MW04-02 05/31/2006 / 06/01/2006	DL-MW05-01 03/03/2006	DL-MW05-02 05/31/2006 / 06/01/2006	DL-MW06-01 03/03/2006	DL-MW06-02 05/31/2006 / 06/01/2006
Voatiles 8260B (µg/L)						
1,2-Dichlorobenzene	3	1.0 U	1.0 U	1.0 U	**0.62 J**	**0.80 J**
1,4-Dichlorobenzene	3	1.0 U	1.0 U	1.0 U	**4.1 J+**	**9.0**
Benzene	1	1.0 U	1.0 U	1.0 U	**4.4**	**7.3**
Carbon disulfide	60	**0.35 J**	1.0 UJ	1.0 U	1.0 U	**1.2**
Chlorobenzene	5	1.0 U	1.0 U	1.0 U	**29 J+**	**44**
Dichlorodifluoromethane	5	1.0 U	1.0 U	1.0 U	1.0 UJ	**0.55 J**
Isopropylbenzene	5	1.0 U	1.0 U	1.0 U	**1.7**	**3.5 J+**
m/p-Xylenes	5	1.0 U	1.0 U	1.0 U	**0.58 J**	**1.3**
o-Xylene	5	1.0 U	1.0 U	1.0 U	**0.57 J**	**1.3**
Toluene	5	1.0 U	1.0 U	1.0 U	1.0 U	**0.42 J**
Semivolatiles 8270C (µg/L)						
2-Methylnaphthalene	NA	10 UJ	10 U	11 UJ	**1.6 J**	**1.7 J**
Naphthalene	10	10 U	10 U	11 U	**23 J**	**17**
PCBs 8082 (ug/L)						
AROCLOR 1016	0.09	0.53 U	0.53 U	0.52 U	0.51 U	0.51 U
AROCLOR 1260	0.09	0.53 U	0.53 U	0.52 U	0.51 U	0.51 UJ
Pesticides 8081B (µg/L)						
All Analytes ND		ND	ND	ND	ND	ND

(1) New York State Department of Environmental Conservation, Technical and Operational Guidance #1.1.1: Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, 1998 Table 1, Class GA, Source of Drinking Water

Bold values indicate detection
Shading indicates values above screening criteria

Key:
mg/L = Milligram per liter.
ug/L = Microgram per liter.
J = Estimated.
J- = Estimated low.
J+ = Estimated high.
U = Not detected.
UJ = Estimated/Not detected.

Table 2-7 Summary of Detections, Surface Soil, Depew Landfill, Depew, New York[1]

Waste	Contaminants of Concern	Concentration Range Detected (ppm)	SCG (ppm)	Frequency of Exceeding SCG
Inorganic Compounds	Antimony	ND-18.8	NA	0 of 30
	Arsenic	1.9-37.4	16[a]	1 of 30
	Beryllium	0.13-0.48	590	0 of 30
	Cadmium	ND-0.5	9.3	0 of 30
	Chromium	5.9-35.6	1500	0 of 30
	Copper	ND-124	270	0 of 30
	Lead	11.6-2160	1000	3 of 30
	Nickel	7.0-28.1	310	0 of 30
	Silver	ND-2.4	1500	0 of 30
	Thallium	ND-1.1	NA	0 of 30
	Zinc	33.2-1160	10,000[b]	0 of 30
	Mercury	ND-0.94	2.8[c]	0 of 30

[1] New York State Department of Environmental Conservation. December 14, 2006. Part 375-6.8, Restricted Use Soil Cleanup Objectives, Protection of Public Health, Commercial.

[a] For constituents where the calculated SCO was lower than the rural soil background concentration as determined by NYSDEC and the Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.

[b] The SCOs for metals were capped at a maximum value of 10,000 ppm.

[c] This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts).

Key:

ppm = Parts per million, which is equivalent to milligrams per kilogram (mg/kg), in soil.
SCG = Standards, criteria, and guidance value.
SCO = Soil cleanup objective.

Table 2-8 Summary of Detections, Subsurface Soil, Depew Landfill, Depew, New York[1]

Waste	Contaminants of Concern	Concentration Range Detected (ppm)	SCG (ppm)	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,2-Dichlorobenzene	ND-7.4	500,000[a]	0 of 9
	1, 4-Dichlorobenzene	ND-26	130,000	0 of 9
	2-Butanone	ND-190	500,000[a]	0 of 9
	4-Methyl 2-Pentanon	ND-3.8	NA	0 of 9
	Acetone	ND-350,000	500,000[a]	0 of 9
	Benzene	ND-2.9	44,000	0 of 9
	Carbon disulfide	ND-7.6	500,000[a]	0 of 9
	Carbon tetrachloride	ND-5.2	22,000	0 of 9
	Chlorobenzene	ND-29	500,000[a]	0 of 9
	Chloroform	ND-1.8	350,000	0 of 9
	Cyclohexane	ND-3.4	NA	0 of 9
	Ethyl Benzene	ND-4.6	390,000	0 of 9
	Isopropylbenzene	ND-27	NA	0 of 9
	M/P-Xylenes	ND-7.7	500,000[a]	0 of 9
	Methylcyclohexane	ND-6.3	NA	0 of 9
	Methylene Chloride	ND-11	500,000[a]	0 of 9
	o-Xylene	ND-3.3	500,000[a]	0 of 9
	Toluene	ND-2.6	500,000[a]	0 of 9
Semivolatile Organic Compounds (SVOCs)	2,4-Dinitrophenol	ND-1000	NA	0 of 9
	2-Methlylnaphthalene	ND-140	NA	0 of 9
	4,6 Dinitro 2-Methylphenol	ND-1000	NA	0 of 9
	Acenaphthene	ND-330	500,000[a]	0 of 9
	Acenaphthylene	ND-89	500,000[a]	0 of 9
	Anthracene	ND-810	500,000[a]	0 of 9
	Benzo(a)anthracene	ND-2200	5600	0 of 9
	Benzo(a)pyrene	ND-2000	1000[b]	2 of 9
	Benzo(a)fluoranthene	ND-3700	5600	0 of 9
	Benzo(g,h,i)perylene	ND-540	500,000[a]	0 of 9
	Benzo(k)fluoranthene	ND-1400	5600	0 of 9
	Bis (2-Ethylhexyl) phthalate	ND-900	NA	0 of 9
	Butylbenzylphthalate	ND-110	NA	0 of 9
	Carbozole	ND-630	NA	0 of 9
	Chrysene	ND-2200	5600	0 of 9
	Dibenz(a,h) anthra-cene	ND-67	560	0 of 9

Table 2-8 Summary of Detections, Subsurface Soil, Depew Landfill, Depew, New York[1]

Waste	Contaminants of Concern	Concentration Range Detected (ppm)	SCG (ppm)	Frequency of Exceeding SCG
	Dibenxofuran	ND-360	NA	0 of 9
	Di-n-butylphthalate	ND-330	NA	0 of 9
	Fluoranthene	ND-5400	500,000[a]	0 of 9
	Fluorine	ND-340	500,000[a]	0 of 9
	Hexachlorocyclopen-tadiene	ND-410	NA	0 of 9
	Indeno(1,2,3-cd)pyrene	ND-320	5600	0 of 9
	Naphalene	ND-270	500,000[a]	0 of 9
	Phenanthrene	ND-5800	500,000[a]	0 of 9
	Pyrene	ND-4800	500,000[a]	0 of 9
PCB/Pesticides	4,4'-DDD	ND-2.1	92,000	0 of 9
	Alpha-chlordane	ND-3.7	24,000	0 0f 9
	Endrin ketone	ND-22	NA	0 of 9
	Methoxychlor	ND-58	NA	0 of 9
	AROCLOR 1254	ND-290	1000	0 of 9
Inorganic Compounds	Aluminum	1860-12900	NA	0 of 81
	Antimony	ND-409	NA	0 of 81
	Arsenic	2.0-27.5	16[b]	7 of 81
	Barium	23.2-1090	400	2 of 8
	Beryllium	ND-0.68	590	0 of 81
	Cadmium	ND-26.2	9.3	5 of 81
	Calcium	2340-121,000	NA	0 of 10
	Chromium	5.6-181	1500	0 of 81
	Cobalt	2.0-16.7	NA	0 of 8
	Copper	ND-878	270	7 of 81
	Iron	ND-148,000	NA	0 of 9
	Lead	ND-4600	1000	15 of 81
	Magnesium	798-14,300	NA	0 of 9
	Manganese	ND-2510	10,000[c]	0 of 8
	Nickel	5.6-937	310	1 of 81
	Potassium	181-2470	NA	0 of 8
	Selenium	ND-9.6	1500	0 of 81
	Silver	ND-22.4	1500	0 of 81
	Sodium	ND-5170	NA	0 of 10
	Thallium	ND-8.5	NA	0 of 81

Table 2-8 Summary of Detections, Subsurface Soil, Depew Landfill, Depew, New York[1]

Waste	Contaminants of Concern	Concentration Range Detected (ppm)	SCG (ppm)	Frequency of Exceeding SCG
	Vanadium	6.8-19	NA	0 of 9
	Zinc	ND-33,500	10,000[c]	1 of 81
	Mercury	ND-1.9	2.8d	0 of 81

[1] New York State Department of Environmental Conservation. December 14, 2006. Part 375-6.8, Restricted Use Soil Cleanup Objectives, Protection of Public Health, Commercial.

[a] The SCOs for commercial use were capped at a maximum value of 500 ppm.
[b] For constituents where the calculated SCO was lower than the rural soil background concentration as determined by NYSDEC and the Department of Health rural soil survey, the rural soil background concentration is used as the track 2 SCO value for this use of the site.
[c] The SCOs for metals were capped at a maximum value of 10,000 ppm.
[d] This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts).

Key:

ppm = Parts per million, which is equivalent to milligrams per kilogram (mg/kg), in soil.
SCG = Standards, criteria, and guidance value.
SCO = Soil cleanup objective.

Table 2-9 Summary of Detections for Groundwater, Depew Landfill, Depew, New York

WASTE	Contaminants of Concern	Concentration Range Detected (ppm)	SCG (ppm)	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,2-Dichlorobenzene	ND-0.8	3	0 of 15
	1,4-Dichlorobenzene	ND-9	3	2 of 15
	Benzene	ND-7.3	1	2 of 15
	Carbon disulfide	ND-1.2	60	0 of 15
	Chlorobenzene	ND-44	5	2 of 15
	Dichlorodifluoro-methane	ND-0.55	5	0 of 15
	Isopropylbenzene	ND-3.5	5	0 of 15
	M/P-Xylenes	ND-1.3	5	0 of 15
	o-xylene	ND-1.3	5	0 of 15
	Toluene	ND-0.42	5	0 of 15
Semivolatile Organic Compounds (SVOCs)	2-Methylnaphthalene	ND-1.7	NA	0 of 15
	Naphthalene	ND-23	10	2 of 15
PCB/Pesticides	AROCLOR 1016	ND-2.0	0.09	1 of 15
	AROCLOR 1260	ND-1.5	0.09	1 of 15
Inorganic Compounds	Aluminum	ND-61,600	NA	0 of 30
	Antimony	ND-103	3	8 of 30
	Arsenic	ND-108	5	4 of 30
	Barium	32-3590	1000	1 of 30
	Beryllium	ND-21.2	3	2 of 30
	Cadmium	ND-19.4	5	3 of 30
	Calcium	93,600-412,000	NA	0 of 30
	Chromium	ND-439	50	6 of 30
	Cobalt	ND-326	NA	0 of 30
	Copper	ND-1230	200	4 of 30
	Iron	ND-565,000	300	18 of 30
	Lead	ND-3260	25	14 of 30
	Magnesium	11,600-585,000	35,000	12 of 30
	Manganese	77-13,400	300	25 of 30
	Nickel	4.9-1000	100	6 of 30
	Potassium	761-26,500	NA	0 of 30
	Selenium	ND-76.3	10	1 of 30
	Silver	ND-10.9	50	0 of 30
	Sodium	11,400-609,000	20,000	25 of 30
	Thallium	ND-10.2	0.5	3 of 30

Table 2-9 Summary of Detections for Groundwater, Depew Landfill, Depew, New York

WASTE	Contaminants of Concern	Concentration Range Detected (ppm)	SCG (ppm)	Frequency of Exceeding SCG
	Vanadium	ND-571	NA	0 of 30
	Zinc	1.8-3130	2,000	3 of 30
	Mercury	ND-2.009	0.7	6 of 30

Key:

ppm = Parts per million, which is equivalent to milligrams per kilogram (mg/kg), in soil.
SCG = Standards, criteria, and guidance value.

3 Identification of Technologies and Development of Alternatives

3.1 Identification of Technologies

3.1.1 General Response Actions

Identification of General Response Actions

General response actions (GRAs) describe classes of technologies that can be used to meet the remediation objectives for each medium of concern. Specific applicable remedial technologies for each medium of concern are identified and initially screened based on their effectiveness, implementability, and cost effectiveness, taking into consideration the site-specific conditions and contaminant characteristics. Past performance (i.e., demonstrated technology) and operating reliability were also considered in identifying and screening applicable technologies. Technologies that were not considered effective and/or technically or administratively feasible were eliminated from further consideration. Based on the RAOs identified, soil and soil vapor are the media of concern. General response actions that are not technologically specific but that address the soils and soil vapor RAOs include:

- Treatment;
- Containment;
- Excavation and disposal;
- Excavation and consolidation;
- Active and passive vapor mitigation/control;
- Institutional controls and/or,
- A combination of the above actions.

3.1.2 Criteria for Preliminary Screening

In accordance with guidance documents issued by NYSDEC (DER-10 and TAGM 4030) and the EPA (Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA [October 1988]), the criteria used for both preliminary screening of GRAs and remedial technologies include the following:

- **Effectiveness.** Evaluating the effectiveness of an action focuses on the degree to which a remedial action is protective of human health and the environment. An assessment is made of the extent to which an action: (1) reduces the mobility, toxicity, and volume of contamination at a site; (2) meets the remediation goals identified in the RAOs; (3) effectively handles the estimated areas and volumes of contaminated media; (4) reduces impacts on human health and the environment in the short-term during the construction and implementation phase; and (5) has been proven or shown to be reliable in the long-term with respect to the contaminant and conditions at the site. Alternatives that do not provide adequate protection of human health and the environment are eliminated from further consideration.

- **Implementability.** The implementability evaluation focuses on the technical and administrative feasibility of a remedial action. *Technical feasibility* refers to the ability to construct and operate a remedial action for the specific conditions at the site and the availability of necessary equipment and technical specialists. Technical feasibility also includes future maintenance, replacement, and monitoring that may be required for a remedial action. *Administrative feasibility* refers to compliance with applicable rules, regulations, statutes, and the ability to obtain permits or approvals from other government agencies or offices and the availability of adequate capacity at permitted treatment, storage, and disposal facilities and related services. Remedial actions that do not appear to be technically or administratively feasible or that would require equipment, facilities, or specialists that are not available within a reasonable period of time are eliminated from further consideration.

- **Relative Cost.** In the preliminary screening of remedial actions, relative costs are considered rather than detailed cost estimates. The capital costs and operation and maintenance costs of a remedial action are compared on the basis of engineering judgment, i.e., each action is evaluated as to whether the costs are high, moderate, or low relative to other remedial actions based on knowledge of the site conditions. A remedial action is eliminated during preliminary screening on the basis of cost if other remedial actions are comparably effective and can be implemented at a much lower cost.

The results of the preliminary screening are summarized below. The GRAs and remedial technologies that appear to meet the RAOs for soil and soil vapor are described.

3.2 Identification of Remedial Technologies

This section identifies the potential remedial action technologies associated with the above identified GRAs that may be applicable to remediation of the media at the Depew Landfill site identified above as requiring attention.

3.2.1 Soil and Soil Vapor Treatment Technologies

An evaluation of the analytical data for surface and subsurface soils indicates that lead contamination above the SCOs is present in certain areas across the site. Contamination has been identified within surface soils and subsurface soils at depths as great as 8 feet.

The following sections discuss the preliminary screening of various GRAs and remedial technologies that were considered for remediation of site soils and soil vapor.

3.2.1.1 No Action

In accordance with the NCP a no-action response must be evaluated during the course of the FS. The no-action alternative is only acceptable when it does not result in an unacceptable risk to human health and the environment.

3.2.1.2 Institutional Controls

Institutional controls are not technologies. They consist of instituted processes or cultural factors that reduce or prevent exposure of the human population to the contaminated soil. Institutional controls are not intended to be used alone or in perpetuity. Rather, they are used in conjunction with natural attenuation processes that result in the eventual reduction of contaminant concentrations to cleanup levels.

Institutional controls applicable to this site are:

- Access restrictions; and
- Deed restrictions.

Access restrictions can include public notifications and signs to identify to the public potential concerns. In some instances, fences can be used to restrict access to a site.

Deed restrictions could include limitations on further development of the site and/or surrounding properties. Long-term monitoring can be useful to demonstrate whether the levels of contamination exceed cleanup criteria.

In addition to access restrictions or deed restrictions, long-term groundwater monitoring would also be recommended to evaluate the site contaminant levels and determine if public threats increase or decrease. If contaminant concentrations increase above acceptable health concerns, further investigation would be recommended to determine the source of increasing lead levels and to determine if alternative measures are required to reduce threats to the public.

3.2.1.3 Removal Technologies

3.2.1.3.1 Excavation

Excavating, removing, and hauling contaminated soils, including soils exceeding NYCRR Part 375 SCOs ("hot spot" areas), use conventional heavy construction equipment such as backhoes and bulldozers. Land disposal and/or treatment of contaminated waste materials typically follow excavation operations. (Disposal technologies are discussed below.)

Two excavation objectives will be considered at the Depew Landfill site. The first will follow the Technical Guidance for Site Investigation and Remediation, which includes remediating to "pre-disposal" site conditions. The second will focus on remediating contamination within "pockets" or "hot-spot" areas that have been identified as containing lead concentrations exceeding 6 NYCRR Part 375- commercial setting SCOs. Standard construction equipment could be used to undertake either approach.

Excavation followed by disposal and/or treatment of contaminated soil and waste has proven to be an effective soil remediation approach, reducing exposure risks. Excavation has been retained as an applicable technology.

3.2.1.3.2 On- and Off-site Disposal

Land disposal of contaminated wastes has historically been the most common remedial action for hazardous waste sites. For this project, two disposal options were considered: off-site disposal at a landfill or other facility or on-site disposal/consolidation.

Off-Site Disposal

Off-site disposal of contaminated soils involves hauling excavated material to an appropriate commercially licensed disposal facility. Disposal facility selection depends on whether the waste is considered hazardous or non-hazardous. Waste material classified as hazardous waste may only be disposed of in a Resource Conservation and Recovery Act (RCRA)-permitted facility. Such facilities may be capable of treatment or processing waste materials into non-hazardous and/or beneficial use products or may be permitted landfills where certain types of waste may be disposed.

Off-site disposal of contaminated materials in a permitted landfill or other facility has been proven effective at removing contaminants of concern within selected media, thereby reducing exposure risks and providing long-term protection. Off-site disposal has been retained as an applicable technology.

On-Site Disposal

On-site disposal of material is considered a potential remedial option at the Depew Landfill. Materials would be consolidated at one location so that a smaller area can be addressed. Further action may be required after materials are consolidated, which may be considered under a different technology. In addition, consolidation of contaminated soils within one location followed by a possible remedy for the entire landfill to protect human health and environment appears to be a viable option. Therefore, on-site disposal has been retained as an applicable technology.

3.2.1.4 Containment

The objective of containment is to cover the contaminated soils to prevent human exposure to soil while minimizing surface water infiltration. Containment could be accomplished in various ways, e.g., using a geomembrane cap or a soil cover. A geomembrane cap typically consists of a low permeability composite cover layer overlain by a barrier/protective layer, typically consisting of 1 to 2 feet of soil, followed by topsoil. A permitted landfill following proper closing procedures could typically require a cap, following the guidelines of 6 NYCRR Part 360. However, per TAGM SW-98-13, *Landfill Regulatory Responsibility*, the DER is responsible for the remedial investigation/design/closure and post-closure monitoring oversight for Class 2 sites listed in the Registry.

A soil cover would consist of a soil layer designed for a thickness appropriate to minimize human exposure and a permeability to reduce surface water infiltration, taking into consideration the characteristics and risks associated with the type of contamination.

Typically, caps or covers associated with landfills will also require a gas venting system to allow landfill gases to be released, thereby minimizing damage to the cap system. Leachate collection systems are also typical for landfill caps. Maintenance is also a requirement for caps to ensure that the integrity of the cap is not compromised, which may occur naturally by erosion, burrowing animals, tree roots, etc. Damage could also be caused by human activity through excavation, puncture, etc.

Containment is a viable option for the Depew Landfill site and will be considered as an applicable technology. Because methane gas may be present, gas venting also will be considered. However, a leachate collection system is not applicable to this site because the waste has not been shown to generate leachate that would require handling and treatment.

3.2.1.5 Vapor Mitigation/Controls

Active Mitigation/Controls

Vapor mitigation and controls can include any in situ remedial technology that would actively or passively remove soil vapor, including VOCs and gases. Examples of active processes include soil vapor extraction (SVE), trenches, or collection layers that would use blowers or vacuums to remove VOCs and gases from the subsurface. This process actively draws the soil vapors from the extraction wells or trenches, where the vapors can be properly treated, if necessary, and/or released into the atmosphere.

Passive Mitigation/Controls

A passive vapor collection and venting system may consist of trenches, collection layers, or vent wells that would passively vent to the atmosphere. The trenches or wells would act as conduits for trapped gases to be released to the atmosphere. This technology is appropriate for low-level gases and gases that would not require treatment or containment. Since methane was present immediately following the field investigation but was not detected during a supplemental monitoring round, it is possible that the gases were trapped in isolated pockets or consisted of low levels that were concentrated until released to the atmosphere.

Numerous factors can affect the success of this technology, including:

- Permeability of the soil;
- Soil structure and stratification;
- Soil moisture; and
- Depth to groundwater.

Regardless of the soil conditions, passive venting appears to be a viable option and will be retained as an applicable technology. However, it is discussed under containment alternatives lead to the continued development of methane gas.

3.3 Development of Alternatives

Remedial alternatives were developed by assembling general response actions chosen to represent the various technology types into combinations that address the site. Five alternatives were developed for the site. These alternatives are described in the following subsections and are summarized in Table 3-1. Descriptions of each alternative have been developed according to the parameters set forth in Technical Guidance for Site Investigation and Remediation, Section 4.2.5.

- Alternative 1: No action;
- Alternative 2: Institutional Controls with Continued Monitoring;
- Alternative 3: Contaminated Soil Removal to “Pre-disposal” Conditions and Off-site Disposal with Continued Monitoring;

- Alternative 4: Contaminated "Hot-Spot" Soil Removal and Off-site Disposal with Continued Monitoring;
- Alternative 5: Soil Cover, Erosion Control, Passive Landfill Gas Control, Monitoring and Institutional Controls.

The remedial alternatives selected to address both soil and soil vapor contamination are further defined and evaluated in Sections 4 and 5. The remainder of this section provides an expanded description of each alternative.

3.3.1 Alternative 1 – No Action

Consideration of the No Action alternative is required by the NCP and is described in 40 CFR Part 300.430. It is also required by DER-10. The No Action alternative involves taking no further action to remediate site conditions. Typically, the No Action alternative is considered an unacceptable alternative because the site would remain in its present condition and human health and the environment would not be adequately protected. Long-term monitoring is not included in this alternative.

3.3.2 Alternative 2 – Institutional Controls with Continued Monitoring

Institutional controls are not remedial technologies. Rather, they are processes that reduce or prevent exposure of the human population to contamination. Institutional controls are often used on contaminated industrial sites where it may not be technically practical to achieve the proposed cleanup goals for soil or groundwater in a reasonable/predictable time frame or in situations where the costs far outweigh the benefits provided. In conjunction with institutional controls natural attenuation will assist in reducing contaminant levels over time. However, institutional controls are inappropriate when a valuable natural resource such as a sole-source aquifer would be or is impacted or when leachability or migration of contamination in subsurface soils becomes a concern. Institutional controls also are inappropriate when surface soil contamination presents a threat to human health and the environment. There are no known users of groundwater in the immediate vicinity of the Depew Landfill site. In addition, the contamination in the soils has not shown any leaching characteristics, but migration of contamination to the creek may be occurring through erosion of the site's soils. DPW employees and people that may access the site, such as fishermen, would be susceptible to exposure to soil contamination. Institutional controls may be effective in a limited role by preventing humans from being exposed to the contamination.

Institutional controls applicable for this site include:

- Public notifications, including fencing and signs;
- Access restrictions; and,
- Deed restrictions or environmental restrictions on future use.

Access restrictions can include public notifications and signs to identify to the public potential concerns. In some instances, fences are used to restrict access to the site. Access to the site from the north is already limited to DPW and ORF employees. However, access can be obtained along the perimeter of the site adjacent to the creek by crossing the creek, which fishermen, for example, are anticipated to do.

Deed restrictions could limit further development of the site and/or surrounding properties. Long-term monitoring can demonstrate whether the levels of contamination exceed cleanup criteria and wells to monitor for off-site migration of contamination and toward potential receptors.

3.3.3 Alternative 3 – Contaminated Soil Removal to "Pre-disposal" Conditions and Off-site Disposal with Continued Monitoring

Under this alternative, contaminated soils would be excavated to background cleanup levels in order to restore the site to be a condition consistent with surrounding native soil types. Determination of background levels are detailed in DER-10 and include the number, type, and location of samples to be used. In addition, when background levels are to be proposed under remedial investigation sampling, a more extensive sampling program to allow a statistical analysis of the background levels may be required. For this FS, the cleanup levels noted in Part 375, Table 375-6.8(a), *Unrestricted Use Soil Cleanup Levels*, have been selected as background levels for this site. Cleanup levels for lead under these requirements are more than 63 ppm. Therefore, this alternative will evaluate excavation efforts to remove and dispose of soil containing lead at concentrations greater than 63 ppm.

Excavation of contaminated soil to "pre-disposal" conditions, along with removal and hauling of contaminated soils, is generally accomplished with conventional heavy construction equipment such as backhoes and bulldozers. Soils containing lead concentrations greater than 63 ppm are shown on Figure 3-1. Based on the RI data, an average excavation depth of 5.5 feet below ground surface (bgs) to remove contamination greater than 63 ppm has been estimated. This excavation includes a surface area of approximately 12 acres, as shown on Figure 3-1. The excavated soils would be transported and disposed of at permitted landfills, a few of which are located within the vicinity of the site.

In addition to the lead-contaminated soils, refuse and municipal waste that is exposed would also be excavated and removed from this site. Waste and debris may be excavated to a depth sufficient to prevent future exposure of any deeper waste. Only the small areas of municipal waste on the site that are exposed would be impacted by this action. Costs for excavating waste and debris have not been estimated.

Soil and fill removed and disposed would be replaced by clean fill from an off-site source. Disturbed surfaces would be restored and revegetated. Soils along the shoreline and banks would be included in the overall site excavation (see Figure 3-1) and would subsequently receive clean fill and erosion control such as erosion control mats or boulders to act as riprap. For costing purposes, it is assumed 1,125 linear feet of bank would require erosion control, at a distance from shoreline to inland of 10 feet.

By excavating lead-enriched soils and exposed municipal waste, it is anticipated that some soils and waste that may contribute to the methane gas presence would be removed, thereby reducing methane gas generation. This reduction, along with the non-detect readings observed in the well head spaces in January 2007, may reduce concerns associated with methane gas. The effectiveness of this alternative in reducing the presence of methane will need to be verified after excavation is completed by sampling groundwater from on-site wells and/or by sampling soil gas for methane.

Groundwater would be monitored twice a year to determine if there are any changes in contaminant concentrations. Under this alternative the groundwater would not require treatment. However, since lead contamination is not currently migrating via groundwater off-site, any increases in concentration would need to be reviewed on a contaminant basis and evaluated for potential threats to human health or the environment, with subsequent action if necessary.

Therefore, it is proposed to install two additional overburden wells to a depth of 20 feet. In addition, surface water and sediment samples in conjunction with OU-2 remedial actions should also be collected as part of the monitoring program to determine if lead-contaminated soils have eroded from the site or if groundwater has created a migration pathway for elevated lead. Groundwater monitoring at eight wells, along with surface water and sediment sampling, would be conducted for five years, at which time the contaminant levels and health risks would be re-evaluated. Costs associated with monitoring, however, have been based on monitoring over a 15-year period for comparison with other alternatives. Costs for sampling sediment and surface water are not included here but should be considered for any study of OU-2.

3.3.4 Alternative 4 – Contaminated Soil Removal and Off-site Disposal with Continued Monitoring

Excavation, removal, and hauling of contaminated soils from “hot spot” areas, or those areas containing the greatest concentration of contaminants, are generally accomplished with conventional heavy construction equipment. Under this alternative, excavated soil containing lead concentrations exceeding the SCOs of 1,000 ppm would be transported and disposed of at permitted landfills, a few of which exist within the vicinity of the site. Excavation followed by disposal and/or treatment of contaminated waste is a demonstrated and effective technology in remediating contaminated soils and reduces exposure risks.

The distribution of soil containing lead concentrations greater than the Part 375.6-8(b) cleanup concentration of 1,000 mg/kg is shown in Figure 3-2. Limiting excavation to these isolated areas, or “hot spots,” would make the site consistent with a designated Restricted Commercial soil cleanup objective, which would in turn be consistent with the activities currently practiced at this site. This alternative reduces the overall health risk to humans while limiting the extent of remediation. An average excavation depth of 6.1 feet bgs to remove contamination greater than 1,000 ppm has been estimated. Analytical data show that elevated lead concentrations are isolated “hot spots,” so the total surface area of excavation would be approximately 2.84 acres.

In addition to the lead-contaminated soils, refuse and municipal waste that is exposed would also be excavated and disposed of at the landfill. Excavation of waste and debris would be of a sufficient depth to prevent future exposure of any deeper waste. Only the small areas of municipal waste on the site that are exposed would be impacted by this action. Costs for excavating waste and debris have not been estimated.

Under this alternative, it is assumed that some shoreline and banks would also be excavated in areas where debris and waste was exposed, particularly in high erosion areas. For purposes of this FS, it is assumed 150 cy of material will be removed from the shoreline.

Soil removed from the excavations and the shoreline and would be replaced by clean fill from an off-site source. Disturbed surfaces would be restored and revegetated. Along the banks in assumed high erosion areas (see Figure 3-2) erosion control consisting of erosion control mats or boulders to act as rip-rap would also be installed. For costing purposes, it has been assumed that 1,125 linear feet of bank would require erosion control at a distance from shoreline to inland of 10 feet.

Methane in groundwater was detected mostly in MW-06, which is located within a designed hot spot area. By excavating lead-contaminated soils and exposed municipal waste in this area (and possibly in all areas), it is possible that soils that may contribute to methane gas levels will be removed, thereby reducing the total on-site methane gas generation. This reduction, along with the non-detect readings observed in the head spaces of wells in January 2007, may eliminate concerns associated with methane gas. This will need to be verified after excavation is completed by sampling existing wells and any newly installed wells.

Groundwater would be monitored twice a year to determine if there are any changes in contaminant concentrations and it is assumed the groundwater would not require treatment. However, since lead contamination is not currently migrating via groundwater off-site, any increases in concentration would need to be reviewed on a contaminant basis and evaluated for potential threats to human health or the environment, with subsequent action if necessary.

Therefore, it is proposed to install two additional overburden wells to a depth of 20 feet. In addition, surface water and sediment samples in conjunction with OU-02 remedial actions should also be collected as part of the monitoring program to determine if lead-contaminated soils have eroded from the site or if groundwater has created a migration pathway for elevated lead. Groundwater monitoring at eight wells, along with surface water and sediment sampling would be conducted for a period of five years, at which time the contaminant levels and health risks would be reevaluated. Costs associated with monitoring, however, have been based on monitoring over a 15-year period for comparison with other alternatives. Costs for sampling sediment and surface water are not included here but should be considered in any study of OU-2.

3.3.5 Alternative 5 – Soil Cover, Erosion Control, Passive Landfill Gas Control, Monitoring and Institutional Controls

Covering or containment of contaminated soils consists of applying a means of preventing human exposure to soil while minimizing surface water infiltration. A soil cover has been selected for this site as an appropriate containment method because, with an appropriate cover system, the risks associated with exposure would be considered low. Also, with current groundwater data suggesting that infiltrating surface water does not contribute to groundwater contaminant levels, a geomembrane cap system consistent with 6 NYCRR Part 360 does not appear to be necessary.

Alternative 5 assumes a 1-foot thick, medium-permeability soil cover would be located over the seasonally flooded tip of the peninsula, continuing up along both sides of the Erie County ORF, to a line approximately 150 feet to the north of the ORF entrance gate (consisting of approximately 7.0 acres of surface area [see Figure 3-3]). Prior to cover soil placement, the site would be grubbed, cleared of trees and shrubs, and graded to remove depressions, and the site would be sloped to allow surface water to flow to the creek. This will eliminate the mounds of fill and the depressions on the peninsula tip believed to have been caused by extensive historical test pits dug in this area. Topsoil would be tilled or raked to break up and loosen the surface soils, allowing the cover soil to blend with the existing surface soils for better union and eliminating an organic interface between the cover soil and the surface soil. A soil cover consisting of a silty-clay ML or CL (according to the ASTM Unifed Soil Classification System [ASTM 1985]) at a thickness of 8 inches is proposed (actual parameters would be determined during remedial design). After placement of the soil cover, the site would be appropriately graded with 4 inches of topsoil for proper vegetation. This would result in a total soil cover thickness of 1 foot.

The impacts of adding a 1 foot soil cover to the creek flow, particularly during flood events, was considered. According to FEMA flood mapping (map ID

3602360003B), the Depew Landfill site is located in Zone A4, which is defined as an "area of 100-year flood; base flood elevations and flood hazard factors determined."

According to floodplain regulations, any development in the floodplain should demonstrate "no adverse effect," which is interpreted as no rise in the base flood elevation of more than 1 foot. Since the proposed remediation is a 1-foot soil cover, the expected base flood elevation in the vicinity of the site would be expected to be less than 1 foot.

In addition, floodways receive extended protection and must show zero rise in the base flood elevation. However, no floodways are designated in the vicinity of the Depew Landfill site.

Under this alternative, it is assumed that some excavation would also be necessary along the shoreline and banks to remove some exposed debris and fill. It is assumed that 150 cy of soil would be removed and require replacement with clean fill. The shoreline and banks would also be designed with erosion control consisting of erosion control mats or boulders to act as rip-rap. For costing purposes, it has been assumed that 1,125 linear feet of bank would require erosion control, at a distance from shoreline to inland (horizontal width) of 10 feet and an average vertical depth of 2 feet. This will prevent the direct erosion of contaminated soils/fill by and into the creek and subsequent deposition of the lead contamination in the sediments, which would be protective of the Cayuga Creek environment. The shoreline and banks would be excavated where necessary in order to relocate exposed fill material away from the creek shoreline. The material pulled back from the banks would be incorporated under the soil cover described above. The shoreline areas excavated, and other areas as required, would be designed with erosion control measures that could include erosion control mats and vegetation and/or bank armament such as boulders and rip-rap. The design of the erosion control measures for the site should take into consideration the creek's hydraulic characteristics. In addition, any design should consider recommendations made in the U.S. Army Corps of Engineers February 1999 report, *Emergency Streambank Protection Project Cayuga Creek (Zurbick Road).* These recommendations should be considered in order to understand the proposed Army Corps modifications to the Zurbrick Road embankment in order to minimize erosional influences created by changes to the creek banks that could result in increased erosion or changes to stream flow patterns, thereby affecting the soil cover or resulting in further lead-soil deposits to the stream.

EEEPC understands there is a potential for soil removal activities at OU-2, depending on future investigations. Based on the timing of construction, soil materials that are removed from OU-2 could be incorporated under the soil cover for OU-1. If soil removal at OU-2 occurs within a timeframe that is acceptable to NYSDEC before the cover for OU-1 is completed without incurring remobilization costs, and provided there are no erosion concerns with leaving OU-1 uncovered, then the soils from OU-2 could be incorporated under the cover. If the two projects cannot be scheduled concurrently, NYSDEC may also decide that the soil cover for OU-1 should be removed to allow the soils from OU-2 to be placed and then recovered. Or the soils from OU-2 could be disposed at a local landfill. Costing associated with any excavation or placement of soils related to OU-2, however, has not been included in this FS.

Landfill gas (LFG), containing a percentage of methane, was detected in the groundwater and monitoring well headspace during well installation at the site. Typically, covering a landfill requires some type of gas-venting system to prevent gas buildup, which could compromise the cover. In addition, these gases may also seek out areas of lower pressure, which could result in their migrating laterally to buildings or other structures with the resultant health and safety concerns.

Gases would not be expected to become trapped under this style of cover. However, for the purposes of the FS, a passive gas venting system has been considered to ensure that a design is in place to vent gases to the atmosphere in case an increase in gas is experienced prior to design or construction. This would include the installation of isolated passive vents to control the release of any potential gas within the subsurface. The vents would be generally placed in the covered area. The passive gas vents would consist of vertical wells of perforated PVC pipe and would be installed approximately to the bottom of the fill depth below grade. Based on the low readings and soil/fill types, ten vents have been assumed for costing purposes. It is also assumed that the wells have a zone of influence of approximately 100 feet and will be spaced equally within the cover. However, actual number and locations of the vents will be designed to provide overlapping zones of influence. No treatment would be anticipated for low-level methane gasses being vented. A methane gas study would be recommended during remedial design to determine the nature of concern regarding the methane gas.

Similarly, under this alternative, groundwater would be monitored twice a year to determine if there are any changes in contaminant concentrations. Although lead contamination is not currently migrating via groundwater off-site, any increases in concentration would need to be reviewed on a contaminant basis and evaluated for potential threats to human health or the environment, with subsequent action if necessary.

Therefore, it is proposed to install two additional overburden wells to a depth of 20 feet. In addition, surface water and sediment samples in conjunction with OU-2 should also be collected as part of the monitoring program to determine if lead contaminated soils have eroded from the site or if groundwater has created a migration pathway for elevated lead. Groundwater monitoring at eight total wells, along with surface water and sediment sampling would be conducted for a period of five years, at which time the contaminant levels and health risks would be re-evaluated. Costs associated with monitoring, however, have been based on monitoring over a 15-year period for comparison with other alternatives. Costs for sampling sediment and surface water will not be included here but should be considered in any study of OU-2. It is assumed that groundwater would not require treatment in this alternative.

Institutional controls will be required under this alternative to prevent damage to the cover system. Deed restrictions or environmental easements will be needed to prevent excavation through the cover system and exposure of fill materials. Although it is assumed that the northern portion of the site will remain useable for the DPW, notice will be required to ensure the DPW does not excavate into existing soils or the cover materials throughout the entire site. Public notifications, including fencing and signs, could also be incorporated to provide notice to people who might access the site, e.g., fisherman.

Table 3-1 Feasibility Study Alternatives Summary for OU-1, Depew Village Landfill, Depew, New York

Media	Alternative 1 No Action	Alternative 2 Institutional Controls with Continued Monitoring	Alternative 3 Contaminated Soil Removal to Pre-Disposal Conditions and Off-site Disposal with Continued Monitoring	Alternative 4 Contaminated Hot-Spot Soil Removal and Off-site Disposal with Continued Monitoring	Alternative 5 Soil Cover, Erosion Control, Passive Landfill Gas Control, Monitoring and Institutional Controls
Soil	■ Required by guidance. Institutional controls such as public notification, deed restriction on future use, fencing and signs. Continued monitoring to ensure no increase in contamination concentrations in groundwater and migration to surface water does not occur. Monitor for increase in gas levels and/or migration to buildings. Development and implementation of a site management plan.	■ Institutional controls such as public notification, deed restriction on future use, fencing and signs. Continued monitoring to ensure no increase in contamination concentrations in groundwater and migration to surface water does not occur. Monitor for increase in gas levels and/or migration to buildings. Development and implementation of a site management plan.	■ Excavate lead-contaminated soils exceeding selected background levels of 63 ppm and transport/dispose to landfill. ■ Backfill excavation with clean fill and restore surface, including vegetation and trees. Install erosion control at selected areas along creek. ■ Continued monitoring to ensure no increase in contaminant concentrations in groundwater and migration to surface water does not occur. ■ Removal of soils predominantly includes the entire site, thereby reducing concerns of methane gas. Therefore, no actions recommended for methane gas under this alternative. ■ Development and implementation of a site management plan.	■ Excavate lead-contaminated soils exceeding selected background levels of 1,000 ppm and transport/dispose to landfill. ■ Main area – backfill excavation with clean fill, restore surface. ■ Shoreline/banks – excavate existing fill from shoreline at creek; then grade, restore surface, backfill excavation with clean fill and restore surface. Install erosion control at selected areas along creek (boulders, riprap, mats, vegetation). ■ Continued monitoring to ensure no increase in contaminant concentrations in groundwater and migration to surface water does not occur. ■ Monitor for increase in gas levels and/or migration to buildings. ■ Institutional controls such as public notification, deed restriction on future use, fencing and signs. Development and implementation of a site management plan.	■ 1-foot soil cover over approximately 5.25 acres consisting of the peninsula tip extending to 150 feet north of the ORF entrance. ■ Shoreline/banks –excavate existing fill from shoreline at creek; then grade, restore surface, and cover where applicable. Install erosion control at select areas along creek (boulders, riprap, mats, vegetation). ■ Install passive gas collection and venting system for methane control. ■ Continued monitoring of groundwater, surface water, and sediments to ensure remedy effectiveness and lead is not migrating via groundwater. ■ Institutional controls such as public notification, deed restriction on future use, fencing and signs. Development and implementation of a site management plan.

Source: NYS GIS Clearinghouse, 2002

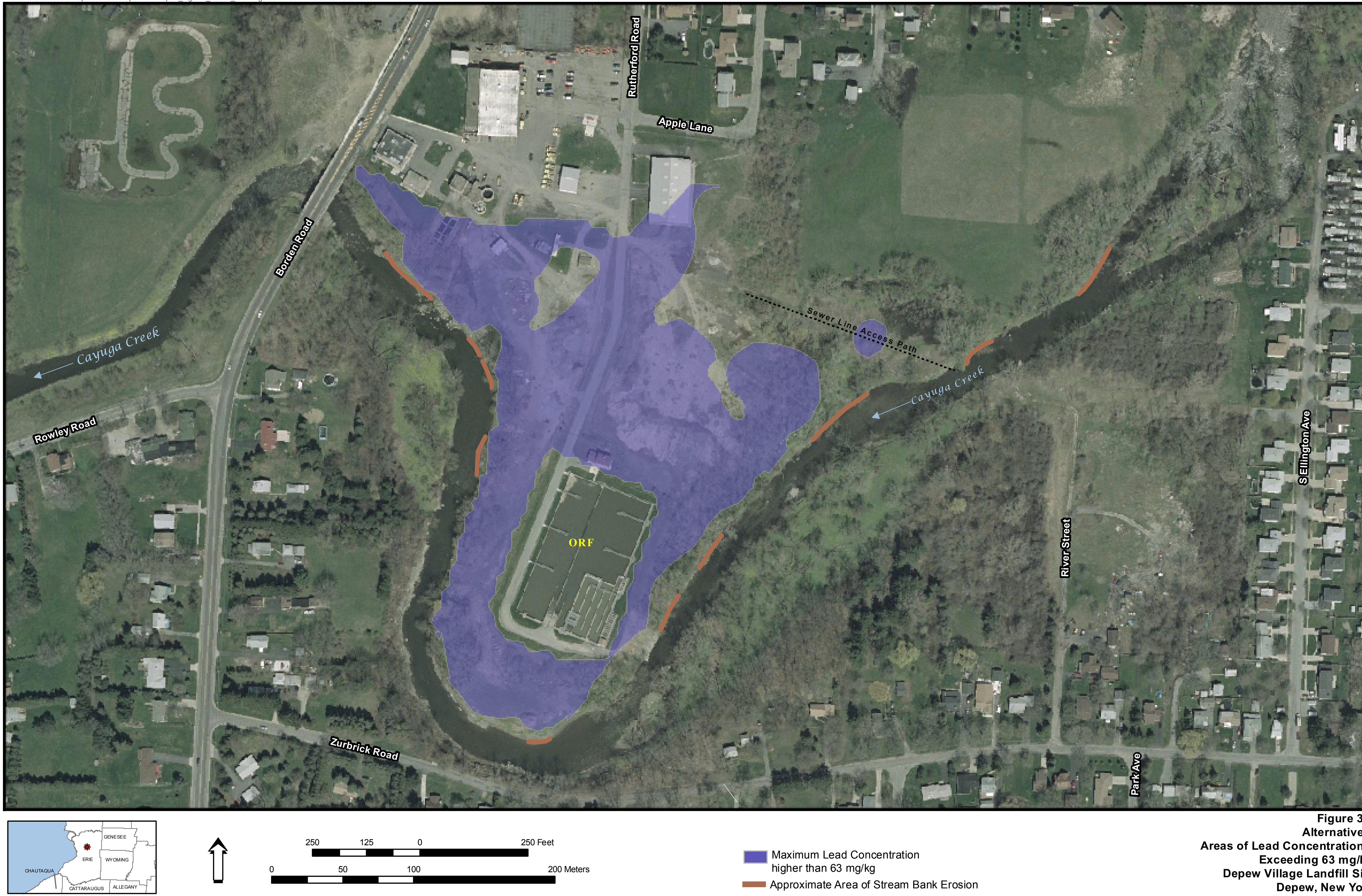
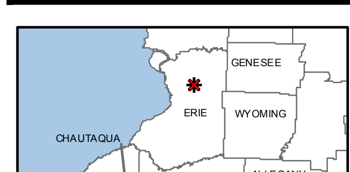


Figure 3-1
Alternative 3
Areas of Lead Concentrations Exceeding 63 mg/kg
Depew Village Landfill Site
Depew, New York

Source: NYS GIS Clearinghouse, 2002



250 125 0 250 Feet

0 50 100 200 Meters

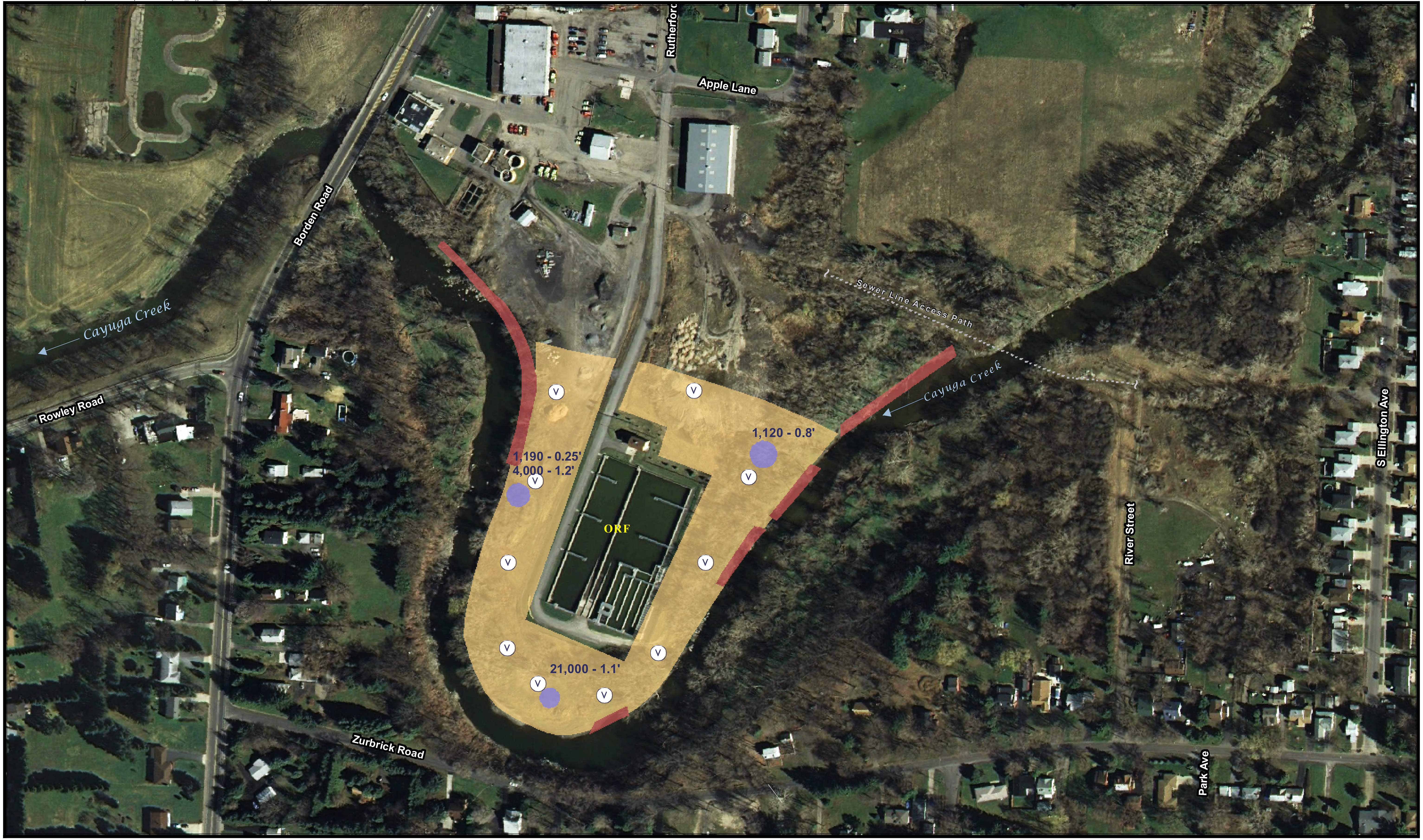
Sewerline Access Path

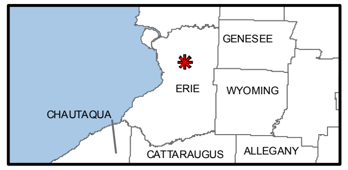
Lead greater than 1000 ppm to be excavated and disposed off site

Approximate Area of Stream Bank Erosion

Figure 3-2
Alternative 4
Areas of Lead Concentrations Exceeding Part 375-6.8 (b) Lead SCO of 1,000 ppm
Depew Village Landfill Site
Depew, New York

Source: NYS GIS Clearinghouse, 2006





250 125 0 250 Feet
0 50 100 200 Meters

V Proposed Passive Venting Locations
Sewerline Access Path
Surface / Near Surface Results (ppm, depth)
~ Capping / Venting Area 7.05 Acres
~ Bank Areas Proposed for Erosion Control

Figure 3-3
Alternative 5
Approximate Areas of Cap, Erosion Control,
Passive LFG Controls
Depew Village Landfill Site
Depew, NY

4 Detailed Analysis of Alternatives

In this section, the five alternatives discussed in Section 3.3 are evaluated against the seven criteria identified in NYSDEC's DER-10, Technical Guidance for Site Investigation and Remediation. These criteria are summarized below:

- **Compliance with SCGs.** This criterion evaluates compliance with SCGs that apply to this site. Standards are promulgated levels that apply directly to the media of interest and are required to be met. Criteria and guidance levels are non-promulgated levels that may be applicable and are to be considered. Attainment of criteria and guidance is not a legally required objective.

  SCGs include chemical-specific values that address concentrations of contaminants in various media; action-specific requirements such as requirements for handling hazardous waste; and location-specific requirements such as wetlands regulations.

- **Overall Protection of Human Health and the Environment.** This criterion provides an overall check on whether the alternative protects human health and the environment. The overall assessment of protection is based on a composite of factors assessed under other evaluation criteria, especially long-term effectiveness, short-term effectiveness, and compliance with SCGs.

- **Short-Term Effectiveness.** This criterion assesses the effects of the alternative during the construction and implementation phase until remedial objectives are met, including protection of the community during the action and the time required to complete the response.

- **Long-Term Effectiveness and Permanence.** This criterion evaluates the permanence of the remedial alternative, the magnitude of the remaining risk, and the adequacy and reliability of the controls on any remaining contamination.

- **Reduction of Toxicity, Mobility, or Volume with Treatment.** This criterion assesses the extent to which material is treated to reduce toxicity, mobility, or volume. As discussed in Section 1.3.1, the nature of the contaminants at this site, the minimal amount of contamination in soil and debris media, and the small size of the site limit the applicability of treatment technologies at this site.

- **Implementability.** This criterion assesses the technical and administrative feasibility of implementing an alternative and the availability of various services required for the alternative's implementation.

- **Cost.** Evaluated costs include capital, operation and maintenance, and present worth.

- **Community Acceptance.** Community acceptance will be addressed during the PRAP public comment period prior to formalization of the ROD. Therefore, no further discussion of this topic will be included in each alternative evaluation.

4.1 Alternative 1: No Action

4.1.1 Description

The No Action alternative is presented as a baseline for comparison with other alternatives. This alternative does not include remedial action, institutional or engineering controls, or long-term monitoring.

4.1.2 Analysis

4.1.2.1 Compliance with SCGs

Implementing a No Action alternative would result in the contamination maintaining its current concentrations and impacts. Contaminant concentrations are not expected to decrease appreciably over time. Therefore, this alternative would not comply with the chemical-specific SCGs for the site.

4.1.2.2 Overall Protection of Human Health and the Environment

Under this alternative, site contamination may pose a potential health risk to human receptors when a complete exposure pathway exists and when the magnitude of exposure is sufficient to cause adverse health effects. Under existing site conditions, DPW employees could be exposed by direct contact with soil contaminants. Trespassers or other persons accessing the property, such as fishermen, could also come into contact with contamination within the soils. Contaminants from the site that have a potential of getting into groundwater may be reduced in concentration as they travel from the site by degradation, dispersion, and other processes. However, currently no leaching or contamination appears to significantly affect the groundwater.

4.1.2.3 Short-Term Effectiveness

No short-term impacts (other than those existing) are anticipated during the implementation of this alternative because no remedial activities are involved.

This alternative does not include source removal or treatment and would not meet any of the six RAOs in a reasonable or predictable timeframe.

4.1.2.4 Long-term Effectiveness and Permanence
This alternative would not be effective in the long-term because this alternative does not involve removal or treatment of the contaminated soil, and thus no risks are associated with removal or treatment of the contaminated media. The risks involved with direct contact with contaminants would remain the same.

4.1.2.5 Reduction of Toxicity, Mobility, or Volume with Treatment
This alternative does not involve the removal or treatment of contaminated soil. Therefore, neither the toxicity, nor mobility, nor volume of contamination is expected to be reduced. Natural attenuation of contaminants may reduce the concentration in soil over time. However, this reduction is not expected to be significant within a reasonable or predictable timeframe.

4.1.2.6 Implementability
There would be no technical obstacles to implementing this alternative.

4.1.2.7 Cost
There would be no costs associated with this alternative.

Alternative 1 is readily implementable with minimal short-term risks because no intrusive work would be done. However, this alternative leaves the soil and associated media unchanged and does not reduce or eliminate existing risks.

4.2 Alternative 2: Institutional Controls with Continued Monitoring

4.2.1 Description
Examples of institutional controls typically include land-use restrictions, natural resource-use restrictions, deed restrictions, deed notices, declaration of environmental restrictions, access controls, site posting requirements, information distribution, restrictive covenants, federal/state/county/local registries, and monitoring requirements. Potential institutional controls applicable to this site include limiting access to the site by anyone other than employees of the DPW; deed restrictions or future development limitations, such as limiting the area to commercial development only or no further development; public notifications; and use of signs and fencing.

In order to evaluate the effects of implementing institutional controls and to evaluate future threats to humans and the environment, groundwater monitoring would be conducted. For purposes of this FS, it is assumed that two additional monitoring wells would be installed throughout the property, where investigations have identified existing groundwater contamination. These wells would allow groundwater to be monitored for changes in contaminant migration. Continued monitoring of selected on-site wells would also be implemented. Well monitoring could identify whether groundwater contamination increases or migrates off-site, thereby requiring other types of action.

4.2.2 Analysis

4.2.2.1 Compliance with SCGs

Although long-term natural attenuation is anticipated for the site contaminants, the contaminant types (metals) and levels in soils and groundwater are not expected to decrease appreciably over time. Therefore, this alternative would not comply with the chemical-specific SCGs for the site. Action-specific SCGs (e.g., safety regulations) would be included in the institutional controls and complied with during site activities.

4.2.2.2 Overall Protection of Human Health and the Environment

This alternative may not reduce the potential health risk to human receptors if a complete exposure pathway exists and if the magnitude of exposure is sufficient to cause adverse health effects. Under existing site conditions, DPW workers could be exposed by direct contact with soil contaminants. Surface water data provides little evidence that site contaminants leach into the creek. Rather, site contaminants are present in soil that is eroded and later deposited into the sediments. Accordingly, this alternative may not be fully protective of human health or the environment.

4.2.2.3 Short-Term Effectiveness

This alternative would not have any short-term impacts other than the activities associated with the installation of the monitoring wells. Sampling events would require that personnel be given access to the site to conduct sampling according to an established schedule.

4.2.2.4 Long-Term Effectiveness and Permanence

This alternative will not be effective in the long-term (in terms of protecting human health and the environment) because this alternative does not involve removal or treatment of the contaminated media.

4.2.2.5 Reduction of Toxicity, Mobility, or Volume with Treatment

Implementing the discussed institutional controls will not reduce the toxicity, mobility, or volume of contaminants. The history of the site has shown that contamination has not been reduced significantly since the site was first evaluated. Therefore, no reduction in the contaminant levels is expected within a reasonable or predictable timeframe.

4.2.2.6 Implementability

This technology can be readily implemented on a technical and administrative basis using typical institutional control practices/procedures and standard groundwater sampling methods.

4.2.2.7 Cost

The total present-worth cost of this alternative based on a 15-year period is $240,800. Table 4-1 presents the quantities, unit costs, and subtotal costs for the various items in this alternative. Biannual groundwater monitoring costs and two inspections per year are assumed with this alternative.

Alternative 2 (institutional controls) is readily implementable with minimal short-term risks because no intrusive work would actually be done. The effectiveness of this alternative in reducing on-site and off-site risks would be based on enforcement of the restrictions/controls over an extended period of time (more than 30 years). This alternative would not be effective at preventing on-site exposure to DPW employees or off-site migration of contaminated groundwater.

4.3 Alternative 3: Contaminated Soil Removal to Pre-disposal Conditions and Off-site Disposal with Continued Monitoring

4.3.1 Description

Under this alternative, excavated lead-contaminated soils would be transported and disposed of at permitted landfills within the area. Soils that contain lead contamination above 63 ppm would be excavated and disposed of off-site. The data indicate that the area requiring excavation is approximately 12 acres to an average depth of 5.5 feet. In addition to the lead-contaminated soils, refuse and municipal waste that is exposed throughout the site, including the shorelines, would also be excavated and disposed of off-site at a landfill. Excavation of waste and debris would occur to a sufficient depth to prevent future exposure of any waste. Erosion-control along creek shorelines in selected areas would be implemented. The objective of this alternative is to remove the lead contamination to below NYSDEC-appointed background levels.

4.3.2 Analysis

4.3.2.1 Compliance with SCGs

Removal of lead contamination from the site to below background levels would essentially remove most soil contamination, thereby meeting SCGs throughout the site. It is anticipated that methane gas levels may be reduced along with the soil removal, along with the ability to generate methane gas. The impact on methane gas would be evaluated after excavation is completed by sampling existing and any newly installed wells.

Groundwater would be monitored twice a year to determine if there are any changes in contaminant concentrations but would not be treated. However, because lead contamination is not currently migrating via groundwater off-site, any increases in concentration would need to be reviewed on a contaminant basis and evaluated for potential threats to human health or the environment, with subsequent action if necessary. In addition, surface water and sediment samples taken ion conjunction of studies of OU-2 should also be collected as part of the monitoring program to determine if lead-contaminated soils have eroded from the site or if groundwater has created a migration pathway. Groundwater monitoring and surface water and sediment sampling would be conducted for five years, at which time the contaminant levels and health risks would be reevaluated. If contaminant levels do not increase, then the soil removal would be deemed successful in eliminating the source. If contaminant levels increase, then an alternative investigation should be implemented.

Applicable action-specific SCGs, including noise limitations and safety regulations, would be complied with during implementation of this alternative.

4.3.2.2 Overall Protection of Human Health and the Environment

Removal of lead-contaminated soils to below background levels and removal of debris that could generate methane gas would benefit the DPW employees as well as any people who access the site. Removal of contaminated soil to background levels may allow the site to be reclassified and potentially removed from the registry of non-active hazardous waste sites. This may allow the site to be further developed in the future. Also, any removal of contamination would reduce the potential for exposure and would be protective of the creek environment. Evaluation of groundwater levels after a period of time could suggest if the cleanup efforts were successful in meeting the objectives or if additional investigations are needed to identify alternate sources. Other than institutional controls associated with groundwater use, no other institutional controls, e.g., limiting access to the site to the DPW employees and limiting the area to commercial development only or no further development, may be necessary.

4.3.2.3 Short-Term Effectiveness

Short-term impacts include disturbing the DPW workers and the surrounding community while the soils are removed, although construction associated with this alternative would not require suspending current operations. Much of the contaminant concentrations exceeding risk-based screening levels are found in subsurface soils. If the site is excavated, construction workers could also be exposed to soil contaminants during excavation operations. Such exposures are expected to be relatively brief and can be mitigated by appropriate monitoring, engineering controls, and use of PPE.

Construction vehicles would generate noise and air emissions and increased traffic. However, these concerns can be minimized through design and best operating practices such as restricting traffic to certain work periods, finding safe transportation routes, etc. Anticipated length of time to complete this work is approximately eight months. Construction associated with this alternative would not require suspension of current site operations including the DPW.

Installation of the monitoring wells and subsequent sampling would have very limited short-term impacts on operations during the relatively brief installation and sampling times.

4.3.2.4 Long-Term Effectiveness and Permanence

Removal of the contaminated soils will reduce the potential for DPW workers, public, and wildlife to come in contact with the contamination. Removal of the contaminants would also reduce the potential for migration of contaminants from the source area into the groundwater or surface water. This will be a direct benefit to human health and the environment and minimize the spread of contamination. Methane gas generation would be minimized because the debris would be removed.

Since groundwater is not treated under this alternative, contamination that may be found in the groundwater could be carried into the creek as the groundwater migrates from the site. However, contaminant levels are relatively low and since the source would be removed, the potential contaminants available to migrate would be reduced. Periodic monitoring will provide information on the effectiveness of the alternative.

4.3.2.5 Reduction of Toxicity, Mobility, or Volume with Treatment

Complete soil contamination removal will eliminate toxicity, mobility, and the volume contributed by the source areas. However, groundwater migration could continue to contribute to off-site migration of contaminants.

4.3.2.6 Implementability

Administratively, costs associated with Alternative 3 are significant. However, it is readily implementable on a technical basis using standard construction means/methods and typical institutional control practices/procedures. Engineering consultants and contractors are readily available to design and complete such an alternative. No technical difficulties are anticipated during excavation and removal of contaminated soil and debris. Disposal would be coordinated with a treatment/disposal facility.

Minimal disturbance of the DPW facilities and workers is anticipated. The monitoring wells should be easily installed with limited interruption of local activities.

4.3.2.7 Cost

The total present-worth cost of this alternative based on a 15-year period is $9,967,200. Table 4-2 presents the quantities, unit costs, and subtotal costs for the various items in this alternative. Biannual groundwater monitoring and two annual inspections are assumed.

Alternative 3 (contaminated soil removal and disposal with continued monitoring) is readily implementable. The primary short-term risks are associated with construction activities on the site, odor and vapor concerns, and handling the contaminated soil. This alternative reduces the risks associated with directly contacting contaminated soils and the potential of groundwater migration from these source soils by reducing toxicity, mobility, or volume.

4.4 Alternative 4: Contaminated Soil Removal and Off-Site Disposal with Continued Monitoring

4.4.1 Description

Under this alternative, hot spots containing elevated lead concentrations above the SCO of 1,000 ppm, including the shoreline and banks, would be excavated and transported for disposal at permitted landfills near the site. Hot spots comprising a total surface area of approximately 2.84 acres would be excavated to an average depth of 6.1 feet. The hot spot excavations would restore the site to a soil cleanup objective consistent with a commercial site, which would be consistent with the current activities at this site. The site also could be listed for future commercial development. This alternative also reduces the overall health risk to humans while limiting the extent of remediation.

In addition to the lead-contaminated soils, refuse and municipal waste that is exposed throughout the site, including the shorelines, would be excavated and disposed off-site at a landfill. Excavation of waste and debris would be at a depth sufficient to prevent future exposure of any waste. Erosion control along selected areas of the creek shoreline would be implemented.

The objective of this alternative is to remove the lead contamination to below commercial SCOs of 1,000 ppm within the main area of the peninsula and to remove refuse and municipal waste, along with lead, from the shoreline to below the Protection of Ecological Resources SCO (63 ppm for lead) to prevent direct erosion of the lead-bearing waste into the creek.

4.4.2 Analysis

4.4.2.1 Compliance with SCGs

Removal of hot spots from the site would remove soil contamination, thereby meeting SCGs at those immediate locations. Along with the soil removal, it is anticipated that methane gas levels also would be reduced. This reduction, along with the non-detect readings observed during the January 2007 sampling, may minimize concerns associated with methane gas. This will need to be verified after excavation is completed by sampling existing wells and any newly installed wells.

Groundwater would be monitored twice a year to determine if there are any changes in contamination levels but would not be treated. Monitoring would occur for a period of five years, at which time the contaminant levels and health risks would be reevaluated. If contaminant levels decrease, then the hot spot removal would be considered successful in eliminating the source. If contaminant levels increase, then an alternative investigation should be implemented.

Applicable action-specific SCGs, including noise limitations and safety regulations, would be complied with during implementation of this alternative.

4.4.2.2 Overall Protection of Human Health and the Environment

Removal of hot spot soil contamination along with debris that would generate methane gas may benefit the DPW employees as well as any persons who access the site. The removal of exposed waste material, particularly along the shoreline, coupled with erosion control, should protect the Cayuga Creek environment.

In order to maintain long-term protection of human health, institutional controls—e.g., limiting access to the site to DPW employees, limiting the area to commercial development only, or no further development—could be employed. Evaluation of contaminant concentrations in groundwater, sediment, and surface water over a period of time could indicate whether the cleanup efforts were successful in meeting the objectives or if additional investigations are needed to identify alternate sources.

4.4.2.3 Short-Term Effectiveness

Short-term impacts include disturbing DPW workers and the surrounding community while the hot spots are removed. Construction associated with this alternative would not require suspending current operations. The potential for construction workers to be exposed to benzo(a)pyrene, arsenic, and lead in specified areas of concern may warrant further evaluation. Much of the contaminant concentrations exceeding risk-based screening levels are found in subsurface soils. If the site is excavated, construction workers could also be exposed to soil contaminants during excavation operations. Such exposures are expected to be relatively brief; however, they can be mitigated by appropriate monitoring, engineering controls, and use of PPE.

Construction vehicles would generate noise, air emissions, and increased traffic. However, these concerns can be minimized through design and best operating practices such as restricting traffic to certain work periods, finding safe transportation routes, etc. The anticipated length of time to complete this work is approximately six months.

Installation of the monitoring wells and subsequent sampling would have very limited short-term impacts on operations during the relatively brief installation and sampling times.

4.4.2.4 Long-Term Effectiveness and Permanence

Removal of the hot spots will remove the potential for DPW workers, the public, and wildlife to come into contact with contamination. Removing the contaminants would also reduce the potential for contaminants to migrate from the source area into the groundwater or surface water. Minimizing the spread of contamination will be a direct benefit to human health and the environment. Methane gas generation also would be minimized because debris would be removed.

It is possible that groundwater will migrate to the creek, and because groundwater would not be treated under this alternative, contamination already found in the groundwater could be carried into the creek. However, contaminant levels are relatively low and would be reduced because the source would be removed. Periodic monitoring will provide information on the effectiveness of the alternative.

4.4.2.5 Reduction of Toxicity, Mobility, or Volume with Treatment
Complete removal of contaminated soils in the hot spots will eliminate toxicity, mobility, and the volume contributed by the source. However, groundwater will not be addressed under this alternative, and so the mobility of dissolved contaminants will not be affected.

4.4.2.6 Implementability
Alternative 4 is readily implemented on a technical and administrative basis using standard construction means/methods and typical institutional control practices/procedures. Engineering consultants and contractors are readily available to design and complete such an alternative. No technical difficulties are anticipated during excavation and removal of contaminated soil and debris. Disposal would be based on coordination with a treatment/disposal facility.

Minimal disturbance of the DPW facilities and workers is anticipated. The monitoring wells should be easily installed with limited interruption of local activities.

4.4.2.7 Cost
The total present-worth cost of this alternative based on a 15-year period is $3,262,700. Table 4-3 presents the quantities, unit costs, and subtotal costs for the various items in this alternative. Biannual groundwater monitoring and two annual inspections are assumed.

Alternative 4 (contaminated soil removal and disposal with continued monitoring) is readily implementable. The primary short-term risks are associated with construction activities on the site, odor and vapor concerns, and handling contaminated soil. This alternative reduces the risks associated with direct contact with contaminated soils. However, the potential of for mobility of dissolved contaminants via groundwater will not be addressed.

4.5 Alternative 5: Soil Cover, Erosion Control, Passive Landfill Gas Control, Monitoring, and Institutional Controls

4.5.1 Description
In Alternative 5, the soils located within the peninsula around the ORF would be covered with 1-foot of medium-permeability soil to provide a stabilized containment area that would prevent human/fauna exposure to contaminants, minimize surface water infiltration, and prevent migration via erosion of the soil/fill mate-

rial into Cayuga Creek. The soil cover would comprise approximately 7.0 acres of surface area.

Under this alternative, erosion-control measures such as erosion control mats and vegetation and/or bank armament such as boulders and rip-rap will be installed along selected areas of the creek banks and shoreline to prevent contaminated soils/fill directly eroding into the creek and subsequently contaminating the sediments with lead. The shoreline and banks would be excavated where necessary in order to relocate exposed fill material away from the creek shoreline. The design of the erosion control measures for the site should take into consideration the creek's hydraulic characteristics. In addition, any design should consider recommendations made in the USACE's *Emergency Streambank Protection Project Cayuga Creek (Zurbick Road)* (February 1999).

Discussions with NYSDEC indicate that additional investigations of OU-2 may take place and that soil may be removed from OU-2 in the future. Depending on the timing of construction, soils removed from OU-2 could be incorporated under the soil cover for OU-1. If soil removal for OU-2 occurs within a timeframe that is acceptable to NYSDEC before the cover for OU-1 is completed, without incurring remobilization costs, and provided that leaving OU-1 uncovered would not result in erosion, then the soils from OU-2 could be incorporated under the cover. If the two projects cannot be scheduled concurrently, NYSDEC may also decide that the soil cover for OU-1 should be removed to allow the soils from OU-2 to be placed and then recovered. Or the soils from OU-2 could be disposed at a local landfill. (Costing associated with any excavation or placement of soils related to OU-2 has not been included in this FS.)

Institutional controls will be required under this alternative to prevent damage to the cover system. Deed restrictions or environmental easements will be needed to prevent excavation through the cover system and exposure of fill materials. Although it is assumed that the northern portion of the site will remain useable for the DPW, notice will be required to ensure they do not excavate into existing soils or the cover materials throughout the entire site. Fencing and signs could also be incorporated to provide notice to the public and people such as fisherman who might access the site.

4.5.2 Analysis

4.5.2.1 Compliance with SCGs

Covering and containing the contaminated portions of the site would meet SCGs for lead in the site soils. Relocating and covering the stream bank soils/fill material, coupled with erosion control measures, would inhibit the source of migration of lead contamination into the creek environment. This would result in compliance with SCGs in the creek environment related to OU-1. Installing passive vents would allow any methane gas to be released to the atmosphere, thereby preventing the gas from finding alternative migration pathways that could result in endangering human health and property. Monitoring will assist in determining if

SCGs are met in the creek surface water and sediments and that the integrity of the cover and erosion control systems are maintained. Applicable action-specific SCGs, including noise limitations and safety regulations, would be complied with during implementation of this alternative.

4.5.2.2 Overall Protection of Human Health and the Environment

Implementing this alternative would benefit those employed at the DPW and the ORF as well as people such as fishermen, who also may access the site. The cover would have to be maintained to prevent erosion of the soils and vegetation and to confirm that burrowing animals have not damaged the systems or brought contaminated soils to the surface, allowing for direct contact. This would be ensured by periodic inspections, routine maintenance, and adhering to reporting requirements.

This alternative would be protective of the Cayuga Creek environment by controlling the on-site contaminant source area, which has caused lead contamination in the sediments by direct erosion of the soils and fill. The cover and creek bank/shoreline erosion controls will assist with preventing the highly energetic creek from further eroding the soil and the subsequent direct deposition of the lead contaminants in the creek environment.

It is anticipated that some trees would have to be removed in order to access the creek banks and to install the cover. However, during design (to the extent practicable) consideration will be given to protecting mature trees that block the view of the facility from nearby residences and that also provide soil stability. Consideration would also be given to replacing trees or adding bushes to the extent possible. Assuming the cover is not compromised and the creek bank's erosion reinforcement stays in place, this alternative would be beneficial to both human health and the environment.

4.5.2.3 Short-Term Effectiveness

Short-term impacts are associated with the installation of the cover system. Construction vehicles would generate noise, air emissions, and an increase in traffic. However, these impacts can be minimized through design and using best operating practices such as restricting traffic to certain work periods, finding safe transportation routes, etc.

Short-term impacts may be associated with the installation of erosion controls. Impacts on water quality may result (increase in turbidity), which can be minimized by protecting all excavated slopes as soon as practical. Also existing regulations would need to be followed by the contractors related to activities that would disturb creek/creek environment. Creek diversion and the replacement or relocation of stream banks may result in short-term effects on the creek biota. The operation of construction equipment in the waterway itself (if required during erosion control construction) would be minimized in order to avoid disturbing creek sediments that may be contaminated. Sediment traps would be used as needed.

All of the short-term impacts are expected to be minor and/or controllable and the creek and the surrounding environment would recover in a reasonable time period. The anticipated length of time to complete this work is approximately six months. Construction associated with this alternative would not require suspending current site operations at the DPW or ORF.

4.5.2.4 Long-Term Effectiveness and Permanence

Constructing a cover over the proposed area would be effective over the long-term by removing the potential of human and wildlife contact and by minimizing surface water infiltration and soil/fill erosion. Leaching groundwater contamination has not been shown to be a concern; therefore, off-site contaminant migration via this pathway is expected to be unaffected. Erosion controls will inhibit the source of the lead contamination from affecting the creek environment. These measures will directly benefit human health and be protective of the nearby ecological resources.

Installing passive soil vents will ensure that gas is not able to build-up and seek alternative paths that may result in vapor intrusion concerns within buildings or residences. Groundwater, surface water, and sediment monitoring will assist in ensuring the long-term effectiveness of the remedial measures. Monitoring will also indicate if the quality of the groundwater entering the creek changes.

This alternative would require periodic inspections to ensure that the remedy is maintained and operating as expected. Institutional controls as discussed above must be implemented. The operation, maintenance, monitoring, and institutional control requirements would be outlined in a site management plan (SMP) that would be developed and implemented.

4.5.2.5 Reduction of Toxicity, Mobility, or Volume with Treatment

Covering and containment of the soils will not reduce the toxicity or volume of the lead contamination. However, the mobility of contaminants, particularly via erosional forces, would be reduced, provided that the cover and erosion control remedies are not compromised. The passive gas-venting system will reduce volume of landfill gases and will control its mobility. This will result in minimizing the associated health and safety hazards.

4.5.2.6 Implementability

Alternative 5 is readily implemented on a technical and administrative basis using standard construction means/methods and typical institutional control practice and procedures. Engineering consultants and contractors are readily available to design and complete such an alternative. No technical difficulties are anticipated during cover placement, soils excavations, construction of the erosion control system, or installation of the passive gas vents.

4.5.2.7 Cost

The total present-worth cost of this alternative based on a 15-year period is $1,177,200. Table 4-4 presents the quantities, unit costs, and subtotal costs for the various items in this alternative. Biannual monitoring costs and inspection are assumed.

Alternative 5 (soil cover, erosion control, passive landfill gas control, monitoring, and institutional controls) is implementable with minimal short-term risks. The primary short-term risks are associated with construction activities. This alternative reduces the risks associated with directly contacting contaminated soils and the potential of groundwater migration from these source soils by reducing mobility. This alternative would require continued maintenance of the cap and continued groundwater monitoring until site use is changed or some alternative activities change the site characteristics.

Table 4-1 Cost Estimate, Depew Landfill Site, Alternative 2 - Institutional Controls

Description	Comments	Quantity	Units	Unit Cost	Cost
Capital Costs					
Work Plan	Includes submittals	1	LS	5,000.00	$5,000
Soil - Not Applicable					
Groundwater Monitoring -					
Well Installations					
Drilling/Installation of Standard Monitoring Wells	Assume 2 additional wells installed	40	LF	30.72	$1,300
Well cap and finishings	to bedrock (20 feet)	2	EA	175.00	$400
Well Development		2	EA	900.00	$1,800
IDW Sampling and Disposal		1	LS	5,000.00	$5,000
Fence and Sign Installation					
6' high chain link fence along north perimeter	From DPW property to creek	850	LF	11.70	$10,000
Install Warning signs every 100' around peninsula		1	LS	5,000.00	$5,000
			Capital Cost Subtotal:		$28,500
	Adjusted Capital Cost Subtotal for Buffalo, New York Location Factor (102.4):				$29,184
	25% Legal, administrative, engineering fees, construction management:				$7,300
			20% Contingencies:		$7,300
			Capital Cost Total:		**$43,800**
Annual Costs					
Bi-Annual Groundwater Sampling	8 wells total; assume 4 wells/day, 2-persons @ $75/hr, 10hr/day	2	Events	$3,000.00	$6,000
Analytical Costs (VOCs and metals)	Samples from 8 wells	8	Events	$160.00	$1,300
Data Evaluation and Reporting		32	HR	$85.00	$2,800
Air Samples Analysis - Methane	In situ measurement with rental equip	2	Events	$1,000.00	$2,000
Site walkover and inspection	Inspect erosion control, etc.	2	Events	$800.00	$1,600
			Annual Cost Subtotal:		$12,100
	Adjusted Capital Cost Subtotal for Buffalo, New York Location Factor (102.4):				$12,390
	10% Legal, administrative, engineering fees:				$1,300
			20% Contingencies:		$2,800
			Annual Cost Total:		**$16,500**
	15-year Present Worth of Annual Costs:				**$197,000**
		2007 Total Present Worth Cost:			**$240,800**

Notes:

1. Eight monitoring wells will be sampled during the long-term monitoring program (2 new + 6 existing).
2. 15-year present worth of costs assumes 3.0% annual interest rate per "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" (EPA 540-R-00-002 August 2000) and the Office of Management and Budget Real Discount Rates for the year 2007 (http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html).
3. Costs presented are based on conventional contracting methods.
4. Air samples will be measured with rented FID equipment and performed in situ at each of the wells.
5. Assume chain-link fence installed along north property line from existing fencing for DPW grounds east towards Cayuga Creek.

Table 4-2 Cost Estimate, Depew Landfill Site, Alternative 3 - Contaminated Soil Removal to "Pre-Disposal" Conditions, Off-site Disposal, with Continued Monitoring

Description	Comments	Quantity	Units	Unit Cost	Cost
Capital Costs					
Work Plan / Final Report	Includes submittals, meetings	1	LS	$15,000.00	$15,000
Soil - Removal to Pre-Disposal Conditions					
Mobilization	Include site prep, trailers, staging ,etc.	1	LS	$100,000.00	$100,000
Health and Safety requirements	Officer, air monitoring, etc.	1760	Hour	$80.00	$140,800
Site scale		1	LS	$10,000.00	$10,000
Permits		1	LS	$2,000.00	$2,000
Surveying		1	LS	$25,000.00	$25,000
Site Clearing					
Cut and chip heavy trees		2	Acre	$11,100.00	$22,200
Grub stumps and remove - heavy		2	Acre	$5,950.00	$11,900
Cut and chip medium trees		2	Acre	$4,725.00	$9,500
Grub stumps and remove - medium		2	Acre	$2,975.00	$6,000
Construction					
Soil excavation -- 3 C.Y. capacity (including shoreline)	160 C.Y./hr - assume averge of 5.5' depth	106250	BCY	$2.37	$251,900
Disposal - 12 CY truck, assume 20 mile roundtrip haul		122188	LCY	$30.00	$3,665,700
Dewatering - 4" diaphragm pump - 8 hrs		45	Day	$705.00	$31,800
Portadam - stream diversion	Equipment rental, vendor rep, install	1	LS	$20,000.00	$20,000
Fill by borrow (include topsoil)		122188	LCY	$9.55	$1,166,900
Haul fill - 20 miles round trip, 0.4 load/hr		203700	Mile	$0.92	$187,500
Fill - spread dumped material, no compaction		122188	LCY	$1.62	$198,000
Compacting fill, 12" lifts, vibrating roller		122188	ECY	$2.67	$326,300
Analytical verification testing - metals		120	EA	$150.00	$18,000
Site Restoration					
Finish grading, large area		58000	SY	$0.64	$37,200
Hydro seeding large areas		58000	SY	$0.35	$20,300
Shrubs	Assume Azalea, Dogwood, Viburnum	1	LS	$2,917.50	$3,000
Trees	Beech, red maple, oak, poplar, willow	1	LS	$19,240.00	$19,300
Synthetic erosoin control	Jute mesh	1250	SY	$1.34	$1,700
Rip-rap		625	LCY	$51.00	$31,900
Well Installations					
Drilling/Installation of Standard Monitoring Wells	Assume 2 additional wells installed	40	LF	30.72	$1,300
Well cap and finishings	to bedrock (20 feet)	2	EA	175.00	$400
Well Development		2	EA	900.00	$1,800
IDW Sampling and Disposal		1	LS	5,000.00	$5,000
				Capital Cost Subtotal:	$6,330,400
	Adjusted Capital Cost Subtotal for Buffalo, New York Location Factor (102.4):				$6,482,330
	25% Legal, administrative, engineering fees, construction management:				$1,620,600
				20% Contingencies:	$1,620,600
				Capital Cost Total:	**$9,723,600**
Annual Costs					
Bi-Annual Groundwater Sampling	8 wells total; assume 4 wells/day, 2-persons @ $75/hr, 10hr/day	2	Events	$3,000.00	$6,000
Analytical Costs (VOCs and metals)	Samples from 8 wells	16	Events	$160.00	$2,600
Data Evaluation and Reporting		32	HR	$85.00	$2,800
Air Samples Analysis - Methane	In situ measurement with rental equip	2	Events	$1,000.00	$2,000
Site walkover and inspection	Inspect erosion control, etc.	2	Events	$800.00	$1,600
				Annual Cost Subtotal:	$15,000
	Adjusted Capital Cost Subtotal for Buffalo, New York Location Factor (102.4):				$15,360
	10% Legal, administrative, engineering fees:				$1,600
				20% Contingencies:	$3,400
				Annual Cost Total:	**$20,400**
	15-year Present Worth of Annual Costs:				**$243,600**
	2007 Total Present Worth Cost:				**$9,967,200**

Notes:

1. Eight monitoring wells will be sampled during the long-term monitoring program (2 new + 6 existing).
2. 15-year present worth of costs assumes 3.0% annual interest rate per "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" (EPA 540-R-00-002 August 2000) and the Office of Management and Budget Real Discount Rates for the year 2007 (http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html).
3. Costs presented are based on conventional contracting methods.
4. Air samples will be measured with rented FID equipment and performed in situ at each of the wells.
5. Excavation consists of 5.5-feet depth across estimated 12 acres to remove lead concentrations greater than 63 ppm.
6. Conversion from bulk cubic yard to loose cubic yard, 1.15 LCY/BCY
7. Portadam to be used to divert creek flow from shoreline excavation areas.
8. Dewatering included for groundwater and storm water removal from excavation areas, as well as removal of water in conjunction with use of Portadar
9. Erosion control assumed over 10-foot depth from shoreline.
10. Assume 15 shrubs of each species. Assume 8 each of beech, red maple, oak, 25 poplar, and 15 willow.

Table 4-3 Cost Estimate, Depew Landfill Site, Alternative 4 - Contaminated Soil Removal and Off-site Disposal with Continued Monitoring

Description	Comments	Quantity	Units	Unit Cost	Cost
Capital Costs					
Work Plan / Final Report	Includes submittals, meetings	1	LS	$15,000.00	$15,000
Soil - "Hot Spot" Removal					
Mobilization	Include site prep, trailers, staging ,etc.	1	LS	$75,000.00	$75,000
Health and Safety requirements	Officer, air monitoring, etc.	1320	Hour	$80.00	$105,600
Site scale		1	LS	$10,000.00	$10,000
Permits		1	LS	$2,000.00	$2,000
Surveying		1	LS	$25,000.00	$25,000
Site Clearing					
Cut and chip heavy trees		2	Acre	$11,100.00	$22,200
Grub stumps and remove - heavy		2	Acre	$5,950.00	$11,900
Cut and chip medium trees		2	Acre	$4,725.00	$9,500
Grub stumps and remove - medium		2	Acre	$2,975.00	$6,000
Construction					
Soil excavation -- 3 C.Y. capacity (including shorelin	depth	28250	BCY	$2.37	$67,000
Disposal - 12 CY truck, assume 20 mile rountrip haul		32488	LCY	$30.00	$974,700
Dewatering - 4" diaphragm pump - 8 hrs		30	Day	$705.00	$21,200
Portadam - stream diversion	Equipment rental, vendor rep, install	1	LS	$15,000.00	$15,000
Fill by borrow (include topsoil)		32488	LCY	$9.55	$310,300
Haul fill - 20 miles round trip, 0.4 load/hr		54200	Mile	$0.92	$49,900
Fill - spread dumped material, no compaction		32488	LCY	$1.62	$52,700
Compacting fill, 12" lifts, vibrating roller		32488	ECY	$2.67	$86,800
Analytical verification testing - metals		100	EA	$150.00	$15,000
Site Restoration					
Finish grading, large area		13900	SY	$0.64	$8,900
Hydro seeding large areas		13900	SY	$0.35	$4,900
Shrubs	Assume Azalea, Dogwood, Viburnum	1	LS	$2,917.50	$3,000
Trees	Beech, red maple, oak, poplar, willow	1	LS	$19,240.00	$19,300
Synthetic erosoin control	Jute mesh	1250	SY	$1.34	$1,700
Rip-rap		625	LCY	$51.00	$31,900
Well Installations					
Drilling/Installation of Standard Monitoring Wells	Assume 2 additional wells installed	40	LF	30.72	$1,300
Well cap and finishings	to bedrock (20 feet)	2	EA	175.00	$400
Well Development		2	EA	900.00	$1,800
IDW Sampling and Disposal		1	LS	5,000.00	$5,000
Fence and Sign Installation					
6' high chain link fence along north peritmeter	From DPW property to creek	850	LF	11.70	$10,000
Install Warning signs every 100' around peninsula	north section of property	1	LS	2,500.00	$2,500
			Capital Cost Subtotal:		$1,965,500
	Adjusted Capital Cost Subtotal for Buffalo, New York Location Factor (102.4):				$2,012,672
	25% Legal, administrative, engineering fees, construction management:				$503,200
			20% Contingencies:		$503,200
			Capital Cost Total:		**$3,019,100**
Annual Costs					
Bi-Annual Groundwater Sampling	8 wells total; assume 4 wells/day, 2-persons @ $75/hr, 10hr/day	2	Events	$3,000.00	$6,000
Analytical Costs (VOCs and metals)	Samples from 8 wells	16	Events	$160.00	$2,600
Data Evaluation and Reporting		32	HR	$85.00	$2,800
Air Samples Analysis - Methane	In situ measurement with rental equip	2	Events	$1,000.00	$2,000
Site walkover and inspection	Inspect erosion control, etc.	2	Events	$800.00	$1,600
			Annual Cost Subtotal:		$15,000
	Adjusted Capital Cost Subtotal for Buffalo, New York Location Factor (102.4):				$15,360
	10% Legal, administrative, engineering fees:				$1,600
			20% Contingencies:		$3,400
			Annual Cost Total:		**$20,400**
	15-year Present Worth of Annual Costs:				**$243,600**
		2007 Total Present Worth Cost:			**$3,262,700**

Notes:

1. Eight monitoring wells will be sampled during the long-term monitoring program (2 new + 6 existing).
2. 15-year present worth of costs assumes 3.0% annual interest rate per "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" (EPA 540-R-00-002 August 2000) and the Office of Management and Budget Real Discount Rates for the year 2007 (http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html).
3. Costs presented are based on conventional contracting methods.
4. Air samples will be measured with rented FID equipment and performed in situ at each of the wells.
5. "Hot spot" excavation consists of average 6.1-feet depth across estimated 2.84 acres to remove lead concentrations greater than 1,000 ppm.
6. Conversion from bulk cubic yard to loose cubic yard, 1.15 LCY/BCY
7. Portadam to be used to divert creek flow from shoreline excavation areas.
8. Dewatering included for groundwater and storm water removal from excavation areas, as well as removal of water in conjunction with use of Portadam.
9. Erosion control assumed over 10-foot depth from shoreline.
10. Assume 15 shrubs of each species. Assume 8 each of beech, red maple, oak, 25 poplar, and 15 willow.
11. Assume chain-link fence installed along north property line from existing fencing for DPW grounds east towards Cayuga Creek.

Table 4-4 Cost Estimate, Depew Landfill Site, Alternative 5 - Soil Cover, Erosion Control, Passive Landfill Gas Control, Monitoring and Institutional Controls

Description	Comment	Quantity	Units	Unit Cost	Cost
Capital Costs					
Work Plan / Final Report	Includes submittals, meetings	1	LS	$15,000.00	$15,000
Capping Contaminated Soils					
Mobilization	Include site prep, trailers, staging ,etc.	1	LS	$25,000.00	$25,000
Health and Safety requirements	Officer, air monitoring, etc.	660	Hour	$80.00	$52,800
Permits		1	LS	$2,000.00	$2,000
Surveying		1	LS	$25,000.00	$25,000
Site Clearing					
Cut and chip heavy trees		2	Acre	$11,100.00	$22,200
Grub stumps and remove - heavy		2	Acre	$5,950.00	$11,900
Cut and chip medium trees		3	Acre	$4,725.00	$14,200
Grub stumps and remove - medium		3	Acre	$2,975.00	$9,000
Construction					
Soil excavation along shoreline - 2 C.Y. capacity	Assume averge of 150 CY, 3.0' average depth	150	BCY	$17.40	$2,700
Haul excavated material to consolidate on site		180	LCY	$3.62	$700
Analytical verification testing - metals		100	EA	$150.00	$15,000
Spread excavated material to be included under cover		150	BCY	$4.19	$700
Scarify topsoil/ripping	Assume 1' depth	11294	BCY	$0.29	$3,300
Fill by borrow (does not include topsoil) - cover soil		7530	LCY	$9.55	$72,000
Haul fill - 20 miles round trip, 0.4 load/hr		12600	Mile	$0.92	$11,600
Fill - spread dumped material, no compaction		7530	LCY	$1.62	$12,200
Compacting fill, 12" lifts, vibrating roller		7530	ECY	$2.67	$20,200
Dewatering - 4" diaphragm pump - 8 hrs		30	Day	$705.00	$21,200
Portadam - stream diversion	Equipment rental, vendor rep, install	1	LS	$15,000.00	$15,000
Gas Venting System					
Drilling/Installation of Venting Wells		100	LF	30.72	$3,100
PVC venting pipe		100	LF	3.00	$300
Crushed stone for gas venting system		3	LCY	$39.50	$200
Labor		16	Hour	$45.00	$800
Site Restoration					
Finish grading, large area	Shoreline (not including cover)	150	SY	$6.40	$1,000
Furnish and place topsoil 4" deep for cover	For cover area	33880	SY	$3.65	$123,700
Spread topsoil from pile for cover		3765	ECY	$4.40	$16,600
Hydro seeding large areas		33880	SY	$0.35	$11,900
Shrubs	Assume Azalea, Dogwood, Viburnum	1	LS	$2,917.50	$3,000
Trees	Beech, red maple, oak, poplar, willow	1	LS	$19,240.00	$19,300
Synthetic erosoin control	Jute mesh - assume 10' width of mesh	1250	SY	$1.34	$1,700
Rip-rap		1000	LCY	$51.00	$51,000
Well Installations					
Drilling/Installation of Standard Monitoring Wells	Assume 2 additional wells installed	40	LF	30.72	$1,300
Well cap and finishings	to bedrock (20 feet)	2	EA	175.00	$400
Well Development		2	EA	900.00	$1,800
IDW Sampling and Disposal		1	LS	5,000.00	$5,000
Fence and Sign Installation					
6' high chain link fence along north peritmeter	From DPW property to creek	850	LF	11.70	$10,000
Install Warning signs every 100' around peninsula		1	LS	5,000.00	$5,000
			Capital Cost Subtotal:		$607,800
	Adjusted Capital Cost Subtotal for Buffalo, New York Location Factor (102.4):				$622,387
	25% Legal, administrative, engineering fees, construction management:				$155,600
			20% Contingencies:		$155,600
			Capital Cost Total:		**$933,600**
Annual Costs					
Bi-Annual Groundwater Sampling	8 wells total; assume 4 wells/day, 2-persons @ $75/hr, 10hr/day	2	Events	$3,000.00	$6,000
Analytical Costs (VOCs and metals)	Samples from 8 wells	16	Events	$160.00	$2,600
Data Evaluation and Reporting		32	HR	$85.00	$2,800
Air Samples Analysis - Methane	In situ measurement with rental equip	2	Events	$1,000.00	$2,000
Site walkover and inspection	Inspect erosion control, etc.	2	Events	$800.00	$1,600
			Annual Cost Subtotal:		$15,000
	Adjusted Capital Cost Subtotal for Buffalo, New York Location Factor (102.4):				$15,360
	10% Legal, administrative, engineering fees:				$1,600
			20% Contingencies:		$3,400
			Annual Cost Total:		**$20,400**
	15-year Present Worth of Annual Costs:				**$243,600**
		2007 Total Present Worth Cost:			**$1,177,200**

Notes:

1. Eight monitoring wells will be sampled during the long-term monitoring program (2 new + 6 existing).
2. 15-year present worth of costs assumes 3.0% annual interest rate per "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" (EPA 540-R-00-002 August 2000) and the Office of Management and Budget Real Discount Rates for the year 2007 (http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html).
3. Costs presented are based on conventional contracting methods.
4. Air samples will be measured with rented FID equipment and performed in situ at each of the wells.
5. Proposed 2-foot thick soil cover to be placed over hot-spot areas with total surface area of approximately 2.84 acres.
6. Conversion from bulk cubic yard to loose cubic yard, 1.15 LCY/BCY
7. Portadam to be used to divert creek flow from shoreline excavation areas.
8. Dewatering included for removal of water in conjunction with use of Portadam. Also included for groundwater and storm water removal from excavation areas.
9. Erosion control assumed over 10-foot depth from shoreline.
10. Assume 15 shrubs of each species. Assume 8 each of beech, red maple, oak, 25 poplar, and 15 willow.
11. Assume chain-link fence installed along north property line from existing fencing for DPW grounds east towards Cayuga Creek.

5 Comparative Evaluation of Alternatives

5.1 Introduction

This section presents a comparative analysis of remedial alternatives. The alternatives for each specific media were based on the seven evaluation criteria, and this comparative analysis is based on the evaluations provided in Section 4. Section 6 discusses the alternatives relative to a site-wide remedy.

5.2 Comparison of Alternatives

The alternatives described in Section 4 consist of the following:

- Alternative 1: No action.
- Alternative 2: Institutional controls with continued monitoring (i.e., access restrictions, deed restrictions).
- Alternative 3: Excavation to "pre-disposal" conditions (removal of all contaminated soils and exposed municipal waste) and off-site disposal with continued monitoring.
- Alternative 4: Excavation and off-site disposal with continued monitoring (removal of hot spots on the site and off-site disposal at local landfills, and groundwater monitoring to determine if groundwater contamination increases).
- Alternative 5: Soil cover, erosion control, passive landfill gas control, monitoring, and institutional controls (installation of soil cover over the southern portion of the site, with some excavation from creek banks as necessary to place proper erosion control; installation of passive vapor-venting system to minimize vapor buildup under the cover and vapor intrusion into adjacent buildings; institutional controls to minimize access to cover areas; and continued groundwater monitoring to determine if contamination increases or is being mobilized).

Compliance with SCGs

Alternatives 3, 4, and 5 would address soils with the goal of complying with SCGs. Alternative 5 would be compliant with soil SCGs in that the contaminated soils would be covered. Alternative 4 may be sufficient to meet SCG requirements along with institutional controls. Alternative 3 would be the most compliant because the contamination would be removed to background levels from the site and would provide the best opportunity to address the soils and meet the SCG requirements. Alternatives 1 and 2 would not comply with SCGs.

Alternatives 3, 4, and 5 would comply with action-specific SCGs.

Overall Protection of Human Health and the Environment

Alternatives 2 through 5 provide varying degrees of long-term protection of human health and the environment. Alternative 2 depends on institutional controls as the primary method of protection of human health and the environment. Alternatives 3, 4, and 5 provide additional protection because contaminated soils, as identified at the site, would be removed or covered. Alternative 5 would also use a passive soil vapor venting system, which would not be needed under Alternatives 3 and 4. Alternative 5 would cover the contaminated soils with clean soils.. Covering would protect human health and the environment provided the cover is not compromised. Any excavation activities into the cover by human or any burrowing animals could result in exposure to the contaminants. Alternative 3 would provide the most immediate benefit to human health and the environment because the contaminated soil would be removed to background levels.

Since municipal drinking water is supplied to area residents, use of groundwater as a drinking water source near the facility is not anticipated. Also, by removing the soils and/or covering, surface water infiltration may be reduced, which should result in a reduction of contaminant migration via groundwater. Therefore, for groundwater, Alternatives 3 through 5 are also a benefit to the environment regarding groundwater. However, considering the overall approach, Alternative 3 remains the most protective of human health and the environment. Alternatives 1 and 2 are not protective.

Short-Term Effectiveness

Alternatives 3, 4, and 5 involve intrusive work, which could cause minor releases of contamination during remedial activities. This is particularly true along the creek banks. Otherwise, intrusive work performed at the site would not result in interruption of any DPW or ORF activities. Increased traffic accessing the site, along with noise and odors, would occur under Alternatives 3 and 4 as soils are removed from the site and fill is brought in. Alternative 5 would create some increased traffic but not as much as Alternatives 3 and 4. Alternatives 1 and 2 would not have any short-term impacts.

Once complete, Alternatives 3, 4, and 5 would meet the RAO to limit (to the extent practicable) direct contact with on-site contaminated soil. Alternative 5 would also meet the RAO to eliminate (to the extent practicable) the potential for human exposure to on-site and off-site gas and vapors. Alternative 5 would meet the RAO to reduce the risk of further off-site contaminated groundwater migration and off-site soil erosion to the creek, provided the cover is not compromised. However, Alternatives 3 and 4 would provide the greatest measure of meeting the RAOs to reduce off-site contaminated groundwater migration and exposure to on-site and off-site gas vapors and eliminate the potential for human exposure to contaminated soils. Alternatives 1 and 2 are not expected to be effective in meeting the RAOs.

Other than Alternative 3, Alternatives 4 and 5 are assumed to be completed in the same general timeframe of approximately six months. Alternative 3 may require additional time (up to approximately eight months) to remove significantly more soil.

Long-term Effectiveness and Permanence

Alternative 5 would provide long-term effectiveness in protecting human health and the environment because the risk associated with directly contacting the contamination in the soils would be minimized by construction of a soil cover provided that the cover is not compromised in any way either by human activities or burrowing animals.. Potential soil vapor migration to nearby buildings and homes would also be minimized with the installation of a passive gas venting system. Surface water infiltration and potential contamination of groundwater will be minimized with the placement of the cover. Alternatives 3 and 4 provide the most certain effectiveness and the most permanence in the long-term for protecting human health and the environment. Alternative 2 provides long-term effectiveness through institutional controls only. Alternative 1 is not considered an adequate, reliable, or permanent long-term remedy.

Reduction in Toxicity, Mobility, or Volume with Treatment

Alternatives 3 and 4 provide the greatest reduction of toxicity, mobility, or volume of site contaminants because the alternatives would remove contaminated soils and dispose of them off-site. Alternative 5 would also reduce the mobility of contaminants but not necessarily toxicity or volume because the soil will be left on-site and covered. However, covering the soils may reduce surface water infiltration and minimize further groundwater contamination and off-site migration. Installing a passive vapor collection system under Alternative 5 should reduce the mobility and volume of gases within the soils and also control their release to the atmosphere. Alternatives 1 and 2 would not reduce the toxicity, mobility, or volume of site contaminants except as would occur through long-term, off-site migration.

Implementability

All alternatives are technically implementable (with readily available methods, equipment, materials, and services) and administratively implementable. However, Alternative 3 may be more difficult to implement than the other alternatives because of the significant quantity of soil material requiring excavation and the need to obtain landfill disposal permits.

Cost

Alternative 1 calls for no action and thus incurs no cost. Institutional controls are the only actions that would be implemented for Alternative 2, so its total present cost is $240,800 (over a 15-year period). Alternative 3, meets the RAOs at a cost of $9,967,200. Alternative 4 has an approximate cost of $3,262,700. Assuming long-term maintenance and inspection activities ensure the integrity of the cover system, Alternative 5 would also meet the RAOs. Costs associated with this alternative are $1,177,200 (see Table 5-1).

Table 5-1 Summary of Total Present Values of Alternatives at Depew Landfill Site
Depew, New York

Description	Alternative 1 No Action	Alternative 2 Institutional Actions	Alternative 3 Contaminated Soil Removal to "Pre-Disposal" Conditions, Off-site Disposal, with Continued Monitoring	Alternative 4 Contaminated Soil Removal and Off-site Disposal with Continued Monitoring	Alternative 5 Soil Cover, Erosion Control, Passive Landfill Gas Control, Monitoring and Institutional Controls
Total Project Duration (Years)	0	15	15	15	15
Capital Cost	$0	$43,800	$9,723,600	$3,019,100	$933,600
Annual O&M Cost	$0	$16,500	$20,400	$20,400	$20,400
Present worth of annual costs based	$0	$197,000	$243,600	$243,600	$243,600
on project duration					
2007 Total Present Value of Alternatives	**$0**	**$240,800**	**$9,967,200**	**$3,262,700**	**$1,177,200**

6 Summary

This FS presents the alternatives applicable to addressing lead-contaminated soil and vapors associated with the presence of buried landfill waste at OU-1 on the Depew Landfill site. This report is a companion document to the RI report (EEEPC March 2007). The RI, along with the previous site investigations, characterized the nature and extent of on-site contamination and provided data to complete this FS. The history of industrial activities has resulted in a variety of contaminants present in on-site soil, groundwater, surface water, and sediment. However, with the exception of lead, most contaminants are at very low concentrations and below applicable cleanup criteria. This FS consequently focuses on soil contaminated by lead and the potential risks of methane gas that may be generating from the buried waste. Lead poses the greatest risk to human health associated with the activities of the DPW and any persons accessing the site for recreational purposes. Eroding creek bank soils also contribute to the site concerns as lead is washed into the creek and raises contaminant levels in the sediment.

6.1 Key Factors

The following are key factors and/or unique conditions that exist on or near the site that required careful consideration during the completion of the FS.

- As previously mentioned, this site is divided into two OUs. OU-2 includes the surface waters, sediment, and the Zurbrick Road embankment. OU-2 areas may eventually need to be addressed to remove health concerns associated with the surface water and sediment and any safety concerns associated with erosion of the soils along Zurbrick Road. The depths and volume of the contaminated soil and fill need to be determined in conjunction with feasible approaches to stabilizing the banks so that more waste does not enter the creek. Ultimately, the waste should be removed and managed according to whether it meets the definition of a hazardous waste.

- A permitted landfill following proper closing procedures could typically require a cap, following the guidelines of 6 NYCRR Part 360. However, per TAGM SW-98-13, *Landfill Regulatory Responsibility*, the DER is responsible for the remedial investigation/design/closure and post-closure monitoring oversight for Class 2 sites listed in the Registry and subsequently has determined that the Part 360 regulations are not applicable to the site.

- Various site features, such as the ORF and DPW buildings, may increase the difficulty of removing soils or capping the soils. Foundation reinforcement may be needed on a case-by-case basis depending on the depth of the excavation compared with the depth of the structure foundations. Also, excavation and soil cover placement will be a challenge to minimize sediment and creek disturbance for all work performed along the creek. Work along the creek may require stream diversion to prevent further migration of soils and also to complete the work effectively. Some trees located across the site will need to be removed to access portions of the site in order to complete the work.

- During methane gas sampling in well headspaces conducted in January 2007, no detections were noted. However, during well installation, methane gas was detected, and methane gas was detected in several groundwater samples. It is possible that some gas within the immediate vicinity of the wells was released from the site soils during drilling and well installation. However, methane gas may be encountered during construction activities and should be monitored accordingly.

6.2 Remedial Action Objectives

The RAOs were developed for contaminated on-site media (soil and groundwater). The RAOs, as described in Section 2.2.3, applicable to the operable unit of concern here, OU-1, include:

- Soil
  - Eliminate, to the extent practicable, direct contact with or ingestion of surface and subsurface soil by humans and animals.
  - Eliminate, to the extent practicable, direct contact with or ingestion of on-site sediments by humans and animals.
  - Eliminate, to the extent practicable, erosion or discharge of contaminants to surface water and sediments of Cayuga Creek.
  - Eliminate, to the extent practicable, soil gas migration and possible vapor intrusion of surrounding municipal buildings, structures, and utilities.

- Groundwater
  - Minimize, to the extent practicable, the potential leaching of contaminants into groundwater and surface water.
  - Minimize, to the extent practicable, the potential human or animal exposure to contaminated groundwater and surface water.

6.3 Summary of Remedial Alternatives

The following is a brief summary of the on-site remedial alternatives developed for soil, including soil vapor and sediment, and groundwater, followed by a discussion of the alternatives as they relate to an overall site remediation approach. A detailed discussion of alternatives is included in Section 4 and the alternative are compared in Section 5.

- Alternative 1: No Action;
- Alternative 2: Institutional Controls with Continued Monitoring;
- Alternative 3: Contaminated Soil Removal to Pre-Disposal Conditions and Off-Site Disposal with Continued Monitoring;
- Alternative 4: Contaminated Soil Removal and Off-Site Disposal with Continued Monitoring;
- Alternative 5: Soil Cover, Erosion Control, Passive Landfill Gas Control, Monitoring and Institutional Controls.

6.4 Overall Site Remediation Approaches

6.4.1 No Action

Alternative 1, the No Action alternative, employs no remedial action; thus on-site contamination concentrations would remain essentially the same and the RAOs for the site would not be achieved in a reasonable or predictable timeframe.

6.4.2 Institutional Controls

Alternative 2 (institutional controls for soil and soil vapor) may be effective in controlling future development activities that may minimize the effects of the existing contamination, but they would not be effective in protecting on-site human health and do not prevent off-site contaminant migration. As such, institutional controls do not fully prevent potential exposures and possible adverse effects on human health or the environment. Only some of the RAOs would be achieved if institutional controls alone were used to mitigate/remedy soil contamination.

6.4.3 Contaminated Soil Removal and Off-site Disposal with Continued Monitoring

Alternatives 3 and 4, which include the soil removal to pre-disposal conditions and removal of hot spots within the site, respectively, meet the RAOs for OU-1. Groundwater should continue to be monitored to determine the effects of the soil removal and determine if groundwater contaminant levels increase which would possibly suggest alternative sources of contamination. If reevaluation of contaminant concentrations after five years indicates rising groundwater contamination, a supplemental investigation should be performed to identify a potential contaminant source.

6.4.4 Soil Cover, Erosion Control, Passive Landfill Gas (LFG) Control, Monitoring and Institutional Controls

Alternative 5, which consists of covering selected areas of the site and installing a passive vapor collection and venting system, may meet the RAOs established for the site. Covering the contaminated soils is intended to minimize surface water infiltration and soil erosion, thereby protecting groundwater and minimizing off-site migration. However, if the cover is compromised, contaminated soil could be exposed, surface water could infiltrate the cover, and/or erosion of the soils could cause contaminants to migrate to the groundwater or creek. This would undermine the purpose of the cover and restore the current hazards associated with the site. This alternative is less expensive than Alternative 3 and 4.

7 References

American Society for Testing and Materials. 1985. D 2487-83, *Classification of Soils for Engineering Purposes: Annual Book of ASTM Standards*. Vol. 04.08, pp 395-408.

Ecology and Environment Engineering, P.C. (EEEPC). March 2007. Remedial Investigation Report for the Depew Village Landfill Site, No. 9-15-105, Depew, New York.

Engineering Science, Inc. and Dames & Moore, Inc. 1988. Engineering Investigations at Inactive Hazardous Waste Sites in the State of New York, Phase I Investigations, Village of Depew Landfill, NYS Site Number 915105, Village of Depew, Erie County, New York State.

New York State Department of Environmental Conservation (NYSDEC). 1990. Final Technical Administration Guidance Memorandum No. 4030, Selection of Remedial Action at Inactive Hazardous Waste Sites.

__________. 1994. Technical and Administrative Guidance Memorandum (TAGM) No. 4046, *Determination of Soil Cleanup Objectives and Soil Cleanup Levels*, prepared by M. J. O'Toole, Jr., Division of Hazardous Waste Remediation, NYSDEC, Albany, New York.

__________. June 1998. Division of Water Technical and Operational Guidance Series (1.1.1): Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, with Addenda, Division of Water, Albany, New York.

__________. January 1999. Technical Guidance for Screening Contaminated Sediments. http://www.dec.ny.gov/docs/wildlife_pdf/seddoc.pdf.

__________. December 2002. Draft DER-10, Technical Guidance for Site Investigation and Remediation, Division of Environmental Remediation, NYSDEC, Albany, New York.

__________. December 14, 2006. Subpart 375-6: Remedial Program Soil Cleaning Objectives. http://www.dec.ny.gov/regs/15507.html#11513.

New York State Department of Health (NYSDOH). February 2005. Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

U.S. Army Corps of Engineers. February 1999. Finding of No Significant Impact and Environmental Assessment: Emergency Streambank Protection Project, Cayuga Creek (Zarbrick Road), Village of Depew/Town of Cheektowaga, Erie County, New York.

United States Environmental Protection Agency (EPA). 1998. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA.