FINAL

Volume 1 of 2

REMEDIAL INVESTIGATION REPORT

Amenia Town Landfill
Amenia, New York

Prepared for:

Amenia Landfill Group
Technical Committee
c/o Ashland Inc.
5200 Blazer Parkway
Dublin, Ohio 43017

Prepared by:

URS
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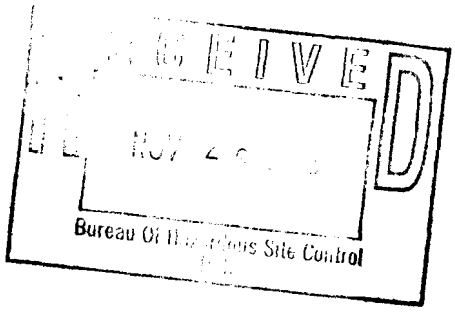
Wayne, New Jersey 07470

November 2003

URS



November 25, 2003

Ms. Karen Maiurano
NYS Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C, 11th Floor
625 Broadway
Albany, NY 12233-7014

Re: Amenia Town Landfill Remedial Investigation Report
November 2003
Site Code #3-14-006

Dear Ms. Maiurano:

In accordance with the Administrative Order on Consent for Amenia Town Landfill, Site Code # 3-14-006, dated October 4, 2001, enclosed please find two copies of the Remedial Investigation Report for the Amenia Town Landfill Site. I certify that the activities that comprised the Remedial Investigation were performed in full accordance with the Department-approved RI/FS Work Plan, dated February 2001, with minor modifications to sampling locations as noted in Section Three of the Remedial Investigation Report.

If you have any questions please do not hesitate to call.

Sincerely,

URS Corporation

Marion Craig
Project Manager

Enclosure

c: Julia Buffard, Amenia Town Hall
Steve Capowski, Dutchess County Department of Health
Miriam Devan, Amenia Free Library
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ALG	Amenia Landfill Group
ASTM	American Society for Testing and Materials
BEHP	Bis(2-ethylhexyl)phthalate
bgs	Below ground surface
BTEX	Benzene, toluene, ethylene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
Cm/Sec	Centimeters per second
COC	Chain-of-custody
COPC	Constituent of Potential Concern
CPP	Citizen Participation Plan
DCA	Dichloroethane
DCB	Dichlorobenzene
DCE	Dichloroethene
DCDH	Dutchess County Department of Health
DOT	United States Department of Transportation
DQOs	Data Quality Objectives
DUSR	Data Usability Summary Report
EPA	United States Environmental Protection Agency
FID	Flame ionization detector
FS	Feasibility Study
FSP	Field Sampling Plan
Ft	Feet
Ft/Min	Feet per minute
GC	Gas Chromatography
GPS	Global Positioning System
HASP	Health and Safety Plan
ID	Inner diameter
LEL	Lowest Effect Level
lb	Pound
LMS	Lawler, Matusky & Skelly Engineers
MCL	Maximum Contaminant Level

mg/kg	Milligram per kilogram (parts per million)
ug/kg	Microgram per kilogram (parts per billion)
ug/g	Microgram per gram (parts per million)
ug/l	Microgram per liter (parts per billion)
ml/min	Milliliter per minute
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NAVD	North Amercian Vertical Datum
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
Order	Order on Consent
OSHA	Occupational Safety And Health Administration
PAH	Polynuclear aromatic hydrocarbons
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene (perchloroethylene)
PID	Photoionization detector
ppb	Parts per billion
ppm	Parts per million
psi	Pounds per square inch
PVC	Polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
RBC	Risk-Based Criteria
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RCA	Recommendation for Corrective Action
RF	Response Factor
RI	Remedial Investigation
RQD	Rock Quality Designation
SCG	New York State Standards, Criteria, and Guidance
SEL	Severe Effect Level
SOP	Standard Operating Procedure
SVOC	Semivolatile organic compound
TAGM	NYSDEC Technical Assistance Guidance Memorandum
TAL	Target Analyte List

TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
TOC	Total Organic Carbon
TOGS	Division of Water Technical and Operational Guidance Series
USCS	Unified Soil Classification System
USGS	United States Geological Survey
VOC	Volatile Organic Compound

This document describes the results of a Remedial Investigation (RI) that was conducted at the Amenia Town Landfill, Dutchess County, New York. Most of the RI field work was conducted between between October 2001 and June 2002. Supplemental site investigations were conducted in January and May 2003. This document is submitted on behalf of the Amenia Landfill Group, in accordance with the requirements of the New York State Department of Environmental Conservation's (NYSDEC) Order on Consent for Amenia Town Landfill, Site # 3-14-006, dated October 4, 2001.

1.1 REMEDIAL INVESTIGATION PROJECT OVERVIEW

The Amenia Town Landfill is located on property consisting of approximately 22 acres, 10 of which serve as a former sanitary landfill. The entire 22 acres are referred to throughout this report as the "Site". Waste disposed over the years in the landfill consisted of municipal, commercial, and industrial material. The Site has always been privately owned, although it was leased by certain municipalities for use by municipal residents and businesses. During the late 1960s and early 1970s, 55-gallon drums of waste were allegedly stored and buried on Site. The landfill was closed in 1976 by the Town of Amenia. Closure of the dump involved application of a soil cover of unknown depth and grading of the site (LMS, 1993). In 1980, NYSDEC personnel conducted a visual inspection of the Site and noted partially buried and exposed drums at the southwest corner of the Site and areas of stressed vegetation.

The NYSDEC conducted a Phase II Investigation of the landfill in late 1991 and 1992. This investigation consisted of soil gas sampling, surface water and sediment sampling, soil sampling, and geophysical investigations. One finding from this investigation was that polychlorinated biphenyls (PCBs) were detected in Site soils and sediments. Because of the potential threats to human health and environment posed by the presence of PCBs, NYSDEC changed the Site listing in the New York State Registry of Inactive Hazardous Waste Disposal Sites. NYSDEC reclassified the Site in December 1992 from a Class 2a Site to a Class 2 Site.

In 1998, after conducting a test pit investigation to evaluate the extent of buried drums in the southwest area of the Site, NYSDEC requested that the U.S. Environmental Protection Agency (EPA) conduct a removal action to excavate and dispose of the drums. In December 1999, 170 drums and about 220 cubic yards of visibly contaminated or discolored soil were removed under EPA authority, analyzed for waste characteristics, and sent for proper off-site disposal.

On October 4, 2001, an Order on Consent (Order) was signed between NYSDEC and a group of potentially responsible parties, known as the Amenia Landfill Group (ALG), for the performance of a Remedial Investigation and Feasibility Study (RI/FS) at the Amenia Town Landfill. Before the Order was signed, the ALG developed a set of RI/FS scoping documents for the Site consisting of the following plans:

- Work Plan (URS, February 2001)
- Field Sampling Plan (URS, February 2001)

- Quality Assurance Project Plan (URS, February 2001)
- Health and Safety Plan (URS, October 2001)
- Citizen Participation Plan (Anne Green Communications, Inc., September 2001)

These documents were approved by NYSDEC and incorporated and attached to the signed Order.

The field activities for the RI were generally conducted between October 2001 and June 2002. Supplemental site investigations were conducted in January and May 2003. The RI was conducted in accordance with the NYSDEC-approved scoping documents listed above, which are consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requirements.

The results of the Remedial Investigation are described in this report. The results of the Feasibility Study, in accordance with the requirements of the Order, will be described in a separate report and distributed to interested parties after approval of this Remedial Investigation Report.

1.2 PROJECT OBJECTIVES

The environmental concern at the Site is the potential for Site media to contain constituents of potential concern (COPCs) resulting from wastes that were buried at the Site, and the migration of COPCs to off-site locations. Other possible sources of COPCs include oil reportedly used on the entrance road to settle dust in the summer.

The overall objective of the RI was to identify the nature and extent of COPCs at the Site and to collect sufficient data of known quality to evaluate the risk posed by the Site to human health and the environment. The objective of the FS is to evaluate remedial alternatives and to recommend a remedy necessary to protect human health and the environment on the basis of several factors, including the extent of COPCs, land use, effectiveness, New York State Standards, Criteria, and Guidelines (equivalent to applicable and relevant and appropriate requirements), and cost.

1.3 SITE BACKGROUND

This section describes the location of the Site, its operational and ownership history, and presents a summary of the results of previous inspections and investigations.

1.3.1 Site Location and Description

The Site is in the Town of Amenia, Dutchess County, New York, about 1.5 miles south of the intersection of Route 22 and Route 44 (Figure 1-1). The Site is in a rural area, bordered to the east by Route 22 and by a wetland and small stream to the north and west. A steep wooded hill is present immediately to the south. The Site is centered at 41 degrees 49 minutes 34 seconds north latitude and 73 degrees 33 minutes 59 seconds west longitude on

the United States Geological Survey, Amenia, New York - Connecticut topographic quadrangle map (1984).

The Site is commonly reported to have a size of about 22 acres (e.g., EPA, 1999), 10 of which were used for landfill purposes (e.g., LMS, 1993). The Site boundaries as shown in Figure 1-2, are approximations of the property lines depicted in the Town of Amenia Tax Maps (1999), which show the Site having an estimated size of 27 acres, with an additional 2 acres used for the Sharon Oil fuel storage area. The larger lot has Amenia Tax Map Number 7066-00-882575 (27.02 acres) and the smaller lot has Amenia Tax Map Number 7066-00-885633 (2 acres). The 10-acre-size estimate for the landfill itself appears reasonable based on the size of the accessible areas within the property boundaries. The inferred limits of waste and boundary of the landfill, estimated from aerial photographs, are shown on Figure 1-2.

Wetlands, a stream, and intermittent ponds border the Site to the north and west. The portion of the wetlands immediately west of the landfill property line (Parcel No. 870717) is owned by County Club Funding (Town of Amenia Tax Assessor, personal communication, March 2000), a Denver asset-management company.

The Harlem Valley Landfill is located immediately south of the Site, on Route 22. This 18-acre landfill was closed under Part 360 regulations in 1998-1999. NYSDEC reports that groundwater beneath the landfill is monitored on a quarterly basis.

Route 22 forms the eastern boundary of the Site. East of Route 22 and paralleling the roadway is an abandoned Conrail railroad spur (Figure 1-1). The area is unfenced (with the exception of Sharon Oil property, described below) and access to the Site is not controlled. The Site is generally well graded and covered with vegetation.

At the north end of the Site, a fenced enclosure, about two acres in size, contains above ground storage tanks of propane and heating oil previously owned by Sharon Oil Company, Sharon, Connecticut. The fuel storage area contains four 20,000 gallon No. 2 fuel oil tanks (which were emptied and closed in place in January 2001) and a 30,000 gallon propane tank. As of May 1999, Sharon Oil was reportedly no longer licensed in Connecticut to distribute No. 2 Fuel oil (Connecticut DRS, 1999). The current operator of the facility is Paraco Gas Corporation.

A small, concrete helicopter landing pad, about 40 ft by 40 ft, is in the north central part of the Site. The pad is active and used about two or three days a week by an unidentified user.

An active public golf course (the Island Green County Club) is located west of the Site, just across the pond.

There are no residences within ¼ mile of the Site (NYSDEC, April 1997).

1.3.2 Site Operational and Ownership History

The Site is a former sanitary landfill that began accepting waste in the late 1940s and operated until April 16, 1976. From the onset of landfilling operations until December 1968, the landfill property was leased by the Town of Amenia from its owners William and Mary

Murphy and operated by the Town of Amenia as a municipal dump. For various periods beginning in the 1950s, the minutes of the Town of Amenia Board meetings reflect that the Town of Sharon, the Town of Northeast, and/or the Village of Millerton paid user fees to the Town of Amenia and/or helped maintain the landfill for the use of their residents and businesses.

On December 5, 1968, the property was sold by William and Mary Murphy to Mr. Salvatore Surico. Mr. Surico continued landfill operations from 1969 until April 1971.

According to an inspection report, on October 22, 1970, the Dutchess County Department of Health (DCDH) conducted an inspection at the Site and noted that "several hundred barrels of industrial waste" were stored in a one-acre area at the southern end of the Site (DCDH, 1970). According to the inspection report, some of these barrels had been punctured and had discharged their contents on the surface of the ground.

In June 1971, Mr. Surico transferred the Site property to the Tri-Town Landfill Corporation ("Tri-Town"). Mr. Surico was president of Tri-Town. In August 1971, Tri-Town sold two acres at the north end of the Site to three individual residents of the Town of Amenia (these two acres were subsequently sold to the Sharon Oil Company sometime before 1981). In November 1971, Tri-Town was in bankruptcy proceedings, and as of early1972, the Town of Amenia had resumed operation of the landfill. Those operations continued until April 16, 1976 when the landfill was closed.

Approximately 20 acres of the Site were conveyed to an individual owner on July 25, 1972 and to a succession of owners thereafter. On July 31, 1986, the Site was conveyed to John Segalla, and subsequently transferred by Mr. Segalla in 1997 to the Route 22 Company, a New York General Partnership comprised of the Route 22 Land Corporation and the Route 22 Land Development Corporation of which Mr. Segalla is President.

1.3.3 Overview of Regulatory History

The Site was listed by NYSDEC as a suspected inactive hazardous waste disposal Site in 1980 after visual inspections revealed drums exposed at the surface and areas of stressed vegetation. On December 29, 1992, the NYSDEC gave notice to the Amenia Town Clerk that it had recently reclassified the Site to Class II due to the confirmed presence of PCBs at the landfill.

Further investigations conducted by NYSDEC in September 1998 revealed the presence of COPCs in soil and sediment and the presence of buried, leaking drums containing waste material in the southwest corner of the Site. On October 6, 1998, NYSDEC formally requested that EPA Region II conduct a time-critical removal action at the Site to mitigate any possible threats presented by the buried drums.

During an inspection on October 7, 1998, EPA observed drums at the surface of the slope adjacent to the wetlands in an area southwest of the landfill. Preliminary analysis of the contents of the drums and soils provided by NYSDEC revealed levels of pesticides such as methidathion and organic compounds, including phenols and benzene above regulatory limits.

During this inspection, EPA observed that the Site was not secured and access was unrestricted. Several drums were discovered at ground level or were only partially buried. EPA and NYSDEC personnel observed that leaking drums had leaked their contents to the soil. EPA Region II commenced a drum removal action for the Site in October-November 1998.

On October 4, 2001, the Order was signed between NYSDEC and the Amenia Landfill Group and the RI field investigation began at the Site on October 22, 2001.

The following key events summarize the regulatory history of the Site:

- The NYSDEC conducted a Phase II Investigation of the landfill in late 1991 and 1992. This investigation included soil gas sampling, surface water and sediment sampling, soil sampling, and geophysical investigations. Data gathered from this investigation was used to reclassify the Site listing in the New York State Registry of Inactive Hazardous Waste Disposal Sites. The Site was reclassified in December 1992 from a Class 2a Site to a Class 2 Site
- The NYSDEC performed test pit excavations in September 1998 to further investigate the anomalies identified during the previous geophysical investigations. Numerous buried drums, including some leaking wastes, were discovered in the southwest corner of the Site. Upon confirming the presence of leaking drummed wastes, the NYSDEC requested that the EPA undertake a removal action to mitigate the further release of these wastes.
- The EPA conducted a drum removal action commencing October-November 1998, whereby drums and soils were removed from the ground and contained and secured on Site pending proper off-site disposal. In December 1999 these drums and soil were removed from the site for off-site disposal.
- An Order on Consent was executed between the NYSDEC and the ALG on October 4, 2001. A RI/FS field investigation of soil, groundwater, surface water, and sediment began at the Site on October 22, 2001.

1.3.4 Overview of Previous Investigations

A summary of the previous investigations conducted at the Amenia Town Landfill is presented in Table 1-1. The organic analytical data for sediment and soil have been reported by previous investigators in either parts per million (mg/kg or µg/g) or parts per billion (µg/kg). The corresponding NYSDEC Cleanup Standards, Guidelines, and Criteria have been converted to the appropriate units in Table 1-2 through Table 1-12. Only a brief summary of the analytical data is provided below.

1.3.4.1 Phase I – August 1986

A Phase I investigation was reportedly conducted at the Site by NYSDEC in August 1986 (EPA, 1998), although a description of the work is not available. LMS (1993) reports that

one conclusion of the Phase I Investigation was that a Phase II investigation for the Site was warranted.

1.3.4.2 EPA Sample Event – February 1987

NUS Corporation, as contractors for the EPA, conducted a limited field investigation and collected four surface soil samples, three surface water and sediment samples, and three samples of potable water (EPA, 1990). The potable water samples were collected from two Amenia town wells and from a private residence about two miles south of the Site (EPA, 1990). The results of the sampling event are summarized in Table 1-2 through Table 1-5. The locations of the soil, surface water, and sediment samples are shown on Figure 1-3.

In surface soil, aside from analytical data that were rejected because of quality assurance and quality control (QA/QC) issues, PCBs were the only organic COPCs identified (Table 1-2). The concentrations of PCBs, however, were not determined in three of the four samples analyzed because of QA/QC problems and the subsequent rejection of several PCB congeners. Sample S2, which had no QA/QC problems, had a total PCB concentration which exceeded the recommended NYSDEC (1994) PCB surface soil cleanup objective (Table 1-2). Inorganic constituent concentrations of arsenic, beryllium, chromium, copper, iron, nickel, selenium, and zinc exceeded their respective NYSDEC cleanup objectives in one or more samples. The background concentrations of metals in soil, however, were not investigated.

The surface water samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, PCBs, and inorganic constituents (Table 1-3). Organic compounds were not detected (with the exception of di-n-butylphthalate, which was detected but has no NYSDEC surface water standard). The inorganic results from two of the three surface water samples showed concentrations of iron and manganese that exceeded the NYSDEC surface water standards (August 1999).

In sediment, VOCs and SVOCs were either not detected or detected at concentrations far below their respective NYSDEC cleanup criteria. Aside from the pesticide and PCB analytical data that were rejected because of QA/QC issues, Aroclor 1248 was detected in sediment sample SED1 at a concentration which exceeded the NYSDEC sediment criterion (Table 1-4). Inorganic constituent concentrations of iron, lead, manganese, nickel, and zinc exceeded their respective NYSDEC cleanup criterion in one or more samples.

The potable water samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and inorganic constituents (Table 1-5). VOCs, pesticides, and PCBs were not detected. Only one organic compound, bis(2-ethylhexyl)phthalate was detected in one of the three samples (GW-3) at a concentration which exceeded the NYSDEC groundwater quality standard. Bis(2-ethylhexyl) phthalate, however, is a common laboratory contaminant and it may have resulted from the analytical process. There is no report of action taken by the EPA to address this compound. Inorganic results from two of the potable water samples (GW-2 and GW-3) showed concentrations of sodium that exceeded the NYSDEC groundwater quality standard.

1.3.4.3 Phase II Investigation – November 1991

LMS (1991) conducted a Phase II Investigation for NYSDEC consisting of a geophysical survey to locate areas of potentially buried drums, a soil gas survey, and sampling of soil, surface water, and sediment for laboratory and field screening analyses. The analytical results of the Phase II investigation are summarized in Table 1-6 through Table 1-10. The sample locations and areas of high magnetic anomalies are shown on Figure 1-3 and Figure 1-4.

The geophysical survey indicated six areas with high magnetic anomalies (INTEX, 1991). These areas are depicted in Figure 1-4. The areas generally extend east to west from the steep slope on the western portion of the Site to Route 22.

The soil gas investigation showed that VOCs (primarily solvents [e.g., dichloroethene, trichloroethene, and tetrachloroethene] and BTEX [benzene, toluene, ethylbenzene, xylene] compounds) were present south of the Sharon Oil enclosure and in the south-central part of the Site (Table 1-6).

Surface soil sampling was conducted focusing on the steep slope on the western portion of the Site. Twenty soil samples were analyzed by an on-site laboratory for PCBs, and ten of those 20 samples were analyzed for VOCs (Table 1-7). PCBs in 14 samples exceeded the recommended NYSDEC surface soil cleanup objective. Only one VOC compound, ethylbenzene, was detected. Ethylbenzene was detected in sample SS-5 below the NYSDEC soil cleanup objective for this compound (Table 1-7).

Four additional soil samples were collected and analyzed at an off-site laboratory for VOCs, SVOCs, pesticides, and PCBs (Table 1-8). VOC, SVOC, and pesticide compounds were detected at concentrations far below their respective NYSDEC soil cleanup objectives. PCBs were detected in two samples, AMSS-17 and AMSS-18, at concentrations that exceeded the NYSDEC surface soil cleanup objective.

Inorganic constituents beryllium, chromium, copper, iron, nickel, and zinc were detected in all four surface soil samples at concentrations that exceeded the NYSDEC soil cleanup objectives. The NYSDEC soil cleanup objective for arsenic was exceeded in two samples, AMSS-19 and AMSS-20.

Surface water and sediment samples were collected at five locations and analyzed for VOCs, SVOCs, pesticides, PCBs, metals, and cyanide (Table 1-9). Of the organic compounds in surface water, only laboratory blank contaminants ("B" qualifier) and common laboratory contaminants (methylene chloride and bis(2-ethylhexyl)phthalate) were detected. The inorganic analytical results showed concentrations of iron that exceeded surface water standards in four of the five samples.

In sediments, SVOCs and pesticides were not detected (Table 1-10). Methylene chloride (blank contaminant with a "B" qualifier) and acetone (another common laboratory contaminant) were detected at very low concentrations. NYSDEC does not have sediment criteria for these two VOC compounds. PCBs were detected in two sediment samples at concentrations that exceeded the NYSDEC sediment criteria. Inorganic constituents antimony, arsenic, cadmium, mercury, copper, iron, lead, manganese, nickel, and zinc were

detected at concentrations that exceeded their respective NYSDEC sediment criteria in one or more of the five samples (Table 1-10).

1.3.4.4 Test Pit Investigation – September 1998

TAMS Consultants, Inc., under contract to NYSDEC (Superfund Standby Contract D003060), conducted a Test Pit Investigation to confirm the presence or absence of buried drums. The results of this investigation are reported in "Test Pit Installation Report Old Amenia Town Landfill Site" dated October 6, 1998 (TAMS, October 1998).

During this investigation, NYSDEC personnel collected at least one soil sample from nine excavations, with the exception of test pit TP-4, and submitted the samples for laboratory analyses (NYSDEC, February 1999). Field screening results and visual observations indicated that the area of TP-4 was not contaminated and therefore, samples were not collected. Samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and inorganic constituents. The sample results from the Test Pit Investigation are summarized in Table 1-11. The locations of the test pits are shown on Figure 1-4.

At the north end of the Site, in test pits TP-1 through TP-8, refuse, fill and other wastes extended to the floor of most of the excavations and groundwater was not intersected in the test pits (TAMS, October 1998). Surface material consisted of six inches to three feet of soil material which overlaid the wastes. In a few test pits, a one- to two-foot sand layer separated layers of garbage, other wastes, and metallic objects. Two of the test pits from the north end of the Site (TP-1 and TP-2) contained crushed or partially crushed drums and several metal pails and containers of various sizes. Test pit TP-1 contained two crushed drums, and test pit TP-2 contained one empty and partially crushed drum and a second empty and crushed drum. Upon completion, each test pit excavation was backfilled with the original material and covered with imported topsoil, which was then leveled and compacted. Elevated photoionization detector (PID) and flame ionization detector (FID) readings were documented by TAMS (October, 1998).

Concentrations of several VOCs (trichloroethene, tetrachloroethene, and BTEX compounds) exceeded the NYSDEC cleanup objectives in soil samples collected in Test Pits TP-1, TP-2, and TP-3 (Table 1-11). The NYSDEC cleanup objectives for several SVOCs were exceeded in samples collected in Test Pits TP-1 and TP-7. PCBs (Aroclor-1242) were detected at concentrations that exceeded the NYSDEC cleanup objectives in samples collected from TP-1, TP-2, TP-3, and TP-6. Arsenic, barium, beryllium, cadmium, chromium, copper, iron, mercury, nickel, and zinc, were detected at concentrations that exceeded the NYSDEC cleanup objectives in one or more samples.

At the southwest corner of the Site, where the drum removal action described in Section 1.3.4.5 occurred, test pits contained whole and crushed drums. Some surface debris (bottles) were identified at TP-9C.

1.3.4.5 Drum Removal Action –1998 and 1999

The EPA conducted the removal action to remove, characterize, stabilize, and stockpile the drums and associated soil from the drum removal area at the southwest corner of the Site. TAMS, under contract to NYSDEC, documented the EPA removal action in the report "Drum Removal Report, Old Amenia Town Landfill Site" (TAMS, December 1998). In general, the removal action focused only on the removal of drums and visibly contaminated (or discolored) soil. Delineation or post excavation sampling was not conducted. An engineering consultant for the Town of Amenia, Chazen Engineering, collected a soil sample from an excavation, as well as drummed waste samples, for separate laboratory analyses, and reported the results of the analyses to NYSDEC (Chazen, 1998). A detailed discussion of the drum work is presented in the TAMS report "Drum Removal Report, Old Amenia Town Landfill Site" (TAMS, December 1998)..

During October-November 1998, EPA and its contractor removed 170 drums containing waste materials (including approximately 30 empty drums) as well as approximately 220 cubic yards of soil from the southwest corner of the Site . The drums were overpacked and transferred to secure storage units at the northern end of the Site near the property owned by Sharon Oil Company. The pile of excavated soil was reshaped and covered with a plastic tarp. A berm was created around the pile to reduce rainwater runoff from the pile. The excavated areas were graded and covered with six inches of topsoil; the topsoil was seeded and covered with straw matting to protect the seed and provide erosion control.

In November 1998, samples were taken from the drums and bulked into eleven composite samples and three individual drum samples. The eleven composite samples and three individual drum samples were submitted for a full Toxicity Characteristic Leachate Procedure (TCLP) analysis and for other Resource Conservation and Recovery Act (RCRA) characteristics. The analytical data were used for waste disposal purposes.

In June 1999, EPA and its contractor obtained samples from 23 individual drums and 6 soil samples from the soil pile. The drum samples were analyzed for VOCs, SVOCs, metals, PCBs, pesticides, TCLP parameters and other RCRA characteristics (URSGWC, 2000). The analytical data from the drums were used for waste disposal purposes. The soil samples were analyzed for VOCs and SVOCs. The soil stockpile analytical results are presented in Table 1-12. The analytical results from the soil stockpile showed concentrations of bis(2-ethylhexyl)phthalate in four of the six samples that exceeded the NYSDEC criterion. The concentrations of other compounds did not exceed NYSDEC criteria.

In December 1999, the stockpiled soil was loaded, and on the basis of the analytical waste characterization data, transported to an appropriate disposal facility in accordance with state and federal regulations. Also in December 1999, 170 drums (164 drums plus five drums of extra sample jar contents and one drum of medical waste) were transported to off-site facilities for disposal in accordance with state and federal regulations.

1.4 REPORT ORGANIZATION

This report is divided into the following sections:

- Section 1.0 introduces the Amenia Town Landfill RI/FS program, describes the objectives of the program, provides a description of the Site, and provides an overview of previous investigations
- Section 2.0 describes the physical characteristics of the Site area on a regional scale and describes the environmental setting specific to the Site
- Section 3.0 describes the field activities and the methods used to conduct the RI/FS field investigation
- Section 4.0 describes the results of the physical characterization of the Site
- Section 5.0 presents a detailed discussion of the analytical results of soil and groundwater samples collected during the current and previous investigations
- Section 6.0 provides a human health risk evaluation for the Amenia Town Landfill
- Section 7.0 summarizes the results of a screening level ecological risk assessment (presented in Attachment 1) conducted for the Site
- Section 8.0 presents a summary and conclusions of the Amenia Town Landfill Remedial Investigation
- Section 9.0 describes recommendations for additional action at the Site
- Section 10.0 is a listing of references cited in this document

The general physical characteristics of the Amenia Town Landfill are presented in this chapter.

2.1 SITE LAYOUT

A detailed description of the Site layout is presented in Section 1.3.1. A map depicting the layout of the Site is presented in Figure 1-2. Limits of waste shown on Figure 1-2 were determined based on historical aerial photographs.

2.2 LANDFILL WASTE MATERIAL

The early history of the landfill is not well documented, although a 1947 Dutchess County Department of Health (DCDH) inspection report identified the Site as a municipal dump for local residents and businesses. Witness interviews have confirmed that other waste was disposed of at the Site in the 1950s, 1960s, and 1970s. In the early 1970s, wastes in the form of cutting oils and filled 55-gallon drums were known by the DCDH to be present at the Site. A DCDH memorandum of October 26, 1970 reported the presence of several hundred drums of waste at the south end of the Site covering an area of one acre. Some of the drums were punctured and the contents of the drums had discharged to the surface of the ground. The memorandum also states that oil was used on the entrance road to settle dust in the summer. In interviews, Mr. Surico, the former owner/operator of the Site, confirmed that such wastes were present at the landfill from December 1968 to April 1971 (see also LMS, 1993). The results of LMS' October 1991 site inspection indicated that although most of the landfill area had been graded flat and supported vegetative cover, certain waste types were visible in a few areas at the Site. These included two areas in the southwest portion of the site, where partially buried drums were observed, and in an area at the northern end of the landfill, at the western slope, where LMS observed a ditch containing exposed fill material, several rusted (empty) drums, a tire and several brown bottles. A similar ditch with fill material and rubbish was also observed farther to the south on the western slope.

The nature of the waste material placed in the landfill was also investigated in 1998 through a test pit program that focused on identifying areas of buried drums (TAMS, October 1998). Nine test pits were excavated to depths between 15-20 feet (ft) below the ground surface to confirm the presence or absence of drums (LMS, 1993). None of the test pits reached the water table.

Test pits TP-1 through TP-8 revealed items such as bed springs, crushed drums (in test pits TP-1 and TP-2), bottles, a washing machine, glass, paper, metal, tires, automobile parts, hot water heaters, hospital waste (IV bottles, syringes), miscellaneous papers dated late 1960s and early to mid-1970s, bags of leaves, and plastic (Figure 1-4). Landfill materials encountered in soil borings during this RI (SB-2, SB-3, MW-2, MW-6, MW-7, MW-8) included items such as glass, paper, metal, rubber, plastic, and brick pieces.

In the drum removal area in the southwest corner of the Site, one piece of plywood was encountered in the soil boring for MW-9. Other than bottles in the top 6 inches of TP-9C, whole and crushed drums and their contents were the only non-indigenous materials identified in test pits TP-9 and TP-9A through TP-9E (TAMS, October 1998).

2.3 Topography and Drainage

The Site is at an elevation of about 510 ft (North American Datum 1988). The central Site area is relatively flat but drops off steeply to the north and west, and rises gradually and then more steeply to a small hill immediately south of the Site. The hill reaches an elevation of about 617 ft. Steep slopes with shrubs and small trees separate the top of the landfill from the lowland areas below. The lowlands are at an elevation of about 485 ft (Figure 1-2).

The general drainage of streams in the area is to the south (USGS, 1984). On the basis of topography, surface water and storm water at the Site is expected to flow from south to north (Figure 1-1)

2.4 Surface Water

The Site is in the Housatonic River Drainage Basin near the headwaters of a small tributary to Wassaic Creek. The tributary appears perennial and is associated with wetlands and marshes in the immediate vicinity of the Site. The tributary flows east and south and joins a larger tributary, Amenia Stream, just east of Route 22 (Figure 1-1). Amenia Stream flows south and joins Wassaic Creek about two miles south of the Site. The NYSDEC classifies these tributaries as Class C fresh surface waters, with fishing as the best usage. Class C waters "shall be suitable for fish propagation and survival" and "for primary and secondary contact recreation, although other factors may limit the use for these purposes" (6 NYCRR, Part 825).

A small to medium sized pond is located immediately west of the landfill (Figure 1-2). The pond apparently originates from a beaver dam that was constructed some time before 1987 (the 1987 NUS sample location map shows the pond, in EPA, 1990).

2.5 Wetlands

Wetlands are present immediately west and north of the Site (Figure 2-1). The wetlands are mapped as part of a Palustrine System (U.S. Fish and Wildlife, March 2000), which consists of fresh water wetlands dominated by shrubs, trees, and persistent emergent plants. NYSDEC assigns it a regulatory wetland size of 34 acres and classifies it as a Class II wetlands (Class I having the highest rank in terms of value).

Class II wetlands are defined by NYSDEC as having any one of 17 ecological characteristics (6 NYCRR, Part 664), including support of an animal species vulnerable in the state, association of the wetland with permanent open water outside the wetland, or hydraulic connection of the wetland to an aquifer recognized by NYSDEC as an important water supply. NYSDEC did not specify which of the 17 Class II characteristics apply to the wetlands adjacent to the Site.

2.6 Geology

The Site is in a geologic and structural province known as the New England Uplands. This province extends along eastern New York State from Manhattan northward to the Adirondack Mountains. The uplands consists of hills and valleys underlain by metamorphic rock (schist and

marble) of Cambrian to Ordovician age (about 500 million years). In general, the more resistant rock, schist, forms the hills while the less resistant marble and dolomite form the valleys.

The following three major rock units occur in the area (Figure 2-1):

Walloomsac Schist (Owl): A black to gray, quartz, feldspar, garnet schist or phyllite, may be calcareous near the base (Middle Ordovician)

Stockbridge Marble (OCst): A white to gray massive to layered marble, generally dolomitic but containing calcite marble in the upper part, locally interlayered with schist, phyllite, or calcareous siltstone or sandstone (Lower Ordovician and Cambrian)

Everett Schist (Cev): A gray to green, fine to medium grained, poorly layered, quartz, feldspar, muscovite schist or phyllite (Cambrian)

The Site lies within a valley underlain by the Stockbridge Marble and surrounded by ridges underlain by the Walloomsac Schist (Figure 2-1). Outcroppings of marble were reported at the unnamed hill immediately south of the landfill and at the small knoll at the northwest corner at the Site. The Everett Schist occurs about one half mile north and about one half mile south of the Site.

LMS (1993) reports that surficial deposits in the Site area consist of glacial outwash sand and gravel that are generally confined to the floor of the valley. One mile north of the Site, the glacial deposits are about 70 feet thick, and consist of about 28 feet of water-bearing gravel overlain by 42 feet of clay. Most of the present day landforms were sculpted during the last period of glaciation, which ended about 10,000 years ago. The major sand, gravel, and clay deposits were laid down at this time as well.

Recent (i.e., from 10,000 years ago to the present) sedimentation, weathering, and erosion are taking place along the surface water courses in the area of the Site. Fluvial (stream related) and palustrine (swamp and wetland) deposits of silt, gravel and clay are associated with the creek beds and banks of the local tributaries to Wassaic Creek.

2.7 Water Supply

The water supply for the Town of Amenia is provided by four wells located within the town limits on Route 343, Lavelle Road, and Washington Court, about one mile north of the landfill. The water is treated with chlorine before distribution to approximately 1,000 people through 300 connections. Residences outside of the district obtain water from private wells. (Amenia Town Water District, Water Treatment Operator, personal communication, March 2000). The preliminary results of a well user survey conducted by New York State Department of Health (NYSDOH, May, 1999) indicates that there are no well users within a ¼ mile radius of the Site boundaries. About 15 residences, however, that rely on well water for domestic use are within a ½ mile radius east of the Site.

2.8 Climate

The average temperature in Poughkeepsie, NY, the county seat of Dutchess County, is about 49 degrees Fahrenheit. The average rainfall in the area is about 41 inches per year (Climate Data for Poughkeepsie, on line, 1997).

This section provides a technical overview of the field activities and the methods and procedures used to conduct the Remedial Investigation at the Amenia Town Landfill.

3.1 FIELD METHODOLOGY PROTOCOLS

The field investigation for the Amenia Town Landfill was conducted in accordance with the Final RI Work Plan (URS, February 2001), which included a Field Sampling Plan, a Quality Assurance Project Plan, a Health and Safety Plan, and a Citizen Participation Plan. These plans were prepared in accordance with the following EPA and NYSDEC guidance and requirements:

- Region II CERCLA Quality Assurance Manual (EPA, 1989)
- Field Methods Compendium (EPA, June 1993)
- Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (EPA, 1988)
- Occupational Safety And Health Administration (OSHA) Hazardous Waste Operations and Emergency Response Standard
- NYSDEC administrative, technical, and sampling guidance (e.g., NYSDEC, August 30, 1988, March 1991; September 1997, etc.)

These plans were accepted by the NYSDEC on March 3, 2001 and attached to the Order upon its execution on October 4, 2001. The purpose of these plans was to provide a system of methods and procedures for the collection of chemical and environmental data that are legally defensible, scientifically valid, representative of site conditions, and acceptable to interested parties for deciding future goals for the Site. The field investigation took place between October 2001 and June 2002, with supplemental investigations in January and May 2003. The methodologies used to conduct the field investigation and related activities are described in detail in these plans. A brief summary of the activities is presented in the following subsections.

3.2 ADVANCING TEST BORINGS

The following types of borings were advanced at the Site:

- Site geologic characterization (SB-1 through SB-3)
- Collection of post excavation soil samples (PE-1 through PE-9)
- Installation of monitoring wells (MW-1 through MW-9, MW-2B, MW-4B, and MW-8B), vibrating wire piezometers (PZ-1 and PZ-1B), and piezometers (PZ-2 and PZ-3)

The borings advanced to collect post excavation samples and to install monitoring wells and piezometers are described in Section 3.3.2 and Section 3.3.3, respectively. The locations of the borings are shown in Figure 3-1.

The RI field investigation began by advancing three test soil borings (SB-1, SB-2, and SB-3) at the Site between October 22 and October 25, 2001. The objectives for these test borings were to collect deep, subsurface data to develop a preliminary geologic model for the Site and to guide installation of shallow and deep monitoring wells. Subsurface conditions below 15 feet, including the depth to the water table and bedrock, were not previously investigated at the landfill. Drilling services for the RI, including advancing test borings, installation of monitoring wells, and rock coring, was provided by Aquifer Drilling and Testing, Inc., New Hyde Park, New York, a New York licensed driller.

The test borings were planned for maximum depths of 100 feet below the ground surface, or 10 feet into bedrock, whichever came first. Each of the borings intersected bedrock before the 100-ft limit and 10 feet of rock core were recovered from each boring. To prevent potential cross contamination between overburden and bedrock, each boring was tremie grouted upon completion.

Modifications were made to the proposed drilling program during the field investigation.

- The boring for monitoring well MW-2 was moved 45 feet west of its proposed location because of access problems with the drill rig.
- The boring for monitoring well MW-1 was moved about 100 feet west of its proposed location because of access problems with the drill rig.
- Proposed deep monitoring well MW-1B was renamed MW-2B, because it was installed closer to MW-2 than to MW-1. Deep monitoring well MW-2B was installed about 60 feet east of the proposed location for MW-1B.
- Due to its proximity to the helicopter pad, soil boring SB-2 was moved 70 feet west of its proposed location to avoid potential helicopter accidents with the drilling mast or disrupting landing schedules during drilling operations.
- The placement of boring SB-2 at its new location was very near the proposed locations for the borings for vibrating wire piezometers PZ-1 and PZ-1B. Therefore, the locations of PZ-1 and PZ-1B were changed to approximately 100-110 feet north of their proposed locations to provide better stratigraphic and hydrogeologic coverage at the center of the Site.

3.3 COLLECTION OF SOIL SAMPLES

This section summarizes the methods used to collect soil samples at the Amenia Town Landfill.

3.3.1 Surface Soil Samples

On November 27 and 28, 2001, a total of thirty-three surface soil samples were collected from the landfill and its perimeter (Figure 3-1). The following three types of surface soil samples were collected from the Site:

- Human health evaluation landfill surface soil samples (SS-1 through SS-9)

- Background soil samples (BG-1 through BG-3)
- Extent and magnitude-assessment samples (SS-W1 through SS-W15 and SS-N1 through SS-N6)

The objectives for the surface soil sampling activity were to evaluate potential risks to human health posed by the soil cover at the top of the landfill, determine background concentrations of inorganic constituents in areas not likely affected by landfill activities, and to determine the extent of constituents of potential concern (COPCs) in soil along the base of the landfill. The human health evaluation soil samples were collected from the 0 to 2 inch interval depth (in accordance with NYSDEC risk evaluation requirements), while the other samples were collected from 0 to 6 inches.

The background surface soil samples (BG-1 through BG-3) were collected and analyzed to evaluate the "natural" concentration of the inorganic constituents in soils in the area of the landfill. The samples were collected in areas believed to contain native soils. One sample (BG-1) was collected in the mounded area at the north end of the landfill and two samples (BG-2 and BG-3) were taken south of the landfill in the undisturbed wooded area.

To evaluate potential risks to human health and environment, nine surface soil samples were collected from the top of the landfill from the 0 to 2-inch depth interval for the laboratory analyses of SVOCs, PCBs, and inorganics. VOCs were not analyzed because this group of chemicals volatilizes very quickly and are normally not found in the upper few inches of soil.

Before collecting a surface soil sample, the locations were carefully cleared by removing any grass layers or surface debris. The samples were collected using dedicated, pre-cleaned, stainless steel spoons. The environmental samples were placed in the containers provided by the analytical laboratory using the spoons. Additional soil from each sampling location was placed in driller's jars and headspace readings of organic vapors were recorded for each sample using a calibrated photoionization detector (PID). In additional to PID readings, other features of each soil sample (e.g., visual description using the Unified Soil Classification System, location, time of collection, etc.) were recorded on Surface Soil Sampling Logs, which are presented in Appendix A. PID Instrument Calibration Logs are presented in Appendix B.

The laboratory bottles were labeled with the sample identification number, project name, date, time, and requested analyses. The samples were placed in coolers containing ice and maintained at approximately 4 degrees Celsius. The samples were sent to the project laboratory (Section 3.14) with appropriate chain-of-custody documentation by overnight carrier on November 28 and November 29, 2001. The samples were analyzed for one or more of the following parameters - semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and inorganic constituents. A summary of the analytical parameters and analytical methodology for each sample is shown in Table 3-1. Quality assurance and quality control (QA/QC) samples consisted of two field blanks prepared on the sampling spoons, two blind duplicate samples, two matrix spike samples, and two matrix spike duplicate samples. The analytical results of the surface soil samples are discussed in Section 5.0.

3.3.2 Post Excavation Soil Samples

On November 8 and 9, 2001, post excavation soil borings PE-1 through PE-9 (Figure 3-1) were advanced at the former drum removal area to a depth of 10 feet below grade utilizing 4 ¼ inch hollow stem augers and a CME 75 model drill rig. The objective of this activity was to confirm the effectiveness of the drum excavation work conducted by the EPA in 1998 by collecting and submitting post excavation samples for laboratory analyses. Post excavation soil samples were not collected previously in this area. Prior to the advancement of each boring, the augers and split spoon samplers were cleaned by steam cleaning at the decontamination pad located on Site.

During drilling operations, cuttings were inspected for evidence of staining, odor or discoloration, and screened for organic vapors using a calibrated Mini-Rae 2000 photoionization detector (PID). No evidence of staining, odor or elevated PID readings were observed in any of the cuttings.

One sample from each boring was collected from a depth of 10-12 feet below grade using 2 foot long and 3-inch diameter split spoon samplers. Upon retrieval of the sampling spoon, the soil sample was visually inspected, logged, and screened for the presence of organic vapors at 6-inch intervals. Each sample was then transferred into laboratory-provided jars and immediately placed on ice in coolers. Each boring was grouted using a tremie pipe after completion. Boring logs are presented in Appendix C.

The laboratory bottles were labeled with the sample identification number, project name, date, time, and requested analyses. The samples were placed in coolers containing ice and maintained at approximately 4 degrees Celsius. The samples were sent to the project laboratory (Ecology and Environment, Inc.) with appropriate chain-of-custody documentation on November 9, 2001 by overnight carrier for next day delivery. The samples were analyzed for target compound list and target analyte list (TCL/TAL) parameters. A summary of the analytical parameters for each sample is shown in Table 3-1. Quality assurance and quality control samples consisted of a field blank prepared on a split spoon sampler, a blind duplicate sample, and a matrix spike and matrix spike duplicate sample (MS/MSD). The analytical results of the post excavation soil samples are discussed in Section 5.0.

A minor modification to the proposed work scope for the post excavation samples was made in the field. During the advancement of PE-3, auger refusal was encountered at 9.5 feet below grade. The boring was relocated 4 feet north of the proposed location and auger refusal was encountered at 8.5 feet below grade. The boring was then relocated 4 feet south of the original location where the boring was completed successfully. The minor offset of this boring from its proposed location did not affect the objective of this activity.

3.3.3 Subsurface Soil Samples from Borings

From October 22, 2001 through December 7, 2001, seventeen borings were advanced to evaluate the stratigraphy on a site-wide basis, to confirm the distribution of overburden soils, landfill waste, and bedrock, and to establish the target depths to install monitoring wells and vibrating wire piezometers. Each boring was advanced through the overburden material

using 4 ¼-inch or 6 ¼-inch ID hollow stem augers and a Davey Kent (DK) or CME 75 model drill rig. Continuous split spoon soil samples were collected following ASTM D-1586-99 methods from each boring to a depth of 40 feet and at 5-feet intervals at depths greater than 40 feet. For collocated borings (e.g., MW-8 and MW-8B) subsurface soil samples were collected only from the deeper boring to avoid duplicate soil data.

Each soil sample was visually inspected for evidence of staining, odor, or discoloration, and described using the Unified Soil Classification System. In addition, a soil sample from each split spoon interval was placed in a driller's jar and screened for headspace organic vapors using a calibrated HNU photoionization detector (PID). These data were recorded on Soil Boring Logs (Appendix C). None of these subsurface soil boring samples were submitted to the laboratory for analysis. Chemical characterization of subsurface soil in the footprint of the landfill, already known to contain COPCs in areas, was not a RI objective.

3.4 COLLECTION OF ROCK CORE

Rock core was recovered from four borings, SB-1, SB-2, SB-3, and PZ-1B (Figure 3-1). Rock core was collected to investigate depth to bedrock, confirm the composition of rock beneath the Site, and to investigate rock properties (e.g., layers, fractures, faults, etc.) that may affect the groundwater flow regime at the Site. Although bedrock was intersected in five other borings, additional core was not required for this investigation because bedrock composition and texture appears consistent across the Site. Table 3-2 provides a summary of bedrock borings. The information shown in Table 3-2 was used to construct a bedrock elevation contour map for the Site, discussed in Section 4.5.

Rock core was recovered in 5-foot lengths, called runs, using a standard NX diamond core bit (2.16-inch ID). Typically, 10 feet of core was recovered from each boring. Once recovered, each core sample was visually inspected for evidence of staining, odor, or discoloration. The rock quality designation (RQD), consisting of the total length of pieces 4-inches or greater in length - divided by the total length of the run - multiplied by 100, was measured and recorded on core logs (Appendix D). Core samples were placed in wooden core boxes, which were labeled with the boring number, run number, sample identification, date, depth of interval and recovery, direction of top of core, and RQD. The rock core is currently archived with the ALG.

3.5 COLLECTION OF SURFACE WATER AND SEDIMENT SAMPLES

Sediment and surface water samples were collected from May 13 to May 16, 2002. Samples were collected from the west stream (upstream from the west pond), west pond, north stream, and east stream (Figure 3-1). Sampling progressed downstream to upstream locations to minimize the chance of spreading disturbed sediment to unsampled locations. The objectives of this sampling were to establish surface water and sediment quality both upstream and downstream of the Site and to evaluate potential effects on the wetlands ecology of the area. Agreements were made between the ALG and owners of adjacent properties to provide access to sampling locations beyond the landfill property boundaries.

Sediment samples were collected using dedicated, acetate core tubes from depths of 0-6 inches and 18-24 inches. The tubes were pushed into the sediment, recovered, sediment extruded from the tube, and transferred to aluminum lined bowls for homogenization (samples for VOC analyses were not homogenized to avoid loss of constituents). Once homogenized, the samples were transferred to laboratory-supplied bottles. Surface water samples were collected directly into a laboratory bottle by immersing it into the water column. Surface water quality parameters of pH, conductivity, turbidity, temperature, dissolved oxygen, and organic vapors were measured in the field.

The laboratory bottles were labeled with the sample identification number, project name, date, time, and requested analyses. The samples were placed in coolers containing ice and maintained at 4 degrees Celsius. The samples were sent to the project laboratory (Ecology and Environment, Inc.) with appropriate chain-of-custody documentation by overnight carrier for next day delivery. The surface water samples were analyzed for TCL and TAL parameters. Sediment samples were analyzed for PCBs, TAL inorganics, total organic carbon (TOC), pH, and grain size. Certain sediment samples were also analyzed for bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate was added in the analyses for sediment samples east of the landfill based on Round 1 groundwater data. These data indicated potential off-site migration of bis(2-ethylhexyl)phthalate in groundwater. A summary of the analytical parameters for each sample is shown in Table 3-3. The analytical results of the sediment and surface water samples are discussed in Section 5.0. Sediment Sampling Logs are presented in Appendix E.

3.6 STAFF GAUGE INSTALLATION

Eight staff gauges (STG-0 to STG-7) were used during the field investigation in water bodies surrounding the Site (Figure 3-1) to evaluate the relationship between the groundwater flow regime beneath the landfill and surface water flow in the west pond and adjacent streams. Seven staff gauges are 2 inch by 4 inch pieces of lumber that were hammered into the pond sediments or stream beds. One "staff gauge" (STG-3) is a notch chiseled into a concrete culvert just west of Route 22. The staff gauges were surveyed horizontally and the elevation of the top of each gauge was determined by the project surveyors (Section 3.12). Surface water elevations at the staff gauges are determined by measuring the distance from the top of the gauge down to the water level of the stream or pond and subtracting that distance from the gauge elevation.

3.7 COLLECTION OF SOIL GAS SURVEY SAMPLES

Soil gas samples were collected from the landfill between December 20 and December 26, 2001. The samples were collected on a nominal 100-ft grid established across the Site creating a total of 52 discrete sampling locations (Figure 3-1). The soil gas samples were collected as a site-wide screening tool to evaluate subsurface organic vapors originating from landfill waste and to identify the presence of any areas containing elevated levels of VOCs ("hotspots").

Drilling services were provided by Zebra Environmental, Albany, New York. A driller using a direct push (Geoprobe) drill rig collected soil gas samples from a depth of about 15 feet below the ground surface. A pre-cleaned soil gas probe was advanced at each location and a vacuum pump was used to purge atmospheric and stale air from the sampling string. After purging, a soil gas sample was drawn and collected into a dedicated Tedlar gas sampling bag. Upon completion, the bag was sealed, labeled, and preserved by storing on ice for laboratory analysis. The samples were handled using chain of custody protocols.

The soil gas samples were analyzed in a field laboratory temporarily set up at the Site by Severn Trent Services, On-Site Technologies, Westfield Massachusetts. A Severn Trent chemist analyzed the soil gas samples by gas chromatography (GC) using EPA method 8021M. Each soil gas sample was analyzed for VOCs using a portable GC with a photoionization detector (PID) and a flame ionization detector (FID). QA/QC samples consisted of field blanks and duplicate samples that were collected once a day or after every twentieth soil gas sample. The soil gas analytical results are presented in Appendix F and discussed in Section 5.0.

3.8 MONITORING WELL AND PIEZOMETER INSTALLATION

Twelve monitoring wells, two vibrating wire piezometers, and two piezometers were installed during this investigation. Monitoring wells were installed to evaluate groundwater quality and hydrogeologic properties of the unconfined overburden/shallow bedrock groundwater units and the confined deep bedrock unit. Vibrating wire piezometers were installed to provide groundwater elevation data for the unconfined and confined units near the center of the landfill. Piezometers were installed on either side of West Pond Tributary and Amenia Stream to determine the discharge point of shallow groundwater leaving the Site. Monitoring well and piezometer locations are depicted in Figure 3-1. Monitoring well and piezometer construction details are presented in Appendix G and summarized in Table 3-4.

3.8.1 Shallow Monitoring Wells in Overburden

Seven shallow wells (MW-1, MW-2, MW-3, MW-4, MW-6, MW-7, and MW-8) were installed in the unconfined, water table aquifer of the overburden soils. Well materials consisted of 2-inch ID, Schedule 40, PVC pipe with flush mount threaded joints. The well screen was a 10 feet long section of 2-inch ID PVC with 0.010-inch slots. Well materials were steam cleaned prior to installation and each overburden well was constructed with the well screen positioned across the water table. The filter pack for each screen consisted of No. 1 sand extending a minimum of two feet above the top of the screen and 1 foot below the bottom of the screen. The bentonite seal consisted of a minimum of 2 feet of hydrated bentonite pellets. The remainder of the borehole annulus was grouted with a cement/bentonite mixture pumped through a tremie pipe. Each well was completed at the ground surface with a 5-foot length of 6-inch steel protective casing with locking cap, secured in place by a 2-ft x 2-ft concrete pad.

3.8.2 Shallow Monitoring Wells in Bedrock

The installation of shallow bedrock water table wells was not originally proposed in the Work Plan. Two borings originally scheduled for the installation of overburden monitoring wells (MW-5 and MW-9) intersected bedrock before reaching the saturated zone. Therefore, these monitoring wells were installed in shallow bedrock where first water was encountered.

The following procedures were used to drill the borings and install the shallow bedrock wells:

- The borings were advanced through overburden using 6 1/4-inch ID augers
- When bedrock was reached, the boring was advanced using a nominal 6-inch diameter air hammer
- The well screen was set across the water table when first water was reached

Each shallow, unconfined monitoring well installed in bedrock was constructed using the same well materials as the shallow overburden monitoring wells. These two shallow bedrock wells are grouped with the seven shallow overburden wells for characterizing unconfined aquifer conditions at the Site.

3.8.3 Deep Monitoring Wells in Bedrock

Three deep monitoring wells, designated as MW-2B, MW-4B, and MW-8B, were installed in the confined bedrock aquifer. The data from the deep wells are used to establish horizontal groundwater gradients and to characterize the groundwater quality of the confined bedrock aquifer. Each well is part of a well cluster consisting of a confined bedrock monitoring well and a corresponding shallow unconfined overburden well (MW-2/MW-2B, MW-4/MW-4B, and MW-8/MW-8B). The water elevation data from the well pairs are used to establish vertical hydraulic gradients between the shallow overburden/bedrock unconfined and confined bedrock units at the Site.

Each deep bedrock well was constructed using two casings. A minimum of 20 feet of 10-inch ID steel casing was drilled and driven into the overburden to isolate the landfill material from the remainder of the overburden materials. A second casing consisting of 6-inch ID steel was used to isolate the overburden from the bedrock. This casing was seated a minimum of ten feet into the upper bedrock and grouted in place by pumping a cement/bentonite mixture into the annulus through a tremie pipe. Well materials were steam cleaned prior to installation and consisted of 2-inch ID, Schedule 40, PVC pipe with flush mount threaded joints. The well screen used was a 10 feet long section of 2-inch ID PVC with 0.010-inch slots. Each well was constructed with the top of the well screen positioned approximately 30 feet below the bottom of the 6-inch casing. The filter pack for each screen consisted of No. 1 sand extending a minimum of two feet above the top of the screen and 1 foot below the bottom of the screen. The bentonite seal consisted of a minimum of 2 feet of bentonite slurry pumped through a tremie pipe. The remainder of the borehole annulus was grouted with a cement/bentonite mixture pumped through a tremie pipe. Each well was

completed at the surface with a 5-foot length of 4–inch steel protective casing with locking cap, secured in place by a 2-ft x 2-ft concrete pad.

Modifications to the Work Plan were made in the field when installing the deep bedrock monitoring wells. Originally, the following methods were proposed.

- drill a 12-inch diameter boring,
- grout 10-inch casing into the top of the bedrock,
- advance the boring using a nominal 6-inch diameter air hammer
- install the well screen 10 feet into the top of competent bedrock.

During drilling, it was found that 10-inch casing could not be lowered to top of rock, because the landfill materials and debris collapsed in the hole after the drill string was removed. Therefore, the drilling method for the deep wells was modified as follows:

- drill a 14-inch diameter boring using mud rotary
- drive 10-inch casing within top 20 feet of landfill material
- advance the boring using a nominal 10-inch diameter bit and mud rotary drilling
- grout 6-inch casing a minimum of 10 feet into the top of the bedrock
- advance the boring approximately 30 feet below the 6-inch casing depth using a 5 7/8-inch air hammer
- install the top of the well screen approximately 30 feet below the bottom of the 6-inch casing

Using a telescoping method from 10-inch diameter casing to 6-inch diameter casing prevented the borehole from excessive collapse and permitted the 6-inch diameter casing to be lowered and grouted into the top of bedrock.

3.8.4 Monitoring Well Development

Monitoring wells were developed at least 24 hours after each monitoring well was installed to allow the grout used to construct each well to set. The wells were developed to remove traces of drilling fluids and restore aquifer properties around the well screen after drilling. With the exception of MW-5, a small submersible pump (Whale model) was used to develop each well until the discharge water became visually free of suspended particles and sediment or for a period of two hours. A dedicated Teflon bailer was used to bail MW-5 due to its low yield and relatively thin saturated thickness. The well was bailed for a total period of two hours. Whale pumps were cleaned between wells. With the exception of MW-2, water from each well during development was allowed to flow on the ground surface. Development water from MW-2 was drummed because petroleum odors were detected in soil samples collected from the saturated zone during the boring drilling. The duration and method used for well development are described on each well construction log provided in Appendix G.

3.8.5 Vibrating Wire Piezometers

Two vibrating wire piezometers were installed near the center of the Site (Figure 3-1) to help establish groundwater flow directions in the unconfined and confined water-bearing units and vertical gradients between each unit. One shallow vibrating wire piezometer (PZ-1) was installed in the unconfined water table aquifer and one deep vibrating wire piezometer (PZ-1B) was installed in the deep, confined bedrock aquifer.

A Geokon Model 4500 Vibrating Wire Piezometer pressure transducer was installed in each boring. No. 1 filter pack was used as a filter pack for each transducer, with a minimum of 4.0 feet extending above the top of the transducer and approximately 0.5 feet below the transducer. A minimum of 2 feet of hydrated bentonite chips or bentonite slurry was placed over the gravel pack before grouting the remainder of the boring annulus with a bentonite/cement slurry using a tremie pipe. Each piezometer was completed with a 6-inch ID steel protective casing with locking cap to house the vibrating wire connector at the ground surface, secured by a 2-ft x 2-ft concrete pad.

Because the proposed placement of the piezometers was very near the location of stratigraphic test boring SB-2, and because the stratigraphy of that area was already known from the test boring, the locations of PZ-1 and PZ-1B were moved approximately 110 feet south. The boring for the deep piezometer provided new stratigraphic data and better areal coverage for unconfined and confined groundwater flow determinations at the Site.

3.8.6 Piezometers

On January 28, 2003, two shallow piezometers were installed off site east of the landfill on either side of West Pond Tributary and Amenia Stream (Figure 3-1). Piezometer PZ-2 was installed west of West Pond Tributary and PZ-3 was installed east of the Amenia Stream. These piezometers were installed to determine if shallow groundwater from the Site discharges into surface water east of the Site. An access agreement was executed between ALG and the property owner on January 10, 2003 providing authorization to install the piezometers.

Each boring was advanced using 4 ¼-inch ID hollow stem augers and a Mobile Drill B-61 model drill rig. Split spoon soil samples were collected from near the bottom of each boring to verify the presence of saturated soil to determine the depth to water.

Piezometer materials consisted of 1-inch ID, Schedule 40, PVC pipe with flush mount threaded joints. The piezometer screens were a 5-ft and 10-ft long section of 1-inch ID PVC with 0.010-inch slots. Each piezometer was constructed with the screen positioned across the water table. The filter pack for each screen consisted of clean No. 1 sand extending a minimum of two feet above the top of the screen. The bentonite seal consisted of a minimum of 2 feet of hydrated bentonite pellets. The remainder of the borehole annulus was grouted with a cement/bentonite mixture pumped through a tremie pipe. Each well was completed at the ground surface with a flush-mounted 8-inch steel curb box with locking cap, secured in place by a 1.5-ft x 1.5-ft concrete pad.

3.9 MONITORING WELL GROUNDWATER SAMPLING

Groundwater samples were collected from the twelve monitoring wells during two separate events. Round 1 groundwater sampling occurred in January 2002 and Round 2 samples were collected in April 2002. Two rounds of samples were collected to assess any potential seasonal variation in groundwater quality and to confirm the analytical results of the first set of groundwater data. The first round of groundwater samples were collected a minimum of two weeks after the monitoring wells were developed to allow the aquifer around each new well to stabilize and to provide analytical data most representative of actual aquifer conditions. Groundwater samples were collected following the EPA standard operating procedures (SOPs) described in "Ground Water Sampling Procedure, Low Stress (Low Flow) Purging and Sampling" (EPA, March 1998).

3.9.1 Monitoring Well Purging

Monitoring wells were purged following EPA low flow SOPs (1998), using a bladder pump operated by an air compressor, disposable Teflon bladders, and dedicated Teflon-coated tubing. The groundwater quality indicator parameters were monitored using a Horiba U22 meter equipped with a flow through cell. The flow rate was maintained between 50 and 200 milliliters per minute (ml/min). The monitoring wells were purged until three consecutive stable readings (at five-minute intervals) for the indicator parameters were achieved. Parameter readings were considered to be stable when the following readings were established:

- The pH reading varied by no more than $\pm$ 0.1
- The specific conductivity reading varied by no more than $\pm$ 3%
- The redox potential varied by no more than $\pm$ 10 mv
- The dissolved oxygen and turbidity readings varied by no more than $\pm$ 10%

Water level measurements were taken periodically throughout the purging process to monitor that the drawdown did not exceed the EPA-recommended maximum of 0.3 ft, if possible. Due to the low recovery rates in the three confined bedrock wells (MW-2B, MW-4B, and MW-8B) the water levels in these wells did not equilibrate during purging. Monitoring Well Purging Logs are presented in Appendix H.

3.9.2 Monitoring Well Sampling

Samples of groundwater were collected immediately after purging in accordance with the EPA guidelines. Groundwater was allowed to flow directly from the tubing into sample bottles provided by the project laboratory. Once filled, sample bottles were placed on iced containers and delivered to the laboratory by overnight courier under chain-of-custody protocols. Groundwater samples were analyzed for TCL and TAL parameters. QA/QC samples consisting of field blanks prepared daily on the bladder pumps, blind duplicate samples, matrix spike and matrix spike duplicate (MS/MSD) samples, and trip blanks. The

low flow groundwater sampling data logs are presented in Appendix H. The analytical results for the groundwater samples are discussed in Section 5.

3.10 COLLECTION OF DRILLING WATER SAMPLE

During the RI, water from an outside source was used at the Site for drilling, installation of monitoring wells, and decontamination. The source of water was an outdoor spigot located about one mile north of the landfill, on the west side of Route 22 outside a small cemetery. URS received permission to use this source from personnel in the Amenia Town Municipal Building.

A sample of water was collected from the spigot on April 5, 2002 to verify the quality of drilling water used at the landfill and to check for the possibility of cross contamination of drilling equipment or groundwater by an outside source. The sample was collected by allowing the spigot to run for ten minutes to purge any stagnant water and filling the laboratory bottles directly from the spigot. The sample was submitted to the project laboratory for TCL/TAL analyses. The analytical results for the drilling water sample are discussed in Section 5.

3.11 AQUIFER CHARACTERIZATION

This section describes the methods used to characterize the shallow unconfined and deeper confined aquifers at the Site.

3.11.1 Water Level Measurements

Water level measurements were collected periodically throughout the field investigation from the installation of the first monitoring well, but the first comprehensive, synoptic measurement round took place in March 2002 (Table 3-4). Since then, additional synoptic rounds were conducted through May 2003. The water level data were used to develop groundwater contour maps and calculate hydraulic gradients in the unconfined and confined geologic units.

As described in Section 3.12, each water monitoring point (piezometers, monitoring wells, staff gauges) was surveyed to obtain elevations relative to the project datum. An electronic water level meter was used to determine the depth to water at monitoring wells and staff gauges relative to the surveyed elevation. The water level meter was rinsed between measurements to minimize the potential for cross contamination of monitoring wells.

Water levels monitored by vibrating wire piezometers PZ-1 and PZ-1B are read using a portable electronic readout box. The leads from the vibrating wire piezometers, exposed at the surface in the protective casing, are attached to the readout box. Once attached, a LCD readout panel displays a gauge reading and temperature, which is used to calculate the water elevation. Water level readings from the vibrating wire piezometers are presented in Table 3-4 and Table 3-5.

3.11.2 Hydraulic Conductivity Tests

Hydraulic conductivity tests, commonly called slug tests, were performed at the Site on January 28, 2002. The slug tests were conducted on six monitoring wells screened in overburden (MW-1, MW-2, MW-3, MW-4, MW-6, and MW-8) and five monitoring wells screened in bedrock (MW-5, MW-2B, MW-4B, MW-8B, and MW-9). The tests were conducted to determine the hydraulic characteristics of the shallow, unconfined (overburden/shallow bedrock) and confined (deeper bedrock) geologic units. Although a slug test was performed at monitoring well MW-7, it was later found that the electronic data file was corrupted and unusable. Monitoring well MW-7 was not retested because the hydraulic conductivity data from the other wells' fill is sufficient for characterization using this method.

A weighted polyvinyl chloride (PVC) cylinder of known volume (the "slug") was used to perform the tests. Rising head tests were performed on monitoring wells installed in the unconfined unit and both rising and falling head tests were performed on monitoring wells installed in the confined unit. The falling head test is appropriate only for monitoring wells in which the screen is fully submerged and therefore, it was not performed on the shallow monitoring wells.

The slug tests were conducted using an automated electronic data logger and submersible pressure transducers. The initial static water level was first measured in each monitoring well to be tested. A pressure transducer was lowered into the test well to a depth of between 6 and 12 inches above the bottom, or when a sufficient water column was available, approximately 10 feet below water level. The data logger was started and the slug was quickly lowered into the well to displace the water column upward. Water level measurements were collected by the data logger as the water level dropped to equilibrium (falling head test). Confirmatory manual water levels were also collected and recorded and the test ended when approximately 90% recovery was achieved. For rising head tests, the slug was quickly removed from the test well and water level measurements were collected by the data logger as the water level rose to equilibrium.

The raw test data were analyzed using a commercial software program (AQTESOLV). Following standard practices, the Bouwer-Rice method (Bouwer and Rice, 1976; Bouwer, 1989) was used to process data collected from the shallow monitoring wells and the Cooper-Bredehoeft-Papadopulos method (1967) was used on data collected from the deeper monitoring wells. These methods are appropriate for unconfined and confined aquifers, respectively. The graphic results of the hydraulic conductivity tests are presented in Appendix I.

The data from monitoring wells MW-6 and MW-2B rising head test did not yield an adequate match to the AQTESOLV solution curve and therefore, the hydraulic conductivity results for these tests are unusable. However, data from the other wells tested is sufficient to estimate hydraulic conductivity values.

3.12 LAND SURVEY

A topographic base map of the Site was prepared by Robinson Aerial Surveys, Inc., Newton, NJ, based on a aerial flyover conducted specifically for the RI in December 1999. The map was prepared with a 1 ft contour interval at a scale of 1 inch = 40 feet.

A land survey of sampling locations established during this RI was performed by Santos Associates, Catskill, New York, a New York State licensed surveyor. The horizontal locations are surveyed in New York (East) State Plane Coordinates (North American Datum of 1983) and the vertical datum is the North American Vertical Datum of 1988. The base map is shown in Figure 3-1.

Several relatively inaccessible sampling locations were surveyed by the RI sampling team using a portable Global Positioning System (GPS). The GPS was used mainly to locate the sediment samples collected in the deeper portions of the West Pond. Where jointly measured, a comparison of land survey locations and GPS locations showed good agreement within a few feet.

3.13 INVESTIGATION DERIVED WASTE

Currently, there are 56 drums secured at the Site that contain well development water (1 drum), drill cuttings (31 drums), drilling mud (18 drums), and decontamination water (6 drums). The final arrangement for these drums will be determined by the ALG and NYSDEC after the Amenia Town Landfill Feasibility Study.

3.14 ANALYTICAL METHODOLOGIES

The project laboratory for the RI was Ecology and Environment, Inc. (NYSDOH No. 10486), Lancaster, New York. In general, EPA SW-846 methods were used to analyze the soil, groundwater, surface water, and sediment samples. The specific methods used are summarized in Table 3-1 and Table 3-3. Geotechnical grain size analyses of sediment samples were subcontracted by Ecology and Environment, Inc. to GeoTesting Express, Inc., Boxborough, Massachusetts.

During the latter part of the field investigation, Ecology and Environment, Inc. developed schedule and technical problems with their inorganics division. To avoid delaying the RI, inorganic analyses of sediment were performed by another New York State certified laboratory, Severn Trent Laboratories (STL), Pittsburgh, Pennsylvania (NYSDOH No. 11182). NYSDEC verbally permitted the use of this laboratory for these samples in May 2002.

3.15 DATA VALIDATION

Validation of the analytical data collected during the RI was performed by URS chemists in accordance with NYSDEC's "Guidance for the Development of Data Usability Summary Reports" (June 1999). Data validation is required to document the quality and validity of

each chemical analysis and to provide a legally defensible analytical database to support Site decisions. The Data Usability Summary Reports (DUSRs) are presented in Appendix J.

This chapter provides a description of the physical characteristics of the Amenia Town Landfill that were assessed during the RI.

4.1 SITE RECONNAISSANCE

Reconnaissance and inspections of the Site were conducted periodically throughout the field investigation to look for potential problems or risks to human health and environment, such as leachate seeps, fissures, or exposed waste materials, posed by the landfill. There were no significant environmental problems noted, although pieces of scrap metal and old tires were observed exposed along the southwest slope and base of the landfill. Additional reconnaissance was conducted on October 28, 2003 by representatives of the ALG and NYSDEC to look for potential leachate seeps. No seeps were observed.

4.2 SURFACE WATER AND SEDIMENT

West Pond lies immediately west of the landfill and encompasses approximately five acres. The pond is situated near the headwaters of a small tributary to the Amenia Stream. West Pond is primarily fed by a small stream that originates from two small ponds located at the golf course immediately west of the pond and flows into the pond about midway down its length. The pond is also largely fed by surface water runoff from the surrounding landscape (including the former landfill), as the pond is located in a valley.

The pond is divided into two contiguous areas which were formed behind two beaver dams that were estimated to have been built prior to 1987. There does not appear to be current use of the pond by beaver. One dam is at the northern-most end of the landfill. The second dam, located about 100 feet south of the first dam, forms the largest areal extent of ponded water. Water flows through the ponds in a northerly direction and becomes West Pond Tributary once it leaves West Pond. Adjacent land use includes forested uplands, the landfill and a golf course.

The West Pond basin is shallow, open and receives direct sunlight. The water level in the pond fluctuates seasonally and is often drastically reduced during extended dry periods. While the water level fluctuates seasonally often exposing large areas of the basin, deeper pockets of water in the original stream channel, and the increased depth created by the beaver dam, help to sustain an aquatic community tolerant of fluctuating conditions. The shallow water conditions and regional annual low temperatures results in the pond freezing solid during the winter, which probably limits the development of an aquatic community more than any other factor. Section 2.2.1.2 of the Screening Level Ecological Risk Assessment (Attachment 1 of this document) describes the aquatic community in the pond in greater detail.

The beaver dams have caused West Pond to become a sink for sediment and organic deposition from the surrounding uplands. Sediment in the pond was primarily a black organic silty muck that was several feet deep. Grain size was typically fine, but some areas had coarser materials that represented soils eroded from the landfill. Percent fines ranged

from 43% to 85% and averaged 72%. Organic content ranged from 6.28% to 42.1%. The sediment particle distribution curves and total organic carbon/pH summaries are presented in Appendix K.

West Pond Tributary originates from an outlet at the northern end of the West Pond and flows around the base of the landfill through wetland habitat approximately 600 feet to a culvert where it crosses beneath Route 22. A small tributary enters West Pond Tributary from the north near the eastern extent of the spit of upland. The narrow (approximately three feet wide) stream had a defined bed and bank that courses through a broad and level wetland. Flow is more diffuse near the culvert where beaver had historically placed a dam, creating a pond throughout this area where only the stream currently flows. The dam, and therefore, the pond no longer exists, and there is evidence that the wetland is drying out as a result. Even in a peak storm event that occurred during the field sampling activities in May, the stream remained mostly within the banks at a depth of several inches. The stream may not be persistent throughout the year and only significant storm events would cause it to rise above the shallow banks. Substrates in the stream were gravel and rubble and riffles were found throughout. The wetland substrates were stable. Mudflats were not present.

West Pond Tributary passes beneath Route 22 where it heads due south meandering somewhat through a wetland adjacent to a railroad bed that sits approximately 30 feet above the wetland. This portion of the tributary is called Amenia Stream. The confluence with a larger tributary is located at the small bridge leading to the quarry just above SD-OF6. Amenia Stream is wider than the West Pond Tributary north of the landfill, but remains shallow and riffles were less evident. Sediments in the stream varied but were primarily a gray/black sandy silt near the northern end and had more organic material where the flow was slower upstream of the quarry bridge. Below the bridge at SD-OF6, just below the confluence with Amenia Stream coming from the northeast, sediments were primarily a light brown silty sand. Grain size throughout this section of the tributary east of Route 22 was typically fine. Percent fines ranged from 45% to 89% and were mostly above 75%. Organic content ranged between 2.12% to 12.4%

4.3 SITE STRATIGRAPHY

This section describes the geologic information collected at the Site during the RI.

4.3.1 Limits of Waste

Establishing the horizontal and vertical limits of waste material in the landfill was not a primary objective of this investigation and therefore, only limited information concerning the composition and distribution of waste was collected. Solid waste material was not encountered in borings for monitoring wells MW-3, MW-4, MW-5, and MW-9. The waste material, where present, generally extends to the depth of the water table, which is about 25 feet below the ground surface. Where observed in drill cuttings or split spoon sampler, waste material consisted of paper, glass, metal fragments, fabric, and plastic.

4.3.2 Surface Soil

Surface soils at the Site generally consist of brown, poorly sorted sand or gravelly sand. Much of the surface soil was presumably imported from unreported sources as a final cover for the landfill. Native soils collected for the background samples (BG-1, BG-2, and BG-3) were texturally and compositionally similar to imported landfill cover soil (Surface Soil Logs – Appendix A).

4.3.3 Overburden

The overburden soils consist of one or more of the following four units: a fill unit, a sand and gravel unit, a silt unit, and a glacial till unit. Each unit is briefly described below.

Fill Unit – The Fill Unit is a mixture of sands and gravels intermixed with landfill waste material. The sands and gravels likely represent periodic cover lifts over the landfill waste. In general, this unit was loose, poorly sorted, and ranged in thickness from 0 to about 38 feet. The quantities and types of landfill waste material intermixed with the soils varied between borings and consisted of varied materials such as glass, paper, metal, rubber, plastic, and brick pieces.

Sand and Gravel Unit – The Sand and Gravel Unit is a continuous layer consisting of a brown, poorly sorted mixture of sands and gravels or interlayered lenses of sands and gravels. The thickness of this unit ranges between 10 and 20 feet.

Silt Unit – The Silt Unit is a continuous, brown, soft silt layer with some interlayered clay. The thickness of this unit ranges between 10 and 20 feet.

Till Unit – The Till Unit is a discontinuous layer consisting of a red-brown to gray, well compacted, heterogeneous mixture of boulders and clay with lenses of sand and gravel. The Till Unit ranges in thickness from 5 to 10 feet.

4.3.4 Bedrock

Bedrock was intersected in nine borings at depth ranging between 20 and 70 feet below the ground surface. The rock underlying the Site is a gray to dark gray, fine to medium grained, massive to fissile dolomitic marble with local thin calcite seams and occasional to abundant pyrite. Micaceaous or phyllitic seams are locally present. The rock is highly fractured in places with secondary mineralization along fracture faces. Bedrock porosity is dependent on secondary discontinuity features such as parted bedding planes, joints, and fractures. Bedrock permeability is dependent on the interconnectivity of these features. The rock composition at the landfill is consistent with regional descriptions of the Stockbridge Marble provided by Fisher and others (1970). Logs of rock core are presented in Appendix D.

4.4 AQUIFER CHARACTERISTICS

The hydrogeologic regime at the landfill is complex because of the interaction between surface water, groundwater in overburden, groundwater in unconfined bedrock, and groundwater in deep confined bedrock.

Groundwater at the Site occurs under shallow unconfined and deep confined aquifer conditions.

Shallow Unconfined Aquifer

The water table in overburden (unconfined conditions) is generally between 20 and 50 feet below the ground surface. At the south end of the Site, where overburden thickness is less than 20 feet, the water table occurs in bedrock (MW-5 and MW-9).

There is a steep hydraulic gradient between the surface water in the West Pond and Amenia Stream east of the landfill. Surface water elevations recorded from staff gauges installed for the RI (Table 3-4), show a drop ranging from about 5 to 8 ft from the West Pond (STG-0) eastward to West Pond Tributary (STG-6) a distance of about 1,000 feet. Groundwater elevations measured in the landfill monitoring wells are lower than the elevation of water in the pond and consistently follow this gradient. Groundwater beneath the landfill appears hydrologically connected and dependent on the elevation of surface water in the West Pond. After rain, for example, the water level rises in the West Pond and groundwater under the landfill responds relatively quickly and rises also. During dry conditions, when the water level drops in the pond, the groundwater level also drops beneath the landfill. Accordingly, groundwater at the Site flows predominantly to the east (Figure 4-1) with a hydraulic gradient of about 0.008 (i.e., the water elevation drops vertically by 0.008 feet for every horizontal foot of travel). Figure 4-1 shows the groundwater contours based on water level data collected in April 2002. The water level data collected on May 15, 2003 (Figure 4-2) show a similar contour pattern. Based on the May 2003 water level data from piezometers PZ-2 and PZ-3 and staff gauges STG-4 through STG-7, shallow groundwater from the Site flows eastward and discharges to surface water.

The soils overlying bedrock at the south end of the landfill are relatively thin and unsaturated. In the area of MW-5 and MW-9, unconfined groundwater exists in bedrock and the soils overlying rock are unsaturated.

Deep Confined Aquifer

Based on groundwater data provided by four bedrock monitoring points (MW-2B, MW-4B, MW-8B, and PZ-1B) confined groundwater flow direction is to the east with a hydraulic gradient of about 0.009 (i.e., the water elevation drops vertically by 0.009 feet for every horizontal foot of travel). There is a positive upward hydraulic gradient between the unconfined and confined aquifers. Elevations of water in the confined, bedrock wells are consistently about 1 to 1.5 feet higher than the water table.

Results of the Hydraulic Conductivity Tests

The results of the hydraulic conductivity tests are summarized in Table 4-1 and the computer curve matching plots are presented in Appendix I.

Hydraulic conductivity values of the monitoring wells screened in the unconfined unit ranged from 0.0044 ft/min to 0.19 ft/min (0.0023 cm/sec to 0.094 cm/sec). The average hydraulic conductivity from these results is 0.080 ft/min (0.041 cm/sec). This value is within the expected range for the hydraulic conductivity in glacial deposits and fine to coarse sand (Driscoll, 1986).

Hydraulic conductivity values of the monitoring wells screened in confined bedrock ranged from 0.000034 ft/min to 0.0076 ft/min (0.000017 cm/sec to 0.0039 cm/sec). The average hydraulic conductivity from these results was 0.00054 ft/min (0.00087 cm/sec). Low hydraulic conductivities such as these are typical of unjointed limestones or metamorphic rocks (Driscoll, 1986).

4.5 CONCEPTUAL SITE MODEL

Groundwater beneath the Site appears to originate primarily from surface water infiltrating the west side of the landfill. Aquifer recharge of the landfill area by infiltration of precipitation is probably not an important hydraulic pathway. Because of the steep slopes around the landfill and relatively small recharge area (less than 9 acres) most precipitation runs off the landfill as overland flow. Groundwater from the site flows east and discharges to surface water. Groundwater does not occur in overburden at the south end of the Site where soil thickness is on the order of about 10 feet or less.

Cross Sections

Figure 4-1 shows cross sections generated from geologic data collected at the Site. Bedrock at the south end of the Site is shallow. The water table under the landfill, recharged primarily by surface water, does not get higher than the water elevation in the West Pond. Therefore, groundwater does not occur in unconfined overburden at elevations higher than about 484 feet (1983 NAVD). The water table relationship at the bedrock/overburden interface is likely to be complex in this area because of the differences of the hydrogeologic properties of the two units, bedrock being less porous and less permeable than the overburden soils. Section A-A', for example, shows the water table with an on-lap relationship with underlying bedrock in the vicinity of MW-5.

This chapter describes the results of the chemical analyses of soil, groundwater, surface water, sediment, soil gas, and drilling water samples collected during this RI.

5.1 COMPARISON OF ANALYTICAL DATA TO REGULATORY CRITERIA

The significance of the analytical results presented below is evaluated by comparing the results to appropriate regulatory criteria. The purpose of this comparison is to provide a basis for the interpretation of the data set and to facilitate characterization of the nature and extent of constituents of concern. NYSDEC developed the following New York State Standards, Criteria, and Guidance (SCGs):

- Determination of Soil Cleanup Objectives and Cleanup Levels, TAGM 4046, January 24, 1994
- Technical Guidance for Screening Contaminated Sediments, July 1994, last revised January 1999
- Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations, 6 NYCRR, Part 703, as amended August 1999
- Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, TOGS 1.1.1, June 1998.

These SCGs are used to determine if constituents of potential concern (COPCs) are adequately defined.

5.2 SOIL

This section describes the analytical results of surface and subsurface soil samples collected at the Amenia Town Landfill during this investigation.

NYSDEC established Soil Cleanup Objectives and Cleanup Levels (TAGM 4046, January 1994) that consist of numerical cleanup levels and a provision to determine site background concentrations for certain inorganic constituents. Three background samples were collected during the RI to provide a baseline for naturally occurring inorganics in soil in the landfill area. As per the approved RI Workplan, these samples were collected from wooded areas, believed to be unaffected by landfill operations.

5.2.1 Background Soil Samples

The background soil samples for the Amenia Town Landfill (BG-1, BG-2, and BG-3) were analyzed for inorganic constituents only, because organic compounds are not usually naturally occurring. Table 5-1 shows the analytical results for the three background samples. The locations of the samples are shown in Figure 5-1. Each target analyte list (TAL) constituent is shown with its respective concentration followed by the average concentration for the three samples. Background aluminum concentrations, for example, ranged between a low concentration of 7,820 mg/kg and a maximum concentration of 12,500 mg/kg, with an average concentration of 10,740 mg/kg. The site background concentrations, as determined by these

samples, serve to define the presence or absence of these constituents which may be attributable to the landfill.

Antimony, cadmium, selenium, sodium, and thallium were undetected in the background samples. Arsenic, barium, cobalt, mercury, and vanadium were detected, although the background concentrations of these constituents do not exceed the numerical recommended soil cleanup objectives established by NYSDEC (TAGM 4046, 1994). The background concentrations of beryllium, chromium, copper, iron, nickel, and zinc exceed the numerical recommended soil cleanup objectives established by NYSDEC. For these constituents, the background concentrations are used to assess the extent of potentially impacted soil.

NYSDEC does not provide numerical recommended soil cleanup objectives for aluminum, antimony, calcium, lead, magnesium, manganese, potassium, silver, sodium, thallium, and cyanide. Therefore, the background concentrations determined during this RI are used for assessment of soil for these constituents.

5.2.2 Landfill Surface Samples

Soil samples SS-1 through SS-9 were collected from the top of the landfill at a shallow depth (0 to 2 inches). These samples were analyzed for SVOCs, PCBs, and inorganic constituents. These samples were not analyzed for VOCs because these chemicals volatilize easily and they are normally not found in the upper few inches of soil. Table 5-2 presents the analytical results for the landfill surface samples. The locations of the samples are shown in Figure 5-1.

One SVOC, phenol, exceeded the SCG of 30 ug/kg. Sample SS-9 had a phenol concentration of 4,090 ug/kg.

PCBs were detected in six of nine samples. Two samples, SS-8 (2,760 ug/kg) and SS-9 (1,140 ug/kg), contained concentrations of PCBs that exceeded the SCG (1,000 ug/kg).

The following inorganics were detected in landfill surface samples at concentrations above SCG or site background concentrations, whichever is higher: aluminum (3 of 9 samples), calcium (8 of 9 samples), chromium (4 of 9 samples), copper (5 of 9 samples), iron (1 of 9 samples), lead (1 of 9 samples), magnesium (9 of 9 samples), manganese (2 of 9 samples), nickel (4 of 9 samples), potassium (8 of 9 samples), sodium (5 of 9 samples), and zinc (5 of 9 samples). Only those inorganics listed below were detected in two or more landfill surface samples at concentrations over twice that of the site background samples.

- Calcium was detected at concentrations up to 46,300 mg/kg. The highest calcium background concentration is 3,890 mg/kg.
- Magnesium was detected at concentrations up to 22,800 mg/kg. The highest magnesium background concentration is 7,920 mg/kg.
- Potassium was detected at concentrations up to 2,250 mg/kg. The highest potassium background concentration is 1,020 mg/kg.

5.2.3 Landfill Perimeter Soil Samples

The perimeter surface soil samples were collected from the base of the west slope and north slope of the landfill and analyzed for PCBs and inorganic constituents. The samples were collected from a depth of 0 to 6 inches.

West Slope: Fifteen soil samples (SS-W1 through SS-W15) were collected from the base of the west slope. Table 5-3 presents the analytical results for the west slope landfill perimeter samples. The locations of the samples are shown in Figure 5-1. PCBs were detected in twelve of the fifteen samples. Eight samples contained concentrations of PCBs that exceeded the SCG (1,000 ug/kg), as summarized in the table below.

	SS-W1	SS-W2	SS-W3	SS-W4	SS-W5	SS-W6	SS-W7	SS-W11
PCBs (ug/kg)	13,660	6,410	20,400	63,600	25,170	2,848	1,410	2,680

The following inorganics were detected in west slope samples at concentrations above SCG or site background concentrations, whichever is higher: aluminum (11 of 15 samples), antimony (15 of 15 samples) barium (4 of 15 samples), cadmium (8 of 15 samples), calcium (13 of 15 samples), chromium (3 of 15 samples), copper (10 of 15 samples), iron (13 of 15 samples), magnesium (14 of 15 samples), manganese (6 of 15 samples), mercury (4 of 15 samples), nickel (11 of 15 samples), potassium (11 of 15 samples), selenium (2 of 15 samples), silver (2 of 15 samples), sodium (14 of 15 samples), and zinc (15 of 15 samples). Only those inorganics listed below were detected in two or more west slope samples at concentrations over twice that of the site background samples.

- Antimony was detected at concentrations up to 44.3 mg/kg. The highest antimony background concentration is 0.56 mg/kg (undetected).
- Barium was detected at concentrations up to 1,240 mg/kg. The NYSDEC recommended soil cleanup objective for barium is 300 mg/kg.
- Cadmium was detected at concentrations up to 7.7 mg/kg. The NYSDEC recommended soil cleanup objective for cadmium is 1.0 mg/kg.
- Calcium was detected at concentrations up to 42,200 mg/kg. The highest calcium background concentration is 3,890 mg/kg.
- Chromium was detected at concentrations up to 83.5 mg/kg. The highest chromium background concentration is 16.4 mg/kg.
- Copper was detected at concentrations up to 609 mg/kg. The highest copper background concentration is 43.8 mg/kg.
- Iron was detected at concentrations up to 273,000 mg/kg. The highest iron background concentration is 31,200 mg/kg.
- Magnesium was detected at concentrations up to 24,800 mg/kg. The highest magnesium background concentration is 7,920 mg/kg.

- Mercury was detected at concentrations up to of 7.0 mg/kg. The highest mercury background concentration is 0.18 mg/kg.
- Nickel was detected at concentrations up to 88.6 mg/kg. The highest background concentration is 30.6 mg/kg.
- Potassium was detected at concentrations up to 2,130 mg/kg. The highest background concentration is 1,020 mg/kg.
- Sodium was detected at concentrations up to 265 mg/kg. The highest sodium background concentration is 37.3 mg/kg.
- Zinc was detected at concentrations up to 3,010 mg/kg. The highest zinc background concentration is 82.9 mg/kg.

North Slope: Six soil samples (SS-N1 through SS-N6) were collected from base of the north slope. The locations of the samples are shown in Figure 5-1. PCBs were detected in each sample. Only one sample, SS-N4 (4,190 ug/kg), contained concentrations of PCBs that exceeded the SCG (Table 5-4).

- The following inorganics were detected in north slope samples at concentrations above SCG or site background concentrations, whichever is higher: calcium (5 of 6 samples), magnesium (5 of 6 samples), manganese (1 of 6 samples), potassium (2 of 6 samples), and zinc (1 of 6 samples). Only those inorganics listed below were detected in two or more north slope samples at concentrations over twice that of the site background samples. Calcium was detected at concentrations up to 46,100 mg/kg. The highest calcium background concentration is 3,890 mg/kg.
- Magnesium was detected at concentrations up to 22,200 mg/kg. The highest magnesium background concentration is 7,920 mg/kg.

5.2.4 Drum Removal Area Post Excavation Samples

Drum removal area post excavation soil samples PE-1 through PE-9 were analyzed for TCL and TAL parameters. Tables 5-5 present the analytical results for the post-excavation samples. The locations of the samples are shown in Figure 5-1.

No VOCs, pesticides or PCBs were detected in concentrations above SCG. One SVOC, phenol, was detected in sample PE-3 at a concentration of 84.2 ug/kg. The SCG for phenol is 30 ug/kg.

- The following inorganics were detected in post-excavation samples at concentrations above SCG or site background concentrations, whichever is higher: aluminum (2 of 9 samples), arsenic (1 of 9 samples), calcium (4 of 9 samples), chromium (1 of 9 samples), copper (4 of 9 samples), iron (4 of 9 samples, magnesium (7 of 9 samples), manganese (3 of 9 samples), nickel (4 of 9 samples), potassium (4 of 9 samples), sodium (4 of 9 samples) and zinc (2 of 9 samples). Only those inorganics listed below were detected in two or more north slope samples at concentrations over twice that of

the site background samples. Calcium was detected at concentrations up to 36,700 mg/kg. The highest calcium background concentration is 3,890 ug/kg.

Magnesium was detected at concentrations up to 23,600 mg/kg. The highest magnesium background concentration is 7,920 mg/kg.

5.3 GROUNDWATER

Two rounds of groundwater samples were collected from the monitoring wells installed during this RI and analyzed for TCL/TAL parameters. Round 1 samples were collected in January 2002 and Round 2 samples were collected in April 2002. The second round of samples were collected to confirm the results of the first round. Discrepancies between the two data sets may reflect seasonal variations of constituents in groundwater.

In this section, groundwater results are compared to NYSDEC's Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS 1.1.1, June 1998). NYSDEC does not have GA groundwater quality standards or guidance values (GA - groundwater as a source of drinking water) for aluminum, calcium, cobalt, potassium, and vanadium (NYSDEC, TOGS 1.1.1, June 1998). EPA drinking water standards (maximum contaminant level – MCL) or EPA Risk Based Criteria (RBC) for aluminum, cobalt, and vanadium were used as a point of reference for these constituents. There are no EPA standards for calcium and potassium. The concentrations of calcium and potassium in groundwater samples are not discussed in the following sections.

5.3.1 Volatile Organic Compounds in Groundwater

A summary of the concentrations of volatile organic compounds detected in Round 1 and Round 2 groundwater samples is presented in Table 5-6. The analytical results are depicted in Figure 5-2. The table below presents only those compounds that were detected in concentrations above the NYSDEC groundwater standards or guidance values. VOCs exceeded SCGs in five of the twelve wells. The compounds detected include benzene and several chlorinated hydrocarbons. Most exceedances are within the same order of magnitude as the standard or guidance value. Exceptions are concentrations identified in MW-6 at the southwest corner of the landfill area and MW-3 at the northeast corner of the landfill area, both unconfined aquifer samples.

Compound	SCG (ug/L)	MW-2		MW-3		MW-4		MW-5		MW-6	
		Rd.1	Rd. 2	Rd.1	Rd.2	Rd.1	Rd.2	Rd.1	Rd.2	Rd.1	Rd.2
Benzene	1	2.13	2.36			5.03	3.2		1.49	2.09	1.34
1,1-DCA	5					5.89	6.49			8.67	7.25
1,1-DCE	5	11.5									
Vinyl Chloride	2			6.41	6.78					13.8	15.3
Cis-1,2 DCE	5			17.1	35.4					104	70.3
TCE	5			11.8	22					16.2	9.14
Trans-1,2 DCE	5									23.8	19.6
Chlorobenzene	5									16.8	9.32
1,4-DCB	3		3.18					4.49	6.42		
1,3-DCB	3		3.23								
Chloroethane	5					8.94	6.4				
1,2-DCA	0.6						3.5				

DCA = dichloroethane DCB = dichlorobenzene

DCE = dichloroethene TCE = trichloroethene

5.3.2 Semi-volatile Organic Compounds in Groundwater

A summary of the concentrations of semi-volatile organic compounds detected in Round 1 and Round 2 groundwater samples is presented in Table 5-7. The analytical results are depicted in Figure 5-2. The table below presents only those compounds that were detected in concentrations that exceed the NYSDEC groundwater standards or guidance values. Four of the twelve wells sampled had exceedances for bis(2-ethylhexyl)phthalate during the first round of sampling, but not the second. One well, MW-2, exceeded the standard for total phenols in the second round, but not in the first. Each of these exceedances is within the same order of magnitude as the SCG.

Compound	SCG (ug/L)	MW-2		MW-3		MW-6		MW-2B	
		Rd. 1	Rd. 2	Rd. 1	Rd. 2	Rd. 1	Rd. 2	Rd. 1	Rd. 2
Bis(2-ethylhexyl)phthalate	5	15.7		26.2		26.2		19.5	
4-chloro-3-methylphenol	1		2.8						

5.3.3 Pesticides in Groundwater

A summary of the concentrations of pesticides detected in Round 1 and Round 2 groundwater samples is presented in Table 5-8. The analytical results are depicted in Figure 5-2. The table below presents only those compounds that were detected in concentrations that exceed the NYSDEC groundwater standards or guidance values. Beta-BHC was the only pesticide detected above the NYSDEC standard. It was detected in one (MW-4) of the twelve wells sampled.

Beta-BHC was detected in the Round 1 and Round 2 samples from MW-4. However, based on data validation, the beta-BHC results for the Round 2 sample from MW-4 and the duplicate sample were rejected. In accordance with USEPA Region II validation guidelines, the data

were rejected because the detected concentrations differed by more than 100% between the primary and confirmation columns. The high percent difference is an indication that the compound is likely not present, and, therefore, is rejected.

Compound	(ug/L)		
Beta-BHC	0.04	0.96	Rejected

5.3.4 PCBs in Groundwater

PCBs were not detected in Round 1 or Round 2 groundwater samples (Table 5-9).

5.3.5 Inorganic Analytes and Cyanide in Groundwater

A summary of the concentrations of inorganic analytes detected in Round 1 and Round 2 groundwater samples is presented in Table 5-10. The analytical results are depicted in Figure 5-2. The table below presents only those analytes that were detected in concentrations that exceed the NYSDEC groundwater standards or guidance values.

Each of the twelve wells sampled contained metals in concentrations above standards or guidance values. Metals are naturally occurring and can be related to minerals in bedrock or unconsolidated deposits. In order to evaluate potential effects from the landfill on metals in groundwater, metals in wells known to be affected by organic compounds (MW-2, -3, -4, -5, -6, and –2B) were compared to those not affected (MW-1, -7, -8, -9, -4B and –8B). Wells with one or more exceedances of groundwater SGCs by organic compounds are shown in bold in the table below. As shown, aluminum (Al), antimony (Sb), iron (Fe), and manganese (Mn) are constituents that occur in just about every sample, and are, therefore, likely to be naturally occurring. Elevated concentrations of arsenic (As), however, appear only in monitoring wells MW-2, MW-4, and MW-5, wells that also have relatively elevated concentrations of organics. In general, elevated levels of iron (Fe), magnesium (Mg), and sodium (Na) also correlate to wells with organics. The comparison below suggests that the landfill may have affected groundwater with respect to arsenic (As), iron (Fe), magnesium (Mg) and sodium (Na).

		Al	Sb	As	Fe	Mg	Mn	Na	Se	Th
	SCG (ug/L)	200	3	25	300	35,000	300	20,000	10	0.5
MW-1	Rd. 1					37,800	613		26.2	16.5
	Rd. 2		6.8				329			7.6
MW-2	Rd. 1	1,240	14.5	40.7	16,300	58,500	781	35,200		
	Rd. 2	710		49.3	15,000	61,800	699	40,600		
MW-3	Rd. 1								15.2	20.9
	Rd. 2		8							
MW-4	Rd. 1	358	16.3	45.3	11,400	84,400		35,700	11.9	
	Rd. 2	5,180	4.4	58.9	26,500	92,800	501	31,000	13	
MW-5	Rd. 1	501	27.5	32.6	18,300	69,300	822	27,900		
	Rd. 2	206	7.7	33.6	15,200	70,400	1,010	27,000		
MW-6	Rd. 1	6,920	29.3		59,600	322,000	3,150	331,000		
	Rd. 2		3.7		42,700	351,000	1,320	325,000		
MW-7	Rd. 1	540	14.5		2,440		1,350			
	Rd. 2	527	8.6		2,480		1,260			
MW-8	Rd. 1	252	14.8		1,940		582			
	Rd. 2	618	5		3,200		472			
MW-9	Rd. 1	214	23.3		500	55,600				
	Rd. 2		10.4			45,700				
MW-2B	Rd. 1		47.8		649	66,100		22,300	11.4	
	Rd. 2	368	7.5		2,470	72,800		31,300		10.8
MW-4B	Rd. 1	545	9.1		733			88,200		
	Rd. 2	2,680			1,600			144,000		
MW-8B	Rd. 1	222	51.8		1,650	66,500			19.7	
	Rd. 2		8		1,690	68,500				15.4

5.4 DRILLING WATER

A sample of water (sample PW-1) used for drilling and well installation work at the landfill was collected for TCL/TAL analyses during the Round 2 groundwater sampling event (April 2002). The sample was analyzed to verify the quality of drilling water used at the landfill and to check for the possibility of cross-contamination of drilling equipment or groundwater from an outside source.

No organic compounds were detected in the drilling water sample at concentrations above the SCG (Table 5-11).

Three metals exceeded their respective SCG in sample PW-1 as summarized below.

	Sb	Mg	Na
SCG (ug/L)	3	35,000	20,000
Drilling Water	4.4	36,300	23,800

5.5 SOIL GAS

A soil gas survey was conducted to provide a qualitative evaluation of the subsurface distribution of potential sources of constituents of concern. The samples were analyzed using EPA method 8021M, which consists of the analysis of 17 volatile organic compounds. The results of the soil gas survey are summarized in Table 5-12 and depicted in Figure 5-3.

Benzene-toluene-ethylbenzene-xylene (BTEX) compounds, chlorobenzene, and vinyl chloride were the most prevalent compounds found in the landfill (Table 5-13). The highest total VOC soil gas concentrations were found in three areas, the south end of the landfill, along the southern fence line of the propane storage enclosure, and the north end of the propane storage enclosure.

5.6 SEDIMENT

Sediment samples were collected from streams near the landfill and the pond west of the landfill in May 2002. In this section, sediment results are compared to NYSDEC's Technical Guidance for Screening Contaminated Sediments, July 1994, last revised January 1999. As per this guidance, metals data were compared to both Lowest Effect Level (LEL) criteria and Severe Effect Level (SEL) criteria. For most metals, the LEL is the concentration that can be tolerated by approximately 95% of benthic invertebrates, and the SEL is the concentration that can be tolerated by approximately 5% of benthic invertebrates.

Upgradient West Stream Samples

Three sediment samples (SD-UP1, SD-UP2 and SD-UP2A) were collected from a stream which feeds the pond west of the landfill. These samples were collected to evaluate the potential for off-site sources to affect sediment adjacent to and downgradient from the landfill. The samples were analyzed for PCBs and TAL inorganics. Sample SD-UP1 was analyzed for VOCs also. Table 5-14 and Table 5-15 present the analytical results for these samples. The analytical results are depicted in Figure 5-4.

VOCs and PCBs were not detected above SCG in upgradient sediment samples from the west stream (Table 5-14).

Inorganic analytes were detected in concentrations above SCG in upgradient sediment samples from the west stream (Table 5-15) as summarized in the table below.

	LEL (mg/kg)	SEL (mg/kg)	SD-UP1	SD-UP2	SD-UP2A
Arsenic	6	33	8.4	6.7	6.3
Iron	2%	4%	7.7%	6%	6.6%
Manganese	460	1100	1120	1270	958
Nickel	16	50	78.5	59.2	75.3
Zinc	120	270	225	170	206

LEL = Lowest Effect Level
SEL = Severe Effect Level

West Pond Samples

Forty-eight sediment samples were collected from the pond west of the landfill. As described in the Final RI Work Plan (URS, February 2001), contingency samples were collected in rows moving outward (west) from the landfill. The initial row of samples (Row 1) were analyzed for PCBs and TAL inorganics. Samples from Rows 2 and 3 were analyzed for PCBs and metals (not cyanide) if the Row 1 samples were contaminated. Most sediment samples were collected from the 0 to 6 inch depth interval, but the "A" samples (e.g., SD-2A) were collected from a depth of 18 to 24 inches. Table 5-16 presents the PCB analytical results for the pond sediment samples.

PCBs were detected in pond sediment samples as summarized below.

Row-3 (ug/kg)	Row-2 (ug/kg)	Row-1 (ug/kg)		Location
ND	1,273	4,800	NORTH	SD-1
ND	4,300	13,790		SD-2
NS	NS	11,990		SD-2A
ND	4,930	18,440		SD-3
ND	3,280	22,400		SD-4
ND	2,100	25,100		SD-5
ND	403	6,750		SD-6
NA	ND	1,052		SD-7
NS	NS	129.6		SD-7A
NA	ND	851		SD-8
NA	ND	334		SD-9
NA	ND	93.6		SD-10
NA	ND*	318		SD-11
NA	ND*	253		SD-12
NA	ND*	553		SD-13
NS	NS	ND		SD-13A
NA	ND*	1,850		SD-14
NA	ND*	797	SOUTH	SD-15
WEST	→	EAST		

ND = not detected
NS = not sampled
NA = not analyzed
* - based on fluid sample analysis (see DUSR in Appendix J)

Metals were detected in pond sediment samples in concentrations above SCG (Table 5-17). The table below lists these metals and presents a comparison of detected concentration ranges by sample row. The table shows that in general, there is a correlation between elevated metal concentrations and proximity to the landfill. Exceptions are antimony, which is higher in Row 3, and nickel, which is present at lower concentrations than the background stream samples. Most exceedances are below SELs except for copper, lead, and zinc in Row 1, and zinc in Row 2.

			Range of Concentrations Detected		
	LEL (mg/kg)	SEL (mg/kg)	Row 1 (mg/kg)	Row 2 (mg/kg)	Row 3 (mg/kg)
Antimony	2	25	ND	ND	1.9-7.6
Arsenic	6	33	3.1-14.4	2.9-12.4	2.7-9.7
Cadmium	0.6	9	0.41-3.8	0.53-0.99	0.64
Copper	16	110	0.5-180	10-52.2	10-31.6
Iron	2%	4%	0.8% - 3.4%	0.5% - 4.2%	1.1% - 4.7%
Lead	31	110	23.5-205	22.1-78.6	14.7-51.2
Manganese	460	1100	101 – 1,740	196 –1,500	307 - 2060
Mercury	0.15	1.3	0.057-2.5	0.075-.46	0.046-0.23
Nickel	16	50	9.6-35.3	6.5-40.7	6.2-50.4
Silver	1	2.2	0.21-7.3	0.66-2	ND
Zinc	120	270	49.6-977	77.9-339	41.1-169

LEL = Lowest Effect Level
SEL = Severe Effect Level

West Pond Tributary Samples – North of Landfill

Ten sediment samples were collected from the stream north of the landfill (West Pond Tributary). The samples were analyzed for PCBs and TAL inorganics. Table 5-18 and Table 5-19 present the analytical results for these samples.

PCBs were detected in 8 of 10 sediment samples from the north stream in concentrations ranging from 29 to 1,193 ug/kg total PCBs (Table 5-18).

Five metals were detected in sediment samples from the north stream in concentrations above SCG as summarized below (Table 5-19). With the exception of the one copper result, these metals were found in similar concentrations in upgradient stream samples.

	LEL (mg/kg)	SEL (mg/kg)	SD-N1 (mg/kg)	SD-N2 (mg/kg)	SD-N3 (mg/kg)	SD-N3A (mg/kg)	SD-N4 (mg/kg)
Arsenic	6	33			6.3	6.5	7.2
Copper	16	110		21.3			
Iron	2%	4%	3.4%	2.1%	8.0%	8.8%	8.2%
Nickel	16	50	36.5	24.2	62.7	85.4	80.2
Zinc	120	270	128	65.5	205	242	190

LEL = Lowest Effect Level
SEL = Severe Effect Level

	LEL (mg/kg)	SEL (mg/kg)	SD-N5 (mg/kg)	SD-N5A (mg/kg)	SD-N6 (mg/kg)	SD-N7 (mg/kg)	SD-N8 (mg/kg)
Arsenic	6	33	9.1	13.9	6.1	6.1	
Copper	16	110					21
Iron	2%	4%	11.2%	3.9%	6.2%	6.7%	6.5%
Nickel	16	50	142	36.4	60.6	66.2	69.6
Zinc	120	270	350		158	172	182

LEL = Lowest Effect Level
SEL = Severe Effect Level

Upgradient Amenia Stream Samples

Three sediment samples were collected from Amenia Stream, which flows from the north and joins the West Pond Tributary on the east side of Route 22. The samples were analyzed for VOCs, bis(2-ethylhexyl)phthalate, PCBs, and TAL inorganics. Table 5-20 presents the analytical results for these samples.

VOCs, bis(2-ethylhexyl)phthalate and PCBs were not detected above SCG in sediment samples from the upgradient east stream (Table 5-20). Five metals were detected in upgradient sediment samples from Amenia Stream in concentrations above SCG as summarized below

	LEL (mg/kg)	SEL (mg/kg)	SD-UP3 (mg/kg)	SD-UP4 (mg/kg)	SD-UP4A (mg/kg)
Arsenic	6	33	7.2		
Copper	16	110	23	20.6	20.1
Iron	2%	4%	3.0%	2.4%	2.2%
Manganese	460	1100	1630	1340	633
Nickel	16	50	27.6	22	21.9

LEL = Lowest Effect Level
SEL = Severe Effect Level

West Pond Tributary Samples – East of Landfill

Seven sediment samples and one field duplicate were collected from the section of tributary that flows on the east side of Route 22. The samples were analyzed for VOCs, bis(2-ethylhexyl)phthalate, PCBs and TAL inorganics. Table 5-21 and Table 5-22 present the analytical results for these samples.

VOCs and bis(2-ethylhexyl)phthalate was not detected above SCG in sediment samples from the stream east of Route 22. PCBs were detected in six of seven samples. Concentrations ranged from 87.9 to 815 ug/kg total PCBs. The southern-most sample contained no detectable levels of PCBs (Table 5-21).

Metals were detected in concentrations above SCG in each of the east stream sediment samples (Table 5-22) as summarized in the table below. In these samples, concentrations of arsenic, copper, lead and manganese were generally higher than those in samples from the stream north of the landfill. Concentrations of iron, nickel and zinc were similar to or lower than upgradient samples from the west stream.

	LEL (mg/kg)	SEL (mg/kg)	SD-OF1	SD-OF2	SD-OF3	SD-OF4	SD-OF4A	SD-OF5	SD-OF6
Arsenic	6	33	7.6	10.3	8	17.4	26.9	23	7.1
Copper	16	110	23.9	31.3	23.8	36.4	29.5	31.3	21.2
Iron	2%	4%	7.7%	5.9%	4.5%	5.9%	4.7%	6.1%	2.9%
Lead	31	110	62.7	40.3	33.3	51.2	46.6		
Manganese	460	1100	2030	2830	1940	1880	967	1310	1370
Nickel	16	50	87.5	49.8	37	46.9	38	31	24.1
Zinc	120	270	231	169	118	163	146		

LEL = Lowest Effect Level
SEL = Severe Effect Level

5.7 SURFACE WATER

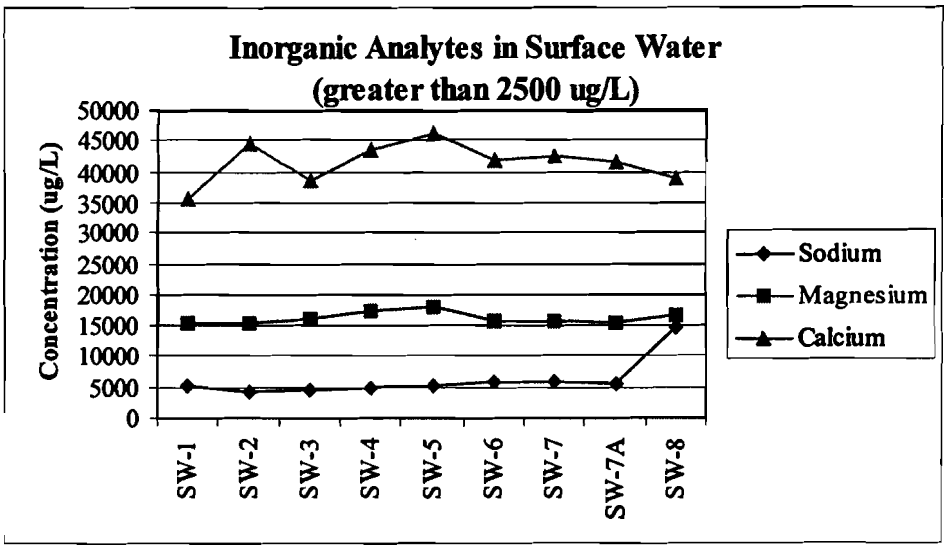
Eight surface water samples and one field duplicate were collected from surrounding streams and the pond west of the landfill. Sample SW-1 was collected from the stream that feeds the pond west of the landfill. Sample SW-2 was collected from the pond. Samples SW-3, SW-4, and SW-5 were collected from the stream north of the landfill. Samples SW-6 and SW-7 (and SW-7A, duplicate of SW-7) were collected from the stream east of Route 22. Sample SW-8 was collected from Amenia Stream from an upgradient location not likely impacted by the landfill. The surface water samples were analyzed for TCL organics and TAL inorganics. Table 5-23 presents the organic analytical results for surface water samples. The analytical results are depicted in Figure 5-5.

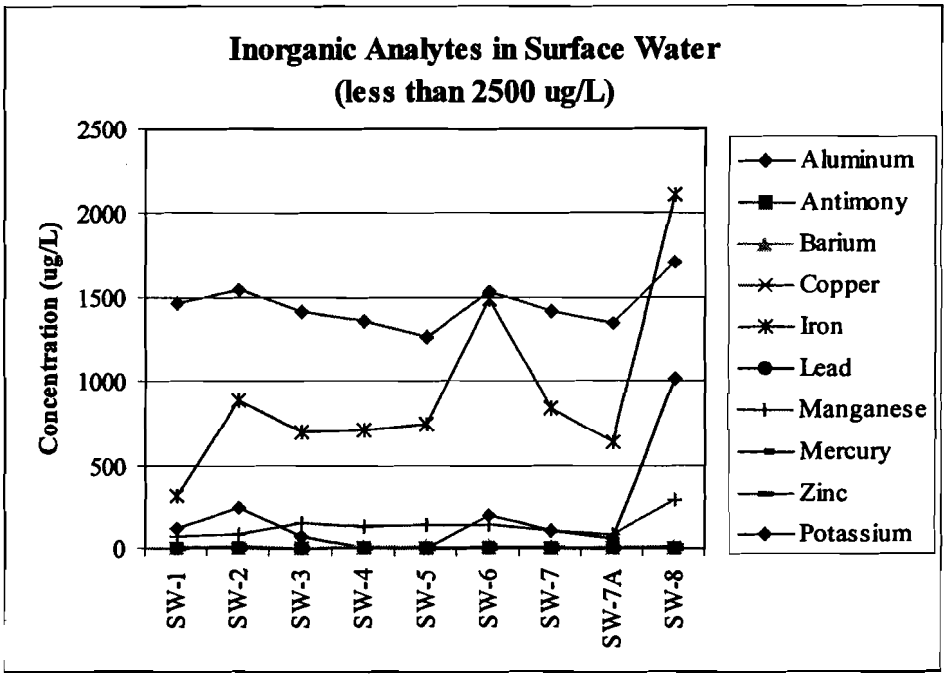
No volatile organics, semi-volatile organics or PCBs were detected above NYSDEC standards in surface water.

Pesticides were detected in three samples from the stream north of the landfill at concentrations above NYSDEC standards as summarized below.

	SCG (ug/L)	SW-3	SW-4	SW-5
alpha-Chlordane	2x10-5		0.01	
delta-BHC	0.008			0.00897
gamma-Chlordane	2x10-5	0.011		

Each surface water sample contained one or more metals in concentrations above SCG (Table 5-24). The graphs below present data for metals detected in one or more samples above SCG. Data are presented from upgradient to downgradient (left to right) to reflect the surface water flow. One exception is the last sample on the right (SW-8) which is the upgradient sample collected from Amenia Stream. The graphs show that there is no correlation between the landfill and metals in surface water. The upgradient sample from Amenia Stream has higher concentrations of many inorganic constituents than the other samples (Table 5-24).





5.8 SUMMARY OF NATURE AND EXTENT OF CONSTITUENTS OF POTENTIAL CONCERN

5.8.1 Soil

- samples of surface soil from the top of the landfill contained PCBs, phenol, calcium, magnesium and zinc in concentrations above SCG.

- samples of soil from the west slope of the landfill contain PCBs and several metals above background and/or SCG.
- one sample from the north slope of the landfill contained PCBs above SCG; one sample contained calcium and magnesium above background concentrations.
- one post-excavation sample from the drum removal area contained one organic compound (phenol) at a concentration above SCG; one sample contained arsenic and manganese above SCG or background concentrations; one sample contained calcium and magnesium above background concentrations.

The nature and extent of COPCs in soil has been defined to the extent necessary to develop any potential remedy for soil.

5.8.2 Groundwater

- benzene and chlorinated volatile organics were detected in shallow wells in concentrations above SCG; concentrations are highest at the southwest corner of the landfill and decrease in the downgradient groundwater flow direction.
- bis(2-ethylhexyl)phthalate was detected in Round 1 samples concentrations above SCG in three shallow and one deep well; this compound was not detected in Round 2 samples.
- phenol was detected in the Round 2 sample from one well at a concentration above SCG.
- beta-BHC was detected in one well at a concentration above SCG.
- groundwater samples contained metals in concentrations above SCG; elevated concentrations of arsenic, iron, magnesium and sodium may be related to landfill impacts.

The downgradient (east) extent of COPCs in groundwater has been defined based on the absence of COPCs in surface water east of the Site into which Site groundwater discharges. The nature and extent of COPCs in groundwater has been defined to the extent necessary to develop any potential remedy for groundwater.

5.8.3 Sediment

- sediment samples from the upgradient stream entering the west pond contained concentrations of arsenic, iron, manganese, nickel and zinc above SCG
- sediment samples from the upgradient stream on the east side of Route 22 contained concentrations of arsenic, copper, iron, manganese and nickel above SCG
- sediment samples from the stream north of the landfill contained PCBs above SCG
- sediment samples from the stream east of Route 22 contained PCBs above SCG; PCBs were not detected in the southern most sample from this stream
- sediment samples from the west pond contained PCBs and metals above SCG.

The nature and extent of COPCs in sediment has been defined to the extent necessary to develop any potential remedy for sediment.

5.8.4 Surface Water

- pesticides were detected above SCG in surface water north of the landfill.
- surface water samples contained one or more metals in concentrations above SCG; the elevated concentrations of metals in upgradient sample SW-8 indicates that surface water from the area of the landfill is not contributing to the inorganics load of Amenia Stream.

The nature and extent of COPCs in surface water has been defined to the extent necessary to develop any potential remedy for surface water.

6.1 INTRODUCTION

This section provides a human health risk evaluation (HHRE) for the Amenia Town Landfill located in Amenia, New York. The goal of this HHRE is to identify potential site related threats to human health and to guide implementation of a remedy for the site.

USEPA developed presumptive remedies in the early 1990s to speed up Superfund cleanups (USEPA, 1993). The Presumptive Remedy for CERCLA Municipal Landfills was developed based on the agency's extensive experience in closing municipal landfills. Because of the volume of wastes found in landfills and the infeasibility of permanent treatment of landfilled material, containment was nearly always chosen as the remedy for landfills. Thus, containment of waste materials from landfills is the goal of the Presumptive Remedy and generally consists of the following five elements:

- Landfill cap
- Source area ground-water control to contain plume
- Leachate collection and treatment
- Landfill gas collection and treatment
- Institutional controls to supplement engineering controls

All of the Presumptive Remedy elements will be evaluated in the Feasibility Study. As per USEPA Directive No. 9355.0-49FS (USEPA, 1993), response actions for individual sites will include only those elements that are necessary based on site-specific conditions. Available data do not indicate that source area groundwater controls or leachate and gas collection and treatment will be required for this site. Therefore, for the purposes of this HHRE, the presumptive remedy for Amenia Town Landfill will be assumed to include at a minimum a landfill cap and institutional controls. This HHRE will evaluate the effectiveness of the presumptive remedy in addressing potential health threats at the site. Any significant potential health threats that may not be addressed by the presumptive remedy will be identified so that they can be addressed in the remedy selection process, i.e. the Feasibility Study.

The methodologies used in performing this risk evaluation are consistent with guidelines established by the USEPA in Risk Assessment Guidance for Superfund (RAGS) (USEPA, 1989), and NYSDEC and NYSDOH guidance for Qualitative Human Health Exposure Assessment (NYSDEC, 2002). The risk evaluation was conducted in the following phases as listed below and detailed in following sections:

- Identification of constituents of potential concern
- Exposure assessment
- Summary/conclusions.

6.2 CONSTITUENTS OF POTENTIAL CONCERN

One of the first steps in the risk assessment process is the identification of the Constituents of Potential Concern (COPCs) for a site. The COPCs are a subset of all of the analytes detected that represent those analytes that have the greatest potential to pose health risks at the site, due to their toxicity, mobility and persistence. If an analyte is not detected at a site or is detected at relatively low concentrations, its contribution to the overall risk at the site can be considered relatively minor. By screening of site data, the HHRE can focus on the analytes that are most likely to pose a risk to human health at a site.

The 2001/2002 RI identified a limited number of analytes in soils, surface water, groundwater and sediment adjacent to the site. Summaries of the maximum detected concentrations for these analytes are presented in Tables 6-1 and 6-2. The maximum detected concentrations are compared to their appropriate NYSDEC Standards, Criteria, and Guidance values (SCGs) (NYSDEC 1994a, 1994b and 1999).

For soil and sediment evaluation, the SCGs listed in Table 6-2 consist of soil cleanup objectives only. The NYSDEC sediment guidance values are not applicable to this HHRE for the following reason. With respect to human health, the only sediment criteria presented in NYSDEC guidance (July 1994) were developed for potential ingestion of fish that may bioaccumulate sediment contaminants. Fish consumption is not considered a complete pathway for the site. Therefore, these criteria are not appropriate. However, there is potential for direct contact with sediments that could result in exposure via incidental ingestion or dermal contact. There are no human health-based sediment criteria for direct contact or incidental ingestion. For this reason, sediment concentrations were compared to health-based soil criteria which address those compounds that could present a potential health threat via direct contact or incidental ingestion.

Highlighting in the tables indicates exceedances of the screening criteria and identification of that analyte as a COPC for the site. If additional data are collected, the data should be reviewed in the context of this HHRE to ensure that the new data do not indicate additional unanticipated health risks that will not be addressed by the remedy.

6.3 EXPOSURE ASSESSMENT

The purpose of the exposure assessment is to determine the potential for intake of site-related COPCs for various receptor populations, considering the effect of the presumptive remedy on potential exposures. The steps required to perform an exposure assessment include the following:

Identification of potential receptor populations (both current populations as well as reasonably anticipated future populations)

- Evaluation of potential exposure pathways for completeness

This HHRE evaluates exposure scenarios to ensure that all relevant receptors and exposure pathways will be adequately addressed by the remedy. As documented in this analysis, exposure scenarios that are considered unlikely or insignificant are not considered further

since they do not reflect realistic exposure conditions likely to result in adverse health impacts.

6.3.1 Identification of Potential Receptor Populations

A receptor population is identified as an individual or group of individuals that may potentially be exposed to site related COPCs. Because land use may change over time, potential receptor populations include both present and reasonably anticipated future populations. It is important to note that the purpose of the exposure assessment is not to identify every possible potential scenario for the site. The exposure assessment focuses on the current and reasonably anticipated future scenarios that could result in substantial exposures, i.e., those that could result in adverse health impacts if not addressed by the remedy. The assessment addresses those potential receptor populations (site visitors and nearby residents) that have the greatest potential to be exposed to site COPCs (i.e., more frequent, more contact intensive, etc.). Evaluation of these likely receptors is conservative and will be protective of other potential receptor populations who may be present at or near the site on a more limited basis. Potential current and reasonably anticipated future receptor populations identified for the site and their definitions are summarized below:

- **Site Visitor/Trespasser/Hunter:** The Site Visitor/Trespasser/Hunter includes any person who might visit the site property on a relatively infrequent (i.e., non-daily) basis. This may include, but is not limited to, occasional visitors to the site for recreational purposes (e.g., hunting), work related activities (e.g., loading and or maintenance work in the propane tank storage area) or other uses of the site (e.g., use of the helicopter landing pad). The Site Visitor/Trespasser/Hunter may be either a child or an adult.
- **Off-site Recreational User:** The Off-site Recreational User includes any person who might come into contact with the surface water features (i.e., pond and stream) near the site. This may include, but is not limited to, children, fishermen or hunters who might wade in the stream and pond during various recreational activities.
- **Off-site Resident:** The Off-site Resident includes residents located near the landfill who might have drinking water supplied from groundwater wells.

Given the rural location of the site, human exposure to COPCs is expected to be limited. Only a few human receptor populations have been identified and they are expected to have only occasional contact with the site or the areas immediately surrounding the site. Various potential future receptor populations were eliminated from consideration because they are not likely to occur at the site. These include potential daily users of the site. No buildings designed for continuous occupancy (i.e., residence or office) currently exist on-site. It is anticipated that the remedy will include institutional controls ensuring that construction of a continuous occupancy building does not occur on site.

No construction activity (i.e., building construction, installation of utilities) is expected to occur in the area of the landfill after the implementation of the presumptive remedy. The presumptive remedy includes capping the landfill. Given the purpose of this barrier, any excavation activity would compromise its effectiveness and would not be allowed on site

without exceptional precautions being taken. It is also assumed that no use of groundwater at the site will occur after the remedy is implemented.

6.3.2 Evaluation of Potential Exposure Pathways

An exposure pathway is a mechanism by which a receptor may come into contact with a COPC. An exposure pathway consists of the following elements as defined in NYSDOH guidance for Qualitative Human Health Exposure Assessment (Appendix 3B, NYSDEC, 2002):

A contaminant source

Contaminant release and transport mechanisms

A point of exposure at which the receptor may make contact with the analyte

A route of exposure through which analyte uptake by the receptor may occur

A receptor population

The evaluation of potential exposure pathways for completeness of these elements is critical. The absence of any one of these elements results in an incomplete exposure pathway. Health risks do not exist in the absence of a complete exposure pathway. Complete pathways, which may have the potential to adversely impact human health or environmental receptors, must be addressed when evaluating potential risks and designing a remedy for the site.

Figure 6-1 presents a site conceptual exposure model (SCEM) for the Amenia Town Landfill. This figure is a visual depiction of potentially complete exposure pathways and the sources and mechanisms by which each receptor population might be exposed. As demonstrated in this figure, the original source of impacts at the site is waste material that was disposed of in the landfill. This material could have released COPCs which mixed/leached into surface soil, subsurface soil and groundwater on the site. Runoff from surface soils likely carried COPCs to nearby surface waters and sediments. Additionally groundwater could potentially migrate off site and affect surface water bodies and sediments in the area, or potentially impact groundwater users.

Exposure to site related COPCs in soils (surface) and sediment could occur via direct skin contact, incidental ingestion (i.e., hand to mouth activity), or indirectly via inhalation of volatile organic compounds (VOCs) or impacted dust released into air.

Exposure to site related analytes in water (surface and groundwater) could occur via direct skin contact, incidental ingestion, indirectly via inhalation as VOCs are released into air, or through ingestion of fish species from the pond and its tributaries.

The following text summarizes the exposure pathway evaluation for each potential receptor population identified for the site:

Site Visitor/Trespasser/Hunter: Under current and reasonably anticipated future Site conditions, the Site Visitor/ Trespasser/Hunter could be directly exposed to impacted surface soil at the site via several exposure routes. These include direct dermal contact,

incidental ingestion (i.e., hand-to-mouth activity) and inhalation of dust emanating from surface soil at the site. Because the presumptive remedy includes capping the landfill soils, these pathways will be incomplete for the site after implementation of the remedy. After the landfill is capped, all impacted soils will be covered by a layer of clean soil and isolated from human contact.

The Site Visitor/Trespasser/Hunter could be exposed to volatile COPCs originating in soil and groundwater via inhalation. Some VOCs have been detected in soil and groundwater at the site but the potential for exposure to these COPCs is expected to be minimal due to the low concentrations of volatile analytes observed and the great dilution of any COPC vapors as they disperse into the ambient air. Capping of the landfill will further decrease the potential flux of volatile COPCs to the ambient air by providing an additional barrier layer.

In summary, under current conditions, there is potential for exposure of the Site Visitor/Trespasser/Hunter to COPCs via direct contact with impacted surface soils. However, the presumptive remedy, installation of a landfill cap, will eliminate the potential for any significant exposure pathways for this receptor population.

- **Off-site Recreational User:** Under current and reasonably anticipated future site conditions, recreational visitors to the pond and stream located adjacent to the site property may be exposed to impacted sediments and surface water at these features. The Off-site Recreational User could be exposed to COPCs in impacted surface water and sediments via direct dermal contact with the water or incidental ingestion (i.e., hand-to-mouth activity). Based on the results of the ecological field survey conducted at the site, no viable fish populations suitable for human consumption are present in surface waters in the immediate vicinity of the site. Therefore, ingestion of COPCs in fish is an incomplete exposure pathway.

  Although low concentrations of volatile COPCs were detected in sediments, no volatile COPCs were identified in surface water. Because of the low concentrations of volatile analytes observed and the great dilution of any vapors as they disperse into the ambient air, potential exposure to COPCs via inhalation for Recreational Users is insignificant.

  Based on the hydrology of the site, groundwater discharges to the stream on the east side of Route 22. Groundwater-related COPCs were not detected in surface water and sediment on the east side of Route 22. This suggests that COPC impacts identified in sediments and surface water resulted from surface water runoff from the landfill. Landfill capping will eliminate additional future off-site impacts from surface water runoff by isolating impacted soils beneath the cap. This will result in a reduced potential exposure for the Off-site Recreational User.

  The presumptive remedy will minimize the potential for transport of constituents to the off-site surface water features near the site. It will not, however, decrease potential

exposure to any COPCs that are already present in the sediments near the site. Because this risk evaluation does not quantitatively evaluate the magnitude of potential exposures to impacted sediments, it cannot specifically determine if exposure to the sediments poses an unacceptable health threat to Off-site Recreational Users. Sediment COPC concentrations above health-based screening levels will be addressed in the Feasibility Study.

Off-site Resident: Off-site Residents who do not use the site recreationally are not expected to have any significant exposure to COPCs via direct contact with impacted soils, surface waters or sediments, or via inhalation of vapors emanating from the site. Impacted groundwater has the potential to migrate off-site, and potentially could affect local groundwater. If wells were located in the area of impacted groundwater, exposure could occur via ingestion of this water or via dermal contact or inhalation during bathing or showering. Based on the results of groundwater level monitoring, groundwater from beneath the Site discharges to a stream on the east side of Route 22. There are no residential wells in the potentially impacted area between the Site and the stream. Given the limited availability of suitable land for residential development between the Site and the stream, it is reasonable to assume that the area will not be developed for residential use in the future. Furthermore, preliminary results of a well user survey conducted by New York State Department of Health (NYSDOH, May 1999) indicates that there are no well users within a 1/4 mile radius of the Site boundaries. Therefore, exposure via groundwater is not a complete pathway.

6.4 SUMMARY AND CONCLUSIONS

This risk evaluation, performed for the Amenia Town Landfill, evaluated potential exposures and likely current and reasonably anticipated future receptor populations to guide implementation of the remedy, which is anticipated to include the following components:

- Landfill cap
- Institutional controls to supplement engineering controls

Several potential current and reasonably anticipated future receptor populations could potentially be affected by the landfill, and were therefore considered in the HHRE. These include the following:

- Site Visitor/Trespasser/Hunter
- Off-site Recreational User
- Off-site Resident

The results of this assessment indicate that implementation of the presumptive remedy (i.e., the landfill cap and institutional controls) would eliminate potential risks to receptors who may occasionally visit the site (Site Visitor/ Trespasser/Hunter) by isolating impacted soil from human contact.

The only potentially significant exposure pathway to COPCs for Off-site Recreational Users is direct contact with sediments. After implementation of the presumptive remedy, risks to the Off-site Recreational Users will be less than the current risks for these receptors. The landfill cap will minimize the potential for transport of constituents to sediment; however, the presumptive remedy does not address existing COPCs identified in sediments above health-based screening levels. These will be addressed in the Feasibility Study.

No complete exposure pathways were identified for current, or reasonably anticipated future, Off-site Residents who are not recreational users.

A screening level ecological risk assessment (SLERA) was conducted for the Site. The objective of the SLERA was to use environmental and ecological data collected at the Site to assess the potential for aquatic and terrestrial ecological impacts attributable to the presence of the Site-related constituents in environmental media and to support remedial decisions.

The complete SLERA is presented in Attachment 1 to the RI Report. Conclusions regarding exposure media, potentially complete pathways, and risk characterization for terrestrial and aquatic habitats identified at the site are as follows:

Exposure Media:

- Three media types with potential exposure routes to viable ecological habitat in the vicinity of the Site were identified: 1) surface waters in West Pond and West Pond Tributary; 2) sediments in West Pond and West Pond Tributary; and 3) surface soils at the top of the landfill area and at the base of the landfill.
- The available analytical data used in this SLERA is adequate to characterize the quality of surface soils, sediment and surface water in the exposure areas and, therefore, no data gaps are identified.

Exposure Pathways:

- The evaluation of the surface water data indicates that this pathway poses negligible risk to aquatic wildlife in West Pond and West Pond Tributary.
- The evaluation of the sediment from West Pond Tributary indicate that this pathway poses low potential exposure to aquatic wildlife.
- Exposure pathways are complete for aquatic wildlife in contact with sediments in West Pond.
- Concentrations of constituents in surface soils at the base of the landfill serve as a potential migration pathway to aquatic/wetland habitats in West Pond.
- Exposure pathways are complete for terrestrial wildlife in contact with surface soils on the top of the landfill.

Risk Characterization:

- Potential exposure risks in West Pond and West Pond Tributary from contact with surface water was determined to be negligible.
- Potential exposure risks at the top of the landfill are primarily associated with a localized surface soil area (SS-8) containing several metals (iron, lead and zinc) and Aroclor 1254.
- Potential exposure risks at the base of the landfill are primarily associated with surface soil areas along the western base of the landfill at SS-W7, SS-W8 and SS-W9 (barium, chromium, copper, iron, mercury, and zinc) and near SS-W4 (Aroclors 1242 and 1254).

- Potential exposure risks in West Pond sediment are primarily associated with several metals (copper, lead, mercury, and zinc) in the southeastern portion of the pond and Aroclors 1242 and 1254 along the nearshore area in the northeast portion of the pond.
- Potential exposure risks in West Pond Tributary are low overall, given the relatively low detections of PCBs ($\leq$ 1.2 mg/kg total PCBs at all stations) and limited physical aquatic habitat, resulting in limited prey resources and likely low use rates by wildlife.

The following recommendations are based on SLERA conclusions:

- The SLERA adequately assessed potential risks for site habitats and a baseline ecological risk assessment is not warranted.
- Based on the risk characterization for the site, remedial alternatives should be developed for localized areas of surface soils on the top of the landfill, localized areas at the base of the landfill, and localized areas of sediments in West Pond.
- The data presented in the SLERA is sufficient to serve as baseline information for considering remedial alternatives in the Feasibility Study.

8.1 PHYSICAL SITE CHARACTERIZATION

The landfill is bounded by wetland areas to the west and north, a steep wooded hill to the south, and Route 22 to the east. Surface water in the surrounding areas flows north from the West Pond to the West Pond Tributary, which flows east under Route 22. On the east side of Route 22 the tributary flows south and converges with Amenia Stream (Figure 1-2).

The Site is underlain by fill consisting of imported cover material, landfill waste, and native materials including sand, gravel, silt and glacial till. Landfill waste is up to 25 feet thick. The unconsolidated deposits overlie bedrock consisting of gray to dark gray dolomitic marble. Bedrock was encountered at depths between 20 and 70 feet below ground surface (Figure 4-1).

Shallow groundwater beneath the Site appears to originate primarily from surface water infiltrating the west side of the landfill and aquifer recharge of the landfill area by infiltration of precipitation is probably not an important hydraulic pathway. Because of the steep slopes around the landfill and relatively small recharge area (less than 9 acres), most precipitation runs off the landfill as overland flow. Groundwater does not occur in overburden at the south end of the Site where soil thickness is on the order of about 10 feet or less. Groundwater flows east from the Site and discharges to surface water (Figure 4-2).

Bedrock at the south end of the Site is shallow. The water table under the landfill, recharged primary by surface water, does not get higher than the water elevation in the West Pond. Therefore, groundwater does not occur in unconfined overburden at elevations higher than about 484 feet (1983 NAVD). The water table relationship at the bedrock/overburden interface is likely to be complex in this area because of the differences of the hydrogeologic properties of the two units, bedrock being less porous and less permeable than the overburden soils.

8.2 NATURE AND EXTENT OF CONSTITUENTS OF POTENTIAL CONCERN

Drum Removal Area

- phenol exceeded NYSDEC's SCGs in one soil sample and calcium and magnesium were detected in certain samples at elevated concentrations relative to background concentrations. The groundwater samples collected from MW-9 only had exceedences of aluminum, antimony, iron, and manganese. The data indicate that the drum removal action was effective and that additional investigation of this area is not warranted.

Landfill Soil

- samples of surface soil from the top of the landfill contained PCBs and phenol above SCG; several surface samples contained calcium, magnesium and potassium in elevated concentrations relative to background and SCG.
- samples of soil from the west slope of the landfill contain PCBs and several metals above background and SCG.

- one sample from the north slope of the landfill contained PCBs above SCG; several samples from the north slope contained calcium and magnesium in elevated concentrations relative to background concentrations.

The nature and extent of soil COPCs has been defined to the extent necessary to develop any potential remedy for soil.

Groundwater

- benzene and chlorinated volatiles were detected in shallow wells (MW-2, -3, -4, -5 and –6) in concentrations above SCG; concentrations are highest at the southwest corner of the landfill and decrease in the downgradient groundwater flow direction.
- bis(2-ethylhexyl)phthalate was detected in Round 1 samples concentrations above SCG in three shallow wells (MW-2, -3 and –6) and one deep well (MW-2B); bis(2-ethylhexyl)phthalate was not detected in Round 2 samples.
- phenol was detected in the Round 2 sample from one well (MW-2) at a concentration above SCG; this compound was not detected in Round 1 samples.
- beta-BHC was detected in one well (MW-4) at a concentration above SCG.
- all groundwater samples contained metals in concentrations above SCG; elevated concentrations of arsenic, iron, magnesium and sodium may be related to landfill activities.

The nature and extent of COPCs in groundwater have been defined to the extent necessary to develop any potential remedy for groundwater.

Sediment

- samples from the upgradient stream entering the West Pond contained concentrations of arsenic, iron, manganese, nickel and zinc above SCG.
- samples from the upgradient stream on the east side of Route 22 contained concentrations of arsenic, copper, iron, manganese and nickel above SCG.
- samples from the West Pond Tributary north of the landfill contained PCBs above SCG
- samples from the Amenia Stream east of Route 22 contained PCBs above SCG; PCBs were not detected in the southern most sample from this stream.
- samples from the West Pond contained PCBs and metals above SCG.

The nature and extent of COPCs in sediment has been defined to the extent necessary to develop any potential remedy for sediment.

Surface Water

- pesticides were detected above SCG in surface water north of the landfill in the West Pond Tributary.

- all surface water samples contained one or more metals in concentrations above SCG; the distribution of the concentrations indicates that surface water from the area of the landfill is not contributing to the inorganics load of Amenia Stream.

The nature and extent of COPCs in surface water has been defined to the extent necessary to develop any potential remedy for surface water.

8.8.3 HUMAN HEALTH RISK EVALUATION

Several potential current and reasonably anticipated future receptor populations could potentially be affected by the landfill, and were therefore considered in the HHRE. These include the following:

- Site Visitor/Trespasser/Hunter
- Off-site Recreational User
- Off-site Resident

The results of this assessment indicate that implementation of the presumptive remedy (i.e., the landfill cap and institutional controls) would eliminate potential risks to receptors who may occasionally visit the site (Site Visitor/ Trespasser/Hunter) by isolating impacted soil from human contact.

The only potentially significant exposure pathway to COPCs for Off-site Recreational Users is direct contact with sediments. After implementation of the presumptive remedy, risks to the Off-site Recreational Users will be less than the current risks for these receptors. The landfill cap will minimize the potential for transport of constituents to sediment; however, the presumptive remedy does not address existing COPCs identified in sediments above health-based screening levels. These will be addressed in the Feasibility Study.

8.8.4 ECOLOGICAL RISK EVALUATION

- Potential exposure risks in West Pond and West Pond Tributary from contact with surface water was determined to be negligible.
- Potential exposure risks at the top of the landfill are primarily associated with a localized surface soil area (SS-8) containing several metals (iron, lead and zinc) and Aroclor 1254.
- Potential exposure risks at the base of the landfill are primarily associated with surface soil areas along the western base of the landfill at SS-W7, SS-W8 and SS-W9 (barium, chromium, copper, iron, mercury, and zinc) and near SS-W4 (Aroclors 1242 and 1254).
- Potential exposure risks in West Pond sediment are primarily associated with several metals (copper, lead, mercury, and zinc) in the southeastern portion of the pond and Aroclors 1242 and 1254 along the nearshore area in the northeast portion of the pond.

- Potential exposure risks in West Pond Tributary are low overall, given the relatively low detections of PCBs ($\leq$ 1.2 mg/kg total PCBs at all stations) and limited physical aquatic habitat, resulting in limited prey resources and likely low use rates by wildlife.

Physical Characterization Studies

- the physical attributes of the site have been adequately characterized. No further physical investigations are recommended.
- to better evaluate potential site remedies, the limits of solid landfill waste will be defined through a test pit excavation program.

Nature and Extent of Constituents of Concern

- the nature and extent of constituents of concern in soil, sediment and surface water are adequately defined to develop remedial measures. No further soil, sediment or surface water investigations are recommended.
- the vertical and horizontal extent of impacted groundwater is adequately defined. No further groundwater delineation is recommended.
- surface water and groundwater monitoring will be required, as appropriate, as part of post-closure long term operation, maintenance and monitoring for the site.

Human Health Risk Evaluation

- the Human Health Risk Evaluation adequately evaluated potential exposures and likely current and reasonably anticipated future receptor populations to guide implementation of the remedy.
- implementation of the presumptive remedy (i.e., the landfill cap and institutional controls) would eliminate potential risks to receptors who may occasionally visit the site (Site Visitor/ Trespasser/Hunter) by isolating impacted soil from human contact.
- existing COPCs identified in sediments above health-based screening levels should be addressed in the Feasibility Study.

Ecological Risk Evaluation

- The SLERA adequately assessed potential risks for site habitats and a baseline ecological risk assessment is not warranted.
- Based on the ecological risk characterization for the site, remedial alternatives should be developed for localized areas of surface soils on the top of the landfill, localized areas at the base of the landfill, and localized areas of sediments in West Pond.
- The data presented in the SLERA is sufficient to serve as baseline information for considering remedial alternatives in the Feasibility Study.

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Table 1-1
Amenia Town Landfill
Summary of Previous Investigations

Matrix	Sample Identification	Analyses	Collection Date	Collected by	Comments	Information Source
Soil Gas	SG-1 through SG-24	VOCs	11/5/1991 to 11/7/1991	Tetra K Testing	Field screening by mobile laboratory	LMS, 1993
Geophysical Survey	Site wide	magnetometer and resistivity surveys	October 1991	INTEX		LMS, 1993

Table 1-1
Amenia Town Landfill
Summary of Previous Investigations

Matrix	Sample Identification	Analyses	Collection Date	Collected by	Comments	Information Source
Surface Soil	NY 66 S1 NY 66 S2 NY 66 S3 NY 66 S4	VOCs, SVOCs pesticides, PCBs inorganics	2/25/1987	NUS Corporation	Pesticide, PCB, and some SVOC data generally rejected for QA/QC reasons	LMS, 1993
	SS-1A, SS-1B, SS-2A, SS-2B, SS-3 through SS-8 SS-9A, SS-9B SS-10, SS-11A, SS-11B SS-12 through SS-16	PCBs	11/7/1991 and 11/8/1991	LMS	Field screening by mobile laboratory	LMS, 1993
	SS-1A, SS-2A, SS-2B, SS-4, SS-5, and SS-6 SS-9A, SS-10, SS-15 and SS-16	VOCs				
	AM SS-17 AM SS-18 AM SS-19 AM SS-20	VOCs, SVOCs, pesticides, PCBs, inorganics, EP TOX, hazardous characteristics	11/11/1991	LMS	Analyzed by fixed laboratory	

Table 1-1
Amenia Town Landfill
Summary of Previous Investigations

Matrix	Sample Identification	Analyses	Collection Date	Collected by	Comments	Information Source
Test Pit Soil	P01- S01, S05, S06 P02 - S03, S04 P03 - S02 P04 - no samples P05 - S08 P06 - S09 P07 - S10 P08 - S11 DX1S-S07	VOCs, SVOCs, Pesticides, PCBs, inorganics	9/9/1998 through 9/11/1998	NYSDEC	four samples of drummed material were analyzed also (not discussed in this report)	NYSDEC, February 1999
Stockpiled soil (from excavations in drum disposal area)	SS-1 SS-2 SS-3 SS-4	VOCs and SVOCs	6/9/1999	URSGWC		URSGWC, internal data

Table 1-1
Amenia Town Landfill
Summary of Previous Investigations

Matrix	Sample Identification	Analyses	Collection Date	Collected by	Comments	Information Source
Sediment	NY 66 SED-1 NY 66 SED-2 NY 66 SED-3	VOCs, SVOCs pesticides, PCBs inorganics	2/25/1987	NUS	Pesticide and PCB data nearly all rejected for QA/QC reasons	LMS, 1993
	AM SD-1 AM SD-2 AM SD-3 AM SD-4 AM SD-5		11/20/1991 through 11/23/1991	LMS		
Surface Water	NY 66 SW-1 NY 66 SW-2 NY 66 SW-3	VOCs, SVOCs pesticides, PCBs inorganics	2/25/1987	NUS		LMS, 1993
	AM SW-1 AM SW-2 AM SW-3 AM SW-4 AM SW-5		11/20/1991 through 11/23/1991	LMS		

Table 1-1
Amenia Town Landfill
Summary of Previous Investigations

Matrix	Sample Identification	Analyses	Collection Date	Collected by	Comments	Information Source
Potable Water	NY 66 GW-1 NY 66 GW-2 NY 66 GW-3	VOCs, SVOCs pesticides, PCBs inorganics	2/25/1987	NUS	Samples collected from two Amenia Town wells and one from a private residence well	LMS, 1993

EP Tox = Extraction Procedure Toxicity Analysis
PCBs = polychlorinated biphenyls
SVOC = semivolatile organic compound
VOC = volatile organic compound

Table 1-2
Amenia Town Landfill
Surface Soil Laboratory Data - February 1987

Parameter (ug/kg)	NYSDEC TAGM 4046 Criteria	NY66 S1	NY66 S2	NY66 S3	NY66 S4
VOCs					
Methylene chloride	100	R	R	R	R
Acetone	200	R	R	R	R
SVOCs					
Benzoic Acid	2,700	---	670	1,200	SVOCs Rejected
Di-n-butylphthalate	8,100	---	540	---	
bis(2-ethylhexyl)phthalate	50,000	---	1,600	---	
Pesticides	not applicable	Pesticides Rejected	---	Pesticides Rejected	Pesticides Rejected
Total PCBs	1,000	14.0 *	**170,000**	13.0 *	Aroclors Rejected

Analytical data source: EPA, September 1990, in LMS, 1993

R = rejected through data validation

PCBs = polychlorinated biphenyls

SVOCs = semivolatile organic compounds

VOCs = volatile organic compounds

* PCB data shown only for Aroclor 1248, remaining Aroclor data rejected

--- = undetected

Table 1-2
Amenia Town Landfill
Surface Soil Laboratory Data - February 1987

Parameter (mg/kg)	NYSDEC TAGM 4046 Criteria	NY66 S1	NY66 S2	NY66 S3	NY66 S4
Inorganics					
Aluminum	sb	6,600	10,200	12,800	20,600
Antimony	sb	---	---	---	---
Arsenic	7.5	6.4	**10**	---	---
Barium	300	R	62	74	84
Beryllium	0.16	---	---	---	**1.1**
Cadmium	1	---	---	---	---
Calcium	sb	R	R	R	R
Chromium	10	8.6	**18**	**17**	**24**
Cobalt	30	12	22	14	12
Copper	25	22	**36**	**50**	---
Iron	2,000	**20,000**	**40,900**	**33,300**	**30,600**
lead	sb	14	134	80	43
Magnesium	sb	10,800	14,400	14,300	6,700
Manganese	sb	663	793	573	387
Mercury	0.1	---	---	---	---
Nickel	13	**26**	**52**	**29**	**31**
Potassium	sb	1,100	1,470	1,350	984
Selenium	2	**2.9**	---	---	---
Silver	sb	---	---	---	---
Sodium	sb	R	R	R	R
Thallium	sb	---	---	---	---
Tin	na	---	---	7.8	---
Vanadium	150	R	R	R	R
Zinc	20	**49**	**179**	**224**	**97**

Source: EPA, September 1990, in LMS, 1993

NYSDEC Soil Cleanup Objectives, TAGM 4046, January 24, 1994

R = rejected through data validation

sb = site background

--- = undetected

NYSDEC (1994) allows a site background criterion for the listed inorganic constituents except mercury

Table 1-3
Amenia Town Landfill
Surface Water Data - February 1987

Parameter (ug/l)	Surface Water Standards	NY66 SW-1	NY66 SW-2	NY66 SW-3
VOCs				
Methylene chloride	5	R	R	R
Acetone	not available	R	R	R
SVOCs				
Di-n-butylphthalate	not available	15	---	---
Pesticides/PCBs	not applicable	---	---	---
Inorganics				
Aluminum	100	68	159	63
Antimony	3	---	---	---
Arsenic	50	---	---	---
Barium	1,000	R	R	R
Beryllium	11	---	---	---
Cadmium	5	---	---	---
Calcium	not available	47,100	49,500	39,900
Chromium	50	---	---	---
Cobalt	not available	---	---	---
Copper	200	---	---	---
Iron	300	**902**	**1,860**	R
lead	50	---	---	---
Magnesium	35,000	14,800	16,000	12,800
Manganese	300	**310**	**590**	175
Mercury	0.7	---	---	---
Nickel	100	---	---	---
Potassium	not available	1,430	1,250	1,270
Selenium	10	---	---	---
Silver	50	---	---	---
Sodium	not available	5,360	5,300	R
Thallium	8	---	---	11
Tin	not available	---	---	---
Vanadium	14	---	---	---
Zinc	site specific	7.5	13	9.9

Source: EPA, September 1990, in LMS, 1993

R = rejected through data validation

--- = undetected

PCBs = polychlorinated biphenyls

VOCs = volatile organic compounds

SVOCs = semivolatile organic compounds

NYSDEC Surface Water Standards from 6 NYCRR 703, August 1999

Table 1-4
Amenia Town Landfill
Sediment Data - February 1987

Parameter (ug/kg)	NYSDEC Sediment Criteria	NY66 SED-1	NY66 SED-2	NY66 SED-3
VOCs				
Methylene chloride	not available	R	R	R
Acetone	not available	390 B	250 B	R
2-Butanone	not available	34	54	36
SVOCs				
bis(2-ethylhexyl)phthalate	199,500	---	---	730
Diethylphthalate	not available	---	---	7,400
Pesticides	not applicable	Pesticides Rejected	Pesticides Rejected	Pesticides Rejected
Total PCBs	1400	**3,700 ***	Aroclors Rejected	Aroclors Rejected

Analytical data source: EPA, September 1990, in LMS, 1993

NYSDEC, Technical Guidance for Screening Contaminated Sediments, last revised January 25, 1999

PCBs = polychlorinated biphenyls

R = rejected through data validation

SVOCs = semivolatile organic compounds

VOCs = volatile organic compounds

--- = undetected

* PCB data shown only for Aroclor 1248, remaining Aroclor data rejected

NYSDEC PCB criterion is for wildlife bioaccumulation

NYSDEC bis(2-ethylhexyl)phthalate criterion is for benthic life chronic toxicity

Table 1-4
Amenia Town Landfill
Sediment Data - February 1987

Parameter (mg/kg)	NYSDEC Sediment Criteria	NY66 SED-1	NY66 SED-2	NY66 SED-3
Inorganics				
Aluminum	not available	9,100	7,050	12,000
Antimony	2	---	---	---
Arsenic	6	---	---	---
Barium	not available	36	37	37
Beryllium	not available	2.2	13	---
Cadmium	0.6	---	---	---
Calcium	not available	R	R	R
Chromium	26	8.1	---	17
Cobalt	not available	28	59	8.9
Copper	16	16	---	---
Iron	20,000	**58,000**	**175,000**	**18,400**
lead	31	24	**32**	**36**
Magnesium	not available	8,520	3,890	5,410
Manganese	460	**1,380**	**1,170**	**132**
Mercury	0.15	---	---	---
Nickel	16	**76**	**193**	**24**
Potassium	not available	1,530	1,440	732
Selenium	not available	---	---	---
Silver	1	---	---	---
Sodium	not available	R	R	R
Thallium	not available	---	---	11
Tin	not available	---	---	NA
Vanadium	not available	R	R	R
Zinc	120	**165**	**510**	**72**

Source: EPA, September 1990, in LMS, 1993

NA = not analyzed

R = rejected through data validation

--- = undetected

NYSDEC inorganic criteria - lowest effect levels shown only

Table 1-5
Amenia Town Landfill
Potable Water Data - February 1987

Parameter (ug/l)	NYSDEC Groundwater Standards	NY66 GW-1	NY66 GW-2	NY66 GW-3
VOCs				
Methylene chloride	5	R	R	R
Acetone	not available	R	R	R
SVOCs				
bis(2-ethylhexyl)phthalate	5	---	---	**220**
Pesticides/PCBs	Not applicable	---	---	---
Inorganics				
Aluminum	200 **	37	---	---
Antimony	3	---	---	---
Arsenic	25	---	---	---
Barium	1,000	R	R	R
Beryllium	4 *	---	---	---
Cadmium	5	---	---	---
Calcium	not available	48,300	67,100	77,000
Chromium	50	---	---	---
Cobalt	not available	---	---	---
Copper	200	---	---	---
Iron	300	R	R	R
lead	25	---	9.6	---
Magnesium	not available	24,400	28,100	23,100
Manganese	300	---	188	2.6
Mercury	0.7	---	---	---
Nickel	100	---	---	---
Potassium	not available	1,420	2,330	1,620
Selenium	10	---	---	---
Silver	50	---	---	---
Sodium	20,000	6,250	**20,800**	**45,900**
Thallium	2 *	---	---	---
Tin	not available	---	---	---
Vanadium	not available	---	---	---
Zinc	5,000 **	28	19	160

Source: EPA, September 1990, in LMS, 1993

NYSDEC Groundwater Quality Standards, August 1999

* = EPA primary drinking water standard (as of October 1999)

** = EPA secondary drinking water standard (as of October 1999)

R = rejected through data validation

PCBs = polychlorinated biphenyls

VOCs = volatile organic compounds

SVOCs = semivolatile organic compounds

--- = undetected

Table 1-6
Amenia Town Landfill
Soil Gas Results - November 1991

VOCs (ug per cubic meter)	SG-1	SG-2	SG-3	SG-4	SG-5	SG-6	SG-7	SG-8	SG-9	SG-10	SG-11	SG-12
Vinyl chloride	8,400	---	---	---	---	---		3,100	---	---	---	---
Benzene	1,500	4,800	---	---	---	300		4,900	---	5,600	2,200	---
PCE	27,000	1,300	---	---	---	---		---	---	---	---	---
Toluene	---	33,000	---	---	---	1,400		3,00	5,400	15,000	3,700	2,000
Ethylbenzene	20,000	12,000	---	---	---	6,700	Not	7,900	---	7,600	27,000	---
m-Xylene	71,000	18,000	---	---	---	11,000	analyzed *	15,000	---	7,600	19,000	---
o,p-Xylene	41,000	15,000	---	---	---	7,600		19,000	---	6,200	23,000	---
Methylene chloride	---	---	---	---	---	---		---	---	---	---	---
1,1,1-TCA	---	---	---	---	---	---		---	---	---	---	---
TCE	---	---	---	---	---	---		---	---	---	---	---
cis/trans-1,2-DCE	1,000	---	---	---	---	---		---	---	---	---	---

Analytical data source: LMS, 1993

PCE = tetrachloroethene

TCA = trichloroethane

TCE = trichloroethene

DCE = dichlorothene

VOCs = volatile organic compounds

--- = undetected

* = not sampled because water was encountered

Table 1-6
Amenia Town Landfill
Soil Gas Results - November 1991

VOCs (ug per cubic meter)	SG-13	SG-14	SG-15	SG-16	SG-17	SG-18	SG-19	SG-20	SG-21	SG-22	SG-23	SG-24
Vinyl chloride	---	340,000	6,000	---	---	1,700	17,000	---	6,600	12,000	28,000	21,000
Benzene	---	38,000	9,700	---	---	8,900	33,000	---	700	4,200	30,000	2,300
PCE	---	79,000	---	---	---	---	---	---	---	13,000	---	---
Toluene	1,300	1,700,000	8,800	1,600	1,000	5,300	26,000	400	1,200	3,500	25,000	2,100
Ethylbenzene	---	560,000	11,000	---	---	46,000	21,000	---	2,600	16,000	35,000	---
m-Xylene	---	1,100,000	16,000	---	---	72,000	36,000	---	6,100	12,000	68,000	---
o,p-Xylene	---	730,000	17,000	---	---	55,000	42,000	---	---	20,000	46,000	---
Methylene chloride	---	6,300	---	---	---	---	---	---	---	---	---	---
1,1,1-TCA	---	14,000	---	---	---	---	---	---	---	---	---	---
TCE	---	170,000	---	---	---	---	---	---	---	---	---	---
cis/trans-1,2-DCE	---	440,000	---	---	---	---	67,000	---	---	8,500	---	2,500
1,1-DCE	---	3,400	---	---	---	---	---	---	---	---	---	---
1,1-DCA	---	5,700	---	---	---	---	---	---	---	---	---	---
2-Butanone	---	1,100	---	---	---	---	---	---	---	---	---	---

Analytical data source: LMS, 1993

PCE = tetrachloroethene

TCA = trichloroethane

TCE = trichloroethene

DCE = dichlorothene

DCA = dichlorothane

--- = undetected

VOCs = volatile organic compounds

Table 1-7
Amenia Town Landfill
Surface Soil Screening Data - November 1991

Compound (mg/kg)	SS-1A	SS-1B	SS-2A	SS-2B	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8
Total PCBs	25	---	12	250	---	15	38	42	8	5
Ethylbenzene	---	na	---	---	na	---	0.22	---	na	na

Compound (mg/kg)	SS-9A	SS-9B	SS-10	SS-11A	SS-11B	SS-12	SS-13	SS-14	SS-15	SS-16
Total PCBs	35	10.2	10	4.5	---	---	---	---	8.2	46
Ethylbenzene	---	na	---	na	na	na	na	na	---	---

Analytical data source: LMS, 1993

Notes:

LMS, 1993 did not define soil designations "A" and "B"

NYSDEC Soil Cleanup Objectives, TAGM 4046, January 24, 1994

The ten samples with the highest PCB levels were analyzed for VOCs

The screening samples were analyzed in the field in a mobile laboratory

PCBs = polychlorinated biphenyls

--- = not detected

na = not analyzed

NYSDEC PCB surface soil cleanup criterion = 1 mg/kg

NYSDEC ethylbenzene soil cleanup criterion = 5.5 mg/kg

Table 1-8
Amenia Town Landfill
Surface Soil Laboratory Data - November 1991

Parameter (mg/kg)	NYSDEC Soil Criteria	AMSS-17	AMSS-18	AMSS-19	AMSS-20
VOCs					
Methylene chloride	0.1	0.011 B	0.015 B	0.016 B	0.019 B
1,1,1-trichloroethane	0.8	---	---	---	0.006
SVOCs					
Benzoic Acid	2.7	0.027	---	R	0.054 B
Di-n-butylphthalate	8.1	0.37	0.14	R	0.16
butylbenzylphthalate	50	0.01	---	R	---
bis(2-ethylhexyl)phthalate	50	0.1	0.26	R	4.1
Pesticides/PCBs					
Endosulfan sulfate	1.0	---	---	---	0.17
Total PCBs	1.0	**48**	**4.6**	0.14	0.12

Analytical data source: LMS, 1993

NYSDEC Soil Cleanup Objectives, TAGM 4046, January 24, 1994

B = laboratory blank contaminant

R = rejected through data validation

PCBs = polychlorinated biphenyls

SVOCs = semivolatile organic compounds

VOCs = volatile organic compounds

Table 1-8
Amenia Town Landfill
Surface Soil Laboratory Data - November 1991

Parameter (mg/kg)	NYSDEC Soil Criteria	AMSS-17	AMSS-18	AMSS-19 ***	AMSS-20
Inorganics					
Aluminum	sb	11,200	13,400	17,900	23,100
Antimony	sb	9.1	11.8	15.5	19.1
Arsenic	7.5	6.7	5.8	**8.3**	**8.2**
Barium	300	39.4	54.6	45.8	68.7
Beryllium	0.16	**0.56**	**0.45**	**0.56**	**1.0**
Cadmium	1	---	---	---	---
Calcium	sb	32,500	25,400	5,330	715
Chromium	10	**13.2**	**16.1**	**19.6**	**59.6**
Cobalt	30	16.5	19.2	23.4	18.9
Copper	25	**35.7**	**35.3**	**32.8**	**62.6**
Iron	2,000	**34,800**	**40,300**	**39,000**	**41,700**
lead	sb	60.6	91.1	38.6	164
Magnesium	sb	18,700	20,400	12,700	8,400
Manganese	sb	971	1,210	1,300	950
Mercury	0.1	---	---	---	---
Nickel	13	**41.6**	**33.9**	**40.3**	**41.6**
Potassium	sb	1,360	1,250	2,010	1,270
Selenium	2	---	---	---	---
Silver	sb	---	---	---	---
Sodium	sb	---	---	---	---
Thallium	sb	---	---	---	---
Vanadium	150	17	18.2	27.5	33.5
Zinc	20	**137**	**204**	**93.7**	**119**
Cyanide	site specific	90	123.1	2.8	1.5

*** = highest concentration of duplicate sample shown

Table 1-9
Amenia Town Landfill
Surface Water Data - November 1991

Parameter (ug/l)	Surface Water Standards	AMSW-01	AMSW-02	AMSW-03	AMSW-04	AMSW-05
VOCs						
Methylene chloride	5	---	3 B	26	---	2 B
Acetone	not available	13 B	11 B	---	---	10 B
SVOCs						
n-Nitrosodiphenylamine	not available	2 B	2 B	2 B	---	---
bis(2-ethylhexyl)phthalate	5	---	1	---	---	---
Pesticides/PCBs	not applicable	---	---	---	---	---
Inorganics						
Aluminum	100	78.2	86.2	57.4	---	---
Antimony	3	---	---	---	---	---
Arsenic	50	---	---	---	---	---
Barium	1,000	---	---	---	---	---
Beryllium	11	---	---	---	---	---
Cadmium	5	---	---	---	---	---
Calcium	not available	54,100	53,400	53,000	52,800	53,200
Chromium	50	---	---	---	---	---
Cobalt	not available	---	---	---	---	---
Copper	200	---	---	2.8	---	2.8
Iron	300	**776**	**503**	**363**	290	**400**
lead	50	---	---	---	---	---
Magnesium	35,000	20,100	19,900	19,800	19,700	19,700
Manganese	300	134	86.7	101	62.7	81.2
Mercury	0.7	0.26	---	---	---	---
Nickel	100	---	---	---	---	---
Potassium	not available	3,180	3,140	3,290	2,650	2,570
Selenium	10	---	---	---	---	---
Silver	50	---	---	---	---	---
Sodium	not available	5,780	5,250	5,190	4,910	5,060
Thallium	8	---	---	---	---	---
Vanadium	14	---	---	---	---	---
Zinc	site specific	4.5	8.4	---	---	---
Cyanide	200	---	---	---	---	---

Source: LMS, 1993

B = laboratory blank contaminant

PCBs = polychlorinated biphenyls

SVOCs = semivolatile organic compounds

VOCs = volatile organic compounds

NYSDEC Surface Water Standards from 6 NYCRR 703, August 1999

Table 1-10
Amenia Town Landfill
Sediment Data - November 1991

Parameter (mg/kg)	NYSDEC Sediment Criteria	SD-01	SD-02	SD-03	SD-04	SD-05
VOCs						
Methylene chloride	not available	0.029 B	0.051 B	0.022 B	0.089 B	0.026 B
Acetone	not available	---	---	---	---	0.15
SVOCs	not applicable	---	---	---	---	---
Pesticides	not applicable	---	---	---	---	---
Total PCBs	1.4	0.51	**1.8**	**23.2**	---	---
Inorganics						
Aluminum	not available	10,800	22,600	10,900	17,600	9,810
Antimony	2	**48.4**	**24.5**	**22.3**	**60.3**	**25.7**
Arsenic	6	**8.4**	**8.2**	5.3	**16.7**	4.7
Barium	not available	74.8	118	44.3	105	51.3
Beryllium	not available	3.6	2.2	0.6	---	0.91
Cadmium	0.6	---	---	**3.8**	---	---
Calcium	not available	5,410	20,100	37,200	25,800	6,660
Chromium	26	9.7	25.6	15.7	25.9	13.4
Cobalt	not available	64.3	38.5	17.7	43.4	26.9
Copper	16	---	**28.5**	**40.2**	**32.8**	9.8
Iron	20,000	**128,000**	**79,500**	**37,800**	**60,600**	**51,400**
lead	31	23.4	**49.6**	**71.4**	**70.8**	19.1
Magnesium	not available	6,610	9,930	21,000	8,900	5,280
Manganese	460	**2,890**	**1,170**	**692**	**969**	**1,320**
Mercury	0.15	---	---	---	**5.4**	**1.3**
Nickel	16	**144**	**88.5**	**43.8**	**81.8**	**53.5**
Potassium	not available	1,640	2,280	1,180	2,890	1,260
Selenium	not available	---	---	---	---	---
Silver	1	---	---	---	---	---
Sodium	not available	---	---	---	---	---
Thallium	not available	---	---	---	---	---
Vanadium	not available	17.3	38.4	17.8	32	15.8
Zinc	120	**347**	**284**	**253**	**245**	**142**
Cyanide	not available	---	---	---	---	---

Analytical data source: LMS, 1993

NYSDEC, Technical Guidance for Screening Contaminated Sediments, last revised January 25, 1999

B = laboratory blank contaminant

PCBs = polychlorinated biphenyls

SVOCs = semivolatile organic compounds

NYSDEC PCB criterion is for wildlife bioaccumulation

VOCs = volatile organic compounds

Table 1-11
Amenia Town Landfill
Test Pit Soil Data - September 1998

Sample Number Test Pit Number Approximate Depth	NYSDEC TAGM 4046 Criteria	P01S01 TP-1 10-11 ft	P01S05 TP-1 12 ft	P01S06 TP-1 17 ft	P02S03 TP-2 6 ft	P02S04 TP-2 17 ft	P03S02 TP-3 18 ft	P05S08 TP-5 12 ft	P06S09 TP-6 9 ft	P07S10 TP-7 19 ft	P08S11 TP-8 17 ft	DX1S07 near TP-9 surface
VOCs (ug/kg)												
Trichloroethene	700	---	**3,400**	510	---	---	---	---	---	---	---	---
Tetrachloroethene	1,400	---	**12,000**	---	---	---	---	---	---	---	---	---
Toluene	1,500	390	**200,000**	**190,000**	14	130	38	---	---	---	---	---
Ethylbenzene	5,500	900	**110,000**	**18,000**	85	28	220	---	15	---	---	---
Xylenes (total)	1,200	**2,500**	**550,000**	**100,000**	**1,500**	190	**1,700**	---	9	4	---	---
SVOCs (ug/kg)												
1,4 - Dichlorobenzene	8,500	---	---	---	---	---	---	---	23	270	---	---
4-methylphenol	900	---	---	---	---	40	---	---	39	---	---	---
Naphthalene	13,000	270	2,200	2,400	--	--	--	--	--	87	--	--
2-Methylnaphthalene	36,400	180	---	---	---	---	---	---	31	97	---	---
Phenanthrene	50,000	--	1,600	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	50,000	---	---	---	---	---	---	---	---	---	150	---
bis(2-ethylhexyl)phthalate	50,000	9,000	**88,000**	16,000	31,000	96	900	63	300	1,300	21	--
Di-n-octyl phthalate	50,000	---	---	---	---	---	---	26	20	55	---	---
Benzo(b)fluoranthene	1,100	--	--	--	--	--	--	34	32	110	21	--
Benzo(k)fluoranthene	1,100	---	---	---	---	---	---	32	33	120	21	---
Benzo(a)pyrene	61	--	--	--	--	--	--	30	32	**120**	25	--
Ideno(1,2,3-cd)pyrene	3,200	---	---	---	---	---	---	32	28	95	21	---
Dibenz(a,h) anthracene	14	--	--	--	--	--	--	--	--	**78**	--	--
Pesticides/PCBs (ug/kg)												
4,4'-DDE	2,100	---	--	--	--	--	--	--	--	--	74	---
Arochlor - 1242	1,000	**390,000**	**530,000**	**4,800,000**	**200,000**	**2,400**	**290,000**	880	**27,000**	--	--	--

Table 1-11
Amenia Town Landfill
Test Pit Soil Data - September 1998

Sample Number Test Pit Number Approximate Depth	NYSDEC TAGM 4046 Criteria	P01S01 TP-1 10-11 ft	P01S05 TP-1 12 ft	P01S06 TP-1 17 ft	P02S03 TP-2 6 ft	P02S04 TP-2 17 ft	P03S02 TP-3 18 ft	P05S08 TP-5 12 ft	P06S09 TP-6 9 ft	P07S10 TP-7 19 ft	P08S11 TP-8 17 ft	DX1S07 near TP-9 surface
Inorganics (mg/kg)												
Aluminum	sb	11,000	10,400	9,200	7,020	10,600	7,230	5,950	9,100	9,120	11,000	10,900
Antimony	sb	7.7	13.8	1.8	1.6	1.5	0.73 U	0.71 U	0.94	0.78 U	2.3	0.97 U
Arsenic	7.5	**11.4**	**8.5**	**7.9**	6.8	**7.7**	7.4	6.7	**8.6**	**8.2**	**18.1**	7.4
Barium	300	148	53.3	29.5	28.2	33.7	38	11.4	73.6	16.3	**367**	25.7
Beryllium	0.16	**0.43**	**0.46**	**0.48**	**0.32**	**0.42**	**0.34**	**0.28**	**0.39**	**0.32**	**0.45**	**0.48**
Cadmium	1	**2.7**	**1.3**	0.92	0.75	0.59	0.67	0.41	**1.1**	0.61	**8**	0.52
Calcium	sb	16,800	14,100	23,600	39,200	14,400	44,200	44,900	31,600	36,600	54,800	555
Chromium	10	**23.6**	**18.5**	**10.8**	9.4	**11.2**	9.3	7.6	**15.4**	**11.6**	**22.2**	**19.3**
Cobalt	30	21.3	29	12.3	17	12.1	11.3	8.5	12.5	13.8	13.6	10.9
Copper	25	**81.7**	**55.6**	**41.2**	**38.3**	**31.6**	**34.2**	**24.3**	**57.8**	**31.7**	**86.6**	**29.8**
Iron	2,000	**55,100**	**30,500**	**30,000**	**22,600**	**27,200**	**22,800**	**20,500**	**39,000**	**31,600**	**39,200**	**26,200**
lead	sb	343	101	26.4	27.4	17.2	106	9.6	215	14	1,170	58.3
Magnesium	sb	11,700	11,100	15,900	18,800	11,300	13,900	23,600	17,700	18,200	13,600	5,540
Manganese	sb	1,150	632	821	691	577	803	743	770	813	2,310	490
Mercury	0.1	**0.13**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.08	0.05 U	0.05 U	0.07 U
Nickel	13	**49.8**	**57.1**	**29.2**	**34.5**	**28.9**	**23.2**	**16.9**	**30.1**	**22.7**	**34**	**24.2**
Potassium	sb	1,160	900	791	720	959	831	610	1,200	1,350	2,460	932
Selenium	2	1.4	0.75 U	0.73 U	0.71 U	0.72 U	0.77	0.71 U	0.76 U	0.78 U	1.3	1.5
Silver	sb	0.27	0.21 U	0.20 U	0.20 U	0.20 U	0.2 U	0.20 U	0.21 U	0.22 U	22.1	0.27 U
Sodium	sb	138	60.1	73.2	62	72.9	91.7	71.1	136	75.6	959	65.5
Thallium	sb	2.5	0.91 U	0.92	1.2	1.5	1.3	1.1	1.5	1.7	2.6	1.5
Vanadium	150	22.6	12.6	12.3	9.9	12.4	9.9	8.4	12.7	11.8	24.5	15.3
Zinc	20	**438**	**83.4**	**73.4**	**55.4**	**70**	**126**	**42.5**	**170**	**202**	**1,380**	**79.8**
Cyanide	na	0.28 U	0.28 U	0.28 U	0.27 U	0.27 U	0.28	0.26 U	0.28 U	0.28 U	0.29 U	0.73

NYSDEC, January 1994, TAGM 4046, Determination of Soil Cleanup Objectives and Cleanup Levels

Source: NYSDEC , February 1999 na = criterion not available VOCs = volatile organic compounds SVOCs = semivolatile organic compounds

--- and U = undetected PCBs = polychlorinated biphenyls sb = site background

NYSDEC (1994) allows a site background criterion for the listed inorganic constituents except mercury

Table 1-12
Amenia Town Landfill
Soil Stockpile Analytical Data - June 1999

Sample No. Laboratory No. Collection date	NYSDEC TAGM 4046 Criteria	SS-1 AA86081 6/9/99	SS-2 AA86082 6/9/99	SS-3 AA86083 6/9/99	SS-4 AA86084 6/9/99	SS-5 AA86085 6/9/99	SS-6 AA86086 6/9/99
VOCs (ug/kg)							
1,1,1-Trichloroethane	800	--	--	--	1.2	--	1.4
Methylene chloride	100	4.1	6.7	5.3	7.6	5.2	6.2
Tetrachloroethene	1,400	--	--	2	2.4	3.1	--
SVOCs (ug/kg)							
Bis(2-Ethylhexyl)phthalate	50,000	**100,000**	**62,000**	**79,000**	14,000	**87,000**	24,000

Analytical data source: URSGWC internal data

NYSDEC Soil Cleanup Objectives, TAGM 4046, January 24, 1994

SVOC = semivolatile organic compound

VOC = volatile organic compound

Table 3-1
Amenia Town Landfill RI/FS
Soil and Groundwater Sampling Summary

Sample Designations	Matrix	Location	Collection Date	Analytical Parameter	Analytical Method
SS-1 through SS-9	Surface Soil (0-2 inches)	Top of Landfill	11/28/2001	SVOCs PCBs Metals Cyanide	8270C 8082 (3550B) 6010B/7471A 9012A
BG-1 BG-2 BG-3	Surface Soil (0-6 inches)	South of Landfill and Small Mound North of Landfill (native soils)	11/28/2001	Metals Cyanide	6010B/7471A 9012A
SS-N1 through SS-N6	Surface Soil (0-6 inches)	Base of Landfill North Slope	11/28/2001	PCBs Metals Cyanide	8082 (3550B) 6010B/7471A 9012A
SS-W1 through SS-W15	Surface Soil (0-6 inches)	Base of Landfill West Slope	11/27/2001	PCBs Metals Cyanide	8082 (3550B) 6010B/7471A 9012A
PE-1 through PE-9	Subsurface Soil 10-12 ft	Drum Removal Area	11/08/2001 (PE-1, 7, 8) and 11/09/2001 (PE-2,3,4,5,6, 9)	VOCs SVOCs Pesticides PCBs Metals Cyanide	8260B 8270C 8081A 8082 (3550B) 6010B/7471A 9012A
MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8	Groundwater Round 1	Shallow Groundwater (across site)	01/23/2002 01/24/2002 01/23/2002 01/22/2002 01/24/2002 01/28/2002 01/25/2002 01/25/2002	VOCs SVOCs Pesticides PCBs Metals Cyanide	8260B 8270C 8081A 8082 (3510C) 200.7 335.3
MW-9	Groundwater Round 1	Shallow Groundwater Drum Removal Area	01/28/2002	VOCs SVOCs Pesticides PCBs Metals Cyanide	8260B 8270C 8081A 8082 (3510C) 200.7 335.3
MW-2B MW-4B MW-8B	Groundwater Round 1	Deep Groundwater (across site)	01/24/2002 01/22/2002 01/25/2002	VOCs SVOCs Pesticides PCBs Metals Cyanide	8260B 8270C 8081A 8082 (3510C) 200.7 335.3
SG-1 through SG-52	Soil Gas	Site Wide	12/19/2001 to 12/26/2001	VOCs	Field GC 8021M

Table 3-1
Amenia Town Landfill RI/FS
Soil and Groundwater Sampling Summary

Sample Designations	Matrix	Location	Collection Date	Analytical Parameter	Analytical Method
MW-1			04/03/2002		
MW-2	Groundwater	Shallow Groundwater	04/04/2002	VOCs	8260B
MW-3	Round 2	(across site)	04/05/2002	SVOCs	8270C
MW-4			04/04/2002	Pesticides	8081A
MW-5			04/04/2002	PCBs	8082 (3510C)
MW-6			04/05/2002	Metals	200.7
MW-7			04/04/2002	Cyanide	335.3
MW-8			04/03/2002		
				VOCs	8260B
		Shallow		SVOCs	8270C
MW-9	Groundwater	Groundwater	04/04/2002	Pesticides	8081A
	Round 2	Drum Removal Area		PCBs	8082 (3510C)
				Metals	200.7
				Cyanide	335.3
				VOCs	8260B
MW-2B		Deep	04/04/2002	SVOCs	8270C
MW-4B	Groundwater	Groundwater	04/05/2002	Pesticides	8081A
MW-8B	Round 2	(across site)	04/03/2002	PCBs	8082 (3510C)
				Metals	200.7
				Cyanide	335.3
				VOCs	8260B
		Water used		SVOCs	8270C
Drilling Water	Tap water	for drilling and	04/05/2002	Pesticides	8081A
PW-1		decontamination		PCBs	8082 (3510C)
				Metals	200.7
				Cyanide	335.3

Notes:

GC = Gas Chromatograph

PCB = Polychlorinated biphenyl

SVOC = Semivolatile organic compound

VOC = Volatile organic compound,

Table 3-2
Amenia Town Landfill RI/FS
Summary of Bedrock Borings

Borings Intersecting Bedrock	Depth to Top of Bedrock (nominal)	Elevation Top of Bedrock	Core Recovered (bgs)
SB-1	42	462.98	42.5 to 53.5 ft
SB-2	62	447.82	65 to 75 ft
SB-3	21	511.96	21.3 to 30.3
PZ-1B	52	455.00	53 to 78 ft
MW-2B	68	438.09	---
MW-4B	66	444.68	---
MW-5	23	498.01	---
MW-8B	71	435.26	---
MW-9	20	503.54	---

Table 3-3
Amenia Town Landfill RI/FS
Surface Water and Sediment Sampling

Sample Designations	Matrix	Location	Collection Date	Analytical Parameter	Analytical Method
SW-1	Surface Water	West stream	05/15/2002	VOCs	8260B
SW-2		West pond	05/15/2002	SVOCs	8270C
SW-3		North stream	05/16/2002	Pesticides	8081A
SW-4		North stream	05/16/2002	PCBs	8082 (3510C)
SW-5		North stream	05/16/2002	Metals	200.7
SW-6		East stream	05/14/2002	Cyanide	335.3
SW-7		East stream	05/14/2002		
SW-8		East stream - upgrad.	05/14/2002		
Shallow Samples	Sediment	West pond Row 1 samples		PCBs	8082 (3665A)
SD-1			05/13/2002	Metals	6010B/7471A
SD-2			05/13/2002	Cyanide	9012A
SD-3			05/13/2002	TOC	EPA 1988
SD-4			05/13/2002	Grain Size	ASTM D4822-88
SD-5			05/13/2002	pH	SW-846 9045C
SD-6			05/13/2002		
SD-7			05/13/2002		
SD-8			05/13/2002		
SD-9			05/13/2002		
SD-10			05/13/2002		
SD-11			05/13/2002		
SD-12			05/13/2002		
SD-13			05/13/2002		
SD-14			05/13/2002		
SD-15			05/13/2002		
Deep samples					
SD-2A			05/13/2002		
SD-7A			05/13/2002		
SD-13A			05/13/2002		
Contingency Samples	Sediment	West pond Row 2 samples		PCBs	8082 (3665A)
SD-1-2			05/15/2002	Metals	6010B/7471A
SD-2-2			05/15/2002		
SD-3-2			05/15/2002		
SD-4-2			05/15/2002		
SD-5-2			05/15/2002		
SD-6-2			05/15/2002		
SD-7-2			05/15/2002		
SD-8-2			05/15/2002		
SD-9-2			05/15/2002		
SD-10-2			05/15/2002		
SD-11-2			05/15/2002		
SD-12-2			05/15/2002		
SD-13-2			05/15/2002		
SD-14-2			05/15/2002		
SD-15-2			05/15/2002		

Table 3-3
Amenia Town Landfill RI/FS
Surface Water and Sediment Sampling

Sample Designations	Matrix	Location	Collection Date	Analytical Parameter	Analytical Method
Contingency Samples					
SD-1-3		West pond	05/15/2002		
SD-2-3		Row 3 samples	05/15/2002		
SD-3-3			05/15/2002		
SD-4-3			05/15/2002	PCBs	8082 (3665A)
SD-5-3			05/15/2002	Metals	6010B/7471A
SD-6-3	Sediment	Each row 3 sample	05/15/2002		
SD-7-3		analyzed for metals	05/15/2002		
SD-8-3			05/15/2002		
SD-9-3		Only samples	05/15/2002		
SD-10-3		SD-1-3 through	05/15/2002		
SD-11-3		SD-6-3 analyzed	05/15/2002		
SD-12-3		for PCBs	05/15/2002		
SD-13-3		(following	05/15/2002		
SD-14-3		contingency strategy)	05/15/2002		
SD-15-3			05/15/2002		
Shallow Samples					
SD-N1			05/16/2002	PCBs	8082 (3665A)
SD-N2			05/16/2002	Metals	6010B/7471A
SD-N3			05/16/2002	TOC	EPA 1988
SD-N4	Sediment	North stream	05/16/2002	Grain Size	ASTM D4822-88
SD-N5			05/16/2002	pH	SW-846 9045C
SD-N6			05/16/2002		
SD-N7			05/16/2002		
SD-N8			05/16/2002		
Deep samples					
SD-N3A			05/16/2002		
SD-N5A			05/16/2002		
Shallow Samples				VOCs	8260B
SD-OF1			05/14/2002	BEHP	8270C
SD-OF2			05/14/2002	PCBs	8082 (3665A)
SD-OF3	Sediment	East Stream	05/14/2002	Metals	6010B/7471A
SD-OF4			05/14/2002	TOC	EPA 1988
SD-OF5			05/14/2002	Grain Size	ASTM D4822-88
SD-OF6			05/14/2002	pH	SW-846 9045C
Deep sample					
SD-OF4A			05/14/2002		

Table 3-3
Amenia Town Landfill RI/FS
Surface Water and Sediment Sampling

Sample Designations	Matrix	Location	Collection Date	Analytical Parameter	Analytical Method
Shallow Samples	Sediment	West stream		VOCs (SD-UP1 only)	8260B
SD-UP1			05/15/2002	PCBs	8082 (3665A)
SD-UP2			05/15/2002	Metals	6010B/7471A
				TOC	EPA 1988
Deep sample				Grain Size	ASTM D4822-88
SD-UP2A			05/15/2002	pH	SW-846 9045C
Shallow Samples	Sediment	East Stream upgradient		VOCs	8260B
				BEHP	8270C
SD-UP3			05/14/2002	PCBs	8082 (3665A)
SD-UP4			05/14/2002	Metals	6010B/7471A
				TOC	EPA 1988
Deep sample				Grain Size	ASTM D4822-88
SD-UP4A			05/14/2002	pH	SW-846 9045C

Notes:

ASTM = American Society for Testing and Materials

EPA 1988 = Loyd Kahn Method

PCB = Polychlorinated biphenyl

TOC = Total organic carbon

BEHP = Bis(2-ethylhexyl)phthalate

VOCs = Volatile organic compounds

Table 3-4
Amenia Town Landfill
Summary of Water Monitoring Points

Name	Install. Date	NYSPC_X Easting	NYSPC_Y Northing	NAD_88 Ground Elevation	Height of Top of Casing (from ground)	Elevation of Top of Outer Casing	Top of Inner Casing (from outer Casing)	Elevation of Top of Inner Casing	Screened Unit	Nominal Boring Depth	Sounding Depth in Ft (from TOR)	Nominal Elevation Bottom of Screen
MW-1	10/30/2001	746351.134	1091736.015	501.42	2.75	504.17	0.28	503.89	overburden	27	29.76	474.13
MW-2	10/30/2001	746550.595	1091783.925	505.62	2.60	508.22	0.25	507.97	overburden	31	33.19	474.78
MW-2B	01/04/2002	746502.780	1091778.344	506.09	2.30	508.39	0.09	508.30	bedrock	115	117.71	390.59
MW-3	10/26/2001	746719.023	1091784.694	504.61	2.68	507.29	0.30	506.99	overburden	32	34.72	472.27
MW-4	10/29/2001	746751.939	1091531.318	510.42	2.57	512.99	0.22	512.77	overburden	38	39.80	472.97
MW-4B	12/05/2001	746743.766	1091529.150	510.68	1.94	512.62	0.27	512.35	bedrock	101	103.15	409.20
MW-5	11/30/2001	746797.163	1091221.941	521.01	2.61	523.62	0.12	523.50	bedrock	33	34.70	488.80
MW-6	11/08/2001	746363.369	1091227.546	532.97	2.96	535.93	0.59	535.34	overburden	55	57.73	477.61
MW-7	11/06/2001	746328.786	1091373.812	509.83	2.62	512.45	0.29	512.16	overburden	29	35.51	476.65
MW-8	11/06/2001	746341.030	1091540.463	505.50	2.81	508.31	0.57	507.74	overburden	33	31.21	476.53
MW-8B	01/04/2002	746347.338	1091535.064	506.26	2.60	508.86	0.24	508.62	bedrock	116	118.60	390.02
MW-9	01/03/2002	746189.211	1090636.048	523.54	2.51	526.05	0.12	525.93	bedrock	57	57.42	468.51
PZ-1	11/02/2001	746511.027	1091581.612	507.42	2.60	510.02	---	---	overburden	37	---	---
PZ-1B	11/01/2001	746512.253	1091589.694	507.00	2.40	509.40	---	---	bedrock	78	---	---
PZ-3 (2)	01/28/2003	746982.287	1091467.588	---	---	500.56	-0.37	500.19	overburden	25	---	---
PZ-4 (3)	01/28/2003	747355.433	1091609.649	---	---	484.20	-0.30	483.90	overburden	10	---	---
STG-0	04/03/2002	746093.108	1091189.944	---	---	---	---	---	staff gauge	---	---	---
STG-1	03/05/2002	746257.900	1091533.487	---	---	---	---	---	staff gauge	---	---	---
STG-2	03/05/2002	746219.309	1091727.838	---	---	---	---	---	staff gauge	---	---	---
STG-3	03/05/2002	746696.855	1091915.336	---	---	---	---	---	staff gauge	---	---	---
STG-4	05/16/2002	747103.934	1091568.413	---	---	---	---	---	staff gauge	---	---	---
STG-5	05/16/2002	747273.783	1091903.605	---	---	---	---	---	staff gauge	---	---	---
STG-A (6)	01/28/2003	747101.220	1091510.770	---	---	---	---	---	staff gauge	---	---	---
STG-B (7)	01/28/2003	747293.744	1091618.593	---	---	---	---	---	staff gauge	---	---	---
SB-1	10/24/2001	746635.930	1091770.051	504.98	---	---	---	---	test boring	54	---	---
SB-2	10/25/2001	746517.541	1091445.153	509.82	---	---	---	---	test boring	75	---	---
SB-3	10/22/2001	746522.898	1091140.007	532.96	---	---	---	---	test boring	30	---	---

Vibrating wire piezometer (PZ-1 and PZ-1B) water levels are calculated from ground surface

Staff Gauge (STG) water levels are calculated from top of staff gauge

Piezometers PZ-3 and PZ-4 have flushmount protective casing (9/16 inch screws)

Table 3-4
Amenia Town Landfill
Summary of Water Monitoring Points

Name	Sensor Depth (from ground)	Elevation Top of Staff Gauge	Riser/ Screen Material	Screen length		Depth to Top of Bedrock (nominal)	Elevation Top of Bedrock	Depth to Bottom of steel casing	Nominal Depth to Top of Gravel Pack	Nominal Depth to Bottom of Waste	Nominal Elev. to Bottom of Waste
MW-1	---	---	2-in PVC	10	stickup	---	---	---	15	14.3	487.12
MW-2	---	---	2-in PVC	10	stickup	---	---	---	19	22.5	483.12
MW-2B	---	---	2-in PVC	10	stickup	68	438.09	78	102	---	---
MW-3	---	---	2-in PVC	10	stickup	---	---	---	19	---	---
MW-4	---	---	2-in PVC	10	stickup	---	---	---	26	---	---
MW-4B	---	---	2-in PVC	10	stickup	66	444.68	76	89	---	---
MW-5	---	---	2-in PVC	10	stickup	23	498.01	---	20	---	---
MW-6	---	---	2-in PVC	10	stickup	---	---	---	41	50	482.97
MW-7	---	---	2-in PVC	10	stickup	---	---	---	20	---	---
MW-8	---	---	2-in PVC	10	stickup	---	---	---	16	18	487.50
MW-8B	---	---	2-in PVC	10	stickup	71	435.26	81	104	---	---
MW-9	---	---	2-in PVC	10	stickup	20	503.54	---	44	---	---
PZ-1	36.62	---	VW sensor	---	stickup	---	---	---	31	24	483.42
PZ-1B	77.05	---	VW sensor	---	stickup	52	455.00	---	73	---	---
PZ-3 (2)	---	---	1-in PVC	10	flush	---	---	---	8	---	---
PZ-4 (3)	---	---	1-in PVC	5	flush	---	---	---	3	---	---
STG-0	---	487.31	stick in mud	---	stickup	---	---	---	---	---	---
STG-1	---	486.56	stick in mud	---	stickup	---	---	---	---	---	---
STG-2	---	487.57	stick in mud	---	stickup	---	---	---	---	---	---
STG-3	---	481.30	culvert	---	culvert	---	---	---	---	---	---
STG-4	---	481.81	stick in mud	---	stickup	---	---	---	---	---	---
STG-5	---	484.14	stick in mud	---	stickup	---	---	---	---	---	---
STG-A (6)	---	478.62	stick in mud	---	stickup	---	---	---	---	---	---
STG-B (7)	---	479.68	stick in mud	---	stickup	---	---	---	---	---	---
SB-1	---	---	tremie grout	---	grouted	42	462.98	---	---	24	480.98
SB-2	---	---	tremie grout	---	grouted	62	447.82	---	---	18	491.82
SB-3	---	---	tremie grout	---	grouted	21	511.96	---	---	10	522.96

Vibrating wire piezometer (PZ-1 and PZ-1B) water levels are calculated from ground surface

Staff Gauge (STG) water levels are calculated from top of staff gauge

Piezometers PZ-3 and PZ-4 have flushmount protective casing (9/16 inch screws)

Table 3-4
Amenia Town Landfill
Summary of Water Monitoring Points

Name	01/21/2002 Depth to Water	01/21/2002 Water Elevation	02/12/2002 Depth to Water	02/12/2002 Water Elevation	03/05/2002 Depth to Water	03/05/2002 Water Elevation	04/03/2002 Depth to Water	04/03/2002 Water Elevation	04/04/2002 Depth to Water	04/04/2002 Water Elevation
MW-1	21.95	**481.94**	21.90	**481.99**	21.84	**482.05**	21.72	**482.17**	---	---
MW-2	26.75	**481.22**	26.70	**481.27**	26.65	**481.32**	26.51	**481.46**	---	---
MW-2B	25.83	**482.47**	25.68	**482.62**	25.76	**482.54**	25.63	**482.67**	---	---
MW-3	27.25	**479.74**	27.95	**479.04**	27.19	**479.80**	27.07	**479.92**	---	---
MW-4	32.85	**479.92**	32.79	**479.98**	32.81	**479.96**	32.62	**480.15**	---	---
MW-4B	31.41	**480.94**	31.35	**481.00**	31.30	**481.05**	31.06	**481.29**	---	---
MW-5	29.60	**493.90**	29.25	**494.25**	28.81	**494.69**	28.79	**494.71**	---	---
MW-6	52.14	**483.20**	52.08	**483.26**	52.07	**483.27**	51.97	**483.37**	51.97	**483.37**
MW-7	29.71	**482.45**	30.18	**481.98**	29.58	**482.58**	29.46	**482.70**	29.46	**482.70**
MW-8	25.85	**481.89**	---	---	25.74	**482.00**	25.58	**482.16**	---	---
MW-8B	24.10	**484.52**	---	---	24.18	**484.44**	23.91	**484.71**	---	---
MW-9	41.31	**484.62**	38.90	**487.03**	38.99	**486.94**	37.20	**488.73**	---	---
PZ-1	---	---	-26.89	**480.53**	-26.54	**480.88**	---	**480.95**	---	---
PZ-1B	---	---	-26.36	**480.64**	-26.49	**480.51**	---	**481.18**	---	---
PZ-3 (2)	---	---	---	---	---	---	---	---	---	---
PZ-4 (3)	---	---	---	---	---	---	---	---	---	---
STG-0	---	---	---	---	---	---	3.35	**483.96**	3.31	**484.00**
STG-1	---	---	---	---	3.33	**483.23**	3.47	**483.09**	3.45	**483.11**
STG-2	---	---	---	---	4.35	**483.22**	4.48	**483.09**	4.46	**483.11**
STG-3	---	---	---	---	---	---	2.45	**478.85**	---	---
STG-4	---	---	---	---	---	---	---	---	---	---
STG-5	---	---	---	---	---	---	---	---	---	---
STG-A (6)	---	---	---	---	---	---	---	---	---	---
STG-B (7)	---	---	---	---	---	---	---	---	---	---

Vibrating wire piezometer (PZ-1 and PZ-1B) water levels are calculated from ground surface

Staff Gauge (STG) water levels are calculated from top of staff gauge

Piezometers PZ-3 and PZ-4 have flushmount protective casing (9/16 inch screws)

PZ-3 and PZ-4 are referred to in this document as PZ-2 and PZ-3, respectively

STG-A and STG-B are referred to in this document as STG-6 and STG-7, respectively

Table 3-4
Amenia Town Landfill
Summary of Water Monitoring Points

Name	06/07/2002 Depth to Water	06/07/2002 Water Elevation	01/28/2003 Depth to Water	01/28/2003 Water Elevation	02/05/2003 Depth to Water	02/05/2003 Water Elevation	05/15/2003 Depth to Water	05/15/2003 Water Elevation
MW-1	20.92	**482.97**	---	---	21.91	**481.98**	21.72	**482.17**
MW-2	25.83	**482.14**	---	---	26.74	**481.23**	26.65	**481.32**
MW-2B	24.58	**483.72**	---	---	25.49	**482.81**	25.56	**482.74**
MW-3	26.29	**480.70**	---	---	27.42	**479.57**	27.41	**479.58**
MW-4	31.94	**480.83**	---	---	32.69	**480.08**	32.71	**480.06**
MW-4B	30.39	**481.96**	---	---	31.31	**481.04**	31.27	**481.08**
MW-5	27.51	**495.99**	---	---	29.51	**493.99**	29.49	**494.01**
MW-6	51.05	**484.29**	---	---	37.60	**497.74**	51.68	**483.66**
MW-7	28.53	**483.63**	---	---	29.44	**482.72**	29.23	**482.93**
MW-8	24.62	**483.12**	---	---	25.72	**482.02**	25.60	**482.14**
MW-8B	22.95	**485.67**	---	---	23.69	**484.93**	23.58	**485.04**
MW-9	32.23	**493.70**	---	---	**lock froze, couldn't open**		35.99	**489.94**
PZ-1	see worksheet	**481.94**	---	---	see worksheet	**480.68**	see worksheet	**480.45**
PZ-1B	see worksheet	**482.35**	---	---	see worksheet	**481.15**	see worksheet	**481.02**
PZ-3 (2)	---	---	22.11	**478.08**	22.04	**478.15**	22.16	**478.03**
PZ-4 (3)	---	---	7.04	**476.86**	6.79	**477.11**	6.82	**477.08**
STG-0	2.63	**484.68**	---	---	**base of gauge frozen**		**too deep**	**—**
STG-1	2.78	**483.78**	---	---	**base of gauge frozen**		2.37	**484.19**
STG-2	3.77	**483.80**	---	---	4.99	**482.58**	3.43	**484.14**
STG-3	1.72	**479.58**	---	---	2.27	**479.03**	2.50	**478.80**
STG-4	3.76	**478.05**	---	---	5.48	**476.33**	5.14	**476.67**
STG-5	4.51	**479.63**	---	---	6.58	**477.56**	5.8	**478.34**
STG-A (6)	---	---	1.44	**477.18**	2.27	**476.35**	1.98	**476.64**
STG-B (7)	---	---	2.35	**477.33**	2.91	**476.77**	2.41	**477.27**

Vibrating wire piezometer (PZ-1 and PZ-1B) water levels are calculated from ground surface

Staff Gauge (STG) water levels are calculated from top of staff gauge

Piezometers PZ-3 and PZ-4 have flushmount protective casing (9/16 inch screws)

PZ-3 and PZ-4 are referred to in this document as PZ-2 and PZ-3, respectively

STG-A and STG-B are referred to in this document as STG-6 and STG-7, respectively

Table 3-5
Amenia Town Landfill
Vibrating Wire Piezometer Readings

PZ-1	
Sensor Depth	36.62
Ground Elev:	507.42
Sensor Serial No.	62619
Calibration Factor	0.01829
Temp. Factor	-0.02053
Initial Gauge	8778.4
Initial Temp	17.9
Initial Baro	1017

PZ-1B	
Sensor Depth	77.05
Ground Elev:	507.00
Sensor Serial No.	62620
Calibration Factor	0.01544
Temp. Factor	-0.03007
Initial Gauge	8872.9
Initial Temp	14.6
Initial Baro	1019

Date	Time	Gauge Reading	Temp. deg C	Bar. Pressure mBar	Pressure psi	Piezometric Elevation ft	Date	Time	Gauge Reading	Temp. deg C	Bar. Pressure mBar	Pressure psi	Piezometric Elevation ft	Piezometric Difference ft	Upward Gradient
---	---	---	---	---	---	---	11/1/01	10:40	7452.8	11.8	1019	22.011	480.73		
11/2/01	10:40	8536.7	13.8	1017	4.505	481.19	11/2/01	8:55	7465	11.0	1017	21.875	480.42	-0.77	-0.01914
11/5/01	13:40	8548.2	11.4	1012	4.416	480.99	11/5/01	1338	7476	11.0	1012	21.778	480.19	-0.79	-0.01964
11/6/01	10:36	8545.5	11.4	1015	4.422	481.00	11/6/02	10:38	7471.8	11.0	1015	21.799	480.24	-0.76	-0.01876
2/12/02 *	12:17	8555.0	11.5	1017	4.217	480.53	2/12/02 *	12:21	7458.6	11.1	1017	21.973	480.64	0.11	0.00282
3/5/02	12:20	8544.2	11.6	1020	4.369	480.88	3/5/02	12:29	7458.6	11.0	1021	21.916	480.51	-0.37	-0.00908
4/3/02	10:30	8556.0	11.6	1003	4.400	480.95	4/3/02	10:30	7456.8	11.0	1003	22.205	481.18	0.23	0.00565
6/7/02	13:37	8529.4	11.5	1007	4.831	481.94	6/7/02	13:46	7420.2	11.0	1007	22.712	482.35	0.41	0.01002
2/5/03	10:20	8552.2	11.5	1016	4.283	480.68	2/5/03	10:16	7445.5	11.0	1016	22.191	481.15	0.47	0.01153
5/15/03 **	11:20	8548.0	11.6	1028	4.184	480.45	5/15/03 **	11:20	7437.7	11.0	1028	22.137	481.02	0.57	0.01413

* Barometric pressure from Amenia weather (Yahoo.com) - 2/13/2002 0900 - 30.03 inches = 1017 psi

** Barometric pressure from Amenia weather (Yahoo.com) - 5/16/2003 0700 - 30.33 inches (and rising) = 1028 psi

Other barametric readings from portable digital barometer

Table 4-1
Amenia Town Landfill
Hydraulic Conductivity Test Results
January 28, 2002

Unconfined Wells

Well	Rising Head or Falling Head	Hydraulic Conductivity (cm/sec)	Hydraulic Conductivity (ft/min)
MW-1	Rising	0.04001	0.07876
MW-2	Rising	0.00225	0.004431
MW-3	Rising	0.00450	0.0088551
MW-4	Rising	0.09444	0.1859
MW-5	Rising	0.01292	0.02543
MW-6	Rising	not usable	not usable
MW-8	Rising	0.09083	0.1788
MW-9	Rising	0.00385	0.007576

Range of hydraulic conductivities:
0.0023 cm/sec to 0.094 cm/sec
0.0044 ft/min to 0.19 ft/min
Average hydraulic conductivity:
0.04082 cm/sec
0.080 ft/min

Confined Bedrock Wells

Well	Rising Head or Falling Head	Hydraulic Conductivity (cm/sec)	Hydraulic Conductivity (ft/min)
MW-2B	Falling	0.00027	0.000538
MW-2B	Rising	not usable	not usable
MW-4B	Rising	0.000017	0.0000339
MW-4B	Falling	0.00018	0.000355
MW-8B	Falling	0.00066	0.001295
MW-8B	Rising	0.00023	0.0004622

Range of hydraulic conductivities:
0.000017 cm/sec to 0.0039 cm/sec
0.000034 ft/min to 0.0076 ft/min
Average hydraulic conductivity:
0.000273 cm/sec
0.00054 ft/min

Table 5-1
Amenia Town Landfill
Inorganic Surface Soil Results - November 28, 2001
Background Samples and Average Concentrations

Inorganic Constituents (mg/kg)	NYSDEC 4046 mg/kg	North BG-1	South BG-2	South BG-3	Average
Aluminum	SB	7,820	12,500	11,900	**10,740**
Antimony	SB	0.51 U	0.56 U	0.55 U	**0.54 U**
Arsenic	7.5	1.40	5.50	5.40	**4.10**
Barium	300	23.90	43.10	79.40	**48.80**
Beryllium	0.16	0.33	0.68	0.78	**0.60**
Cadmium	1	0.023 U	0.026 U	0.025 U	**0.025 U**
Calcium	SB	1,860	3,890	951	**2,234**
Chromium	10	9.20	16.40	14.80	**13.47**
Cobalt	30	5.40	14.20	9.40	**9.67**
Copper	25	26.70	43.80	20.60	**30.37**
Iron	2,000	16,600	31,200	28,000	**25,267**
Lead	SB	24.00	27.30	47.30	**32.87**
Magnesium	SB	4,420	7,920	4,490	**5,610**
Manganese	SB	541	1,030	989	**853**
Mercury	0.1	0.039	0.058	0.18	**0.09**
Nickel	13	16.40	30.60	22.20	**23.07**
Potassium	SB	625	1,020	552	**732**
Selenium	2	0.58 U	0.64 U	0.62 U	**0.61 U**
Silver	SB	0.33 U	0.36 U	0.69	**0.46**
Sodium	SB	33.8 U	37.3 U	36.2 U	**35.7 U**
Thallium	SB	0.66 U	0.73 U	0.71 U	**0.70 U**
Vanadium	150	13.30	22.10	24.10	**19.83**
Zinc	20	49.30	76.10	82.90	**69.43**
Cyanide	SB	0.42	0.22	0.23	**0.29**

Cleanup objectives from NYSDEC TAGM 4046, January 24, 1994

SB = site background

U = undetected

Table 5-2
Amenia Town Landfill
SVOC Surface Soil Results - November 28, 2001
Top of Landfill Samples

SVOCs (ug/kg)	NYSDEC 4046 ug/kg	SS-1	SS-1 SS-Dup2	SS-2	SS-3	SS-4
2-Chlorophenol	800	---	---	---	---	---
Bis(2-ethylhexyl)phthalate	50,000	91.9 J	77.5 J	---	1,350	---
Chrysene	400	37.1 J	---	---	---	---
Fluoranthene	50,000	56.0 J	63.9 J	---	---	---
Phenol	30	---	---	---	---	---
Pyrene	50,000	65.2 J	96.1 J	---	---	---

SVOCs (ug/kg)	NYSDEC 4046 ug/kg	SS-5	SS-6	SS-7	SS-8	SS-9	FB112801 Field Blank ug/l
2-Chlorophenol	800	---	---	---	---	84.9 J	---
Bis(2-ethylhexyl)phthalate	50,000	89.8 J	---	55.6 J	115 J	---	---
Chrysene	400	---	---	---	---	---	---
Fluoranthene	50,000	---	---	---	49.3 J	---	---
Phenol	30	---	---	---	---	4,090	---
Pyrene	50,000	---	---	---	65.0 J	---	---

Cleanup objectives from NYSDEC TAGM 4046, January 24, 1994

SVOC = Semivolatile organic compound

Samples collected November 28, 2001

J = Analyte detected below reporting limits

--- = undetected

Table 5-2
Amenia Town Landfill
PCB Surface Soil Results - November 28, 2001
Top of Landfill Samples

PCBs (ug/kg)	SS-1	SS-DUP2 SS-1 Duplicate	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	FB112801 Field Blank ug/l
Aroclor 1016	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1242	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1248	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1254	35.7 J	48.3	---	508 J	---	---	27.2 J	448	2,760 J	1,140	0.206 J
Aroclor 1260	---	---	---	---	---	---	---	---	---	---	---
PCBs Total	35.7	48.3	---	508	---	---	27.2	448	2,760	1,140	0.206

PCBs = Polychlorinated biphenyls

--- = undetected

J = Analyte detected below reporting limits

EPA Method 8082

Detection limit (nominal) = 21.6 ug/kg, except Aroclor 1221 = 43.1 ug/kg

NYSDEC 4046 Cleanup Objective for PCB in surface soil = 1,000 ug/kg

Cleanup objective from NYSDEC TAGM 4046, January 24, 1994

1,000 ug/kg (parts per billion) = 1 mg/kg (parts per million)

SS-1 through SS-9 collected November 28, 2001

Table 5-2
Amenia Town Landfill
Inorganic Surface Soil Results - November 28, 2001
Top of Landfill Samples

Inorganic Constituents (mg/kg)	NYSDEC 4046 mg/kg	Site Background Range Low	Site Background Range High	SS-1	SS-DUP1 SS-1 Duplicate	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9
Aluminum	SB	7,820	12,500	11,100E	9,810 E	10,000 E	9,180 E	12,000 E	14,000 E	13,900 E	11,300 E	16,000 E	7,160 E
Antimony	SB	0.51 U	0.56 U	0.52 UN	0.52 UN	0.51 U	0.55 UN	0.55 UN	0.56 UN	0.49 UN	0.5 UJ	0.57 UN	0.49 UN
Arsenic	7.5	1.4	5.5	0.88 B	0.79 U	0.97 B	2.6 B	2.3 B	1.3 B	1.2 B	0.76 U	1.9 B	0.87 B
Barium	300	23.9	79.4	34.8	40.2	44.6	30.2	35.7	42.1	85.1	49.7	73.9	22.5
Beryllium	0.16	0.33	0.78	0.45 B	0.46 B	0.50 B	0.47 B	0.61 B	0.7	0.63	0.54 B	0.75	0.35 B
Cadmium	1	0.023 U	0.026 U	0.024 U	0.023 U	0.023 U	0.025 U	0.025 U	0.025 U	0.022 U	0.023 U	0.026 U	0.022 U
Calcium	SB	951	3,890	18,300	13,500	21,400	27,800	7,280	3,520	8,700	30,800	10,400	46,300
Chromium	10	9.2	16.4	14.9 E	13.3 E	11.3 E	14 E	16.6 E	18.6 E	17.9 E	15.9 E	21.7 E	10.9 E
Cobalt	30	5.4	14.2	10.7 E	9.8 E	10.3 E	13.5 E	14.9 E	15.5 E	17.2 E	11.9 E	16 E	11.1 E
Copper	25	20.6	43.8	34.8 E	33.4 E	25.8 E	46.9 E	46.8 E	43.3 E	44.7 E	47.1 E	65.1 E	34.4 E
Iron	2,000	16,600	31,200	26,700	23,100	23,800	27,300	28,700	31,000	30,800	26,300	34,700	23,200
Lead	SB	24	47.3	44.6 E	44.8 E	17.6 E	36.8 E	24.5 E	19.6 E	37.7 E	42.6 E	89.7 E	22.5 E
Magnesium	SB	4,420	7,920	16,300	11,700	14,800	18,800	10,200	9,530	12,000	22,300	12,600	22,800
Manganese	SB	541	1,030	764 E	888 E	997 E	821 E	874 E	1,070 E	1,370 E	819 E	668 E	660 E
Mercury	0.1	0.039	0.18	0.044 B	0.041 BN	0.026 BN	0.05 BN	0.02 UN	0.021 UN	0.018 UN	0.11 N	0.16 N	0.019 UN
Nickel	13.0	16.4	30.6	24.2 E	22.6 E	21.5 E	28.8 E	31.6 E	33.0 E	33.8 E	25.2 E	37.4 E	23.6 E
Potassium	SB	552	1,020	1,380	1,080	681	1,890	2,150	2,250	1,810	2,010	2,180	1,280
Selenium	2	0.58 U	0.64 U	0.59 U	0.59 U	0.58 U	0.63 U	0.62 U	0.63 U	0.56 U	0.57 U	0.65 U	0.55 U
Silver	SB	0.33 U	0.69	0.33 U	0.33 U	0.33 U	0.35 U	0.35 U	0.35 U	0.31 U	0.32 U	0.36 U	0.31 U
Sodium	SB	33.8 U	37.3 U	41.1 B	34.2 U	33.9 U	36.6 U	41.4 B	51.3 B	33 B	73.7 B	47.1 B	33 B
Thallium	SB	0.66 U	0.73 U	0.68 U	0.67 U	0.66 U	0.72 U	0.71 U	0.72 U	0.63 U	0.65 U	0.74 U	0.63 U
Vanadium	150	13.3	24.1	17.5 E	15.9 E	14.8 E	17.1 E	22.9 E	26.9 E	23.5 E	30.6 E	29.8 E	12.3 E
Zinc	20	49.3	82.9	99.5 E	86.9 E	61.4 E	87.5 E	76.1 E	77.4 E	114 E	118 E	281 E	74.2 E
Cyanide	SB	0.22	0.42	0.23 B	0.14 B	0.20 B	0.19 B	0.23 B	0.22 B	0.13 B	0.16 B	0.47 B	0.13 B

SS-1 through SS-9 collected November 28, 2001

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

U = undetected

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

SB = Site background

Cleanup objectives from NYSDEC TAGM 4046, January 24, 1994

T 5-3

Amenia Town Landfill

PCB Surface Soil Results - November 27, 2001

Perimeter Samples - West Slope

PCBs (ug/kg)	SS-W1	SS-W2	SS-W3	SS-W4	SS-W5	SS-W6	DUP-1 SS-W6 Duplicate	SS-W7	SS-W8
Aroclor 1016	---	---	---	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---	---	---	---
Aroclor 1242	5,900 J	3,360	12,100 J	29,700 J	15,900 J	862 J	988 J	---	---
Aroclor 1248	---	---	---	---	---	---	---	---	---
Aroclor 1254	7,760 J	3,050 J	8,300 J	33,900 J	9,270 J	1,790	1,860 J	1,410 J	---
Aroclor 1260	---	---	---	---	---	---	---	---	---
PCBs Total	13,660	6,410	20,400	63,600	25,170	2,652	2,848	1,410	---

PCBs (ug/kg)	SS-W9	SS-W10	SS-W11	SS-W12	SS-W13	SS-W14	SS-W15	FB112701 Field Blank (ug/l)
Aroclor 1016	---	---	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---	---	---
Aroclor 1242	---	---	1,010 J	---	---	---	---	---
Aroclor 1248	248	---	---	---	---	---	---	---
Aroclor 1254	544	56.5	1,670	25.3 J	---	---	28.6 J	---
Aroclor 1260	---	---	---	---	---	---	---	---
PCBs Total	792.0	56.5	2,680	25.3	---	---	28.6	---

Detection limit (nominal) = 21.6 ug/kg, except Aroclor 1221 = 43.1 ug/kg

NYSDEC 4046 Cleanup Objective for PCB in surface soil = 1,000 ug/kg

Cleanup objective from NYSDEC TAGM 4046, January 24, 1994

1,000 ug/kg (parts per billion) = 1 mg/kg (parts per million)

SS-W1 through SS-W15 collected November 27, 2001

PCBs = Polychlorinated biphenyls

--- = undetected

J = Analyte detected below reporting limits

EPA Method 8082

Amenia Town Landfill
Inorganic Surface Soil Results - November 27, 2001
Perimeter Samples - West Slope

Inorganic Constituents (mg/kg)	NYSDEC 4046 mg/kg	Site Background Range Low	Site Background Range High	SS-W1	SS-W2	SS-W3	SS-W4	SS-W5	SS-W6	SS-DUP1 SS-W6 Duplicate	SS-W7
Aluminum	SB	7,820 E	12,500 E	15,900 E	12,200 E	17,900 E	14,900 E	17,100 E	14,900 E	13,000 E	10,300 E
Antimony	SB	0.51 UN	0.56 UN	7.3 N	3.5 N	9.3 N	6.3 N	5.8 N	6.1 N	5.3 N	44.3 N
Arsenic	7.5	1.4 B	5.5	0.86 U	0.96 U	0.92 U	0.86 U	1.7 B	0.91 U	0.86 U	0.97 U
Barium	300	23.9	79.4	62.3 E	19.9 E	50.5 E	48.0 E	55.2 E	42.8 E	41.2 E	432 E
Beryllium	0.16	0.33 B	0.78	0.45 B	0.4 B	0.5 B	0.46 B	0.48 B	0.34 B	0.43 B	0.32 B
Cadmium	1	0.023 U	0.026 U	1.1	0.59 B	1.3	1.7	0.97	0.82	0.65	7.7
Calcium	SB	951	3,890	30,900 E	24,100 E	27,900 E	28,800 E	42,200 E	18,700 E	30,500 E	8,720 E
Chromium	10	9.2 E	16.4 E	12.4 E	10.5 E	14.1 E	12.8 E	13.3 E	10.7 E	9.1 E	72.9 E
Cobalt	30	5.4 E	14.2 E	19.8	11.9	16.0	13.5	14.7	11.3	12.5	19.0
Copper	25	20.6 E	43.8 E	40.3	61.9	68.0	59.2	62.2	42.5	39.9	335
Iron	2,000	16,600	31,200	33,900	27,600	45,300	32,800	36,700	31,800	34,400	273,000
Lead	SB	24 E	47.3 E	R	R	R	R	R	R	R	R
Magnesium	SB	4,420	7,920	23,800 E	20,800 E	24,500 E	23,900 E	23,500 E	18,700 E	22,800 E	7,580 E
Manganese	SB	541 E	1,030 E	1,310 *	416 *	764 *	708 *	798 *	665 *	715 *	1,660 *
Mercury	0.1	0.039 BN	0.18 N	0.075 N	0.079 BN	0.11 N	0.12 N	0.1 N	0.05 BN	0.041 BN	7.0 N
Nickel	13.0	16.4 E	30.6 E	32.3	27.3	44.2	31.0	32.9	25.9	32.8	52.0
Potassium	SB	552	1,020	1,680 EN	1,160 EN	1,680 EN	1,590 EN	1,850 EN	1,130 EN	1,140 EN	1,000 EN
Selenium	2	0.58 U	0.64 U	3.3 *	0.53 U	0.51 U*	1.7 B*	3.6 *	0.5 U*	0.48 U*	0.54 U*
Silver	SB	0.33 U	0.69 B	0.33 U	0.37 U*N	0.35 U*N	0.33 U*N	0.35 U*N	0.35 U*N	0.33 U*N	0.37 U*N
Sodium	SB	33.8 U	37.3 U	110 B	33.4 B	51.0 B	60.4 B	63.3 B	38.9 B	36.8 B	201
Thallium	SB	0.66 U	0.73 U	0.99 U	1.1 U	1.1 U	1.0 U	1.1 U	1.1 U	1.0 U	1.1 U
Vanadium	150	13.3 E	24.1 E	24.7	21.2	32.0	25.9	29.2	22.8	23.7	90.9
Zinc	20	49.3 E	82.9 E	152	127	288	218	260	178	213	943
Cyanide	SB	0.22 B	0.42 B	0.12 B	0.15 B	0.23 B	0.22 B	0.15 B	0.099 B	0.13 B	0.07 U

SS-W1 through SS-W15 collected November 27, 2001

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

U = undetected

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

R = data rejected through validation

SB = Site background

Cleanup objectives from NYSDEC TAGM 4046, January 24, 1994

* = duplicate analysis not within control limits (RPD > 20%)

Amenia Town Landfill
Inorganic Surface Soil Results - November 27, 2001
Perimeter Samples - West Slope

Inorganic Constituents (mg/kg)	NYSDEC 4046 mg/kg	Site Background Range Low	Site Background Range High	SS-W8	SS-W9	SS-W10	SS-W11	SS-W12	SS-W13	SS-W14	SS-W15	FB112701 ug/l
Aluminum	SB	7,820 E	12,500 E	11,300 E	14,100 E	12,100 E	12,700 E	16,000 E	16,400 E	18,900 E	20,400 E	34.3 B
Antimony	SB	0.51 UN	0.56 UN	28.3 N	15.0 N	5.3 N	5.9 N	13.3 N	8.2 N	11.1 N	10.8 N	4.5 U
Arsenic	7.5	1.4 B	5.5	0.85 U	0.91 U	0.86 U	0.84 U	0.94 U	1.0 U	0.84 U	0.77 U	5.2 U
Barium	300	23.9	79.4	456 E	1,240 E	67.3 E	632 E	97.8 E	58.1 E	49.7 E	38.1 E	0.2 U
Beryllium	0.16	0.33 B	0.78	0.41 B	0.57 B	0.51 B	0.45 B	0.65	0.64 B	0.74	0.74	0.49 B
Cadmium	1	0.023 U	0.026 U	5.9	4.9	0.82	1.1	1.6	0.5 B	0.43 B	0.13 B	0.43 B
Calcium	SB	951	3,890	17,100 E	13,800 E	18,900 E	34,800 E	15,400 E	4,090 E	1,160 E	82.2 E	75.5 B
Chromium	10	9.2 E	16.4 E	83.5 E	40.9 E	12.5 E	16.0 E	14.7 E	12.6 E	12.3 E	15.0 E	0.71 B
Cobalt	30	5.4 E	14.2 E	19.3	17.3	16.0	12.1	21.7	14.8	15.7	10.4	0.4 U
Copper	25	20.6 E	43.8 E	609	260	49.8	71.8	83.6	24.3	35.7	23.8	2.7 U
Iron	2,000	16,600	31,200	205,000	66,300	31,800	40,700	63,200	28,600	34,900	33,300	18.0 U
Lead	SB	24 E	47.3 E	R	R	R	R	R	R	R	R	1.4 U
Magnesium	SB	4,420	7,920	10,600 E	12,000 E	17,500 E	24,800 E	17,100 E	8,430 E	10,200 E	8,940 E	24.1 U
Manganese	SB	541 E	1,030 E	1,530 *	1,480 *	1,380 *	987 *	1,440 *	890 *	810 *	346 *	0.3 U
Mercury	0.1	0.039 BN	0.18 N	5.9 N	3.3 N	0.18 N	0.23 N	0.14 N	0.15 N	0.083 N	0.11 N	0.1 U
Nickel	13.0	16.4 E	30.6 E	88.6	68.0	29.5	30.9	42.5	30.4	33.0	27.8	0.4 U
Potassium	SB	552	1,020	1,460 EN	2,130 EN	1,270 EN	1,590 EN	1,450 EN	842 EN	983 EN	650 EN	196 U
Selenium	2	0.58 U	0.64 U	0.47 U*	0.5 U*	1.3 B*	0.46 U*	0.52 U*	0.56 U*	0.47 U*	0.42 U*	5.0 U
Silver	SB	0.33 U	0.69 B	0.32 U*N	18.0 *N	0.33 U*N	0.32 U*N	0.99 B*N	0.39 U*N	0.32 U*N	0.29 U*N	3.4 U
Sodium	SB	33.8 U	37.3 U	246	265	43.9 B	101 B	70.2 B	31.0 B	29.3 B	28.2 B	122 U
Thallium	SB	0.66 U	0.73 U	0.99 U	1.1 U	1.0 U	0.97 U	1.1 U	1.2 U	0.98 U	0.89 U	4.6 U
Vanadium	150	13.3 E	24.1 E	70.0	47.4	25.5	31.2	37.6	31.8	31.4	39.9	0.6 U
Zinc	20	49.3 E	82.9 E	1,800	3,010	221	266	369	99.1	101	87.3	0.7 U
Cyanide	SB	0.22 B	0.42 B	0.78	0.72	0.07 B	0.22 B	0.18 B	0.17 B	0.13 B	0.056 U	1.0 U

SS-W1 through SS-W15 collected November 27, 2001

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

U = undetected

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

* = Duplicate analysis not within control limits (RPD > 20%)

R = data rejected through validation

SB = Site background

Cleanup objectives from NYSDEC TAGM 4046, January 24, 1994

Table 5-4
Amenia Town Landfill
PCB Surface Soil Results - November 28, 2001
Perimeter Samples - North Slope

PCBs (ug/kg)	SS-N1	SS-N2	SS-N3	SS-N4	SS-N5	SS-N6
Aroclor 1016	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---
Aroclor 1242	---	---	---	---	---	---
Aroclor 1248	---	---	---	---	---	---
Aroclor 1254	61 J	104 J	785 J	4,190 J	595 J	500 J
Aroclor 1260	---	---	---	---	---	---
PCBs Total	61	104	785	4,190	595	500

PCBs = Polychlorinated biphenyls

— = undetected

J = Analyte detected below reporting limits

EPA Method 8082

Detection limit (nominal) = 21.6 ug/kg, except Aroclor 1221 = 43.1 ug/kg

NYSDEC 4046 Cleanup Objective for PCB in surface soil = 1,000 ug/kg

Cleanup objective from NYSDEC TAGM 4046, January 24, 1994

1,000 ug/kg (parts per billion) = 1 mg/kg (parts per million)

SS-N1 through SSN-6 collected November 28, 2001

Table 5-4
Amenia Town Landfill
Inorganic Surface Soil Results - November 28, 2001
Perimeter Samples - North Slope

Inorganic Constituents (mg/kg)	NYSDEC 4046 mg/kg	Site Background Range Low	Site Background Range High	SS-N1	SS-N2	SS-N3	SS-N4	SS-N5	SS-N6	FB112801
Aluminum	SB	7,820 E	12,500 E	12,300 E	6,470 E	6,400 E	7,220 E	5,520 E	8,480 E	--
Antimony	SB	0.51 UN	0.56 UN	0.55 UN	0.54 UN	0.53 UN	0.62 UN	0.45 UN	0.57 UN	--
Arsenic	7.5	1.4 B	5.5	2.6 B	0.83 U	0.8 U	0.94 U	0.69 U	0.87 U	--
Barium	300	23.9	79.4	77.2	20.6	21.8	23.7	13.5	28.4	--
Beryllium	0.16	0.33 B	0.78	0.62 B	0.29 B	0.3 B	0.3 B	0.26 B	0.34 B	--
Cadmium	1	0.023 U	0.026 U	0.025 U	0.025 U	0.024 U	0.028 U	0.021 U	0.026 U	0.27 B
Calcium	SB	951	3,890	2,210	35,300	23,100	29,700	46,100	21,400	124 B
Chromium	10	9.2 E	16.4 E	13.7 E	9.3 E	3.9 E	10.1 E	8.3 E	11.8 E	1.1 B
Cobalt	30	5.4 E	14.2 E	10 E	10.7 E	10.1 E	10.3 E	8.3 E	10.6 E	--
Copper	25	20.6 E	43.8 E	25.3 E	37.3 E	34.5 E	37.4 E	25.8 E	37.7 E	--
Iron	2,000	16,600	31,200	26,400	21,900	22,000	22,200	17,000	23,200	--
Lead	SB	24 E	47.3 E	39.6 E	22.8 E	20.7 E	29.3 E	12.1 E	25.3 E	--
Magnesium	SB	4,420	7,920	4,890	20,000	14,500	18,700	22,200	15,700	--
Manganese	SB	541 E	1,030 E	1,240 E	520 E	753 E	593 E	586 E	703 E	--
Mercury	0.1	0.039 BN	0.18 N	0.12 N	0.03 BN	0.047 BN	0.061 BN	0.017 UN	0.058 BN	--
Nickel	13.0	16.4 E	30.6 E	22.1 E	22.7 E	21.9 E	23.1 E	17.9 E	22.8 E	--
Potassium	SB	552	1,020	575	1,100	1,140	933	915	1,010	--
Selenium	2	0.58 U	0.64 U	0.63 U	0.62 U	0.6 U	0.71 U	0.52 U	0.65 U	--
Silver	SB	0.33 U	0.69 B	0.35 U	0.35 U	0.34 U	0.39 U	0.29 U	0.36 U	--
Sodium	SB	33.8 U	37.3 U	36.5 U	36.8 B	34.8 U	41 U	30.1 U	37.7 U	--
Thallium	SB	0.66 U	0.73 U	0.71 U	0.7 U	0.68 U	0.8 U	0.59 U	0.74 U	--
Vanadium	150	13.3 E	24.1 E	20.7 E	12 E	12.1 E	13.7 E	9.2 E	13.9 E	--
Zinc	20	49.3 E	82.9 E	79.7 E	56.3 E	66.5 E	72.7 E	45.3 E	84 E	0.70 B
Cyanide	SB	0.22 B	0.42 B	0.26 B	0.15 B	0.27 B	0.31 B	0.078 B	0.19 B	1.1 B

SS-N1 through SS-N6 collected November 28, 2001

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

U = undetected

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

SB = Site background

Cleanup objectives from NYSDEC TAGM 4046, January 24, 1994

-- = undetected in field blank

Table 5-5
Amenia Town Landfill
VOC Post-Excavation Soil Results
November 8 and November 9, 2001

VOCs (ug/kg)	NYSDEC 4046 ug/kg	PE-1	PE-2	PE-3	PE-4	PE-5	PE-5 Duplicate	PE-6	PE-7	PE-8	PE-9	Field Blank FB-1 (ug/l)
Tetrachloroethene	1,400	1.83 J	---	---	---	---	---	---	---	---	---	---

Cleanup objectives from NYSDEC TAGM 4046, January 24, 1994

VOC = Volatile organic compound

Samples collected 11/08/2001 and 11/09/2001

Samples collected from the 10 to 12 ft depth interval

J = Analyte detected below reporting limits

--- = undetected

Table 5-5
Amenia Town Landfill
SVOC Post-Excavation Soil Results
November 8 and November 9, 2001

SVOCs (ug/kg)	NYSDEC 4046 ug/kg	PE-1	PE-2	PE-3	PE-4	PE-5	PE-5 Duplicate	PE-6	PE-7	PE-8	PE-9	Field Blank FB-1 (ug/l)
Bis(2-ethylhexyl)phthalate	50,000	101 J	---	108 J	---	---	---	---	---	---	---	---
Phenol	30	---	---	84.2 J	---	---	---	---	---	---	---	---

Cleanup objectives from NYSDEC TAGM 4046, January 24, 1994

SVOC = Semivolatile organic compound

Samples collected 11/08/2001 and 11/09/2001

Samples collected from the 10 to 12 ft depth interval

J = Analyte detected below reporting limits

— = undetected

Table 5-5
Amenia Town Landfill
Pesticide Post-Excavation Soil Results
November 8 and November 9, 2001

Pesticides (ug/kg)	NYSDEC 4046 ug/kg	PE-1	PE-2	PE-3	PE-4	PE-5	PE-5 Duplicate	PE-6	PE-7	PE-8	PE-9	Field Blank FB-1 (ug/l)
4,4'-DDE	2,100	3.28 J	---	---	---	---	---	---	---	---	---	---
4,4'-DDT	2,100	2.38 J	---	1.59 J	---	---	---	---	---	---	---	---

Cleanup objective from NYSDEC TAGM 4046, January 24, 1994

1,000 ug/kg (parts per billion) = 1 mg/kg (parts per million)

Samples collected 11/08/2001 and 11/09/2001

Samples collected from the 10 to 12 ft depth interval

J = Analyte detected below reporting limits

--- = undetected

Table 5-5
Amenia Town Landfill
PCB Post-Excavation Soil Results
November 8 and November 9, 2001

PCBs (ug/kg)	PE-1	PE-2	PE-3	PE-4	PE-5	PE-5 Duplicate	PE-6	PE-7	PE-8	PE-9	Field Blank FB-1 (ug/l)
Aroclor 1016	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1242	---	---	37.5	---	---	---	---	---	---	---	---
Aroclor 1248	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1254	---	---	31.2	---	---	---	---	---	---	---	---
Aroclor 1260	10.2 J	---	---	---	---	---	---	---	---	---	---
PCBs Total	10.2 J	---	68.7	---	---	---	---	---	---	---	---

PCBs = Polychlorinated biphenyls

--- = undetected J = Analyte detected below reporting limits

EPA Method 8082

Detection limit (nominal) = 21.6 ug/kg, except Aroclor 1221 = 43.1 ug/kg

NYSDEC 4046 Cleanup Objective for PCB in surface soil = 1,000 ug/kg

NYSDEC 4046 Cleanup Objective for PCB in subsurface soil = 10,000 ug/kg

Cleanup objective from NYSDEC TAGM 4046, January 24, 1994

1,000 ug/kg (parts per billion) = 1 mg/kg (parts per million)

Samples collected 11/08/2001 and 11/09/2001

Samples collected from the 10 to 12 ft depth interval

Table 5-5
Amenia Town Landfill
Inorganic Post Excavation Soil Results
November 8 and November 9, 2001

Inorganic Constituents (mg/kg)	NYSDEC 4046 mg/kg	Site Background Range Low	Site Background Range High	PE-1	PE-2	PE-3	PE-4	PE-5	PE-5 Duplicate	PE-6	PE-7	PE-8	PE-9	Field Blank FB-1 (ug/l)
Aluminum	SB	7,820	12,500	12,900	9,910	12,100	6,380	9,480	9,640	8,200	14,300	9,930	10,600	—
Antimony	SB	0.51 U	0.56 U	0.48 U	0.42 U	0.43 U	0.47 U	0.42 U	0.43 U	0.41 U	0.46 U	0.42 U	0.44 U	—
Arsenic	7.5	1.4	5.5	3.9	3.8	7.0	7.2	1.9	1.8 B	2.3 B	4.3	9.0	5.6	—
Barium	300	23.9	79.4	67.7	20.5	21.0	21.5	18.8	21.3	15.3	31.3	34.5	22.3	—
Beryllium	0.16	0.33	0.78	0.72	0.41 B	0.52	0.39 B	0.35 B	0.37 B	0.33 B	0.68	0.39 B	0.48 B	—
Cadmium	1	0.023 U	0.026 U	0.022 U	0.019 U	0.019 U	0.021 U	0.019 U	0.019 U	0.019 U	0.021 U	0.019 U	0.020 U	—
Calcium	SB	951	3,890	804 *N	25,000 *N	1,490 *N	3,970 *N	27,400 *N	31,400 *N	36,700 *N	726 *N	3,660 *N	2,320 *N	188 J
Chromium	10	9.2	16.4	14.4	12.9	16.7	10.6	12.6	12.6	11.1	18.3	13.2	14.9	—
Cobalt	30	5.4	14.2	11.4	14.1	17.7	12.2	11.4	12.7	15.2	18.5	16.6	20.3	—
Copper	25	20.6	43.8	25.9 EN	40.9 EN	46.6 EN	33.7 EN	35.7 EN	40.8 EN	41.8 EN	44.0 EN	57.8 EN	46.9 EN	5.24 J
Iron	2,000	16,600	31,200	26,600	27,000	32,700	19,600	23,000	23,800	24,600	32,800	34,300	33,600	—
Lead	SB	24	47.3	21.8	15.7	18.3	11.8	11.8	11.8	13.7	17.0	18.7	20.3	—
Magnesium	SB	4,420	7,920	5,150	15,400	8,690	6,450	16,600	17,200	23,600	9,900	8,700	8,750	—
Manganese	SB	541	1,030	911 E	903 E	952 E	1,390 E	481 E	651 E	634 E	752 E	2,400 E	1,560 E	—
Mercury	0.1	0.039	0.18	0.035 BN	0.016 U	0.017 U	0.018 U	0.014 U	0.014 U	0.016 U	0.016 U	0.018 U	0.018 U	—
Nickel	13	16.4	30.6	22.1	30.0	33.6	23.2	22.5	24.8	25.8	31.4	46.8	37.8	—
Potassium	SB	552	1,020	560 N	1,070 N	1,120 N	806 N	1,180 N	1,160 N	850 N	1,400 N	936 N	1,010 N	72.9 J
Selenium	2	0.58 U	0.64 U	0.55 U	0.48 U	0.49 U	0.53 U	0.48 U	0.48 U	0.47 U	0.53 U	0.48 U	0.50 U	3.1 J
Silver	SB	0.33 U	0.69	0.31 U	0.27 U	0.27 U	0.30 U	0.27 U	0.27 U	0.26 U	0.29 U	0.27 U	0.28 U	—
Sodium	SB	33.8 U	37.3 U	31.9 U	29.0 B	28.3 U	31.0 U	29.1 B	40.9 B	31.3 B	30.6 U	27.9 U	29.0 U	—
Thallium	SB	0.66 U	0.73 U	0.62 U	0.55 U	0.55 U	0.61 U	0.55 U	0.55 U	0.53 U	0.60 U	0.55 U	0.57 U	—
Vanadium	150	13.3	24.1	20.3	14.8	18.9	14.1	16.1	15.4	13.3	23.3	17.0	18.6	—
Zinc	20	49.3	82.9	75.3 EN	74.8 EN	83.2 EN	44.6 EN	59.8 EN	66.3 EN	63.0 EN	81.8 EN	79.4 EN	94.2 EN	3.6 J
Cyanide	SB	0.22	0.42	0.17	0.053 U	0.054 U	0.053 U	0.052 U	0.052 U	0.051 U	0.054 U	0.055 U	0.055 U	—

— = undetected in field blank

Samples collected 11/08/2001 and 11/09/2001

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

* = Duplicate analysis not within control limits (RPD > 20 %)

J = estimated concentration

Cleanup objectives from NYSDEC TAGM 4046, January 24, 1994

Samples collected from the 10 to 12 ft depth interval

Table 5-6
Amenia Town Landfill RI/FS
VOC Groundwater Results

VOCs (ug/L)	NYSDEC GQS	MW-1 1/23/02	MW-1 4/3/2002	MW-2 1/24/02	MW-2 04/04/2002	MW-2B 1/24/02	MW-2B 04/04/2002	MW-3 1/23/02	MW-3 04/05/2002	MW-4 1/22/02	MW-4 04/04/2002
1,1-Dichlororethane	5	--	--	--	--	--	--	--	1.65 J	[redacted]	[redacted]
1,1-Dichlororethene	5	--	--	[redacted]	--	--	--	--	--	--	--
1,2-Dichlorobenzene	3	--	--	1.39 J	1.51 J	--	--	--	--	1.25 J	1.51 J
1,2-Dichloroethane	0.6	--	--	--	--	--	--	--	--	--	[redacted]
1,3-Dichlorobenzene	3	--	--	--	[redacted]	--	--	--	--	--	--
1,4-Dichlorobenzene	3	--	--	2.53 J	[redacted]	--	--	--	--	--	0.745 J
Acetone	50	--	--	--	--	--	15.1	--	--	--	--
Benzene	1	--	--	[redacted]	[redacted]	--	--	--	--	[redacted]	[redacted]
Chlorobenzene	5	--	--	1.51 J	1.64 J	--	--	--	--	4.97 J	4.98 J
Chloroethane	5	--	--	--	--	--	--	--	--	[redacted]	[redacted]
cis-1,2-Dichloroethene	5	--	--	--	--	--	--	[redacted]	[redacted]	--	--
Ethylbenzene	5	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	5	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	5	--	--	--	--	--	--	--	0.547 J	--	--
Trans-1,2-Dichloroethene	5	--	--	--	--	--	--	--	--	--	--
Trichloroethene	5	--	--	--	--	--	--	[redacted]	[redacted]	1.04 J	1.12 J
Vinyl Chloride	2	--	--	--	--	--	--	[redacted]	[redacted]	--	--

VOCs = volatile organic compounds

J = analyte detected below reporting limits

--- = undetected

EPA Method 8260B

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

Table 5-6
Amenia Town Landfill RI/FS
VOC Groundwater Results

VOCs (ug/L)	NYSDEC GQS	Dup-012202 MW-4 1/22/02	Dup-040502 MW-4 04/04/2002	MW-4B 1/22/02	MW-4B 04/05/2002	MW-5 1/24/02	MW-5 04/04/2002	MW-6 01/28/02	MW-6 04/05/2002	MW-7 01/25/02	MW-7 04/04/2002
1,1-Dichlororethane	5	5.64	6.49	--	--	--	--	[illegible]	7.25	--	--
1,1-Dichlororethene	5	--	--	--	--	--	--	1.42 J	--	--	--
1,2-Dichlorobenzene	3	1.21 J	1.52 J	--	--	--	--	1.30 J	0.67 J	--	--
1,2-Dichloroethane	0.6	--	[illegible]	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	3	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3	--	0.768 J	--	--	[illegible]	[illegible]	2.06 J	1.16 J	--	--
Acetone	50	--	--	17.2	25.5 J	--	--	--	5.34 J	--	--
Benzene	1	[illegible]	[illegible]	--	--	--	1.49 J	[illegible]	[illegible]	--	--
Chlorobenzene	5	4.83 J	4.96 J	--	--	2.43 J	2.83 J	[illegible]	[illegible]	--	--
Chloroethane	5	[illegible]	[illegible]	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	5	--	--	--	--	--	0.714 J	[illegible]	70.3	--	--
Ethylbenzene	5	--	--	--	--	--	0.656 J	--	--	--	--
Methylene Chloride	5	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	5	--	--	--	--	--	--	--	--	--	--
Trans-1,2-Dichloroethene	5	--	--	--	--	--	--	[illegible]	19.6	--	--
Trichloroethene	5	1.06 J	1.25 J	--	--	--	--	[illegible]	[illegible]	--	--
Vinyl Chloride	2	--	--	--	--	--	--	[illegible]	[illegible]	--	--

Table 5-6
Amenia Town Landfill RI/FS
VOC Groundwater Results

VOCs (ug/L)	NYSDEC GQS	MW-8 1/25/02	MW-8 04/03/2002	MW-8B 01/25/02	MW-8B 04/03/2002	MW-9 1/28/02	MW-9 04/04/2002
1,1-Dichlororethane	5	--	--	--	--	--	--
1,1-Dichlororethene	5	--	--	--	--	--	--
1,2-Dichlorobenzene	3	--	--	--	--	--	--
1,2-Dichloroethane	0.6	--	--	--	--	--	--
1,3-Dichlorobenzene	3	--	--	--	--	--	--
1,4-Dichlorobenzene	3	--	--	--	--	--	--
Acetone	50	--	--	--	--	--	--
Benzene	1	--	--	--	--	--	--
Chlorobenzene	5	--	--	--	--	--	--
Chloroethane	5	--	--	--	--	--	--
cis-1,2-Dichloroethene	5	--	--	--	--	--	--
Ethylbenzene	5	--	--	--	--	--	--
Methylene Chloride	5	--	--	--	--	--	--
Tetrachloroethene	5	--	--	--	--	2.25 J	0.797 J
Trans-1,2-Dichloroethene	5	--	--	--	--	--	--
Trichloroethene	5	--	--	--	--	--	--
Vinyl Chloride	2	--	--	--	--	--	--

Table 5-6
Amenia Town Landfill RI/FS
VOC Groundwater Results

VOCs (ug/L)	NYSDEC GQS	FB-012202 1/22/02	TB-01-22-02 1/22/02	FB-012302 1/23/02	TB-012302 1/23/02	FB-012402 1/24/02	FB-012502 1/25/02	TB-012802 1/28/02	FB-012802 1/28/02
1,1-Dichlororethane	5	--	--	--	--	--	--	--	--
1,1-Dichlororethene	5	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	3	--	--	--	--	--	--	--	--
1,2-Dichloroethane	0.6	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	3	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3	--	--	--	--	--	--	--	--
Acetone	50	--	--	--	--	--	31.6 J	--	--
Benzene	1	--	--	--	--	--	--	--	--
Chlorobenzene	5	--	--	--	--	--	--	--	--
Chloroethane	5	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	5	--	--	--	--	--	--	--	--
Ethylbenzene	5	--	--	--	--	--	--	--	--
Methylene Chloride	5	--	--	4.4 J	--	4 J	1.55 J	--	--
Tetrachloroethene	5	--	--	--	--	--	--	--	--
Trans-1,2-Dichloroethene	5	--	--	--	--	--	--	--	--
Trichloroethene	5	--	--	--	--	--	--	--	--
Vinyl Chloride	2	--	--	--	--	--	--	--	--

VOCs = volatile organic compounds

J = analyte detected below reporting limits

--- = undetected

EPA Method 8260B

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

Table 5-6
Amenia Town Landfill RI/FS
VOC Groundwater Results

VOCs (ug/L)	NYSDEC GQS	**FB040302** 04/03/2002	**TB040402** 04/04/2002	**TB040402A** 04/04/2002	**FB040402** 04/04/2002	**TB040502** 04/05/2002	**FB040502** 04/05/2002
1,1-Dichlororethane	5	--	--	--	--	--	--
1,1-Dichlororethene	5	--	--	--	--	--	--
1,2-Dichlorobenzene	3	--	--	--	--	--	--
1,2-Dichloroethane	0.6	--	--	--	--	--	--
1,3-Dichlorobenzene	3	--	--	--	--	--	--
1,4-Dichlorobenzene	3	--	--	--	--	--	--
Acetone	50	--	--	--	--	--	--
Benzene	1	--	--	--	--	--	--
Chlorobenzene	5	--	--	--	--	--	--
Chloroethane	5	--	--	--	--	--	--
cis-1,2-Dichloroethene	5	--	--	--	--	--	--
Ethylbenzene	5	--	--	--	--	--	--
Methylene Chloride	5	2.82 J	--	--	2.95 J	--	2.9 J
Tetrachloroethene	5	--	--	--	--	--	--
Trans-1,2-Dichloroethene	5	--	--	--	--	--	--
Trichloroethene	5	--	--	--	--	--	--
Vinyl Chloride	2	--	--	--	--	--	--

VOCs = volatile organic compounds

J = analyte detected below reporting limits

--- = undetected

EPA Method 8260B

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

Table 5-7
Amenia Town Landfill RI/FS
SVOC Groundwater Results

SVOCs (ug/L)	NYSDEC GQS	MW-1 1/23/02	MW-1 4/3/2002	MW-2 1/24/02	MW-2 04/04/2002	MW-2B 1/24/02	MW-2B 04/04/2002	MW-3 1/23/02	MW-3 04/05/2002	MW-4 1/22/02	MW-4 04/04/2002
1,4-Dichlorobenzene	3	--	--	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	1 *	--	--	--	[redacted]	--	--	--	--	--	--
Benzoic Acid	none	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl)phthalate	5	--	--	[redacted]	--	[redacted]	--	[redacted]	--	--	--
Diethyl phthalate	50	--	--	--	--	--	--	--	--	--	--

Benzoic acid is not regulated by the NYSDEC Principal Organic Contaminant Standard as of June 1998

SVOC = semivolatile organic compound

J = analyte detected below reporting limits

* = NYSDEC standard for total chlorinated phenols

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

--- = undetected

EPA Method 8270C

Table 5-7
Amenia Town Landfill RI/FS
SVOC Groundwater Results

SVOCs (ug/L)	NYSDEC GQS	Dup-010002 MW-4 1/22/02	Dup-040502 MW-4 04/04/2002	MW-4B 1/22/02	MW-4B 04/05/2002	MW-5 1/24/02	MW-5 04/04/2002	MW-6 01/28/02	MW-6 04/05/2002	MW-7 01/25/02	MW-7 04/04/2002
1,4-Dichlorobenzene	3	--	--	--	--	--	[redacted]	--	--	--	--
4-Chloro-3-methylphenol	1 *	--	--	--	--	--	--	--	--	--	--
Benzoic Acid	none	--	--	--	14.8 J	--	--	--	--	--	--
Bis (2-ethylhexyl)phthalate	5	--	--	--	--	--	--	[redacted]	--	--	--
Diethyl phthalate	50	--	--	--	--	--	3.55 J	--	--	--	--

Benzoic acid is not regulated by the NYSDEC Principal Organic Contaminant Standard as of June 1998

SVOC = semivolatile organic compound

J = analyte detected below reporting limits

* = NYSDEC standard for total chlorinated phenols

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

--- = undetected

EPA Method 8270C

Table 5-7
Amenia Town Landfill RI/FS
SVOC Groundwater Results

SVOCs (ug/L)	NYSDEC GQS	MW-8 1/25/02	MW-8 04/03/2002	MW-8B 01/25/02	MW-8B 04/03/2002	MW-9 1/28/02	MW-9 04/04/2002
1,4-Dichlorobenzene	3	--	--	--	--	--	--
4-Chloro-3-methylphenol	1 *	--	--	--	--	--	--
Benzoic Acid	none	--	--	--	--	--	--
Bis (2-ethylhexyl)phthalate	5	--	--	--	--	--	--
Diethyl phthalate	50	--	--	--	--	--	--

Benzoic acid is not regulated by the NYSDEC Principal Organic Contaminant Standard as of June 1998

SVOC = semivolatile organic compound

J = analyte detected below reporting limits

* = NYSDEC standard for total chlorinated phenols

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

--- = undetected

EPA Method 8270C

Table 5-7
Amenia Town Landfill RI/FS
SVOC Groundwater Results

SVOCs (ug/L)	NYSDEC GQS	FB-012202 1/22/02	FB-012302 1/23/02	FB-012402 1/24/02	FB-012502 1/25/02	FB-012802 1/28/02	FB040302 04/03/2002	FB040402 04/04/2002	FB040502 04/05/2002
1,4-Dichlorobenzene	3	--	--	--	--	--	--	--	--
4-Chloro-3-methylphenol	1 *	--	--	--	--	--	--	--	--
Benzoic Acid	none	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl)phthalate	5	--	--	--	--	--	--	--	--
Diethyl phthalate	50	--	--	--	--	--	--	--	--

Benzoic acid is not regulated by the NYSDEC Principal Organic Contaminant Standard as of June 1998

SVOC = semivolatile organic compound

J = analyte detected below reporting limits

* = NYSDEC standard for total chlorinated phenols

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

--- = undetected

EPA Method 8270C

Table 5-8
Amenia Town Landfill RI/FS
Pesticide Groundwater Results

Pesticides (ug/L)	NYSDEC GQS	MW-1 1/23/02	MW-1 4/3/2002	MW-2 1/24/02	MW-2 04/04/2002	MW-2B 1/24/02	MW-2B 04/04/2002	MW-3 1/23/02	MW-3 04/05/2002	MW-4 1/22/02	MW-4 04/04/2002
alpha-chlordane	0.05 *	--	--	--	--	--	--	--	--	--	--
beta-BHC	0.04	--	--	--	--	--	--	--	--	[redacted]	R
delta-BHC	0.04	--	--	--	--	--	--	--	--	--	--
gamma-BHC	0.05	--	--	--	--	--	--	--	--	--	R
Endosulfan II	none	--	--	--	--	--	--	--	--	--	--
Endrin aldehyde	5	--	--	--	--	--	--	--	--	0.0510 J	--
Heptachlor	0.04	--	--	--	0.0104 J	--	--	--	--	--	--

EPA Method 8081A

--- = undetected

J = analyte detected below reporting limits

R = rejected - percent difference between concentration on primary column and confirmation column exceeded 100%

N = Single column analysis

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

* = NYSDEC Standard is for chlordane

Endosulfan II is not regulated by the NYSDEC Principal Organic Contaminant Standard as of June 1998

Table 5-8
Amenia Town Landfill
Pesticide Groundwater Results

Pesticides (ug/L)	NYSDEC GQS	Dup-012202 MW-4 1/22/02	Dup-040502 MW-4 04/04/2002	MW-4B 1/22/02	MW-4B 04/05/2002	MW-5 1/24/02	MW-5 04/04/2002	MW-6 01/28/02	MW-6 04/05/2002	MW-7 01/28/02	MW-7 04/04/2002
alpha-chlordane	0.05 *	--	--	--	--	--	--	--	--	--	--
beta-BHC	0.04	[redacted]	R	--	--	--	0.0203 J	--	--	--	--
delta-BHC	0.04	--	--	--	--	--	--	--	--	--	--
gamma-BHC	0.05	--	R	--	--	--	--	--	--	--	--
Endosulfan II	none	--	--	--	--	--	--	--	--	--	--
Endrin aldehyde	5	--	--	--	--	--	--	0.0414 J	--	--	--
Heptachlor	0.04	--	--	--	--	--	--	--	--	--	--

EPA Method 8081A

--- = undetected

J = analyte detected below reporting limits

R = rejected - percent difference between concentration on primary column and confirmation column exceeded 100%

N = Single column analysis

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

* = NYSDEC Standard is for chlordane

Endosulfan II is not regulated by the NYSDEC Principal Organic Contaminant Standard as of June 1998

Table 5-8
Amenia Town Landfill
Pesticide Groundwater Results

Pesticides (ug/L)	NYSDEC GQS	MW-8 01/24/02	MW-8 04/03/2002	MW-8B 01/24/02	MW-8B 04/03/2002	MW-9 01/28/02	MW-9 04/04/2002
Alpha-chlordane	0.05 *	--	--	--	--	--	--
beta-BHC	0.04	--	--	--	--	--	--
delta-BHC	0.04	--	--	--	--	--	--
gamma-BHC	0.05	--	--	--	--	--	--
Endosulfan II	none	--	--	--	--	--	--
Endrin aldehyde	5	--	--	--	--	--	--
Heptachlor	0.04	--	--	--	--	R	--

EPA Method 8081A

-- = undetected

J = analyte detected below reporting limits

R = rejected - percent difference between concentration on primary column and confirmation column exceeded 100%

N = Single column analysis

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

* = NYSDEC Standard is for chlordane

Endosulfan II is not regulated by the NYSDEC Principal Organic Contaminant Standard as of June 1998

Table 5-8
Amenia Town Landfill
Pesticide Groundwater Results

Pesticides (ug/L)	NYSDEC GQS	FB-012202 1/22/02	FB040302 04/03/2002	FB-012302 1/23/02	FB040402 04/04/2002	FB-012402 01/24/02	FB040502 04/05/2002	FB-012502 1/25/02	FB-012802 1/28/02
Alpha-chlordane	0.05 *	--	--	--	--	--	--	--	--
beta-BHC	0.04	--	--	--	--	--	--	--	--
delta-BHC	0.04	--	--	--	--	--	--	--	--
gamma-BHC	0.05	--	--	--	--	--	--	--	--
Endosulfan II	none	--	--	--	--	--	--	--	--
Endrin aldehyde	5	--	--	--	--	--	--	--	--
Heptachlor	0.04	--	--	--	--	--	--	--	--

EPA Method 8081A

--- = undetected

J = analyte detected below reporting limits

R = rejected - percent difference between concentration on primary column and confirmation column exceeded 100%

N = Single column analysis

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

* = NYSDEC Standard is for chlordane

Endosulfan II is not regulated by the NYSDEC Principal Organic Contaminant Standard as of June 1998

Table 5-9
Amenia Town Landfill RI/FS
PCB Groundwater Results

PCBs (ug/L)	NYSDEC GQS	MW-1 1/23/02	MW-1 4/3/2002	MW-2 1/24/02	MW-2 04/04/2002	MW-2B 1/24/02	MW-2B 04/04/2002	MW-3 1/23/02	MW-3 04/05/2002	MW-4 1/22/02	MW-4 04/04/2002
Aroclor 1016	0.09 ug/l	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	applies to the	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	sum of these	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	substances	--	--	--	--	--	--	--	--	--	--
Aroclor 1248		--	--	--	--	--	--	--	--	--	--
Aroclor 1254		--	--	--	--	--	--	--	--	--	--
Aroclor 1260		--	--	--	--	--	--	--	--	--	--
PCBs Total	0.09	---	---	---	---	---	---	---	---	---	---

PCBs = Polychlorinated biphenyls

--- = undetected

EPA Method 8082

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

Table 5-9
Amenia Town Landfill RI/FS
PCB Groundwater Results

PCBs (ug/L)	NYSDEC GQS	Dup-012202 **Duplicate** (MW-4)	Dup-040502 **MW-4** 04/04/2002	**MW-4B** 1/22/02	**MW-4B** 04/05/2002	**MW-5** 1/24/02	**MW-5** 04/04/2002	**MW-6** 01/28/02	**MW-6** 04/05/2002	**MW-7** 01/25/02	**MW-7** 04/04/2002
Aroclor 1016	0.09 ug/l GQS	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	applies to the	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	sum of these	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	substances	--	--	--	--	--	--	--	--	--	--
Aroclor 1248		--	--	--	--	--	--	--	--	--	--
Aroclor 1254		--	--	--	--	--	--	--	--	--	--
Aroclor 1260		--	--	--	--	--	--	--	--	--	--
PCBs Total	0.09	---	---	---	---	---	---	---	---	---	---

PCBs = Polychlorinated biphenyls

--- = undetected

EPA Method 8082

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

Table 5-9
Amenia Town Landfill RI/FS
PCB Groundwater Results

PCBs (ug/L)	NYSDEC GQS	MW-8 01/24/02	MW-8 04/03/2002	MW-8B 01/24/02	MW-8B 04/03/2002	MW-9 01/28/02	MW-9 04/04/2002
Aroclor 1016	0.09 ug/l GQS applies to the sum of these substances	--	--	--	--	--	--
Aroclor 1221		--	--	--	--	--	--
Aroclor 1232		--	--	--	--	--	--
Aroclor 1242		--	--	--	--	--	--
Aroclor 1248		--	--	--	--	--	--
Aroclor 1254		--	--	--	--	--	--
Aroclor 1260		--	--	--	--	--	--
PCBs Total	0.09	---	---	---	---	---	---

PCBs = Polychlorinated biphenyls

--- = undetected

EPA Method 8082

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

Table 5-9
Amenia Town Landfill RI/FS
PCB Groundwater Results

PCBs (ug/L)	NYSDEC GQS	FB-012202 1/22/02	FB040302 04/03/2002	FB-012302 1/23/02	FB040402 04/04/2002	FB-012402 1/24/02	FB040502 04/05/2002	FB-012502 1/25/02	FB-012802 1/28/02
Aroclor 1016	0.09 ug/l GQS applies to the sum of these substances	--	--	--	--	--	--	--	--
Aroclor 1221		--	--	--	--	--	--	--	--
Aroclor 1232		--	--	--	--	--	--	--	--
Aroclor 1242		--	--	--	--	--	--	--	--
Aroclor 1248		--	--	--	--	--	--	--	--
Aroclor 1254		--	--	--	--	--	--	--	--
Aroclor 1260		--	--	--	--	--	--	--	--
PCBs Total	0.09	---	---	---	---	---	---	---	---

PCBs = Polychlorinated biphenyls

--- = undetected

EPA Method 8082

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

Table 5-10
Amenia Town Landfill RI/FS
Inorganic Groundwater Results

Inorganic Constituents (ug/L)	NYSDEC GQS	MW-1 1/23/02	MW-1 4/3/2002	MW-2 1/24/02	MW-2 04/04/2002	MW-2B 1/24/02	MW-2B 04/04/2002	MW-3 1/23/02	MW-3 04/05/2002	MW-4 1/22/02	MW-4 04/04/2002
Aluminum	200 (1)	67.2 B	56.3 U	1,240	710	95.3 B	368	42.8 B	56.3 U	358	5,180
Antimony	3	4.2 U	6.8 B	14.5	2.7 B	47.8	7.5 B	4.2 U	8.0 B	14.9	4.4 B
Arsenic	25	7.6 UN	12.2 B	40.7	49.3	12.1 B	15 B	7.6 UN	9.4 B	42.3	58.8
Barium	1,000	2.4 B	20.5	285	270	24.1	26.3	0.2 U	32.3	109	129
Beryllium	3	0.3 U	1.3 U	0.3 U	1.3 U	0.3 U	1.3 U	0.3 U	1.3 U	0.3 U	1.3 U
Cadmium	5	0.2 U	1.5 U	0.2 U	1.5 U	0.28 B	1.5 U	0.2 U	1.5 U	0.2 U	1.5 U
Calcium	---	130,000	133,000	82,400	87,800	326,000	354,000	113,000	111,000	87,800	113,000
Chromium	50	4.7 B	3.2 U	1.2 B	3.2 U	2.7 B	3.5 B	2.3 B	3.2 U	0.91 B	7.9 B
Cobalt	730 (2)	0.5 U	3.0 U	15.6 B	16.4 B	0.5 U	3.0 U	0.5 U	3.0 U	3.1 B	12.5 B
Copper	200	2.0 B	7.8 B	4.5 B	5.8 B	7.4 B	10.3 B	5.2 B	3.8 U	7.6 B	36.8
Iron *	300	95.6 BE	75.9 B	16,300	15,000	649	2,470	93.8 BE	72.7 B	11,100	26,200
Lead	25	7.6	2.9 U	1.7 U	2.9 U	1.7 U	3.7 B	1.7 U	2.9 U	1.7 U	15.4
Magnesium **	35,000	37,800	34,900	58,500	61,800	66,100	72,800	31,600	31,000	80,400	91,500
Manganese *	300	613	329	781	699	85.0	85.8	5.9 B	13.8	162	501
Mercury	0.7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	100	3.6 B	3.6 U	25.5	25	0.6 U	3.6 U	2.6 B	3.6 U	5.3 B	23.1
Potassium	---	945 B	1,090 BJ	28,100	30,400 J	9,870	8,590 J	2,440	2,340 J	16,800 E	19,100 J
Selenium	10	26.2	6.9 U	4.2 U	7.3 B	11.4 B	6.9 U	15.2 B	6.9 U	4.2 U	13.0 B
Silver	50	2.9 U	2.1 U	2.9 U	2.1 U	2.9 U	2.1 U	2.9 U	2.1 U	2.9 U	2.1 U
Sodium	20,000	6,210 E	5,620	35,200	40,600	22,300	31,300	7,880 E	7,280	33,600 E	31,000
Thallium	0.5	16.5	7.6 B	8.8 U	6.9 U	8.8 U	10.8 B	20.9	6.9 U	8.8 U	6.9 U
Vanadium	260 (2)	0.7 U	2.9 U	3.8 B	3.6 B	0.7 U	2.9 U	0.7 U	2.9 U	2.2 B	11.8 B
Zinc	2,000	1.0 UE	R	R	R	R	R	1.9 BE	R	1.1 B	R
Cyanide	200	10 U	10 U	1.2 B	10 U	1.0 B	10 U	10 U	10 U	R	10 U

E = estimated value because of interference

N = spike analysis not within control limits

B = value less than PQL but greater than MDL

U = undetected

J = estimated concentration

R= Rejected - concentrations were less than five times the concentration detected in the associated field blanks

* total iron and manganese standard = 500 ug/l

** concentration of magnesium is a NYSDEC guidance value, not a standard

(1) EPA secondary drinking water standard (Summer 2000)

(2) EPA Region III Risk-Based Criteria for Tap Water (9/25/2001)

Table 5-10
Amenia Town Landfill RI/FS
Inorganic Groundwater Results

Inorganic Constituents (ug/L)	NYSDEC GQS	Dup-012202 MW-4 1/22/02	Dup-040502 MW-4 04/04/2002	MW-4B 1/22/02	MW-4B 04/05/2002	MW-5 1/24/02	MW-5 04/04/2002	MW-6 01/28/02	MW-6 04/05/2002	MW-7 01/25/02	MW-7 04/04/2002
Aluminum	200 (1)	297	2,890	545	2,680	501	206	6,920	197 B	540	527
Antimony	3	16.3	6.0 B	9.1 B	2.5 B	27.5	7.7 B	29.3	3.7 B	14.5	8.6 B
Arsenic	25	45.3	58.9	9.4 B	10.8 B	32.6	33.6	18.3 B	18.3 B	8.9 B	10.1 B
Barium	1,000	112	116	89.7	79.1	133	136	207	166	59.2	67.6
Beryllium	3	0.3 U	1.3 U	0.3 U	1.3 U	0.3 U	1.3 U	0.31 B	1.3 U	0.3 U	1.3 U
Cadmium	5	0.2 U	1.5 U	0.2 U	1.5 U	0.2 U	1.5 U	0.2 U	1.5 U	0.2 U	1.5 U
Calcium	---	92,400	103,000	44,400	20,800	182,000	197,000	175,000	194,000	86,700	86,600
Chromium	50	1.6 B	5.2 B	2.9 B	3.2 U	0.5 U	3.2 U	4.1 B	4.3 B	1.2 B	3.2 U
Cobalt	730 (2)	3.2 B	9.4 B	0.5 U	3.0 U	1.0 B	3.0 U	20.7	7.0 B	1.8 B	3.0 U
Copper	200	3.1 B	30.2	11.2 B	5.4 B	1.8 U	3.8 U	42.8	3.8 U	1.8 U	6.9 B
Iron *	300	11,400	26,500	733	1,600	18,300	15,200	59,600	42,700	2,440	2,480
Lead	25	1.7 U	13.6	1.7 U	3.5 B	1.7 U	2.9 U	24.0	5.6	1.7 U	2.9 U
Magnesium	35,000	84,400	92,800	6,960	5,360	69,300	70,400	322,000	351,000	29,400	27,900
Manganese	300	162	418	17.8	18.3	822	1,010	3,150	1,320	1,350	1,260
Mercury	0.7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	100	6.5 B	16.8 B	1.3 B	3.6 U	8.7 B	8.1 B	48.2	28.3	5.8 B	5.8 B
Potassium	---	17,900	17,000 J	70,200 E	114,000 J	12,300	12,500 E	225,000	233,000 J	3,520	3,710 J
Selenium	10	11.9 B	11.4	4.2 U	6.9 U	4.2 U	6.9 U	8.4 B	6.9 U	4.2 U	6.9 U
Silver	50	2.9 U	2.1 U	2.9 U	2.1 U	2.9 U	2.1 U	2.9 U	2.1 U	2.9 U	2.1 U
Sodium	20,000	35,700 E	28,900	88,200 E	144,000	27,900	27,000	331,000	325,000	3,630	4,170
Thallium	0.5	8.8 U	6.9 U	8.8 U	6.9 U	8.8 U	6.9 U	8.8 U	6.9 U	8.8 U	6.9 U
Vanadium	260 (2)	2.5 B	7.9 B	5.5 B	8.2 B	3.1 B	2.9 B	19.3 B	8.4 B	0.78 B	2.9 U
Zinc	2,000	1.0 U	R	9.4 B	R	R	R	R	4.5 U	R	R
Cyanide	200	R	10 U	R	10 U	1.0 U	10 U	1.4 B	10 U	1.0 U	10 U

Amenia Town Landfill RI/FS
Inorganic Groundwater Results

Inorganic Constituents (ug/L)	NYSDEC GQS	MW-8 01/24/02	MW-8 04/03/2002	MW-8B 01/24/02	MW-8B 04/03/2002	MW-9 01/28/02	MW-9 04/04/2002
Aluminum	200 (1)	253	618	222	101 B	214	91.5 B
Antimony	3	14.8	5.0 B	51.8	8.0 B	23.3	10.4
Arsenic	25	7.6 U	8.0 B	8.7 B	13.6 B	12.2 B	12.0 B
Barium	1,000	33.3	33.4	17.1 B	18.8 B	60.9	49.8
Beryllium	3	0.3 U	1.3 U	0.3 U	1.3 U	0.3 U	1.3 U
Cadmium	5	0.2 U	1.5 U	0.58 B	1.5 U	0.5 B	1.5 U
Calcium	---	83,100	81,600	377,000	385,000	141,000	125,000
Chromium	50	0.83 B	3.2 U	1.9 B	3.6 B	1.5 B	3.2 U
Cobalt	730 (2)	0.5 U	3.0 U	0.5 U	3.0 U	0.5 U	3.0 U
Copper	200	1.8 U	4.3 B	1.8 U	4.2 B	2.3 B	7.2 B
Iron *	300	1,940	3,200	1,650	1,690	500	71.7 B
Lead	25	1.7 U	2.9 U	1.7 U	2.9 U	1.7 U	2.9 U
Magnesium **	35,000	24,900	25,300	66,500	68,500	55,600	45,700
Manganese *	300	582	472	130	110	38.3	6.0 B
Mercury	0.7	0.1 U	0.1 U	0.1 U	R	0.1 U	0.1 U
Nickel	100	0.83 B	3.6 U	0.6 U	3.6 U	0.92 B	3.6 U
Potassium	---	4,170	3,460 J	2,940	3,080 J	4,270	1,170 BJ
Selenium	10	4.2 U	6.9 U	19.7 B	6.9 U	4.8 B	6.9 U
Silver	50	2.9 U	2.1 U	2.9 U	2.1 U	2.9 UN	2.1 U
Sodium	20,000	4,080	4,230	7,650	8,850	13,300	8,130
Thallium	0.5	8.8 U	6.9 U	8.8 U	15.4 B	8.8 U	6.9 U
Vanadium	260 (2)	0.7 U	2.9 U	0.7 U	2.9 U	0.7 U	2.9 U
Zinc	2,000	R	R	R	R	R	R
Cyanide	200	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U

Table 5-10
Amenia Town Landfill RI/FS
Inorganic Groundwater Results

Inorganic Constituents (ug/L)	NYSDEC GQS	FB-012202 1/22/02	FB040302 04/03/2002	FB-012302 1/23/02	FB040402 04/04/2002	FB-012402 1/24/02	FB040502 04/05/2002	FB-012502 1/25/02	FB-012802 1/28/02
Aluminum	200 (1)	25.8 U	56.3 U	25.8 U	56.3 U	25.8 U	56.3 U	25.8 U	25.8 U
Antimony	3	4.2 U	2.5 U	4.2 U	2.5 U	4.2 U	2.5 U	4.2 U	4.2 U
Arsenic	25	7.6 U	7.6 U	7.6 UN	7.6 U	7.6 U	7.6 U	7.6 U	7.6 U
Barium	1,000	0.2 U	6.0 U	0.2 U	6.0 U	1.3 B	6.0 U	0.2 U	0.23 B
Beryllium	3	0.3 U	1.3 U	0.3 U	1.3 U	0.3 U	1.3 U	0.3 U	0.33 B
Cadmium	5	0.2 U	1.5 U	0.2 U	1.5 U	0.2 U	1.5 U	0.2 U	0.2 U
Calcium	—	108 B	279 U	44.6 B	279 U	147 B	279 U	69.7 B	81.7 B
Chromium	50	0.5 U	3.2 U	1.0 B	3.2 U	5.9 B	3.2 U	5.8 B	0.64 B
Cobalt	730 (2)	0.5 U	3.0 U	0.5 U	3.0 U	0.5 U	3.0 U	0.5 U	0.5 U
Copper	200	1.8 U	3.8 U	2.4 B	3.8 U	1.8 U	3.8 U	1.8 U	1.8 U
Iron *	300	15.9 U	52.5 U	15.9 UE	52.5 U	23.6 B	52.5 U	19.5 B	23.6 B
Lead	25	1.7 U	2.9 U	1.7 U	2.9 U	1.7 U	2.9 U	1.7 U	1.7 U
Magnesium **	35,000	41.3 B	190 U	29.8 U	190 U	29.8 U	190 U	29.8 U	29.8 U
Manganese *	300	0.5 U	2.7 U	0.87 B	2.7 U	0.59 B	2.7 U	0.7 B	7.7 B
Mercury	0.7	0.1 U	0.19 B	0.1 U	0.25	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	100	0.6 U	3.6 U	2.5 B	3.6 U	3.4 B	3.6 U	3.2 B	0.6 U
Potassium	—	599 BE	17.9 U	118 U	17.9 U	118 U	325 BJ	118 U	552 B
Selenium	10	4.2 U	6.9 U	5.5 B	6.9 U	4.2 U	6.9 U	4.2 U	4.2 U
Silver	50	2.9 U	2.1 U	2.9 U	2.1 U	2.9 U	2.1 U	2.9 U	2.9 UN
Sodium	20,000	630 BE	391 U	153 BE	391 U	49.9 U	391 U	49.9 U	49.9 U
Thallium	0.5	8.8 U	6.9 U	8.8 U	6.9 U	8.8 U	6.9 U	8.8 U	8.8 U
Vanadium	260 (2)	0.7 U	2.9 U	0.7 U	2.9 U	0.7 U	2.9 U	0.7 U	0.7 U
Zinc	2,000	2.1 B	11.3	5.0 BE	12.4	R	12.1	1.0 U	R
Cyanide	200	R	10 U	10 U	10 U	1.0 U	10 U	1.0 U	1.0 U

Table 5-11
Amenia Town Landfill RI/FS
Drilling Water Results

VOCs (ug/L)	NYSDEC GQS	PW-1 04/05/2002
VOCs (ug/l) Dibromochloromethane	50	1.09 J
SVOCs (ug/l) (1)		--
Pesticides/PCBs		--

VOCs = Volatile organic compounds

SVOCs = Semivolatile organic compounds

PCBs = Polychlorinated biphenyls

--- = undetected

NYSDEC Groundwater Quality Standards (GQS):

TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

(1) All acid phenolic compounds rejected because of poor surogate recovery

Table 5-11
Amenia Town Landfill RI/FS
Drilling Water Results

Inorganic Constituents (ug/L)	NYSDEC GQS	PW-1 04/05/2002
Aluminum	200 (1)	56.3 U
Antimony	3	4.4 B
Arsenic	25	9.2 B
Barium	1,000	20
Beryllium	3	1.3 U
Cadmium	5	1.5 U
Calcium	---	73,900
Chromium	50	3.2 U
Cobalt	730 (2)	3.0 U
Copper	200	24.3
Iron *	300	52.5 U
Lead	25	2.9 U
Magnesium **	35,000	36,300
Manganese *	300	25.8
Mercury	0.7	0.19 B
Nickel	100	3.6 U
Potassium	---	3,710 J
Selenium	10	7.0 B
Silver	50	2.1 U
Sodium	20,000	23,800
Thallium	0.5	6.9 U
Vanadium	260 (2)	2.9 U
Zinc	2,000	109
Cyanide	200	10 U

E = estimated value because of interference

N = spike analysis not within control limits

B = value less than PQL but greater than MDL

U = undetected

J = estimated concentration

* total iron and manganese standard = 500 ug/l

** concentration of magnesium is a NYSDEC guidance value, not a standard

(1) EPA secondary drinking water standard (Summer 2000)

(2) EPA Region III Risk-Based Criteria for Tap Water (9/25/2001)

Table 5-12
Amenia Town Landfill
Soil Gas Results - December 19 to December 26, 2001

VOCs (mg per cubic meter)	SG-1	SG-2	SG-3	SG-4	SG-5	SG-6	SG-7	SG-8	SG-9 *	SG-10 *	SG-10 Dupl *	SG-11 *	SG-12
Vinyl chloride	---	---	0.4	---	---	---	---	---	---	---	---	0.7	0.2
1,1-DCE	---	---	---	---	---	---	---	---	---	---	---	---	---
Methylene chloride	2.4 B	2.2 B	2.5 B	2.0 B	2.4 B	2.2 B	2.1 B	2.1 B	2.1 B	2.1 B	2.1 B	1.7 B	1.4 B
t-1,2-DCE	---	---	---	---	---	---	---	---	---	---	---	---	---
1,1-DCA	---	---	---	---	---	---	---	---	---	---	---	0.6	---
c-1,2-DCE	---	---	---	---	---	---	---	---	---	---	---	0.7	---
1,1,1-TCA	---	---	---	---	---	---	---	---	---	---	---	---	---
Carbon tet.	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2-DCA	---	---	---	---	---	---	---	---	---	---	---	---	---
TCE	---	---	---	---	---	---	---	---	---	---	---	0.9	---
PCE	---	1.0	---	---	---	---	---	---	---	---	---	0.2	---
Benzene	---	---	---	---	---	---	---	---	---	---	---	1.6	0.9
Toluene	1.0 B	1.0 B	1.8 B	0.8 B	1.0 B	1.0 B	0.8 B	0.9 B	0.8 B	0.8 B	0.8 B	16.2 B	0.3 B
Chlorobenzene	---	---	---	---	0.07	---	---	---	---	---	---	0.2	0.1
Ethylbenzene	---	---	0.3	---	0.1	---	---	---	---	0.1	---	2.3	1.0
m&p-Xylene	---	---	0.4	---	0.1	---	---	---	---	---	---	2.4	1.5
o-Xylene	---	---	0.3	---	---	---	---	---	---	---	---	1.4	0.4
VOC Total	0.00	1.00	1.40	0.00	0.27	0.00	0.00	0.00	0.00	0.10	0.00	11.00	4.10

Analytical data source: URS Soil Gas Survey, December 2001

PCE = tetrachloroethene

TCA = trichloroethane

TCE = trichloroethene

DCE = dichlorothene

DCA = dichlorothane

VOCs = volatile organic compounds

Detection limit = 0.020 mg/cubic meter, except m&p-xylene, which is 0.040 mg/cubic meter

EPA Method 8021 (modified)

B = detected in laboratory blank

--- = undetected

1 mg/cubic meter = 1,000 ug/cubic meter

* = surrogate recovery exceeds QA/QC control of 75-125%

Table 5-12
Amenia Town Landfill
Soil Gas Results - December 19 to December 26, 2001

VOCs (mg per cubic meter)	SG-13	SG-14 *	SG-15 *	SG-16	SG-17	SG-18 *	SG-19 *	SG-20 *	SG-21	SG-21 Dupl	SG-22	SG-23	SG-24 *
Vinyl chloride	0.1	---	1.4	0.2	---	1.4	2.1	---	---	---	2.1	0.5	1.4
1,1-DCE	---	---	---	---	---	---	---	---	---	---	---	---	---
Methylene chloride	1.3 B	---	1.8 B	1.3 B	1.3 B	0.1	0.2	0.1	---	---	6.5 B	1.7 B	1.5 B
t-1,2-DCE	---	---	---	---	---	---	---	---	---	---	---	---	---
1,1-DCA	---	---	---	---	---	0.3	0.2	---	---	---	0.8	---	---
c-1,2-DCE	---	---	---	---	---	0.3	---	---	---	---	0.9	---	---
1,1,1-TCA	---	---	---	---	---	---	---	---	---	---	---	---	---
Carbon tet.	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2-DCA	---	---	---	---	---	---	---	---	---	---	---	---	---
TCE	---	0.6	---	---	---	0.5	---	---	---	---	---	---	---
PCE	---	0.6	---	---	---	0.5	---	---	---	---	0.4	---	---
Benzene	2.3	---	0.1	0.3	---	0.05	0.5	---	---	---	1.2	0.2	0.2
Toluene	0.7 B	0.4	4.0 B	0.2 B	0.4 B	0.8	0.6	0.2	0.2	0.1	12 B	0.3 B	0.1 B
Chlorobenzene	0.2	---	---	---	---	---	0.3	---	---	---	---	1.5	1.6
Ethylbenzene	0.9	---	6.3	1.3	0.3	0.2	1.7	---	---	---	2.5	3.4	2.1
m&p-Xylene	2.5	---	8.1	1.2	0.6	0.5	---	---	---	---	4.4	4.2	6.1
o-Xylene	1.0	---	2.3	0.2	0.1	---	---	---	---	---	2.6	1.3	2.3
VOC Total	7.00	1.60	18.20	3.20	1.00	4.65	5.60	0.30	0.20	0.10	14.90	11.10	13.70

Analytical data source: URS Soil Gas Survey, December 2001

PCE = tetrachloroethene

TCA = trichloroethane

TCE = trichloroethene

DCE = dichlorothene

DCA = dichlorothane

VOCs = volatile organic compounds

Detection limit = 0.020 mg/cubic meter, except m&p-xylene, which is 0.040 mg/cubic meter

EPA Method 8021 (modified)

B = detected in laboratory blank

--- = undetected

1 mg/cubic meter = 1,000 ug/cubic meter

* = surrogate recovery exceeds QA/QC control of 75-125%

Table 5-12
Amenia Town Landfill
Soil Gas Results - December 19 to December 26, 2001

VOCs (mg per cubic meter)	SG-25	SG-26 *	SG-27 *	SG-28	SG-29	SG-30	SG-31	SG-32	SG-33 *	SG-34	SG-35	SG-36	SG-37
Vinyl chloride	---	---	3.6	---	0.2	---	---	---	0.8	---	---	---	---
1,1-DCE	---	---	---	---	---	---	---	---	---	---	---	---	---
Methylene chloride	1.3 B	---	0.2	---	---	2.4 B	2.4 B	1.4 B	1.6 B	1.3 B	---	---	---
t-1,2-DCE	---	---	---	---	---	---	---	---	---	---	---	---	---
1,1-DCA	---	---	5.3	---	---	---	---	---	---	---	---	---	---
c-1,2-DCE	---	---	0.3	---	---	---	---	---	---	---	---	7.6	---
1,1,1-TCA	---	---	---	---	---	---	---	---	---	---	---	---	---
Carbon tet.	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2-DCA	---	---	---	---	---	---	---	---	---	---	---	---	---
TCE	---	---	---	---	---	---	---	---	---	---	---	---	---
PCE	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzene	---	---	19.0	0.1	1.1	---	---	---	1.3	---	0.1	10.0	0.2
Toluene	0.6 B	0.2	15.0	0.6	1.6	1.3 B	1.2 B	0.8	0.4 B	0.4 B	0.4	26.0	0.4
Chlorobenzene	---	---	1.6	---	---	---	---	---	1.2	---	---	---	---
Ethylbenzene	0.1	---	16.0	0.2	0.1	---	---	0.1	4.2	0.2	0.2	26.0	0.2
m&p-Xylene	0.3	---	39.0	0.5	0.3	---	---	0.1	6.2	0.5	0.9	79.0	0.5
o-Xylene	0.1	---	23.0	0.05	0.2	---	0.4	0.2	2.1	0.1	---	44.0	---
VOC Total	0.50	0.20	123.00	1.45	3.50	0.00	0.40	1.20	15.80	0.80	1.60	192.60	1.30

Analytical data source: URS Soil Gas Survey, December 2001

PCE = tetrachloroethene

TCA = trichloroethane

TCE = trichloroethene

DCE = dichlorothene

DCA = dichlorothane

VOCs = volatile organic compounds

Detection limit = 0.020 mg/cubic meter, except m&p-xylene, which is 0.040 mg/cubic meter

EPA Method 8021 (modified)

B = detected in laboratory blank

--- = undetected

1 mg/cubic meter = 1,000 ug/cubic meter

* = surrogate recovery exceeds QA/QC control of 75-125%

Table 5-12
Amenia Town Landfill
Soil Gas Results - December 19 to December 26, 2001

VOCs (mg per cubic meter)	SG-38	SG-39	SG-40	SG-41	SG-42	SG-43	SG-43 Dup	SG-44	SG-45	SG-46	SG-46 Dup	SG-47 *	SG-48
Vinyl chloride	---	---	---	0.6	2.2	---	---	---	---	---	---	---	---
1,1-DCE	---	---	---	---	---	---	---	---	---	---	---	---	---
Methylene chloride	---	2.6 B	2.4 B	2.4 B	1.7 B	---	1.0 B	1.4 B	---	---	---	---	---
t-1,2-DCE	---	---	---	---	---	---	---	---	---	---	---	---	---
1,1-DCA	---	---	---	---	---	---	---	---	---	---	---	---	---
c-1,2-DCE	---	---	---	---	---	---	---	---	---	1.3	1.4	---	---
1,1,1-TCA	---	---	---	---	---	---	---	---	---	---	---	---	---
Carbon tet.	---	---	---	---	---	---	---	---	---	---	---	---	---
1,2-DCA	---	---	---	---	---	---	---	---	---	---	---	---	---
TCE	---	---	---	---	---	---	---	---	---	---	---	---	---
PCE	---	---	---	---	---	---	---	---	---	0.03	0.042	---	---
Benzene	4.6	---	---	---	---	---	---	---	---	5.0	5.3	---	0.3
Toluene	0.8	1.1 B	1.1 B	1.1 B	0.7 B	0.4 B	0.3 B	0.8 B	0.2	1.9	1.9	0.1	0.5
Chlorobenzene	---	---	---	---	---	---	---	---	---	0.1	0.2	---	---
Ethylbenzene	5.6	---	---	0.1	0.4	---	---	0.1	0.1	7.9	8.3	0.1	0.2
m&p-Xylene	11.0	---	---	0.1	0.6	---	---	0.1	0.2	25.0	26.0	0.2	0.7
o-Xylene	4.6	---	---	---	0.5	---	---	---	0.1	22.0	24.0	---	---
VOC Total	26.60	0.00	0.00	0.80	3.70	0.00	0.00	0.20	0.60	63.23	67.14	0.40	1.70

Analytical data source: URS Soil Gas Survey, December 2001

PCE = tetrachloroethene

TCA = trichloroethane

TCE = trichloroethene

DCE = dichlorothene

DCA = dichlorothane

VOCs = volatile organic compounds

Detection limit = 0.020 mg/cubic meter, except m&p-xylene, which is 0.040 mg/cubic meter

EPA Method 8021 (modified)

B = detected in laboratory blank

--- = undetected

1 mg/cubic meter = 1,000 ug/cubic meter

* = surrogate recovery exceeds QA/QC control of 75-125%

Table 5-12
Amenia Town Landfill
Soil Gas Results - December 19 to December 26, 2001

VOCs (mg per cubic meter)	SG-49	SG-49 Dup	SG-50	SG-51	SG-52	AA-1	AA-2
Vinyl chloride	---	---	0.1	---	---	---	---
1,1-DCE	---	---	---	---	---	---	---
Methylene chloride	1.1 B	---	1.2 B	---	---	2.6 B	1.1 B
t-1,2-DCE	---	---	---	---	---	---	---
1,1-DCA	---	---	---	---	---	---	---
c-1,2-DCE	---	---	---	---	---	---	---
1,1,1-TCA	---	---	---	---	---	---	---
Carbon tet.	---	---	---	---	---	---	---
1,2-DCA	---	---	---	---	---	---	---
TCE	---	---	---	---	---	---	---
PCE	---	---	---	0.1	---	---	---
Benzene	---	---	---	---	---	---	---
Toluene	0.4 B	0.4 B	0.4 B	0.2	0.1	1.1 B	1.1 B
Chlorobenzene	---	---	---	---	---	---	---
Ethylbenzene	0.05	---	0.4	0.1	---	0.1	0.04
m&p-Xylene	0.10	---	0.4	0.1	---	0.1	---
o-Xylene	---	---	0.2	---	---	---	---
VOC Total	0.15	0.00	1.10	0.50	0.10	0.20	0.04

Analytical data source: URS Soil Gas Survey, December 2001

PCE = tetrachloroethene

TCA = trichloroethane

TCE = trichloroethene

DCE = dichlorothene

DCA = dichlorothane

VOCs = volatile organic compounds

Detection limit = 0.020 mg/cubic meter, except m&p-xylene, which is 0.040 mg/cubic meter

EPA Method 8021 (modified)

B = detected in laboratory blank

--- = undetected

1 mg/cubic meter = 1,000 ug/cubic meter

Table 5-13
Amenia Town Landfill
Soil Gas Results - December 19 to December 26, 2001
Summary of Detected Compounds

Number of Detects	Vinyl chloride	Meth. chloride	1,1-DCA	c-1,2-DCE	TCE	PCE	Benzene	Toluene	Chloro-benzene	Ethyl-benzene	Total Xylenes
1	SG-3	SG-18	SG-11	SG-11	SG-11	SG-2	SG-11	SG-14	SG-5	SG-3	SG-3
2	SG-11	SG-19	SG-18	SG-18	SG-14	SG-11	SG-12	SG-18	SG-11	SG-5	SG-5
3	SG-12	SG-20	SG-19	SG-22	SG-18	SG-14	SG-13	SG-19	SG-12	SG-10	SG-11
4	SG-13	SG-27	SG-22	SG-27		SG-18	SG-15	SG-20	SG-13	SG-11	SG-12
5	SG-15		SG-27	SG-36		SG-22	SG-16	SG-21	SG-19	SG-12	SG-13
6	SG-16			SG-46		SG-46	SG-18	SG-26	SG-23	SG-13	SG-15
7	SG-18					SG-51	SG-19	SG-27	SG-24	SG-15	SG-16
8	SG-19						SG-22	SG-28	SG-27	SG-16	SG-17
9	SG-22						SG-23	SG-29	SG-33	SG-17	SG-18
10	SG-23						SG-24	SG-32	SG-46	SG-18	SG-22
11	SG-24						SG-27	SG-35		SG-19	SG-23
12	SG-27						SG-28	SG-36		SG-22	SG-24
13	SG-29						SG-29	SG-37		SG-23	SG-25
14	SG-33						SG-33	SG-38		SG-24	SG-27
15	SG-41						SG-35	SG-45		SG-25	SG-28
16	SG-42						SG-36	SG-46		SG-27	SG-29
17	SG-50						SG-37	SG-47		SG-28	SG-31
18							SG-38	SG-48		SG-29	SG-32
19							SG-46	SG-51		SG-32	SG-33
20							SG-48	SG-52		SG-33	SG-34
21										SG-34	SG-35
22										SG-35	SG-36
23										SG-36	SG-37
24										SG-37	SG-38
25										SG-38	SG-41
26										SG-41	SG-42
27										SG-42	SG-44
28										SG-44	SG-45
29										SG-45	SG-46
30										SG-46	SG-47
31										SG-47	SG-48
32										SG-48	SG-49
33										SG-49	SG-50
34										SG-50	SG-51
35										SG-51	

Note:

1,1-DCE, trans-1,2-DCE, 1,1,1-TCA, carbon tetrachloride, and 1,2-DCA were not detected in any sample

Table 5-14
Amenia Town Landfill
VOC and PCB Sediment Results - May 15, 2002
West Stream Samples

	SD-UP1	SD-UP2	SD-UP2A
VOCs (ug/kg)	---	NA	NA
PCBs (ug/kg)			
Aroclor 1016	---	---	---
Aroclor 1221	---	---	---
Aroclor 1232	---	---	---
Aroclor 1242	---	---	---
Aroclor 1248	---	---	---
Aroclor 1254	---	---	---
Aroclor 1260	---	---	---
PCBs Total	---	---	---

PCBs = Polychlorinated biphenyls

VOCs = Volatile organic compounds

--- = undetected

J = Analyte detected below reporting limits

NA = not analyzed

PCB detection limit (nominal) = 39.5 ug/kg, except Aroclor 1221 = 79.0 ug/kg

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

NYSDEC Fresh Water Human Health Bioaccumulation Sediment Criteria for PCB = 0.8 ug/kgOC

NYSDEC Fresh Water Wildlife Bioaccumulation Sediment Criteria for PCB = 1400 ug/kgOC

EPA Method 8082

Samples collected from the 0 to 0.5 ft depth interval,

except SD-UP2A which was collected from the 1.5 to 2 ft depth interval

Table 5-15
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 15, 2002
West Stream Samples

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-UP1	SD-UP2	SD-UP2A
Aluminum	—	—	10400 J	9620 J	10600 J
Antimony	2	25	2.0 U	1.6 U	1.7 U
Arsenic	6	33	8.4	6.7	6.3
Barium	—	—	44.4	35.7	43.1
Beryllium	—	—	2.1 J	1.8 J	2.0 J
Cadmium	0.6	9	0.15 B	0.78 U	0.86 U
Calcium	—	—	3810	7140	2720
Chromium	26	110	12.3	12.8	12.9
Cobalt	—	—	29.1	24.8	30.0
Copper	16	110	28.7	26.2	23.8
Iron	2%	4%	76700	60000	66300
Lead	31	110	23.0	11.0	21.5
Magnesium	—	—	6680	9010	6180
Manganese	460	1100	1120	1270	958
Mercury	0.15	1.3	0.041 B	0.028 B	0.050 B
Nickel	16	50	78.5	59.2	75.3
Potassium	—	—	1080	1130	1040
Selenium	—	—	1.3	0.84	1.0
Silver	1	2.2	1.0 U	0.78 U	0.86 U
Sodium	—	—	1020 U	778 U	864 U
Thallium	—	—	7.1	5.8	6.4
Vanadium	—	—	11.8	10.5	13.1
Zinc	120	270	225	170	206
Cyanide	—	—	1.01 U	0.743 U	0.843 U

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

J = the associated method blank contains the target analyte at a reportable level

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

U = undetected

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

R = data rejected through validation

Samples collected from the 0 to 0.5 ft depth interval, except SD-UP2A, which was collected from the 1.5 to 2 ft depth interval

Table 5-16
Amenia Town Landfill
PCB Sediment Results - May 13, 2002
West Pond Samples - Row 1

PCBs (ug/kg)	SD-1	SD-2	SD-2A	SD-3	SD-4	SD-4C Duplicate	SD-5	SD-6	SD-7	SD-7A
Aroclor 1016	---	---	---	---	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---	---	---	---	---
Aroclor 1242	1,850 J	9,670 J	8,510 J	12,200 J	11,500 J	12,100 J	15,100 J	3,680 J	484 J	42.1 J
Aroclor 1248	---	---	---	---	---	---	---	---	---	---
Aroclor 1254	2,950 J	4,120 J	3,480 J	6,240 J	7,780 J	10,300 J	10,000 J	3,070 J	568 J	87.5 J
Aroclor 1260	---	---	---	---	---	---	---	---	---	---
PCBs Total	4,800 J	13,790 J	11,990 J	18,440 J	19,280 J	22,400 J	25,100 J	6,750 J	1,052 J	129.6 J

PCBs (ug/kg)	SD-8	SD-9	SD-10	SD-11	SD-12	SD-13	SD-13A	SD-14	SD-15	FB051302 (ug/l)
Aroclor 1016	---	---	---	---	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---	---	---	---	---
Aroclor 1242	353 J	104 J	---	127 J	---	---	---	---	---	---
Aroclor 1248	---	---	---	---	---	---	---	---	---	---
Aroclor 1254	498 J	230 J	93.6 J	191 J	253 J	553 J	---	1,850 J	797 J	---
Aroclor 1260	---	---	---	---	---	---	---	---	---	---
PCBs Total	851 J	334 J	93.6 J	318 J	253 J	553 J	---	1,850 J	797 J	---

PCBs = Polychlorinated biphenyls --- = undetected

J = Analyte detected below reporting limits

Detection limit (nominal) = 325 ug/kg, except Aroclor 1221 = 649 ug/kg

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

NYSDEC Fresh Water Human Health Bioaccumulation Sediment Criteria for PCB = 0.8 ug/kgOC

NYSDEC Fresh Water Wildlife Bioaccumulation Sediment Criteria for PCB = 1400 ug/kgOC

EPA Method 8082

Samples collected from the 0 to 0.5 ft depth interval, except SD-2A, SD-7A, and SD-13A which were collected from the 1.5 to 2 ft depth interval.

Table 5-1o
Amenia Town Landfill
PCB Sediment Results - May 15, 2002
West Pond Samples - Row 2

PCBs (ug/kg)	SD-1-2	SD-2-2	SD-3-2	SD-4-2	SD-5-2	SD-6-2	SD-7-2	SD-8-2
Aroclor 1016	---	---	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---	---	---
Aroclor 1242	725 J	2420 J	2,730 J	1,790 J	1,080 J	174 J	---	---
Aroclor 1248	---	---	---	---	---	---	---	---
Aroclor 1254	548 J	1,880 J	2,200 J	1,490 J	1,020 J	229 J	---	---
Aroclor 1260	---	---	---	---	---	---	---	---
PCBs Total	1,273 J	4,300 J	4,930 J	3,280 J	2,100 J	403 J	---	---

PCBs (ug/kg)	SD-9-2	SD-10-2	SD-11-2 ***	SD-12-2 ***	SD-13-2 ***	SD-14-2 ***	SD-15-2 ***
Aroclor 1016	---	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---	---
Aroclor 1242	---	---	---	---	---	---	---
Aroclor 1248	---	---	---	---	---	---	---
Aroclor 1254	---	---	---	---	---	---	---
Aroclor 1260	---	---	---	---	---	---	---
PCBs Total	---	---	---	---	---	---	---

PCBs = Polychlorinated biphenyls Samples collected from the 0 to 0.5 ft depth interval

J = Analyte detected below reporting limits --- = undetected EPA Method 8082

Detection limit (nominal) = 83.8 ug/kg, except Aroclor 1221 = 168 ug/kg

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

NYSDEC Fresh Water Human Health Bioaccumulation Sediment Criteria for PCB = 0.8 ug/kgOC

NYSDEC Fresh Water Wildlife Bioaccumulation Sediment Criteria for PCB = 1400 ug/kgOC

*** Percent moisture of samples SD-11-2 through SD-15-2 = ranged from 90.1 to 91.8%. EPA Region II Validation Guidelines recommend rejecting data in soil samples with % moisture greater than 90%

Table 5-16
Amenia Town Landfill
PCB Sediment Results - May 15, 2002
West Pond Samples - Row 3

PCBs (ug/kg)	SD-1-3	SD-2-3	SD-3-3	SD-4-3	SD-5-3	SD-6-3
Aroclor 1016	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---
Aroclor 1242	---	---	---	---	---	---
Aroclor 1248	---	---	---	---	---	---
Aroclor 1254	---	---	---	---	---	---
Aroclor 1260	---	---	---	---	---	---
PCBs Total	---	---	---	---	---	---

PCBs = Polychlorinated biphenyls

--- = undetected

J = Analyte detected below reporting limits

Detection limit (nominal) = 151 ug/kg, except Aroclor 1221 = 305 ug/kg

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

NYSDEC Fresh Water Human Health Bioaccumulation Sediment Criteria for PCB = 0.8 ug/kgOC

NYSDEC Fresh Water Wildlife Bioaccumulation Sediment Criteria for PCB = 1400 ug/kgOC

EPA Method 8082

Samples collected from the 0 to 0.5 ft depth interval

Table 3-17
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 13, 2002
West Pond Samples - Row 1

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-1	SD-2	SD-2A	SD-3	SD-4	SD-4C Duplicate	SD-5	SD-6	SD-7	SD-7A
Aluminum	---	---	6280 J	10900 J	12200 J	3500 J	5520 J	3810 J	4440 J	4000 J	9140 J	9050 J
Antimony	2	25	2.3 U	3.7 U	2.3 U	3.1 U	4.5 U	3.5 U	3.6 U	3.1 U	4.4 U	2.5 U
Arsenic	6	33	3.1	7.5	6.5	7.3	5.1	4.7	6.4	6.9	5.5	5.0
Barium	---	---	27.1 B	57.1 B	66.2	32.7 B	49.8 B	27.3 B	43.6 B	53.2 B	66.2 B	52.3
Beryllium	---	---	0.54 B	0.72 B	0.79 B	0.32 B	0.55 B	0.45 B	0.49 B	0.45 B	0.73 B	0.73 B
Cadmium	0.6	9	0.51 B	0.66 B	0.75 B	0.80 B	0.93 B	0.58 B	1.4 B	0.70 B	1.1 B	0.83 B
Calcium	---	---	16600 J	17200 J	14700 J	40300 J	3720 J0	22800 J	30200 J	34400 J	13200 J	6360 J
Chromium	26	110	9.1	13.6	14.4	6.9	8.4	6.1	8.0	6.9	12.1	11.7
Cobalt	---	---	9.1 B	16.3 B	14.5	6.6 B	9.4 B	9.9 B	11.5 B	8.7 B	7.8 B	5.0 B
Copper	16	110	21.8	42.0	39.6	35.9	41.2	31.2	46.1	39.7	48.9	28.6
Iron	2%	4%	19100	24200	25200	15200	20200	13000	17700	20600	21200	14600
Lead	31	110	23.5	49.0	54.8	64.5	73.5	35.6	83.0	75.3	95.2	47.3
Magnesium	---	---	6900	8990	10600	5590	6090	4820	5550	5540	3250	2350
Manganese	460	1100	339 J	570 J	624 J	609 J	731 J	355 J	620 J	691 J	474 J	218 J
Mercury	0.15	1.3	0.057 B	0.13 B	0.13 B	0.086 B	0.13 B	0.077 B	0.24 B	0.15 B	0.53	0.27
Nickel	16	50	22.2	30.7	29.2	16.4	20.6	17.5	18.3	17.4	16.1 B	13.2
Potassium	---	---	646 B J	1260 B J	866 B J	538 B J	545 B J	393 BJ	467 B J	420 B J	416 B J	269 B J
Selenium	---	---	1.1 U	1.8 U	1.1 U	1.5 U	2.3 U	1.7 U	1.8 U	1.6 U	2.2 U	0.77 B
Silver	1	2.2	1.1 U	1.8 U	0.21 B	1.5 U	0.31 B	1.7 U	0.64 B	0.30 B	1.1 B	0.87 B
Sodium	---	---	75.6 B J	1840 U	1140 U	1540 U	2260 U	110 BJ	99.6 B J	99.6 B J	2210 U	88.7 B J
Thallium	---	---	2.3	2.8 B	2.5	3.1U	4.5 U	3.5 U	3.0 B	2.8 B	3.4 B	2.5 U
Vanadium	---	---	8.6 B	16.6 B	17.4	6.5 B	10.5 B	6.2 B	9.4 B	9.4 B	14.9 B	12.4
Zinc	120	270	89.0 J	155 J	150 J	177 J	130 J	102 J	166 J	141 J	212 J	150 J
Cyanide	---	---	1.35 U	1.14 U	1.48 U	2.19 U	2.14 U	2.05 U	0.960 J	1.53 U	2.03 U	1.21 U

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

U = undetected

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R = data rejected through validation

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

Samples collected from the 0 to 0.5 ft depth interval, except SD-2A, SD-7A, and SD-13A which were collected from the 1.5 to 2 ft depth interval.

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

Table 5-17

Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 13, 2002
West Pond Samples - Row 1

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-8	SD-9	SD-10	SD-11	SD-12	SD-13	SD-13A	SD-14	SD-15	FB051302
Aluminum	---	---	6500 J	4110 J	3760 J	11000 J	4080 J	2870 J	3570 J	2950 J	6960 J	56.3 U
Antimony	2	25	8.7 U	8.0 U	5.3 U	5.4 U	6.6 U	7.7 U	4.7 U	7.7 U	5.8 U	2.5 U
Arsenic	6	33	14.4	8.4	11.3	11.5	4.8 B	7.3 B	3.9 B	5.0 B	5.2 B	7.6 U
Barium	---	---	74.8 B	61.8 B	37.2 B	127	38.7 B	92.0 B	160	66.8 B	74.1 B	6.0 U
Beryllium	---	---	1.1 B	0.88 B	0.49 B	1.2 B	0.76 B	0.70 B	0.47 B	0.91 B	1.0 B	1.3 U
Cadmium	0.6	9	1.0 B	0.66 B	0.41 B	1.8 B	2.9 B	3.2 B	3.8	2.5 B	0.89 B	1.5 U
Calcium	---	---	22000 J	13100 J	21700 J	9990 J	18400 J	10900 J	12600 J	15100 J	27500 J	279 U
Chromium	26	110	9.8	7.1	5.7	18.6	7.8	10.5	11.4	8.5	10.0	3.2 U
Cobalt	---	---	9.3 B	3.9 B	4.6 B	14.9 B	3.5 B	3.9 B	1.8 B	4.3 B	5.7 B	3.0 U
Copper	16	110	27.1	12.2 B	12.1 B	86.4	49.7	166	180	87.8	17.6	5.2 B
Iron	2%	4%	33800	20800	17300	28300	10900	15600	7690	10200	15600	237
Lead	31	110	63.4	46.0	24.4	205	71.4	121	131	70.8	59.0	2.9 U
Magnesium	---	---	3470 B	1740 B	2300 B	6500	3130 B	2340 B	2520	2390 B	3820	190 U
Manganese	460	1100	733 J	1740 J	231 J	301 J	101 J	142 J	144 J	147 J	226 J	27.9
Mercury	0.15	1.3	0.14 B	0.26 B	0.11 B	0.58	0.81	1.9	2.5	1.2	0.20 B	0.10 U
Nickel	16	50	21.3 B	9.8 B	9.6 B	35.3	12.3 B	12.9 B	9.7 B	10.9 B	13.9 B	0.1000 U
Potassium	---	---	484 B J	246 B J	344 B J	1030 B J	299 B J	283 B J	166 B J	227 B J	312 B J	0.8793
Selenium	---	---	2.8 B	4.0 U	2.6 U	2.7 U	9.5	3.8 U	2.3 U	3.8 U	2.2 B	3.6 U
Silver	1	2.2	4.4 U	0.73 B	2.6 U	5.0	2.4 B	5.4	7.3	3.3 B	0.59 B	17.9 U
Sodium	---	---	307 B J	240 B J	196 B J	203 B J	3320 U	3830 U	179 B J	3830 U	2910 U	6.9 U
Thallium	---	---	8.7 U	8.0 U	5.3 U	5.4 U	6.6 U	7.7 U	4.7 U	7.7 U	5.8 U	2.1 U
Vanadium	---	---	16.0 B	10.2 B	7.9 B	23.5 B	22.4 B	10.7 B	7.8 B	8.2 B	12.6 B	391 U
Zinc	120	270	150 J	76.4 J	49.6 J	377 J	587 J	977 J	603 J	575 J	96.5 J	6.9 U
Cyanide	---	---	3.64 U	3.40 U	2.52 U	2.82 U	3.24 U	3.05 U	2.26 U	3.58 U	3.06 U	2.9 U

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

J = the associated method blank contains the target analyte at a reportable level

R = data rejected through validation

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

Samples collected from the 0 to 0.5 ft depth interval, except SD-2A, SD-7A, and SD-13A which were collected from the 1.5 to 2 ft depth interval.

E = reported value is estimated because of the presence of interference

U = undetected

N = spike analysis not within control limits

Table 5-17
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 15, 2002
West Pond Samples - Row 2

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-1-2	SD-2-2	SD-3-2	SD-4-2	SD-5-2	SD-6-2	SD-7-2	SD-8-2
Aluminum	---	---	11900 J	13100 J	12900 J	8850 J	8920 J	11400 J	6490 J	8360 J
Antimony	2	25	7.6 U	8.0 U	7.1 U	6.3 U	7.5 U	8.7 U	10 U	9.5 U
Arsenic	6	33	10.6	12.4	9.2	10.5	8.2	8.5 B	8.1 B	6.3 B
Barium	---	---	74.7 B J	78.6 B J	87.9 B J	53.0 B J	62.8 B J	71.3 B J	50.0 B J	64.9 B J
Beryllium	---	---	1.7 B J	1.7 B J	1.6 B J	1.6 B J	1.7 B J	2.2 B J	2.0 B J	2.0 B J
Cadmium	0.6	9	3.8 U	4.0 U	3.6 U	3.1 U	3.8 U	4.4 U	5.0 U	4.8 U
Calcium	---	---	14400	52800	66500	13200	19000	23800	46400	128000
Chromium	26	110	20.0	16.8	16.4	15.9	14.7	16.0	9.5	10
Cobalt	---	---	18.6 B	20.0 B	18.0 B	13.4 B	11.8 B	15.9 B	8.5 B	11.4 B
Copper	16	110	35.7	52.2	48.2	34.3	28.5	36.7	17.0 B	19.5 B
Iron	2%	4%	36300	42100	33500	33000	30700	36400	27000	29800
Lead	31	110	69.9	70.4	58.3	78.6	70.3	70.1	41.0	23.7
Magnesium	---	---	6610	9090	8770	4870	4630	5830	3940 B	6050
Manganese	460	1100	756	947	1500	398	478	627	830	991
Mercury	0.15	1.3	0.22 B	0.14 B	0.13 B	0.23 B	0.15 B	0.21 B	0.26 B	0.95 U
Nickel	16	50	40.7	39.4	37.9	30.1	24.8 B	30.4 B	16.1 B	20.6 B
Potassium	---	---	909 B	1270 B	1320 B	596 B	614 B	1090 B	832 B	1360 B
Selenium	---	---	4.4	4.0	3.4 B	5.3	4.0	3.8 B	5.0 U	4.8 U
Silver	1	2.2	3.8 U	0.66 B	3.6 U	0.70 B	1.6 B	1.1 B	5.0 U	4.8 U
Sodium	---	---	3790 U	208 B	217 B	167 B	3760 U	4370 U	4980 U	228 B
Thallium	---	---	5.0 B	8.7	7.1 U	6.3 U	7.5 U	5.1 B	7.4 B	9.5 U
Vanadium	---	---	19.3 B	26.0 B	23.8 B	19.6 B	17.4 B	20.7 B	12.8 B	14.8 B
Zinc	120	270	219	201	163	233	233	186	112	77.9

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

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R = data rejected through validation

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

U = undetected

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

Samples collected from the 0 to 0.5 ft depth interval

Table 5-17
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 15, 2002
West Pond Samples - Row 2

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-9-2	SD-10-2	SD-11-2	SD-12-2 ***	SD-13-2	SD-14-2	SD-15-2 ***
Aluminum	---	---	13200 J	13900 J	6500 J	2500 J	2400 J	1960 J	2520 J
Antimony	2	25	8.5 U	7.2 U	10.5 U	11.0 U	9.4 U	9.8 U	11.3 U
Arsenic	6	33	9.3	5.7 B	12.1	2.9 B	3.5 B	3.1 B	4.5 B
Barium	---	---	82.9 B J	85.8 B J	44.3 B J	39.2 B J	46.2 B J	36.7 B J	39.4 B J
Beryllium	---	---	2.2 B J	2.0 B J	2.3 B J	2.2 B J	2.2 B J	2.1 B J	2.7 B J
Cadmium	0.6	9	4.2 U	3.6 U	5.3 U	5.5 U	0.99 B	0.53 B	0.87 B
Calcium	---	---	66400	112000	22400	31700	39000	84900	41400
Chromium	26	110	15.0	14.2	9.3	4.9 B	5.4	4.3 B	5.7
Cobalt	---	---	15.2 B	14.6 B	8.3 B	3.2 B	3.1 B	3.5 B	4.8 B
Copper	16	110	31.5	29.6	22.6 B	20.3 B	44.4	16.9 B	10.0 B
Iron	2%	4%	31900	29600	29400	10400	8910	5880	8430
Lead	31	110	33.2	22.1	48.0	42.3	54.7	44.3	67.9
Magnesium	---	---	7010	7910	5090 B	3560 B	3060 B	3250 B	4420 B
Manganese	460	1100	511	711	276	260	227	209	196
Mercury	0.15	1.3	0.12 B	0.075 B	0.19 B	0.29 B	0.46 B	0.31 B	0.12 B
Nickel	16	50	28.7 B	28.7	17.6 B	7.4 B	7.2 B	6.5 B	8.4 B
Potassium	---	---	1510 B	1670 B	606 B	362 B	321 B	321 B	288 B
Selenium	---	---	4.1 B	3.6 U	3.5 B	5.5 U	4.7 U	4.9 U	3.4 B
Silver	1	2.2	4.2 U	3.6 U	1.0 B	0.91 B	2.0 B	0.71 B	5.7 U
Sodium	---	---	4250 U	3580 U	290 B	5500 U	270 B	4890 U	5670 U
Thallium	---	---	8.5 U	7.2 U	10.5 U	11.0 U	9.4 U	9.8 U	11.3 U
Vanadium	---	---	22.0 B	21.1 B	13.3 B	7.1 B	9.3 B	5.6 B	10.7 B
Zinc	120	270	99.9	81.4	125	133	339	141	102

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

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B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

Samples collected from the 0 to 0.5 ft depth interval

U = undetected

N = spike analysis not within control limits

*** Percent moisture of samples SD-12-2 and SD-15-2 = 91%. EPA II Validation Guidelines recommend rejecting data in soil samples with % moisture greater than 90%

Table 5-17
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 15, 2002
West Pond Samples - Row 3

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-1-3	SD-2-3	SD-3-3	SD-4-3	SD-5-3	SD-6-3	SD-7-3	SD-8-3
Aluminum	---	---	9530 E*	9400 E*	8050 E*	6540 E*	7530 E*	8260 E*	7880 E*	7610 E*
Antimony	2	25	5.9 BN	3.5 BN	2.8 BN	1.9 BN	2.0 BN	7.6 BN	7.0 BN	6.1 BN
Arsenic	6	33	9.1 B	9.7 B	7.3 B	4.7 B	6.8 B	8.8 B	8.1 B	9.6 B
Barium	---	---	71.3 N	72.1 N	50.5 N	40.9 N	49.0 N	65.4 N	63.1 N	55.4 N
Beryllium	---	---	1.5 B*N	0.75 B*N	0.73 B*N	0.45 B*N	0.62 B*N	0.87 U*N	0.76 U*N	0.67 U*N
Cadmium	0.6	9	0.64 U	0.68 U	0.64 B	0.26 U	0.31 U	0.87 U	0.76 U	0.67 U
Calcium	---	---	60200 E*	15900 E*	7460 E*	14600 E*	13300 E*	82100 E*	103000 E*	89200 E*
Chromium	26	110	12.5 *N	15.0 *N	12.3 *N	9.1 *N	10.9 *N	9.6 *N	9.1 *N	9.1 *N
Cobalt	---	---	23.5 *N	16.1 *N	13.6 *N	7.9 *N	11.4 *N	12.3 B*N	11.5 B*N	12.6 B*N
Copper	16	110	28.1	24.2	20.9	12.5	15.8	25.9	25.3	25.1
Iron	2%	4%	47800 E*	28400 E*	29500 E*	16300 E*	19300 E*	29500 E*	28300 E*	27800 E*
Lead	31	110	33.6	45.2	44.6	24.1	22.9	38.3	30.6	34.2
Magnesium	---	---	6360 E*N	4860 E*N	4100 E*N	3550 E*N	3800 E*N	5470 E*N	5630 E*N	5540 E*N
Manganese	460	1100	2060 E*N	729 E*N	634 E*N	565 E*N	496 E*N	1310 E*N	967 E*N	774 E*N
Mercury	0.15	1.3	R	0.16 BN	0.23 N	0.046 BN	0.048 BN	R	0.15 BN	R
Nickel	16	50	50.4 *N	26.5 *N	27.8 *N	15.9 *N	22.5 *N	21.8 *N	22.0 *N	24.1 *N
Potassium	---	---	1490 N	905 BN	828 BN	545 N	656 N	1480 N	1450 N	1320 N
Selenium	---	---	5.1 UN	5.4 UN	4.7 UN	2.1 UN	2.5 UN	6.9 UN	6.1 UN	5.3 UN
Silver	1	2.2	1.3 U	1.4 U	1.2 U	0.51 U	0.62 U	1.7 U	1.5 U	1.3 U
Sodium	---	---	273 B	198 U	170 U	74.7 U	90.7 U	252 U	222 U	194 U
Thallium	---	---	8.7 B	3.5 B	2.3 U	2.2 B	1.7 B	8.9 B	8.2 B	6.3 B
Vanadium	---	---	12.3 B*N	14.5 *N	11.5 B*N	8.5 *N	9.9 *N	12.6 B*N	11.3 B*N	12.1 B*N
Zinc	120	270	169	131	144	73.2	85.8	88.6	87.5	90.1

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

J = the associated method blank contains the target analyte at a reportable level

R = data rejected through validation

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

U = undetected

Samples collected from the 0 to 0.5 ft depth interval

Table 5-17
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 15, 2002
West Pond Samples - Row 3

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-9-3	SD-10-3	SD-11-3	SD-12-3 ***	SD-13-3	SD-14-3 ***	SD-15-3
Aluminum	---	---	11200 E*	13300 E*	9030 E*	7380 E*	11300 E*	5760 E*	3530 E*
Antimony	2	25	6.2 BN	4.7 N	5.2 BN	4.1 BN	6.8 BN	7.5 BN	4.8 BN
Arsenic	6	33	9.1 B	5.4 B	5.6 B	6.1 B	6.8 B	6.1 B	2.7 B
Barium	---	---	69.4 N	78.2 N	68.8 N	52.8 N	74.3 N	49.2 N	39.0 N
Beryllium	---	---	0.66 B*N	0.68 B*N	0.76 U*N	0.90 U*N	0.75 U*N	0.96 U*N	0.57 U*N
Cadmium	0.6	9	0.64 U	0.44 U	0.76 U	0.90 U*N	0.75 U	0.96 U	0.57 U
Calcium	---	---	82400 E*	90100 E*	85900 E*	24400 E*	99800 E*	74900 E*	157000 E*
Chromium	26	110	12.7 *N	14.1 *N	9.8 *N	9.0 *N	11.9 *N	7.2 B*N	4.4 B*N
Cobalt	---	---	16.0 *N	14.4 *N	10.8 B*N	8.2 B*N	9.8 B*N	7.3 B*N	4.1 B*N
Copper	16	110	31.6	31.5	22.1	21.3	22.8	15.5 B	10.0 B
Iron	2%	4%	31000 E*	26900 E*	27000 E*	23600 E*	22000 E*	16200 E*	11600 E*
Lead	31	110	27.9	22.7	22.9	51.2	22.3	33.1	14.7
Magnesium	---	---	7230 E*N	7720 E*N	6140 E*N	4580 E*N	6560 E*N	4620 E*N	4530 E*N
Manganese	460	1100	842 E*N	764 E*N	522 E*N	394 E*N	441 E*N	307 E*N	376 E*N
Mercury	0.15	1.3	0.20 BN	0.12 BN	R	0.19 BN	R	R	R
Nickel	16	50	31.1 *N	28.3 *N	17.3 *N	14.8 B*N	18.2 *N	10.3 B*N	6.2 B*N
Potassium	---	---	1570 N	1700 N	1310 N	1070 BN	1570 N	871 BN	600 BN
Selenium	---	---	5.1 UN	3.5 UN	6.1 UN	7.2 UN	6.0 UN	7.7 UN	4.5 UN
Silver	1	2.2	1.3 U	0.87 U	1.5 U	1.8 U	1.5 U	1.9 U	1.1 U
Sodium	---	---	187 U	127 U	220 U	261 U	219 U	279 U	165 U
Thallium	---	---	6.8 B	4.6 B	6.6 B	5.9 B	7.2 B	7.4 B	4.8 B
Vanadium	---	---	14.4 *N	15.8 *N	10.9 B*N	11.5 B*N	13.4 B*N	8.3 B*N	5.6 B*N
Zinc	120	270	107	95.0	78.5	99.8	69.9	77.7	41.1

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

J = the associated method blank contains the target analyte at a reportable level

* = Duplicate analysis not within control limits (RPD > 20%)

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

Samples collected from the 0 to 0.5 ft depth interval

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

U = undetected

R = data rejected through validation

*** Percent moisture of samples SD-12-3 and SD-14-3 = 91.3 and 90.7%, respectively. EPA II Validation Guidelines recommend rejecting data in soil samples with % moisture greater than 90%

Table 5-18
Amenia Town Landfill
PCB Sediment Results - May 16, 2002
North Stream Samples

PCBs (ug/kg)	SD-N1	SD-N2	SD-N3	SD-N3A	SD-N4	SD-N5	SD-N5A	SD-N6	SD-N7	SD-N8	FB051602 (ug/l)
Aroclor 1016	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1221	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1232	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1242	557	43.3 J	270	119	143	---	---	69.0 J	---	187	---
Aroclor 1248	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1254	636	59.5	285	132	190	29.0 J	---	124	---	104	---
Aroclor 1260	---	---	---	---	---	---	---	---	---	---	---
PCBs Total	1193	103.3 J	555	251	333	29	---	193 J	---	291	---

PCBs = Polychlorinated biphenyls

--- = undetected

J = Analyte detected below reporting limits

Detection limit (nominal) = 81.2 ug/kg, except Aroclor 1221 = 162 ug/kg

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

NYSDEC Fresh Water Human Health Bioaccumulation Sediment Criteria for PCB = 0.8 ug/kgOC

NYSDEC Fresh Water Wildlife Bioaccumulation Sediment Criteria for PCB = 1400 ug/kgOC

EPA Method 8082

Samples collected from the 0 to 0.5 ft depth interval, except SD-N3A and SD-N5A which were collected from the 1.5 to 2 ft depth interval

Table 5-19
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 16, 2002
North Stream Samples

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-N1	SD-N2	SD-N3	SD-N3A	SD-N4	SD-N5
Aluminum	---	---	8280 J	9900 J	6050 J	7300 J	4030 J	3270 J
Antimony	2	25	3.8 U	2.5 U	3.9 U	2.6 U	3.9 U	3.3 U
Arsenic	6	33	4.4	4.3	6.3	6.5	7.2	9.1
Barium	---	---	54.5 B	40.7 B	54.6 B	37.7 B	70.3 B	16.7 B
Beryllium	---	---	1.6 B J	0.83 B J	2.7 J	2.8 J	2.4 J	3.5 J
Cadmium	0.6	9	1.9 U	1.2 U	2.0 U	1.3 U	1.9 U	1.7 U
Calcium	---	---	6830	13700	4840	4340	15200	1990
Chromium	26	110	9.7	10.4	8.3	10.0	6.1	5.6
Cobalt	---	---	14.1 B	10.3 B	24.7	32.9	29.5	124
Copper	16	110	15.2	21.3	13.7	10.6	9.5 B	8.1
Iron	2%	4%	34200	21100	79500	88000	81600	112000
Lead	31	110	27.0	14.4	17.8	13.5	13.5	1.9
Magnesium	---	---	3600	4270	2840	3670	3060	2110
Manganese	460	1100	427	442	2540	1850	5070	874
Mercury	0.15	1.3	0.12 B	0.054 B	0.072 B	0.063 B	0.086 B	0.17 U
Nickel	16	50	36.5	24.2	62.7	85.4	80.2	142
Potassium	---	---	501 B	513 B	371 B	498 B	355 B	520 B
Selenium	---	---	1.9	1.1 B	1.9 B	1.6	2.4	1.7 U
Silver	1	2.2	1.9 U	1.2 U	0.28 B	0.20 B	0.38 B	0.83 U
Sodium	---	---	1890 U	1230 U	92.7 B J	1310 U	129 B J	826
Thallium	---	---	2.2 B	1.8 B	5.8	7.6	5.2 B	12.2
Vanadium	---	---	10.8 B	12.0 B	5.5 B	6.2 B	4.0 B	16.5 U
Zinc	120	270	128	65.5	205	242	190	350
Cyanide	---	---	2.03 U	1.50 U	1.93 U	1.35 U	2.00 U	0.838 U

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

J = the associated method blank contains the target analyte at a reportable level

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

U = undetected

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

R = data rejected through validation

Samples collected from the 0 to 0.5 ft depth interval, except SD-N3A and SD-N5A, which were collected from the 1.5 to 2 ft depth interval

Table 5-19
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 16, 2002
North Stream Samples

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-N5A	SD-N6	SD-N7	SD-N8	FB051602 (ug/l)
Aluminum	—	—	7710 J	4420 J	4200 J	7860 J	56.3 U
Antimony	2	25	3.1 U	4.5 U	4.3 U	3.9 U	2.5 U
Arsenic	6	33	13.9	6.1	6.1	6.0	7.6 U
Barium	—	—	34.4 B	65.2 B	58.9 B	62.0 B	6.0 U
Beryllium	—	—	1.8 J	2.0 B J	2.2 J	2.1 J	1.3 U
Cadmium	0.6	9	1.5 U	2.2 U	2.1 U	1.9 U	1.5 U
Calcium	—	—	14400	9050	7030	10600	279 U
Chromium	26	110	10.2	6.2	6.3	10.1	3.2 U
Cobalt	—	—	13.5 B	24.4	26.0	27.4	3.0 U
Copper	16	110	15.7	11.4	10.6 B	21.0	3.8 U
Iron	2%	4%	39000	62400	67500	65500	52.5 U
Lead	31	110	8.3	17.4	16.7	25.8	2.9 U
Magnesium	—	—	5970	3020	2910	6240	190 U
Manganese	460	1100	321	2970	3210	2270	2.7 U
Mercury	0.15	1.3	0.030 B	0.079 B	0.095 B	0.080 B	0.10 U
Nickel	16	50	36.4	60.6	66.2	69.6	3.6 U
Potassium	—	—	404 B	432 B	340 B	593 B	17.9 U
Selenium	—	—	3.7	3.2	1.9 B	3.4	6.9 U
Silver	1	2.2	1.5 U	0.49 B	0.43 B	0.30 B	2.1 U
Sodium	—	—	1550 U	2240 U	128 B J	142 B J	391 U
Thallium	—	—	2.0 B	3.6 B	4.3	5.5	6.9 U
Vanadium	—	—	6.7 B	5.6 B	3.8 B	8.7 B	2.9 U
Zinc	120	270	102	158	172	182	11.7
Cyanide	—	—	1.81 U	2.14 U	2.11 U	1.98 U	NA

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

J = the associated method blank contains the target analyte at a reportable level

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

U = undetected

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

R = data rejected through validation

Samples collected from the 0 to 0.5 ft depth interval, except SD-N3A and SD-N5A, which were collected from the 1.5 to 2 ft depth interval

Table 5-20
Amenia Town Landfill
Organic Sediment Results - May 14, 2002
East Stream Upgradient Samples

VOCs (ug/kg)	NYSDEC Human Health Criteria (ug/kgOC)	NYSDEC Wildlife Criteria (ug/kgOC)	SD-UP3	SD-UP4	SD-UP4A	FB051402 (ug/l)
Acetone	na	na	---	---	11.0 J	---
Chloroform	na	na	---	---	---	1.62 J
SVOCS (ug/kg)						
Bis(2-ethylhexyl)phthalate	na	199,500	---	---	---	2.91 J
PCBs (ug/kg)						
Aroclor 1016	not applicable	not applicable	---	---	---	---
Aroclor 1221	not applicable	not applicable	---	---	---	---
Aroclor 1232	not applicable	not applicable	---	---	---	---
Aroclor 1242	not applicable	not applicable	---	---	---	---
Aroclor 1248	not applicable	not applicable	---	---	---	---
Aroclor 1254	not applicable	not applicable	---	---	---	---
Aroclor 1260	not applicable	not applicable	---	---	---	---

NYSDEC Technical Guidance for Screening Contaminated Sediments, last revised January 25, 1999

VOC = Volatile organic compound

SVOC = Semivolatile organic compound

PCB = Polychlorinated biphenyl

J = Analyte detected below reporting limits

--- = undetected

na = not available

Samples collected from the 0 to 0.5 ft depth interval, except SD-UP4A, which was collected from the 1.5 to 2 ft depth interval

Table 5-20
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 14, 2002
East Stream Upgradient Samples

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-UP3	SD-UP4	SD-UP4A	FB051402 (ug/l)
Aluminum	---	---	8490	6800	7210	56.3 U
Antimony	2	25	2.0 U	2.2 U	1.5 U	2.7 B
Arsenic	6	33	7.2	5.9	4.9	7.6 U
Barium	---	---	42.2	43.8 B	28.7 B	6.0 U
Beryllium	---	---	0.68 B J	0.63 B J	0.52 B J	1.3 U
Cadmium	0.6	9	1.0 U	1.1 U	0.74 U	1.5 U
Calcium	---	---	10800 J	9040 J	5040 J	279 U
Chromium	26	110	11.6 J	9.2 J	9.2 J	3.2 U
Cobalt	---	---	14.4	11.3	11.8	3.0 U
Copper	16	110	23.0	20.6	20.1	3.8 U
Iron	2%	4%	29900 J	23600 J	21800 J	52.5 U
Lead	31	110	22.6	22.9	20.8	2.9 U
Magnesium	---	---	8780	6000	5570	190 U
Manganese	460	1100	1630 J	1340 J	633 J	4.7 B
Mercury	0.15	1.3	0.058 B	0.048 B	0.032 B	0.10 U
Nickel	16	50	27.6	22.0	21.9	3.6 U
Potassium	---	---	449 B J	390 B J	366 B J	17.9 U
Selenium	---	---	1.3	1.4	0.99	6.9 U
Silver	1	2.2	0.14 B	0.18 B	0.74 U	2.1 U
Sodium	---	---	80.6 B J	100 B J	57.4 B J	391 U
Thallium	---	---	2.0 U	2.2 U	1.5 U	6.9 U
Vanadium	---	---	11.7	9.6 B	9.9	2.9 U
Zinc	120	270	93.3 J	79.6 J	70.4 J	11.6 U
Cyanide	---	---	0.902 U	0.923 U	0.666 U	NA

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

J = the associated method blank contains the target analyte at a reportable level

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

U = undetected

E = reported value is estimated because of the presence of interference

N = spike analysis not within control limits

R = data rejected through validation

Samples collected from the 0 to 0.5 ft depth interval, except SD-UP4A, which was collected from the 1.5 to 2 ft depth interval

Table 5
Amenia Town Landfill
Organic Sediment Results - May 14, 2002
East Stream Samples

VOCs (ug/kg)	NYSDEC Human Health Criteria (ug/kgOC)	NYSDEC Wildlife Criteria (ug/kgOC)	SD-OF1	SD-OF2	SD-OF3	SD-OF4	SD-OF4B Duplicate of SD-OF4	SD-OF4A	SD-OF5	SD-OF6
1,1-Dichloroethane	---	---	---	---	---	---	---	5.24 J	---	---
1,2-Dichlorobenzene	---	---	---	---	9.27 J	---	---	11.5 J	---	---
1,4-Dichlorobenzene	---	---	---	---	15.9 J	---	---	3.41 J	---	---
2-Butanone	---	---	32.1	18.7 J	---	10.7 J	17.9 J	113	43.1	18.1 J
Acetone	---	---	141	89.7	24.2 J	57.9	80.4	466	202	91.7
Benzene	600	---	---	---	---	---	---	4.43 J	---	---
Carbon disulfide	---	---	---	---	---	---	---	9.76 J	---	---
Chlorobenzene	---	---	---	---	---	---	---	13.6 J	---	---
Trichloroethene	2000	---	---	---	---	---	---	4.07 J	---	---
SVOCs (ug/kg)										
Bis(2-ethylhexyl)phthalate	---	---	---	---	---	---	---	---	---	---
PCBs (ug/kg)										
Aroclor 1016			---	---	---	---	---	---	---	---
Aroclor 1221			---	---	---	---	---	---	---	---
Aroclor 1232			---	---	---	---	---	---	---	---
Aroclor 1242			196	288	363	353	209	---	108	---
Aroclor 1248			---	---	---	---	---	---	---	---
Aroclor 1254			199	302	452	376	220	87.9	115	---
Aroclor 1260			---	---	---	---	---	---	---	---
		PCBs Total	395	590	815	729	429	87.9	223	---

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999
PCB detection limit (nominal) = 46.6 ug/kg, except Aroclor 1221 = 93.2 ug/kg
NYSDEC Fresh Water Human Health Bioaccumulation Sediment Criteria for PCB = 0.8 ug/kgOC
NYSDEC Fresh Water Wildlife Bioaccumulation Sediment Criteria for PCB = 1400 ug/kgOC
Samples collected from the 0 to 0.5 ft depth interval, except SD-OF4A which was collected from the 1.5 to 2 ft depth interval

VOC = Volatile organic compound
SVOC = Semivolatile organic compound
J = Analyte detected below reporting limits
PCBs = Polychlorinated biphenyls
--- = undetected

Table 5-22
Amenia Town Landfill RI/FS
Inorganic Sediment Results - May 14, 2002
East Stream Samples

Inorganic Constituents (mg/kg)	Lowest Effect Level (mg/kg)	Severe Effect Level (mg/kg)	SD-OF1	SD-OF2	SD-OF3	SD-OF4	SD-OF4B Duplicate of SD-OF4	SD-OF4A	SD-OF5	SD-OF6
Aluminum	---	---	7970	8370	7070	11000	11600	9810	7790	7670
Antimony	2	25	2.5 U	3.3 U	3.7 U	3.4 U	3.6 U	3.5 U	3.2 U	2.1 U
Arsenic	6	33	7.6	10.3	8.0	16.7	17.4	26.9	23.0	7.1
Barium	---	---	65.9	92.8	167	211	224	136	97.7	42.9
Beryllium	---	---	2.1 J	1.5 B J	1.2 B J	1.3 B J	1.4 B J	1.1 B J	1.0 B J	0.66 B J
Cadmium	0.6	9	1.2 U	1.7 U	1.9 U	1.7 U	1.8 U	1.7 U	1.6 U	1.0 U
Calcium	---	---	8930 J	12000 J	11900 J	10700 J	11600 J	12200 J	26800 J	15100 J
Chromium	26	110	10.3 J	11.2 J	9.7 J	14.0 J	14.2 J	12.4 J	9.4 J	10.1 J
Cobalt	---	---	36.7	22.8	15.9 B	23.3	22.8	19.6	13.3 B	13.7
Copper	16	110	23.9	31.3	23.8	36.4	36.3	29.5	31.3	21.2
Iron	2%	4%	76900 J	58700 J	44500 J	55700 J	58700 J	46800 J	60600 J	28500 J
Lead	31	110	62.7	40.3	33.3	48.9	51.2	46.6	25.8	21.5
Magnesium	---	---	6040	7380	5630	8520	9060	7670	10200	9910
Manganese	460	1100	2030 J	2830 J	1940 J	1610 J	1880 J	967 J	1310 J	1370 J
Mercury	0.15	1.3	0.092 B	0.11 B	0.12 B	0.13 B	0.16 B	0.17 B	0.069 B	0.042 B
Nickel	16	50	87.5	49.8	37.0	46.3	46.9	38.0	31.0	24.1
Potassium	---	---	400 B J	477 B J	492 B J	641 B J	686 B J	568 B J	578 B J	408 B J
Selenium	---	---	3.4	3.1	2.6	2.8	3.2	3.2	2.7	1.4
Silver	1	2.2	0.21 B	1.7 U	0.25 B	1.7 U	0.26 B	0.30 B	0.27 B	1.0 U
Sodium	---	---	130 B J	209 B J	236 B J	195 B J	177 B J	177 B J	197 B J	111 B J
Thallium	---	---	2.8	1.9 B	3.7 U	3.4 U	3.6 U	3.2 B	2.4 B	2.1 U
Vanadium	---	---	15.2	15.3 B	12.5 B	18.0	18.8	15.2 B	13.8 B	11.1
Zinc	120	270	231 J	169 J	118 J	158 J	163 J	146 J	115 J	79.1 J
Cyanide	---	---	1.14 U	1.97	1.80 U	1.70 U	1.08 J	1.59 U	1.63 U	0.972 U

NYSDEC Technical Guidance for Screening Contaminated Sediments, January 25, 1999

J = the associated method blank contains the target analyte at a reportable level

N = spike analysis not within control limits

B = reported value is less than the Practical Quantitation/Reporting Limits but greater than the Method Detection Limit

Samples collected from the 0 to 0.5 ft depth interval, except SD-OF4A which was collected from the 1.5 to 2 ft depth interval

E = reported value is estimated because of the presence of interference

U = undetected

R = data rejected through validation

Table 5-23
Amenia Town Landfill RI/FS
Organic Surface Water Results - May 14 to May 16, 2002

VOCs (ug/L)	NYSDEC AWQS (ug/L)	SW-1 5/15/02	SW-2 5/15/02	SW-3 5/16/02	SW-4 5/16/02	SW-5 5/16/02	SW-6 5/14/02	SW-7 5/14/02	Duplicate SW-7A 5/14/02	SW-8 5/14/02
VOCs	---	---	---	---	---	---	---	---	---	---
SVOCs	---	---	---	---	---	---	---	---	---	---
Pesticides										
alpha-Chlordane	2×10^{-5}	---	---	---	0.0100 J	---	---	---	---	---
delta-BHC	0.008	---	---	---	---	0.00897 J	---	---	---	---
gamma-Chlordane	2×10^{-5}	---	---	0.0110 J	---	---	---	---	---	---
Total PCBs	0.09	--	--	--	--	--	--	--	--	--

VOCs = volatile organic compounds

SVOCs = semivolatile organic compounds

PCBs = polychlorinated biphenyls

J = analyte detected below reporting limits

--- = undetected

NYSDEC Ambient Water Quality Standards and Guidance Values, Water Class C: TOGS 1.1.1, June 1998

Table 5-24
Amenia Town Landfill RI/FS
Inorganic Surface Water Results - May 14 to May 16, 2002

Inorganic Constituents (ug/L)	NYSDEC AWQS	SW-1 5/15/02	SW-2 5/15/02	SW-3 5/16/02	SW-4 5/16/02	SW-5 5/16/02	SW-6 5/14/02	SW-7 5/14/02	Duplicate SW-7A 5/14/02	SW-8 5/14/02	FB051502 5/15/02
Aluminum	100	123 B	243	65.5 B	56.3 U	56.3 U	203	110 B	64.4 B	1020	56.3 U
Antimony	---	4.1 B	4.2 B	4.1 B	3.6 B	2.9 B	5.0 B	5.4 B	4.4 B	5.3 B	2.5 U
Arsenic	150	7.6 U	7.6 U	7.6 U	7.6 U	7.6 U	7.6 U	7.6 U	7.6 U	7.6 U	7.6 U
Barium	---	7.3 B	10.5 B	6.0 U	8.8 B	8.1 B	9.0 B	7.3 B	6.8 B	17.0 B	6.0 U
Beryllium	*	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Cadmium	*	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Calcium	---	35700	44400	38700	43600	46000	41900	42500	41400	38900	279 U
Chromium	*	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U
Cobalt	5	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
Copper	*	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	3.8 U	4.0 B	3.8 U
Iron	300	R	R	R	R	R	1480	835	633	2110	52.5 U
Lead	*	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	3.5 B	2.9 U
Magnesium	---	15200	15300	15900	17200	18000	15600	15600	15300	16800	190 U
Manganese	---	R	R	151	R	141	142	105	86.3	293	25.8
Mercury	0.77	0.10 U	0.10 U	0.10 U	0.10 U	0.11 B	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Nickel	*	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U
Potassium	---	1460 B	1550	1420 B	1360 B	1260 B	1530	1420 B	1350 B	1710	17.9 U
Selenium	4.6	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U
Silver	0.1	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Sodium	---	5260	4110	4490	4990	5180	5740	5810	5680	14600	391 U
Thallium	8	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U	6.9 U
Vanadium	14	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U
Zinc	*	R	R	R	4.5 U	4.5 U	12.0	6.9 B	4.5 U	12.6	10.9
Cyanide	5.2	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA

(1) NYSDEC Fish Propagation (Fresh Waters)/Fish Survival (Fresh Waters)

B = value less than PQL but greater than MDL

U = undetected

--- = criterion not available

* = criterion dependent on hardness of water

NA = not analyzed

R = Rejected data, see Appendix J for explanation

Table 6-1
Chemicals Detected in Water
Maximum Detected Concentrations
Amenia Town Landfill
Amenia, New York

Parameter	NYSDEC GQS (µg/L)	Groundwater (µg/L)	Surface Water (µg/L)
VOCs			
1,1-Dichlororethane	5	8.67	ND
1,1-Dichlororethene	5	11.5	ND
1,2-Dichlorobenzene	3	1.52 J	ND
1,2-Dichloroethane	0.6	3.5 J	ND
1,3-Dichlorobenzene	3	3.29 J	ND
1,4-Dichlorobenzene	3	6.42	ND
Acetone	50	25.5 J	ND
Benzene	1	5.03	ND
Chlorobenzene	5	16.8	ND
Chloroethane	5	8.94 J	ND
cis-1,2-dichloroethene	5	104.0	ND
Ethylbenzene	5	0.656 J	ND
Tetrachloroethene	5	2.25 J	ND
trans-1,2-dichlorethene	5	23.8	ND
Trichloroethene	5	22.0	ND
Vinyl Chloride	2	15.3	ND
SVOCs			
1,4-Dichlorobenzene	3	3.88 J	ND
4-Chloro-3-methylphenol[1]	1	2.8 J	ND
Benzoic acid	none	14.8 J	ND
bis(2-Ethylhexyl)phthalate	5	26.2	ND
Diethylphthalate	50	3.55 J	ND
Pesticides			
alpha-Chlordane	0.05	ND	0.0100 J
beta-BHC	0.04	0.966	ND
delta-BHC	0.04	ND	0.00897 J
Endosulfan II	none	ND	ND
Endrin aldehyde	5	0.0510 J	ND
gamma-Chlordane	0.05	ND	0.0110 J
Heptachlor	0.04	0.0104 J	ND

Table 6-1
Chemicals Detected in Water
Maximum Detected Concentrations
Amenia Town Landfill
Amenia, New York

Parameter	NYSDEC GQS (µg/L)	Groundwater (µg/L)	Surface Water (µg/L)
Inorganics			
Aluminum[3]	200	[illegible]	243
Antimony	3	[illegible]	5.40
Arsenic	25	[illegible]	ND
Barium	1,000	285	10.50
Cadmium	5	0.58 B	ND
Calcium	none	385000	46000
Chromium	50	7.9 B	ND
Cobalt	730	20.7	ND
Copper	200	36.8	ND
Iron[3]	300	[illegible]	1480
Lead	25	24.0	ND
Magnesium[2]	35,000	[illegible]	18000
Manganese	300	[illegible]	151
Mercury	0.7	ND	0.11 B
Nickel	100	28.3	ND
Potassium	none	233000 E	1550
Selenium	10	[illegible]	ND
Sodium	20,000	[illegible]	5810
Thallium	0.5	[illegible]	ND
Vanadium	260	19.3 B	ND
Zinc	2000	42.7	12
Cyanide	200	1.4 B	ND

[1]Standard is for total chlorinated phenols

[2]These are NYSDEC guidance values, not standards

[3]Based on USEPA secondary MCL, not health based

Highlighting represents exceedance of screening criteria

NYSDEC Groundwater Quality Standards (GQS): TOGS 1.1.1, June 1998 and 6 NYCRR Part 703, August 1999

ND = not detected

Table 6-2
Chemicals Detected in Soils and Sediments
Maximum Detected Concentrations
Amenia Town Landfill
Amenia, New York

Parameter	NYSDEC Soil Criteria (ug/kg)	Surface Soil (ug/kg)	Sediments (ug/kg)
SVOCs/VOCs			
1,2-Dichlorobenzene	7900	NA	9.27
1,4-Dichlorobenzene	8500	NA	15.9
2-Butanone	300	NA	43.1
2-Chlorophenol	800	84.9	NA
Acetone	200	NA	202
bis(2-Ethylhexyl)phthalate	50000	1350	ND
Chrysene	400	37.1	NA
Fluoranthene	50000	56	NA
Phenol	30	4090	NA
Pyrene	50000	65.2	NA
PCBs			
Aroclor 1242	1000	ND	15100 J
Aroclor 1254	1000	2760	10000
Inorganics	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**
Aluminum	background	16000	13900
Antimony	background	ND	7.6
Arsenic	7.5	2.6	23
Barium	300	85.1	211
Beryllium	0.16	0.75	3.5
Cadmium	1	ND	3.2
Calcium	background	46300	128000
Chromium	10	21.7	20
Cobalt	30	17.2	124
Copper	25	65.1	166
Iron	2000	34700	112000
Lead	background	89.7	205
Magnesium	background	22800	10600
Manganese	background	1370	5070
Mercury	0.1	0.16	1.9
Nickel	13	37.4	142
Potassium	background	2250	1700
Selenium	2	ND	9.5
Silver	background	ND	5.4
Sodium	background	73.7	307

Table 6-2
Chemicals Detected in Soils and Sediments
Maximum Detected Concentrations
Amenia Town Landfill
Amenia, New York

Parameter	NYSDEC Soil Criteria (ug/kg)	Surface Soil (ug/kg)	Sediments (ug/kg)
Inorganics - cont.			
Thallium	background	ND	12.2
Vanadium	150	30.6	26
Zinc	20	281	977
Cyanide	background	0.47	1.97

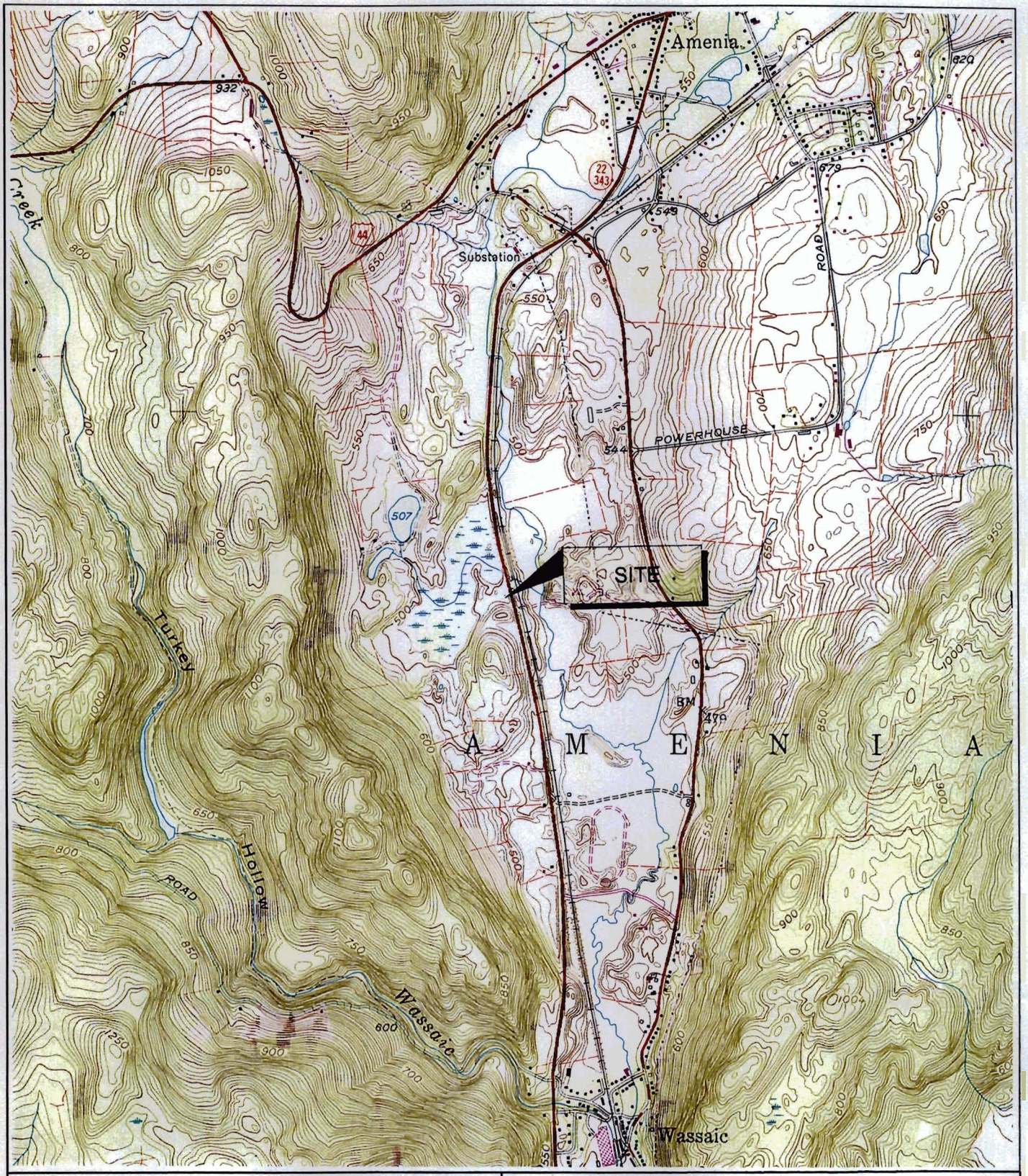
Screening Criteria For are from NYSDEC TAGM 4046, January 24, 1994

Screening Criteria are NYSDEC recommended cleanup goals, not necessarily health-based

Highlighting represents exceedance of screening criteria

ND = not detected

NA = not analyzed



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SCALE (FEET)

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MAP SOURCE:

U.S.G.S. 7.5 MINUTE SERIES QUADRANGLE OF AMENIA, NY–CT, DATED 1958, PHOTOREVISED 1984.

SITE LOCATION MAP
AMENIA TOWN LANDFILL
AMENIA, NEW YORK

URS

WAYNE, NEW JERSEY

DR. BY	JL	SCALE	AS SHOWN	DWG. NO. 14141006	PROJ. NO. 1E04141
CK'D. BY	AG		DATE MAR 15, 2000	FIG. NO.	1-1

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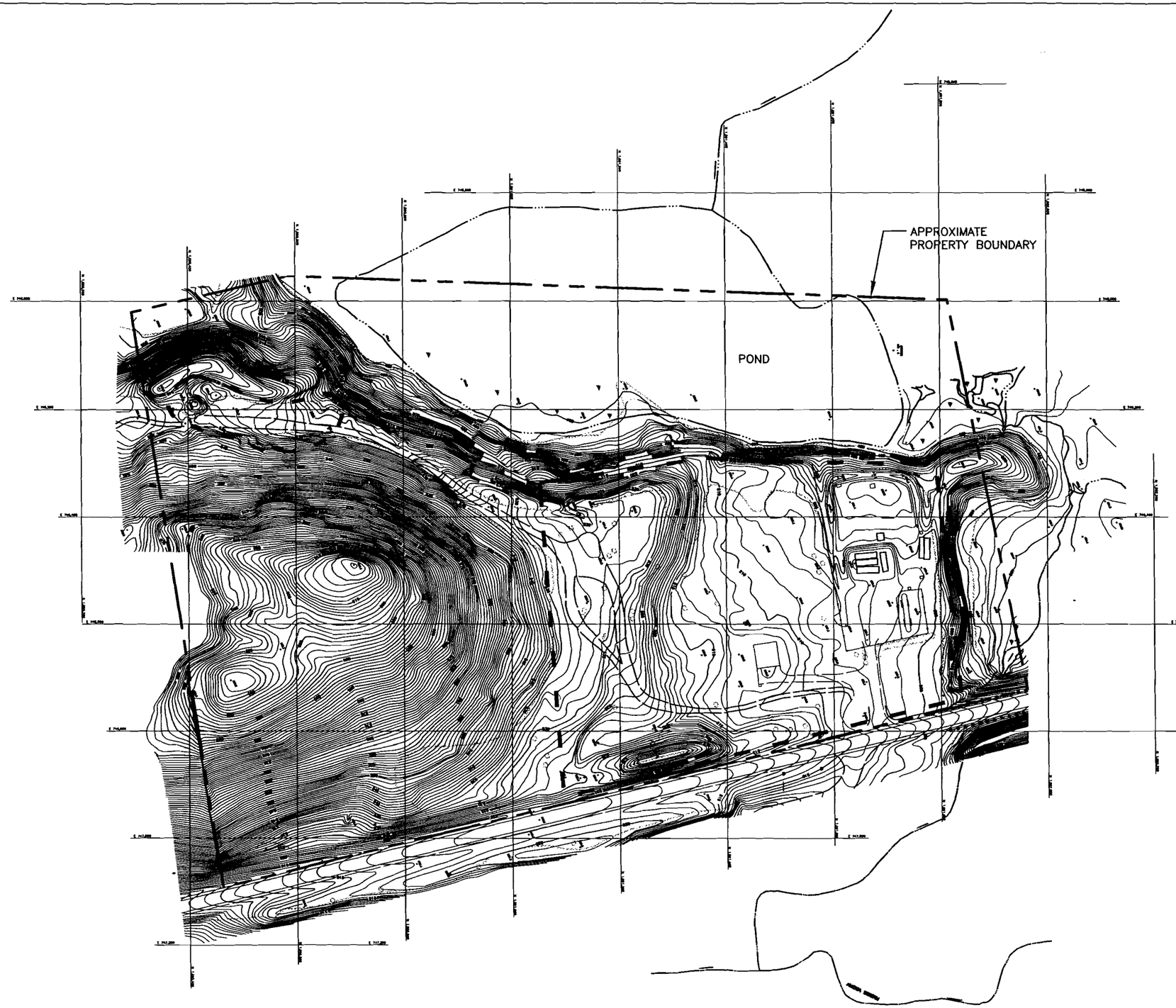

N

LEGEND:

SITE BOUNDARY

APPROXIMATE LIMITS OF WASTE

NOTES:

1. WATER BODY BOUNDARIES ARE APPROXIMATE AND BASED ON 1990 AERIAL PHOTOGRAPH
2. PROPERTY BOUNDARY IS APPROXIMATE AND BASED ON AMENIA TOWN ASSESSOR'S 7066–00 TAX MAP, 1999.

0 100 200 400

SCALE (FEET)

SITE LAYOUT
AMENIA, TOWN LANDFILL
AMENIA, NEW YORK

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. 14141008	PROJ. NO. 1E04141
CK'D. BY	AG		DATE MAR 23, 2000		FIG. NO. 1-2

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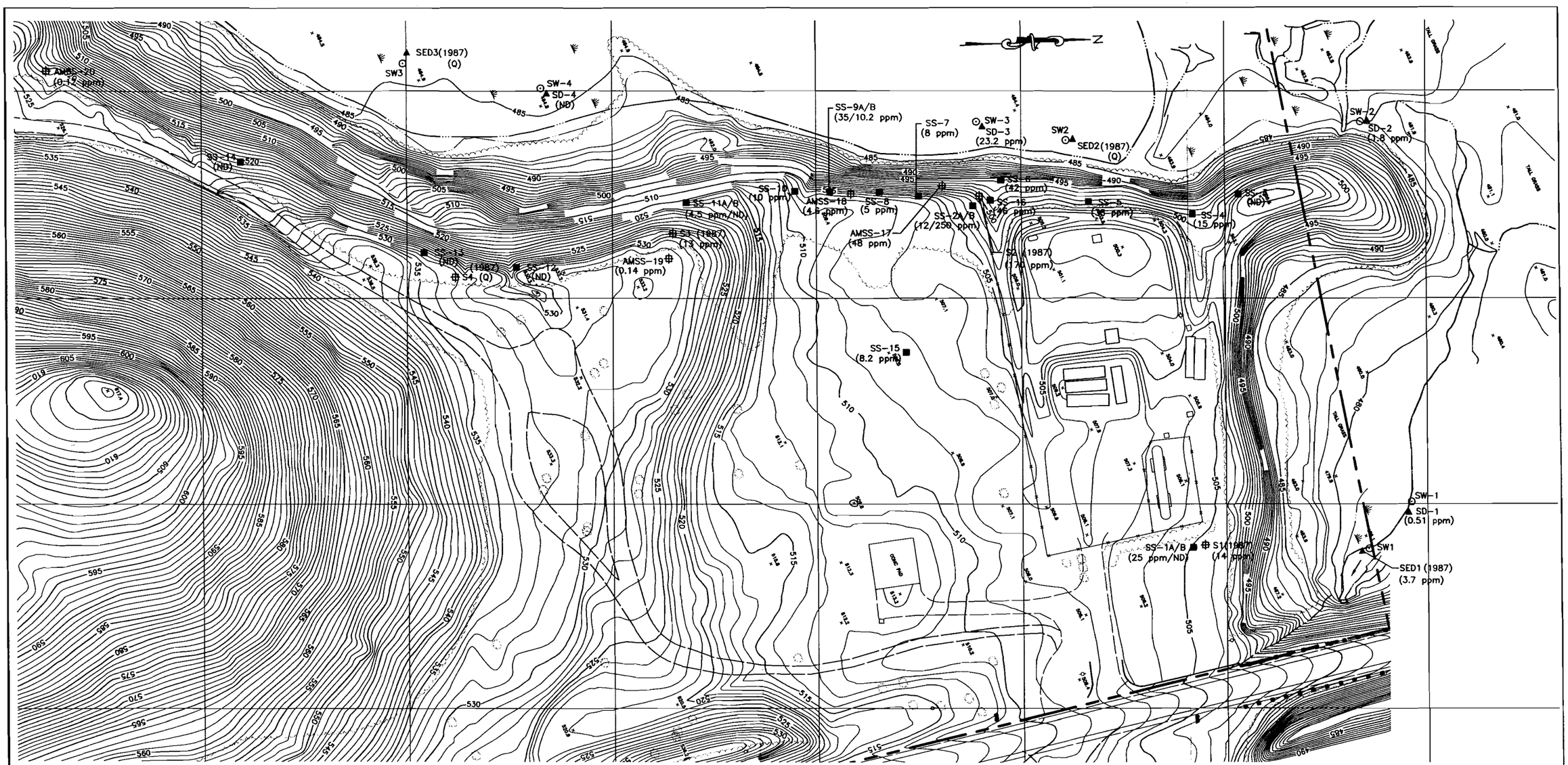

LEGEND:

————	SITE BOUNDARY
SD-5 ▲	SEDIMENT SAMPLE LOCATION – 1987(SED1) AND 1991(SD-1)
SS-13 ■	SOIL SAMPLES ANALYZED BY MOBILE LABORATORY ON-SITE – 1991
AMSS-17 ⊕	SOIL SAMPLES ANALYZED BY FIXED LABORATORY OFF-SITE – 1987(S1) AND 1991(AMSS-1)
SW-1 ⊙	SURFACE WATER SAMPLE LOCATION
(3.7 ppm)	TOTAL POLYCHLORINATED BIPHENYLS (PCBs) CONCENTRATION
ND	NOT DETECTED
PPM	PARTS PER MILLION (mg/kg)
Q	ANALYSIS DID NOT PASS QA/QC REQUIREMENTS

NOTES:

1. WATER BODY BOUNDARIES ARE APPROXIMATE AND BASED ON 1990 AERIAL PHOTOGRAPH
2. PROPERTY BOUNDARY IS APPROXIMATE AND BASED ON AMENIA TOWN ASSESSOR'S 7066-00 TAX MAP, 1999.
3. NYSDEC SURFACE SOIL CRITERIA FOR TOTAL PCBs: 1.0 ppm

0 50 100 200
SCALE (FEET)

PREVIOUS INVESTIGATIONS SAMPLING LOCATIONS
AMENIA TOWN LANDFILL
AMENIA, NEW YORK

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. 14141014	PROJ. NO. 1ED4141
CK'D. BY	AS	DATE	MAR 16, 2002	FIG. NO.	1-3

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