Remedial Investigation Report - Final

Volume I of II - Text, Tables, Plate, and Figures

Peter Cooper Landfill Site
Gowanda, New York

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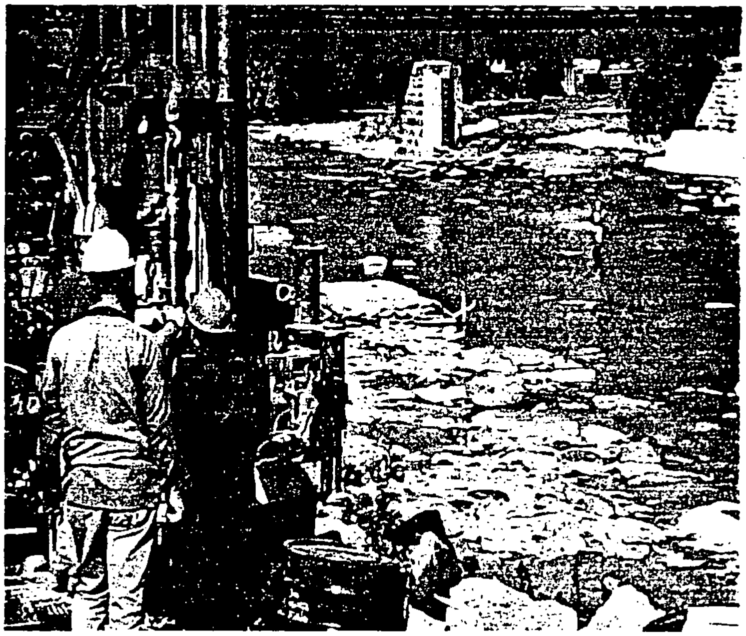

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PREFACE

The Peter Cooper Landfill Site Remedial Investigation (RI) Report was originally submitted to the United States Environmental Protection Agency (USEPA) in December 2002. This Final RI Report incorporates responses to USEPA comments dated July 18, 2003 and subsequent comments dated October 29, 2003. For completeness, USEPA comments and respondent responses are included in Appendix R.

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REMEDIAL INVESTIGATION REPORT
Peter Cooper Gowanda Site
Gowanda, New York

1.0 INTRODUCTION

1.1 SITE LOCATION AND DESCRIPTION

The Peter Cooper Landfill National Priority List (NPL) Site, hereinafter referred to as the "Peter Cooper Gowanda Site" or the "Site," is comprised of an inactive landfill area and former animal-glue and adhesives manufacturing plant located on approximately 26 acres of property between Palmer Street and Cattaraugus Creek (i.e., the Creek) in the Village of Gowanda, Cattaraugus County, New York (Figures 1-1). The Site is bordered to the north by Cattaraugus Creek, to the south by Palmer Street, to the west by a former hydroelectric dam and wetland area, and to the east by residential properties. The former office, laboratory, plant water reservoir and employee parking lot are located south of Palmer Street on an approximately 20 acre parcel. This parcel, hereafter referred to as the "office parcel", is currently owned by a private interest and is not part of the NPL Site.

The Inactive Landfill Area is situated on the western side of the Site (Plate 1), with the western edge of the landfill located on property owned by NYSEG. Specifically, the Inactive Landfill Area is an approximately 15.6-acre area bordered to the north and south by Cattaraugus Creek and Palmer Street, respectively; to the west by a former hydroelectric dam and the approximate western limit of contiguous wetlands; and to the east by a line running approximately perpendicular to Cattaraugus Creek from the former sluiceway to Palmer Street. The portion of the Inactive Landfill Area that contains waste fill encompasses only an approximate 5-acre sub-area (i.e., the elevated fill area) in the northwest corner of the Site.

The Former Manufacturing Plant Area is located on the eastern side of the Peter Cooper Site (Plate 1), and includes the remaining 10.4-acre portion of the Site outside the Inactive Landfill Area. The Former Manufacturing Plant Area is bounded on the north by Cattaraugus Creek, on the south by Palmer Street, on the west by the Inactive Landfill Area and the east by the residential property boundary.

1.2 SITE HISTORY

1.2.1 Historic Operations

The Peter Cooper Site was previously used to manufacture animal glue and industrial adhesives. Peter Cooper Corporation (PCCI) and/or its predecessors, Eastern Tanners Glue Company and successors (Rousselot Gelatin Corporation (PCCII)), manufactured animal glue at the site from 1904 to 1971 and adhesives from the 1950s until the plant closed in 1985. Animal glue manufacturing operations were reportedly closed by the early 1970s. The northwest portion of the Inactive Landfill Area was reportedly used to dispose of residuals from the animal glue manufacturing process, commonly referred to as cookhouse sludge. The cookhouse sludge was derived from animal hides, some of which were chrome-tanned, used as a feedstock in the process. Based on observations of the landfill sludge material made during this RI, the cook house sludge appears to be mixed with cinders, ash, and construction and demolition debris. This sludge mixture is referred to in this report as sludge fill.

Benchmark's review of historic (1924 and 1948) fire insurance (Sanborn) maps and aerial photos from 1939, 1956,1966, 1973, 1980, 1983 and 1990 indicates that the Former Manufacturing Plant Area was substantially covered by buildings and support structures throughout its operational history. The historic Site features and manufacturing process areas present on a 1948 Sanborn map are shown in Appendix A. The 1980 aerial photo for the Site indicates that animal glue manufacturing facilities were decommissioned/demolished at that time.

In June 1971, the New York State Supreme Court ordered PCCI to remove all or part of the waste pile and terminate discharges into Cattaraugus Creek. In response, PCCI reportedly removed approximately 38,600 tons of waste pile material to its Markhams, New York site in early 1972. Between 1972 and 1975, the remaining waste pile at the site was graded, covered with a 6" clay barrier layer and 18-30 inches of barrier protection soil, and vegetated with grass (O'Brien & Gere, 1991). Stone rip-rap and concrete blocks were placed along the bank of Cattaraugus Creek to protect the fill material from scouring.

In July 1976, the assets of original PCCI, including the manufacturing plant and property located in Gowanda, were purchased by Rousselot Gelatin Corporation and its parent, Rousselot, S.A., of France. Rousselot Gelatin was renamed Peter Cooper Corporation (PCCII) and this newly-formed PCCII sold the Gowanda site to the current owner, JimCar Development, Inc., in April 1988.

1.2.2 Previous Investigations and Remedial Measures

NYSDEC performed Phase I and Phase II Site Investigations at the Peter Cooper Gowanda Site in 1981 and 1983, respectively (RCRA Research, Inc. 1983 and 1984). The Phase I included limited soil and seep sampling performed in November 1981.

The Phase II investigation was performed in May 1983 and included the investigation of soil, groundwater, surface water and sediment. Samples were analyzed for total halogenated organics and total volatile halogenated organics, as well as priority pollutant metals. Analytical results indicated the presence of arsenic, chromium and zinc in soil and sediment samples. Surface water and groundwater inorganic analyses were non-detect with the exception of low levels of chromium in groundwater. Phase I and II analytical results are presented in Appendices B-1 and B-2.

The current PCCII subsequently agreed with the New York State Department of Environmental Conservation (NYSDEC) to perform a Remedial Investigation and Feasibility Study (RI/FS) at the site. The RI was performed by O'Brien & Gere Engineers under a NYSDEC-approved work plan. Activities performed during the RI included collection of soil, surface water, sediment, waste material, seep, and groundwater samples. The 1989 RI data is presented in Appendix B-3. Most of the O'Brien & Gere investigation targeted the Inactive Landfill Area. The RI Report was issued in January 1989. The RI concluded that there were no significant health risks associated with the site.

The FS Report was issued in March 1991. In June of 1991, NYSDEC and PCCII reportedly agreed upon a remedial alternative for the site that included containment of source materials, leachate collection and access restrictions through fencing and deed restrictions.

In 1991 NYSDEC removed the site from its Registry of Inactive Hazardous Waste Sites because it did not meet the statutory definition of an inactive hazardous waste disposal site. As a consequence of this designation, NYSDEC could not use State resources to implement a remedial program. NYSDEC and the Village of Gowanda reportedly requested EPA to evaluate the site for NPL listing.

In 1996, United States Environmental Protection Agency (USEPA) Region II activated the Response Engineering and Analytical Contract (REAC) and the Superfund Technical and Assessment Response Team (START) to collect and analyze soil, groundwater, surface water, and sediment samples from the Peter Cooper Site. Results from the 1996 sampling event are presented in Appendix B-4 and discussed in further detail in Section 1.2.3.

In 1997, New York State Electric & Gas Corporation (NYSEG), under an order on consent with USEPA, placed an approximately 150-foot long rip-rap revetment adjacent to Cattaraugus Creek on the portion of the site owned by NYSEG (i.e., northwest portion of the site).

In 1998, USEPA Region II prepared a Hazard Ranking System Model score for the site and listed the Peter Cooper Site on the NPL. USEPA subsequently notified several potentially responsible parties (PRPs) of their possible involvement in the site investigation and remediation, and proceeded to develop a Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the site. The Revised Final RI/FS Work Plan was issued by USEPA on June 15, 1999. Representatives of certain PRPs subsequently met with USEPA and volunteered to prepare a modified RI/FS Work Plan addressing the Inactive Landfill Area of the site. The final RI/FS work plan for the Inactive Landfill Area was submitted to USEPA in March 2000. In April 2000 USEPA issued a Unilateral Administrative Order to certain PRPs directing completion of the RI/FS for the Inactive Landfill Area as well as the Former Manufacturing Plant Area. Representatives of the cooperating PRPs subsequently submitted an Addendum to the March 2000 RI/FS Work Plan that extended RI/FS activities to the Former Manufacturing Plant Area. The Addendum was approved in August 2000.

1.2.3 Chemical Constituents Historically Detected in Site Media

The following subsections describe the results of historic sampling programs that we used to characterize the nature and distribution of chemical constituents in site media at the Site.

1.2.3.1 Landfill Waste

The 1989 RI Report describes the collection and analysis of six landfill waste material samples. Each sample was obtained from below the landfill cap and consists of black, cindery waste/fill material. Low concentrations of organic compounds were detected in these samples including chlorobenzene (0.06 mg/kg) and 2-butanone (0.14 mg/kg). Average concentrations for inorganic compounds in these samples were 13,000 mg/kg for total chromium, 9.8 mg/kg for arsenic, and 620 mg/kg for zinc. EP Toxicity testing was conducted on each of the samples. Analytical results indicate that the concentrations were below EP Toxicity criteria (40CFR 261.24). The 1989 RI results indicate that materials present in the landfill are consistent with that expected from the production processes for the facility. A summary of the inorganic waste source results for the RI is provided in Appendix B-3.

During the 1996 USEPA investigation, six waste samples were collected at depths of 1 to 3 feet below the ground surface (bgs). The samples were analyzed for chromium, hexavalent chromium, and arsenic. The locations of these samples are shown in Appendix B-4. Results of inorganic analyses for soil samples are also provided in Appendix B-4. Concentrations of arsenic ranged from 4.6 to 33 mg/kg. Total chromium concentrations ranged from 2,900 mg/kg for sample HA MW-03 to 37,000 mg/kg at sample location HA SB-71DUP. Hexavalent chromium was not detected in any of the waste samples.

The six waste samples collected during the 1996 USEPA investigation also were analyzed for semi-volatile organic compounds (SVOCs). A summary of the analytical results for these samples is provided in Appendix B-4 (Landfill Waste Samples). Compounds detected in the waste included low concentrations of PAHs and phenolic compounds. A number of tentatively identified compounds (TIC) in the alkane group were found at estimated concentrations up to 0.26 percent by weight. These compounds are likely associated with the anaerobic decomposition of processed animal hide material.

1.2.3.2 Chemical Constituents in Soil

Four rounds of surface soil sampling were conducted during the 1989 RI. Surface soil samples were collected near the landfill and in the area of the former factory area. Sample locations are shown in Appendix B-3.

The initial sampling, in September 1986, consisted of the collection of 20 samples for arsenic, total chromium, and hexavalent chromium analysis. The second round of sampling was conducted in April 1987, and consisted of the collection of 13 samples. During this event, each sample submitted for analysis was a composite of four grab samples collected equidistant from the sampling point (O'Brien & Gere, 1989). The third and fourth rounds of sampling were performed during July and August 1988. The third sampling event included 10 waste material samples collected below the landfill cap. The fourth round included nine sampling points located in the area adjacent to the old concrete dam.

Background soil concentrations for arsenic, zinc, total chromium and hexavalent chromium were established by O'Brien & Gere by doubling the mean background concentration for each of these compounds to provide a basis for evaluating sample concentrations. A total of 46 surface soil (depth of 0-3 inches below grade); 21 shallow subsurface soil (9 to 12 inches) and one subsurface soil (33 to 36 inches) sample were collected and analyzed. Three of the 46 surface soil samples were collected from background sample locations south of Palmer Street approximately 2000 feet south of the landfill. Arsenic concentrations detected in the soil samples fell within the calculated background range with only one exception. The reported value of 417 mg/kg at location 30 (see Appendix B-3) was over ten times higher than any other sample result and was considered as anomalous (O'Brien & Gere, 1989).

The 1989 RI Report indicated that 33 of 65 soil samples contained total chromium concentrations above the calculated background concentration range in soils (52 mg/kg). Five soil sampling locations west of the former Cattaraugus Creek dam (in the wetland area) contained chromium at concentrations greater than 1000 mg/kg. Hexavalent chromium concentrations in the surface soils exceeded detection limits in 33 of 65 samples analyzed. The maximum concentration of hexavalent chromium detected was 24 mg/kg. However, the number of positive detections of hexavalent chromium may be overstated. The analytical method used is subject to interference from chromium and an apparent positive detection of hexavalent chromium may result. Zinc analyses were performed on 20 surface soil samples. The average zinc concentration in surface soils was 401 mg/kg.

Nine surface soil samples were collected during the 1996 USEPA investigation. Sampling included seven soil samples collected from the southern bank of the Cattaraugus Creek (bank samples) and two samples from the wetland area (wetland samples) located west of the landfill. The bank samples were collected from the face of the landfill, adjacent to Cattaraugus Creek. Surface soil samples were analyzed for chromium, hexavalent chromium, zinc, and SVOCs. Summaries of the analytical results for these samples are provided in Appendix B-4.

Arsenic concentrations in soil samples collected along Cattaraugus Creek range, from 4.9 mg/kg (Bank 100) to 15 mg/kg (Bank 200). Total chromium concentrations ranged from 27 mg/kg (Bank 100) to 750 mg/kg (Bank 0). Maximum arsenic and chromium concentrations in the wetland samples were 6.7 mg/kg and 27 mg/kg, respectively. Hexavalent chromium was not detected in any of the soil or sediment samples (Weston, 1996).

Low concentrations of several SVOCs, including low levels of PAHs and one phthalate, were detected. PAH compounds, likely associated with the historic storage of coal on the bed of the railroad spur, were detected at concentrations ranging from 52 to 950 ug/kg.

1.2.3.3 Chemical Constituents in Subsurface Soil

During the USEPA investigation, a total of five subsurface soil samples were collected from depths of 0 and 2 feet bgs in the southeastern area of the property. Refer to Appendix B-4 for a summary of the analytical results. Arsenic concentrations ranged from 5.3 mg/kg (HA SB-75) to 19 mg/kg (HA SB-76) while total chromium concentrations ranged from 23 mg/kg (HA SB-75) to 730 mg/kg (HA SB-76). Hexavalent chromium was not detected in any of the samples. Analysis of the subsurface soil samples collected during the 1989 RI reported concentrations within the ranges of constituents reported by USEPA Region II.

Three of the five subsurface samples (HA SB-74, HA SB-75 and HA SB-76) contained relatively low concentrations of PAH compounds. These three sample locations were those closest to the waste pile access road and the abandoned rail line.

1.2.3.4 Chemical Constituents in Surface Water and Sediment

Six surface water and five sediment samples were collected from Cattaraugus Creek during the 1996 USEPA investigation. Samples were collected adjacent to and downstream of the landfill. Sample locations and analytical results are shown in Appendix B-4. Samples were analyzed for Target Analyte List (TAL) inorganics, hexavalent chromium, and SVOCs. Analytical results for surface water samples ranged from 0.0023 mg/l to 0.0046 mg/l for arsenic and from 0.006 to 0.009 mg/l for total chromium. Analytical results for sediment samples ranged from 4.8 to 6.3 mg/kg for arsenic and from not detected (10 mg/kg) to 12 mg/kg for total chromium. Hexavalent chromium was not detected in any of the surface water or sediment samples. Low concentrations of PAHs were detected in the sediment samples.

Four rounds of surface water samples were collected from three locations in Cattaraugus Creek during the 1989 RI. The samples were analyzed for arsenic, chromium, hexavalent chromium, zinc, calcium, and magnesium. Sampling results are summarized in Appendix B-3. Arsenic was not detected in any of the samples. Total chromium concentrations ranged from 0.008 to 0.019 mg/l in the downstream samples. Hexavalent chromium was detected inconsistently in both upstream and downstream surface water samples. The highest concentration of hexavalent chromium (0.016 mg/l) was detected in downstream sample 13 in September 1986. One sediment sample (sample 14) was collected from a sand bar in Cattaraugus Creek adjacent to the wetland northwest of MW-4. No other sediment samples were collected because the upstream sampling locations were devoid of sediment due to the bedrock creek bed and the high stream velocity in the vicinity of the site. Both arsenic and chromium were detected at concentrations within the range of background of 6.6 mg/kg. Hexavalent chromium was not detected in the sediment sample. Sample locations 13 and 14 are shown in Appendix B-4.

1.2.3.5 Chemical Constituents in Groundwater

Groundwater samples collected from on-site monitoring wells during the 1989 RI and 1996 USEPA investigations indicate that chemical constituents associated with waste materials at the Site also are present in groundwater in the overburden and bedrock. Results of groundwater sampling for the 1991 RI and the 1996 USEPA are provided in Appendix B-3 and B-4, respectively.

Three rounds of groundwater samples were collected during the 1989 RI: September 1986, April 1987, and, July 1988. Groundwater sample results for total metals and filterable metals are summarized in Appendix B-3. Monitoring wells that were sampled included MW- 1 SR, MW- 1 D, MW-2D, MW-4D, MW-5, and, MW-6. Monitoring wells MW-2S, MW-3, and MW-4S (wells along the creek) were not sampled (see map in Appendix B-3 for monitoring well locations).

1989 RI

During the first round of sampling, ground water samples for metals analysis were filtered in the field. As requested by NYSDEC, samples collected for the second round of sampling were not filtered, however, selected samples were filtered to assist in comparing data with the first round results (O'Brien & Gere, 1989). Groundwater samples were analyzed for arsenic, total chromium, and hexavalent chromium. Samples from monitoring wells from MW- 1S, MW-1D, MW-4D, MW-5 and MW-6 were analyzed for priority pollutants including PCB/Pesticides, purgeable organic compounds, and SVOCs.

Results of groundwater monitoring conducted during the 1989 RI indicate the presence of chromium, hexavalent chromium, and arsenic in both the shallow and bedrock wells and in both filtered and unfiltered samples. In the April 1987 sampling round (unfiltered samples), arsenic, total chromium, and hexavalent chromium were detected in shallow (MW-1S) and bedrock monitoring wells (MW-1D) located upgradient and southwest of the landfill. One or more inorganic substances including chromium, hexavalent chromium, and arsenic were detected in samples from bedrock monitoring wells MW-2D and MW-4D and in overburden monitoring well MW-6. In the filtered samples collected in September 1986, arsenic, chromium, and hexavalent chromium were detected in monitoring well samples MW-1D and MW-2D; chromium was detected in monitoring well MW-4D, and arsenic and chromium were detected in a sample from monitoring well MW-6. Other inorganic compounds detected at elevated concentrations in the overburden where waste/fill is present include: ammonia, Total Kjeldahl Nitrogen (TKN), BOD_5, and specific conductance.

No organic compounds were detected in MW-5 during the first round of sampling. In the second sampling round, six organic compounds including acetone, 2-butanone, bis (2ethylhexyl) phthalate, chlorobenzene, methylphenol, and 2,4,-methylphenol were detected in the groundwater sample from monitoring well MW-5. Round three consisted of sampling of four monitoring wells: MW-1S,MW-1D,MW-4D and MW-6. Monochlorobenzene was detected in one well (MW-6) at a concentration of 26 ug/l.

1996 USEPA Investigation

Seven downgradient monitoring wells were purged and sampled during the USEPA investigation in September 1996. Groundwater sampling results for organic and inorganic parameters are provided in Appendix B-4. Monitoring wells that were sampled included MW-02S, MW-02D, MW-03, MW-04S, MW-4D, MW-05, and MW-06.

Inorganic compounds including: chromium; hexavalent chromium; and arsenic were also detected in groundwater samples collected in the 1996 USEPA investigation. Arsenic concentrations ranged from not detected (MW-05) to 0.1 mg/l (MW-02S). Chromium concentrations ranged from 0.004 mg/l (MW04D) to 1.1 mg/l (MW-03). Hexavalent chromium was detected in all of the groundwater samples; concentrations ranged from 0.008 mg/l to 0.06 mg/l. SVOCs, including phenols and trace concentrations of PAHs, were also detected in groundwater samples collected from monitoring wells MW-2S, MW-3, and MW-6 during the 1996 USEPA investigation. Phenol (8,000 ug/l), 2-methylphenol (69 ug/l), and 4-methylphenol (42,000 ug/l) were detected in monitoring well MW-2S. Phenol (99 ug/l) and 4-methylphenol (1,200 ug/l) were detected in the groundwater sample from MW-3.

1.2.3.6 Chemical Constituents in Air

No data were collected concerning the quantity and characteristics of gas generated by the landfill.

1.3 CURRENT CONDITIONS

Benchmark Environmental Engineering & Science, PLLC (Benchmark) and Geomatrix Consultants, Inc. (Geomatrix) performed Remedial Investigation field activities at the Site on several occasions beginning in August 2000 and continuing through April 2001. A brief description of site conditions as observed during these investigations is provided below. Section 3.0 provides additional detail concerning site conditions.

1.3.1 Inactive Landfill Area

Cover on the surface of the landfill is generally well vegetated and is preventing direct contact with waste materials, but appears to be thin in a few places where stressed vegetation is visible. Odors have been detected where stressed vegetation is visible within the elevated fill area and near certain seeps which are present along the northeast side of the Inactive Landfill Area.

The remains of a concrete and cemented boulder dam are present on the western edge of the elevated fill area that separates the fill area from the adjacent wetland area. The dam was reportedly part of a hydroelectric generating station. The dam is constructed of a large concrete monolith that at one time extended into the Creek, and cemented boulders that extend toward Palmer Street. The top of the dam sits approximately 8-feet above the adjacent wetland area. Riprap revetment is present on the creek bank in the northwest corner of the site. The revetment runs from the water to the top of the bank, and extends approximately 150 feet east from the former dam.

As indicated in Plate 1, a sluiceway was present on a portion of the northern border of the Area. According to the O'Brien & Gere Remedial Investigation Report, the sluiceway served as a Creek water source for the plant, possibly for fire protection system and/or process water feed. The sluiceway no longer exists as an open channel. It appears that fill has been placed up to the outer wall of the sluiceway.

1.3.2 Former Manufacturing Plant Area

In general, all former buildings and support structures have been demolished to grade. Wood, masonry demolition debris, the remnants of former foundations and various other salvage materials reportedly brought to the Site by the current property owner, JimCar Development, substantially cover the eastern side of the area. The debris exists in mounds several feet high, and limits site access on the southeastern side of the Area. Scrub vegetation and deciduous trees of various sizes are present outside and around the debris piles and foundation slabs, and along the northwestern side of the Former Manufacturing Plant Area. No visible evidence of production waste or vegetative stress was encountered.

1.4 PURPOSE AND SCOPE

This Remedial Investigation (RI) Report has been prepared on behalf of the responding PRPs (the Respondents) to present a characterization of the nature and extent of chemical impacts in both the Inactive Landfill Area and the Former Manufacturing Plant Area of the Site.

This Report contains seven sections.

- Section 2.0 presents a discussion of the RI sampling and methodology.
- Section 3.0 presents a discussion of land use and physical conditions of the Site.
- Section 4.0 presents the nature and extent of chemical presence in Site media.
- Section 5.0 describes chemical constituent migration pathways.
- Section 6.0 presents a summary of the Baseline Risk Assessment.
- Section 7.0 presents cited references.

2.0 SAMPLING LOCATIONS AND RATIONALE

This section presents a discussion of the rationale for the data collection program of the RI. The rationale was used to select the locations and depths at which to sample a given environmental media. This section also presents the methodologies used to collect samples and make physical measurements and observations, and the methodologies used to chemically analyze the environmental samples. The Remedial Investigation scope of work was documented in the USEPA-approved RI/FS Work Plan dated October 1999, revised March 2000 and Addendum dated May 2000.

The information in this section is sorted by type of environmental media (e.g., soil, water). This organization is paralleled in the presentation of results. In some cases, the rationale or methodology was dependent on the location at the site, that is, whether the data were being collected at the Inactive Landfill Area or at the FMP Area. In such cases, the information pertaining to the Inactive Landfill Area is presented first and the information pertaining to the FMP Area is presented second.

In addition to sample collection of Site media, some data collected during the RI required the installation of monitoring wells and survey benchmarks from land surveying. Data collection methods are made available to the reader in this section.

RI field activities were conducted by Geomatrix Consultants, Inc. (Geomatrix) and Benchmark Environmental Engineering (Benchmark) in accordance with the Site Health and Safety Plan (HASP) for Remedial Investigation Activities, Peter Cooper Site, Gowanda, New York, (Benchmark, May 2000). Environmental sample collection was performed in accordance with the Field Operating Procedures (FOPs) provided in the Quality Assurance Project Plan for Remedial Investigation/Feasibility Study, Peter Cooper Site, Gowanda, New York (QAPP) prepared in May 2000, revised in August 2000, by Geomatrix and Benchmark. All field activities were conducted under oversite from a USEPA contractor, TAMS Consultants, Inc. (TAMS) (now known as EarthTech). Each sampling location was surveyed by TVGA Engineering & Surveying (TVGA) and plotted on the site base map shown on Plate 1.

2.1 SLUDGE FILL CHARACTERIZATION

The sludge fill was characterized through the following activities:

- Geophysical (electromagnetic) methods were conducted to delineate the area occupied by fill and assess the vertical extent of groundwater impacted by constituents in the sludge fill;
- Test pits and hand holes were excavated to make physical observations and measurements of the extent of the sludge fill; and,
- Soil borings were completed to evaluate physical and chemical properties of the sludge fill.

The following sections describe the methodologies that were employed.

2.1.1 Collection of Geophysical Data

Two geophysical surveys were conducted at the Inactive Landfill Area. These surveys included a downhole electromagnetic (EM) survey and a surface EM survey. The downhole EM survey was conducted to profile the vertical terrain conductivity to assist with the characterization of the vertical extent of groundwater impacts from sludge fill disposal. The surface EM survey was conducted to geophysically characterize the lateral location of conductive fill material. These surface EM data were subsequently used to focus intrusive test pit and soil boring activities.

The geophysical methods used during this survey are established, indirect techniques for non-destructive subsurface reconnaissance exploration. As these instruments utilize indirect methods, they are subject to inherent limitations and ambiguities. Metallic surface features (electrical wires, scrap metal, etc.) preclude reliable non-invasive data/results beneath, and in the immediate vicinity of, the surface features. Targets such as conductive plumes, buried wastes, etc. are detectable only if they produce recognizable anomalies or patterns against the background geophysical data collected.

2.1.1.1 Geophysical Survey Methodology

Downhole Logging: The deep bedrock monitoring well, MW-4D2, at the Inactive Landfill area was geophysically logged using induction logging methods on October 5, 2000. Landfill leachate usually promotes an increase in the total dissolved solids (TDS) concentration of ground water. The elevated values of TDS create higher than background values of electrical conductance. EM conductivity logging was performed for the purpose of mapping formation conductivity. Electromagnetic surveys map the distribution of conductivity in the subsurface. A detailed discussion of the downhole logging is presented in Appendix C.

Surface Electromagnetic Survey: The Geonics EM-31 device was used to map the apparent electrical conductivity of shallow soils from the ground surface to a depth of 15 feet across the Inactive Landfill Area during the week of September 15, 2000. A reference grid was installed over the area that was geophysically surveyed by TVGA. The grid consisted of alternating orange and yellow pin flags spaced to facilitate data acquisition along lines spaced 12.5 feet apart. Select grid coordinates were marked to assure that grid coordinates could be reoccupied if necessary. Surface features were annotated on-site to assist with geophysical data interpretation.

The terrain conductivity (quadrature) component of the EM field is a measurement of the apparent ground conductivity. All readings were taken with the instrument oriented parallel to the direction of travel, in the vertical dipole mode and with the instrument at waist height. The depth of investigation with the instrument in this configuration is approximately 15 feet. Readings were automatically stored in a solid state memory data logger during the survey. The data logger was interfaced to a portable computer and the data were electronically transferred for subsequent processing and interpretation. A detailed discussion of the geophysical survey is presented in Appendix C.

2.1.2 Physical Observations and Measurements

2.1.2.1 Waste Fill Delineation

In accordance with the RI/FS Work Plan, test pits were excavated around the apparent perimeter of the elevated fill area to establish the limits of buried waste fill material. This work was performed on October 5 through 12, 2000 using a rubber-tired backhoe. Test pit excavations were initially targeted at locations inside the apparent edge of the elevated fill mound, and were extended or relocated radially outward until the transition between sludge-bearing fill and surrounding soil/fill was evident. A total of five test pits (TP-A through TP-E) were excavated to locate the limits of the waste fill.

Upon establishing a transition point between waste fill and surrounding soil/fill material, the transition point was staked for tie in to the site survey. Test pits at transition zones were generally excavated to a depth up to 12-feet below ground surface to verify that deeper zones of waste fill were not present. Test pit observations and field measurements are discussed in Section 3.5.1. Test pit locations are shown on Figure 2-1. All test pits were backfilled with excavated materials in the opposite order from which they were removed to assure cover soil replacement.

In addition to the perimeter test pits described above, five test pits labeled TP-1/G through TP-5/G (Figure 2-1) were excavated adjacent to the riprap revetment on the Creek bank and the former hydroelectric dam. The purpose of test pit excavation was to characterize sludge fill materials and determine the thickness of the sludge fill in the northwest corner of the landfill. Although additional test pits were planned along the northeastern portion of the elevated fill area, access was limited due to the steep slope of the bank and tree cover.

Test pits TP-1/G & TP-2/G were excavated to the top of rock. Test Pits TP-3/G through TP-5/G were excavated until water was encountered. Rapid infiltration of groundwater prevented further test pit advancement. Excavated material was placed on plastic sheeting adjacent to the test pit. Soils and fill were logged by a field geologist and screened for organic vapors with a photoionization detector (PID). Findings are presented in Section 3.5.1.

2.1.2.2 Existing Cover Evaluation

A total of 24 test holes were excavated on October 10 and 11, 2000 across the elevated fill portion of the Inactive Landfill Area (Figure 2-1). Test holes were excavated to determine existing landfill cover system thickness and characteristics. Although the RI/FS Work Plan specified hand excavation of the test holes, cover soils were found to be thicker than originally anticipated. Accordingly, USEPA's on-site representative, TAMS Consultants, approved excavation via a rubber-tired backhoe. Each test hole was extended into waste material to allow measurement of approximate cover thickness and description of the soil horizons. A field geologist recorded a description of the soil types encountered on field test pit log forms (Appendix D) and photographed each test hole. Excavated soil material was placed adjacent to the hole and returned in the opposite order that it was removed. Test hole locations were surveyed upon completion of the program. Findings are discussed in Section 3.5.1.

2.1.3 Collection of Geotechnical Data

Geotechnical samples were collected from within the Inactive Landfill Area to characterize the engineering properties of cover soils and sludge fill material and assess the existing cover soil's effectiveness in minimizing infiltration of precipitation. Results will be used in the evaluation of remedial alternatives for the Site. Soil samples for geotechnical analysis were sent to Third Rock, LLC, in East Aurora, New York.

2.1.3.1 Cover Soil

At each test hole, a representative soil sample was collected. Four individual samples were combined to represent one composite sample such that each composite represents approximately one-acre of cover soil. In addition, one undisturbed soil sample (i.e. Shelby tube) per acre was collected to evaluate in place properties. A total of six composite soil samples and six undisturbed soil samples were analyzed to represent the cover system.

Bulk composite samples were analyzed for grain size distribution (ASTM D421, D422), Atterberg Limits (D4318), Modified Proctor (ASTM D1557), and Recompacted Permeability (ASTM D5084). Shelby tube samples were analyzed for moisture content (ASTM D2216), hydraulic conductivity (ASTM D5084) and shear strength (ASTM D3080). Results are presented in Section 3.5.1.

2.1.3.2 Sludge Fill

Three Shelby tube soil samplers were advanced using direct push techniques in the elevated portion of the Inactive Landfill Area to allow for sludge fill geotechnical sample collection. At each location, additional sludge fill material was collected and combined into one composite sample representative of the sludge fill material. The composite sample was analyzed for Total Organic Carbon (Walkley Black Titration Method), Atterberg Limits (ASTM D4318), grainsize distribution (ASTM D421, 422), and Shear Strength (ASTM D3080). A discrete sample (ST-2) was also collected for vertical permeability (ASTM D5084) determined in the laboratory. Results are presented in Section 3.5.1.

2.2 SOIL

Surface and subsurface soil samples were collected across the Inactive Landfill Area and the Former Manufacturing Plant Area to evaluate the extent of chemical impact in soil, if any, and support human health and ecological risk assessments. The following sections describe the sampling rationale and methodology.

2.2.1 Sampling Rationale

2.2.1.1 Inactive Landfill Area

Surface and subsurface soil samples were collected across the Inactive Landfill Area to evaluate the physical characteristics of the soil and fill including the presence of odors or staining of soil related to potential chemical impact and assess the nature, magnitude and extent of chemical concentrations in soil and fill. Surface soil sampling was conducted in a grid-like pattern to provide complete characterization of the approximately 8-acre portion of the non-elevated area of the Inactive Landfill Area. Subsurface soil samples were collected at the Inactive Landfill Area in areas of anomalously elevated conductivity (fill) established by the geophysical investigation. Subsurface sampling in these areas was used to establish fill type and collect soil samples for chemical characterization. Also, the area of the former concrete sluiceway channel was investigated to ascertain the location of a settling basin shown on historical fire insurance maps and aerial photos and assess chemical presence in soil and sediment in the basin.

2.2.1.2 Former Manufacturing Plant Area

Surface soil and subsurface soil sampling at the Former Manufacturing Plant Area was conducted to assess potential chemical presence in soil/fill located near historic operational areas of the former glue factory (see map in Appendix A). These areas include:

- a former unloading house,
- downgradient of ponds formerly in the northwest portion of the Former Manufacturing Plant Area,
- the former Fertilizer Plant,
- downgradient of the former Machine Shop and storage area,
- the former Vat House,
- historic storage tanks adjacent to the former Cook House,
- the former Cook House,
- the former Acid Room,
- the former Dry House,
- the former Finished Product Warehouse,
- downgradient of storage buildings formerly adjacent to the Finished Product Warehouse, and
- general areas the southeastern property boundary.

2.2.2 Surface Soil Sampling Methodology

Surface soil samples from the Inactive Landfill Area and the Former Manufacturing Plant Area were collected using dedicated and disposable, stainless steel sampling equipment. Samples designated for VOC analysis were collected using EnCore® samplers. Samples to be analyzed for SVOCs and metals were placed in laboratory provided, certified clean, glass sampling jars. Each sample was given a unique nine-digit sample identification code and placed on ice until a laboratory provided courier picked up the samples under chain-of-custody procedures, as described in the QAPP.

2.2.2.1 Inactive Landfill Area

Surface soil sampling at the Inactive Landfill Area was conducted on October 11 and 12, 2000. A total of 20 soil samples (LFSS-1 through LFSS-20) were collected from 0 to 6-inches below ground surface (immediately below the soil and vegetative layer) at locations shown on Figure 2-2. A shovel was used to remove the vegetative layer and expose the sampling interval.

2.2.2.2 Former Manufacturing Plant Area

Surface soil sampling at the Former Manufacturing Plant Area was conducted on October 5, 6, and 9, 2000. A total of 12 borings were advanced and 10 soil samples (SB-1, SB-2, SB-4, SB-5, SB-7, SB-8, SB-9, SB-10, MWFP-2, and MWFP-3) were collected from 0 to 2.5 feet below ground surface as shown on Figure 2-3. Direct push techniques were used in combination with 4-1/4-inch hollow stem augers (HSA) to advance soil borings and allow for continuous sampling using dedicated and disposable acetate sleeves. Borings were logged by a field hydrogeologist in accordance with the Unified Soil Classification System (USCS) and screened with a photoionization detector (PID) for VOCs. Boring logs are provided in Appendix E.

A surface soil sample was not collected from borings SB-3 and SB-6. Concrete foundation slabs were present. Subsurface soil samples were collected by coring through the slabs and advancing the boring below the concrete corehole.

2.2.3 Subsurface Soil Sampling Methodology

Subsurface soil samples from the Inactive Landfill Area and the Former Manufacturing Plant Area were collected using dedicated and disposable, stainless steel sampling equipment. Samples designated for VOC analysis were collected using EnCore® samplers. Samples for SVOCs and metals were collected in laboratory provided, certified clean, glass sampling jars. Each sample was given a unique nine-digit sample identification code and placed on ice until a laboratory provided courier picked up the samples under chain-of-custody procedures, as described in the QAPP.

2.2.3.1 Inactive Landfill Area

Test pit excavation within the Inactive Landfill Area (outside or adjacent to the elevated fill area) and subsurface soil sample collection activities were conducted October 6 through the week of October 9, 2000. A total of 9 soil samples (TP-1/SUB through TP-9/SUB) were collected from test pit excavations from depths ranging from 3 to 12.5-feet below ground surface (bgs) at locations shown on Figure 2-4. A rubber tired backhoe was used to excavate test pits to the water table with the exception of TP-2/SUB which was excavated to native material since groundwater was not encountered. The test pits allowed for continuous observation of soil horizons and features including zones of groundwater seepage. Soil samples were collected from the sidewalls of test pit excavations immediately above the apparent saturated zone.

Three test pits were excavated in the area of the former sluiceway and settling basin and two subsurface soil samples were collected. The test pit excavated in the former sluiceway (TP-10/SUB) was sampled immediately above the concrete sluiceway bottom at a depth of 1-foot bgs. The soil sample collected from a test pit associated with the former settling basin (TP-Settling Basin/SUB) was collected just above the concrete basin pad as was TP-5/SUB which is assumed to be the eastern limit of the former settling basin.

At the completion of each test pit, the excavated material was replaced in the opposite order that it was removed.

2.2.3.2 Former Manufacturing Plant Area

Subsurface soil sampling at the Former Manufacturing Plant Area was conducted on October 5, 6, and 9, 2000. Soil borings were advanced using direct push techniques at surface soil sampling locations (see Figure 2-3) to facilitate subsurface soil sample collection. A total of 12 subsurface soil samples (SB-1, SB-2, SB-3, SB-4, SB-5, SB-6, SB-7, SB-8, SB-9, SB-10, MWFP-2, and MWFP-3) were collected from depths ranging from 3 to 12-feet bgs. Soil samples exhibiting the highest degree of suspected chemical impact were selected for laboratory analysis. If evidence of impact was not observed, the soil sample was collected immediately above the apparent saturated zone.

2.2.4 Geotechnical Data

A total of 11 surface and 12 subsurface soil samples from the Former Manufacturing Plant Area collected on October 5, 6, and 9, 2000 were evaluated for grain size distribution analysis (ASTM D421). The geotechnical data were used to evaluate potential soil mobility and assess the engineering properties for use in the Baseline Risk Assessment and the engineering Feasibility Study.

2.2.5 Methods of Chemical Analysis

Surface and subsurface soil samples from the Inactive Plant Area and the Former Manufacturing Plant Area were couriered to Columbia Analytical Services (CAS), in Rochester, New York for chemical analysis. The laboratory employed analytical testing methods described in USEPA Test Methods for Evaluating Solid Wastes contained in SW-846, revised 1991.

Based on historic analytical data obtained from previous investigations (Appendix B) and agreed to by the USEPA, soil samples collected from the Inactive Landfill Area were analyzed for a list of target analytes referred to as chemicals of potential concern (COPCs). The COPCs included volatile aromatic hydrocarbon compounds and select metals (arsenic, chromium, hexavalent chromium, and zinc). The target VOCs were verified during a preliminary sampling event of groundwater collected and analyzed from the Inactive Landfill Area described in Section 2.4.1.7. The target VOC analyte list includes:

- benzene,
- chlorobenzene,
- ethylbenzene,
- 1,2-dichlorobenzene,
- 1,4-dichlorobenzene,
- toluene, and
- total xylenes.

VOCs were analyzed by EPA Method 8260B. Arsenic, total chromium, and zinc were analyzed by EPA Method 6010B and hexavalent chromium analyzed by EPA Method 7196. The hexavalent chromium was prepared per EPA Method 3060A to suppress oxidation of soluble trivalent chromium to hexavalent chromium. The analysis also included Total Organic Carbon (TOC), percent solids, and pH.

Soil samples collected from the Former Manufacturing Plant Area were analyzed for a full suite of compounds including: TCL VOCs (EPA Method 8260B), TCL SVOCs (EPA Method 8270C) and Target Analyte List (TAL) Metals (EPA Method 6010B, 7470) including hexavalent chromium (EPA Method 3060A/7196), TOC, percent solids, and pH.

2.3 LANDFILL GAS

Landfill gas samples were collected within the elevated fill area of the Inactive Landfill Area to evaluate VOC presence in landfill gas. Landfill gas analytical results were used to evaluate potential air-borne pathways from volatilization of chemicals present in the sludge fill.

2.3.1 Gas Sampling Methodology

Landfill gas sampling was facilitated by installing gas monitoring wells. Three borings were advanced to the top of bedrock within the elevated fill area using 4-1/4-inch hollow stem augers (HSA) and continuous split spoon sampling. At boring completion, landfill gas monitoring wells (GMW-1, GMW-2, and GMW-3) were constructed with 2-inch diameter, Schedule 40 PVC riser pipe. Well locations are shown on Figure 2-5A. The gas probes were set to screen the sludge fill material with slotted well screens ranging from 3.5 to 7.5-feet in length. Each gas monitoring well was completed with #00N sand pack and a bentonite chip seal. Boring logs are included in Appendix E.

The headspace of each gas monitoring well was field screened for landfill gases on October 12, 2000 and May 2, 2001 using hand-held field instruments. The well headspace was screened for methane, hydrogen sulfide gas, percent oxygen, carbon monoxide, and VOCs with a PID. Water was present in GMW-2 and GMW-3 and was purged using a disposable bailer prior to instrument screening.

During the October 12, 2000 sampling event, 6-liter summa canisters were used to collect landfill gas samples from each well. The initial pressure in each summa canister was confirmed at 30 millimeters of mercury (mm Hg) prior to use. Dedicated Teflon®, tubing was connected to each canister and inserted into the well headspace several feet below the top of the PVC riser. The canister vacuum was released and the canister was filled until the regulator registered a vacuum pressure of 2 to 5 mm Hg.

Each canister was given a unique nine-digit sample identification code and a laboratory provided courier picked up the samples under chain-of-custody procedures, as described in the QAPP. Analytical results are discussed in Section 4.3.

2.3.2 Methods of Chemical Analysis

The summa canisters were analyzed by Performance Analytical, a specialty analytical laboratory specializing in air analysis (subcontracted through CAS) using EPA Method TO-

14A for VOCs and landfill gases, oxygen, nitrogen, methane, and carbon dioxide (Modified EPA Method TO-3).

2.4 GROUNDWATER

A groundwater monitoring program was conducted at the Peter Cooper Site to assess chemical presence in groundwater to support human health and ecological risk assessments. Additionally, the groundwater monitoring program provides an assessment of potential groundwater migration pathways, supports the hydrogeologic and fate and transport conceptual models for the Site, and considers the effects of seasonal variation on groundwater quality and flow. The following sections describe the sampling rationale and methodology. Monitoring well locations discussed in this section are shown in Figure 2-5A and 2-5B for the Inactive Landfill Area and Former Manufacturing Plant Area, respectively. Monitoring well logs for all wells at the Peter Cooper Gowanda Site are included in Appendix E.

2.4.1 Initial Groundwater Monitoring Well Evaluation

Previous investigations of the Inactive Landfill Area (1989 RI) installed 10 groundwater monitoring wells (MW-1, MW-1SR, MW-1D, MW-2S, MW-2D, MW-3, MW-4S, MW-4D, MW-5, and MW-6). Monitoring well MW-1, originally installed by RECRA Research in 1995, was found unusable by OBG and MW-1SR was installed as a replacement well. The original well MW-`1 was not abandoned by OBG. On June 15 and 16, 2000, Geomatrix conducted a groundwater monitoring well integrity program of the existing wells at the Inactive Landfill Area to determine the usability of each well for the Remedial Investigation. All wells were located to ascertain well integrity by evaluating the condition of the protective casing, access to the well, and potential quality of groundwater samples that would be collected from the well. An attempt was made to re-develop each well for future sampling for the RI, however, wells MW-2, MW-3, MW-4S, and MW-4D were determined unusable for groundwater sample collection as a result of obstructions in the well or failure to produce adequate water.

2.4.1.1 Replacement of Groundwater Monitoring Wells

Four replacement wells (MW-2S(R), MW-3(R), MW-4S(R), and MW-4D(R)) were installed by Nothnagle Drilling Company (Nothnagle) of Rochester, New York the week of July 10, 2000 in accordance with the FOPs provided in the QAPP. The replacement wells were drilled to a similar total depth as the original groundwater monitoring well using a CME-55 track-mounted drill rig equipped with 4 ¼-inch hollow stem augers (HSAs) which were decontaminated between locations in accordance with the QAPP. Continuous split spoon samples were obtained and logged by a Geomatrix hydrogeologist. The bedrock well, MW-

4D(R), was advanced into bedrock using an HQ core barrel. Drill cuttings were containerized on-site in drums and rock cores were retained in core boxes provided by the drilling contractor.

At the completion of the borings, a 2-inch diameter schedule 40-PVC monitoring well was installed in each borehole. The well screen (0.01-inch slot size) interval was placed to span a similar screen interval as the original monitoring well. A filter pack sand (#00N) material extended to the top of the well screen after which 1-foot of transition sand (#00) was placed to prevent potential seepage of bentonite or grout into the sand pack. Bentonite chips were poured to form the filter pack seal and the remainder of the borehole annulus to 3-feet below grade was filled with a cement/bentonite grout using a tremie pipe. The top of the riser pipe extended approximately 3-feet above grade and installed with a lockable, protective 4-inch diameter steel casing anchored in concrete to allow surface water to drain away form the well.

The drilling augers were decontaminated between well replacement locations using a steam cleaner. Water used for equipment decontamination was containerized in 55-gallon drums, marked with the date and contents.

Boring and monitoring well installation logs are provided in Appendix E. Well construction details are summarized in Table 2-1.

2.4.1.2 Abandonment of Groundwater Monitoring Wells

The five unusable monitoring wells (MW-1S {original well installed by RECRA}, MW-2S, MW-3, MW-4S, and MW-4D) were abandoned after well replacement.

The protective casing of non-functional monitoring wells MW-1S, MW-2S, MW-3S, and MW-4S were removed and the risers and well screens were pulled and the borehole was over drilled. The protective casing and well materials at MW-4D could not be removed until the well was reamed. Each remaining borehole was backfilled with cement/bentonite grout using a tremie pipe. The wire-wrapped well screens of the abandoned wells were highly corroded with ½-inch to 3-inch diameter openings. The observed corrosion is typical of galvanized iron well screens that do not have cathodic protection and have been in the ground for more than 15 years.

The hollow stem augers were decontaminated between well abandonment locations using a steam cleaner. Water used for decontamination was containerized in 55-gallon drums marked with the date and contents.

2.4.1.3 *Groundwater Monitoring Well Development*

The newly installed groundwater monitoring wells (MW-2S(R), MW-3(R), MW-4S(R), and MW-4D(R)) were developed on July 14, 2000 to reduce the turbidity of the water and improve the hydraulic communication between the well bore and the water-bearing zone.

A stainless steel bailer was used to surge the entire length of the well screen and remove water from the well. After each well volume of water removed, field parameters (temperature, pH, specific conductivity, and turbidity) were measured using hand held field instruments. Development was considered complete when a minimum of ten well volumes was purged and differences between measurements was less than 10% difference for three or more well volumes.

2.4.1.4 *Initial Groundwater Monitoring Well Sampling*

On August 14, 2000, four groundwater monitoring wells (MW-2S(R), MW-3(R), MW-4S(R), and MW-6) screened in or immediately below waste were sampled and analyzed to refine the list of Chemical Constituents of Potential Concern (COPCs) defined in the Work Plan for the Inactive Landfill Area.

Prior to sampling, the water level was recorded in each well and purged with dedicated tubing and a peristaltic pump to remove a minimum of three well volumes or until field measured parameters (temperature, pH, specific conductivity, oxidation-reduction potential, turbidity, and dissolved oxygen) stabilized. Field measured parameters were measured using hand held portable instruments which were calibrated in accordance with the FOPs of the QAPP on the day of sampling.

After stabilization was achieved, a dedicated and disposable bailer was used to collect the groundwater sample. Samples were collected in the order of volatilization sensitivity. Groundwater samples were collected in pre-preserved, laboratory provided, certified clean sample containers and labeled with a unique nine-digit code in accordance with the FOPs of the QAPP and placed on ice.

Samples were submitted under chain of custody procedures to CAS for target compound list volatile organic compounds (TCL VOCs) by EPA Method 8260B, target compound list semi-volatile organic compounds (TCL SVOCs) by EPA Method 8270C, and total target analyte list (TAL) inorganics by EPA Method 6010B/7470 plus hexavalent chromium by EPA Method 7196.

To satisfy quality assurance and quality control requirements, a duplicate sample was collected from groundwater monitoring well MW-3(R) and a matrix spike/matrix spike duplicate (MS/MSD) was requested for the sample collected from groundwater monitoring well MW-4S(R).

2.4.1.5 Initial Groundwater Sampling and Selection of COPCs - Inactive Landfill Area

Analytical data packages were validated by a third party certified data validator (Data Validation Services). The data validation determined that the data were usable with minor qualifications and satisfied the data quality objectives. The analytical results and data validation report is included in Appendix F. As a result of the initial groundwater sampling, aromatic hydrocarbon VOCs were added to the list of analytes defined as COPCs for the Inactive Landfill Area in a September 28, 2000 letter to the USEPA (Appendix G). The selected aromatic VOC list includes:

- benzene,
- chlorobenzene,
- ethylbenzene,
- 1,2-dichlorobenzene,
- 1,4-dichlorobenzene,
- toluene, and
- total xylenes.

2.4.2 Groundwater Monitoring Wells and Piezometer Installation Rationale

2.4.2.1 Inactive Landfill Area

Upgradient water quality data were lacking in the southwestern and southeastern portions of the Inactive Landfill Area. These data in additional to hydraulic data were needed to support the Baseline Risk Assessment and assess and support an assessment of chemical constituent migration pathways. Therefore, two additional upgradient groundwater monitoring well pairs were installed in the southeast (MW-7S/MW-7D) and southwest (MW-8S/MW-8D) portion of the Inactive Landfill Area.

Bedrock water quality data was lacking in the western portion of the Inactive Landfill Area. A bedrock well (MW-5D) was installed adjacent to the existing monitoring well MW-5.

A deep bedrock groundwater monitoring well (MW-4D2) was installed adjacent to the MW-4S(R)/MW-4D(R) well pair to establish the vertical hydraulic gradient in the bedrock, to characterize the depth of the active groundwater flow, and assess potential chemical constituents from the Inactive Landfill Area in deeper bedrock.

A shallow piezometer was installed adjacent to the former hydroelectric dam (PZ-1) and a well point was driven into the wetland soil on the opposite side of the dam (DP-1). Water level data from the piezometer and drive point were used to evaluate the dam as a barrier to groundwater flow from the Inactive Landfill Area to the wetland.

2.4.2.2 Former Manufacturing Plant Area

Overburden and bedrock groundwater quality and hydrogeologic information were not available for the Former Manufacturing Plant Area prior to this remedial investigation. A total of three well pairs were proposed in the Former Manufacturing Plant Area: an upgradient well pair (MWFP-1D, an overburden well was not installed since the overburden was unsaturated) and two well pairs downgradient of process areas of the former plant (MWFP-2S/2D and MWFP-3S/3D) were installed to provide water quality data for the overburden and bedrock and support chemical fate and transport assessment of detected compounds.

The monitoring well pair MWFP-2S and -2D is downgradient of a former Finished Product Warehouse and Storage Areas. The locations of monitoring wells MWFP-3S and -3D are downgradient of former the Vat House and Machine Shop.

2.4.3 Groundwater Monitoring Wells and Piezometer Installation Methodology

2.4.3.1 Inactive Landfill Area

The overburden groundwater monitoring wells (MW-7S and MW-8S) were installed to a depth approximately 5 to 10 feet below the water table. The bedrock groundwater monitoring wells (MW-5D, MW-7D, and MW-8D) were installed in the upper bedrock zone and MW-4D2 was installed approximately 15-feet below the water level of Cattaraugus Creek.

The wells were installed in accordance with the FOPs in the QAPP and as described in Section 2.4.1.2. Well construction details are summarized in Table 2-1.

The piezometer (PZ-1) was installed using the same methods of overburden well installation to a depth of approximately 5 to 10 feet below the water table. The drive point (DP-1) was installed using a "drive point" piezometer consisting of a 2-foot well screen attached to a carbon steel riser to a depth of approximately five feet below the ground surface of the wetland. The base of the screen was fitted with a flush-threaded drive point for installation. The drive point was advanced using a pounding block and a sledgehammer to a depth of approximately 5-feet bgs. The drive point was fitted with a vented, locking J-plug.

2.4.3.2 Former Manufacturing Plant Area

Groundwater monitoring completion depths (lower overburden and shallow bedrock) in the Former Manufacturing Plant Area were consistent with those established for the Inactive Landfill Area. The overburden groundwater monitoring wells (MWFP-2S and MWFP-3S) and the bedrock groundwater monitoring wells (MWFP-1D, MWFP-2D, and MWFP-3D) of the Former Manufacturing Plant Area were installed in accordance with the FOPs in the QAPP and as described in Section 2.4.1.2. Well construction details are summarized in Table 2-1.

2.4.4 Newly Installed Groundwater Monitoring Well Development

Groundwater monitoring well development of the newly installed wells (MW-4D2, MW-5D, MW-7S, MW-7D, MW-8S, MW-8D, MWFP-1D, MWFP-2S, MWFP-2D, MWFP-3S, and MWFP-3D) was conducted using a stainless steel bailer and/or submersible pump in accordance with the FOPs in the QAPP and as described in Section 2.4.1.4.

Complete development, as described in the FOPs was achieved in all wells with the exception of MW-4D2, MW-7S, and MW-8D which exhibited extremely slow recharge rates during development. After purging these groundwater wells, recovery to static conditions required in excess of 24 hours. These wells were pumped and/or bailed dry many times (over several days) during the well development program. Due to the slow recharge of these wells, the water quality stabilization and volume requirements as stipulated in the QAPP (stabilization of water quality parameters, turbidity at 5 NTUs, and removal of 10 well volumes) were not achievable.

These variances from the Work Plan and FOP procedures did not negatively impact project objects and were discussed with the USEPA oversite contractor, TAMS Consultants.

2.4.5 Hydraulic Conductivity Estimates

The hydraulic conductivity of the overburden and bedrock was estimated for saturated site media. Hydraulic conductivity estimates were developed for the screened interval of each monitoring well using the "rising head" variable head slug test method. This was accomplished by removing a "slug" of known volume from the column of water in the well with a bailer and measuring the rate of water level recovery. Slug test data were analyzed using Aqtesolve®

aquifer test software by applying the unconfined and confined Bouwer and Rice (1976) methods for monitoring wells screened in the overburden and bedrock, respectively. Hydraulic conductivity data reduction for each slug test is presented in Appendix H. Hydraulic conductivity values estimated using these methods are presented and discussed in Section 3.5.

Hydraulic conductivity estimates were also obtained from the bedrock using packer test methods. Packer test methods were applied during bedrock drilling at monitoring well MW-4D2. The purpose of the packer testing was to evaluate hydraulic properties of distinct intervals within the bedrock downgradient from the inactive landfill area. Packer tests were conducted at four, 5-foot intervals:

- 18 to 23 feet below ground surface (bgs);
- 23 to 28 feet bgs;
- 28 to 33 feet bgs; and
- 33 to 38 feet bgs.

A double packer assemblage was used to isolate the test intervals in the HQ-size core hole. The pack test consisted of the injection of potable water at several different injection pressures for time periods ranging from 5 to 10 minutes. The flow rate from injection is calculated for each test interval. The water injection pressures, total quantity of water injected into the formation, and test specifications are included in the pressure test reports presented in Appendix H. The data from the packer injection tests were used to estimate the effective transmissivity of the isolated interval using the Thiem equation:

$$T = \frac{Q \ln\left(\frac{R}{r_b}\right)}{2\pi P_i}$$

where:

T = transmissivity (m^2/day);
Q = injection rate (m^3/day);
R = radius of influence (m);
r_b = radius of borehole (m); and
P_i = net injection pressure (m).

The net injection pressure is the combined pressure head based on the following:

$$P_i = P_g + h_g + h_s - h_f$$

where:

P_i = net injection pressure (m);
P_g = gauge pressure (m);
h_g = height of gauge above ground level (m);
h_s = depth of pre-test water level (m); and
h_f = friction losses (m).

Hydraulic conductivity is estimated by dividing the transmissivity by the length of the interval tested. Injection flow rates were measurable in two of the four tests performed. The total water injected into the 23 to 28 foot bgs and 33 to 38 foot bgs interval was less 0.1 gallons indicating very low transmissivity of these intervals. Nearly 7 gallons of water was injected into the 18 to 23 foot bgs interval during 19 minutes of injection and nearly 5 gallons was injected into the 28 to 33 foot bgs interval during 20 minutes of injection. Applying the Thiem equation to these test intervals, hydraulic conductivity estimates for each interval are:

Test Interval (feet bgs)	**Hydraulic Conductivity (cm/s)**
18 to 23	3.6×10^{-5}
23 to 28	Not quantifiable; likely less than 1×10^{-6}
28 to 33	1.6×10^{-5}
33 to 38	Not quantifiable; likely less than 1×10^{-6}

Hydraulic conductivity data reduction for each packer test is presented in Appendix H. Hydraulic conductivity values estimated using these methods are discussed in Section 3.5.

2.4.6 Groundwater Elevation Measurements

Groundwater elevations were measured in all existing and newly installed wells/piezometers on a monthly basis beginning on August 14, 2000 or after installation. Groundwater elevation measurements were collected for the entire period between the first and second groundwater sampling events (November 2000 and April/May 2001). Groundwater elevations were measured using an electric water level meter to the nearest 0.01 feet in accordance with the FOPs in the QAPP.

An upstream and downstream surface water monitoring station were installed in the Creek adjacent to the Site. The water level in Cattaraugus Creek was measured beginning in December, 2000 to assess the interaction between groundwater and surface water.

2.4.7 Groundwater Sampling

All existing and newly installed groundwater monitoring wells were sampled during two (2) full rounds of sampling. The first sampling event occurred during the high water table conditions (November 2000) and the second sampling event occurred during the low water table conditions (April/May 2001) to allow for seasonal variations in groundwater quality.

Upgradient groundwater monitoring wells were sampled first. Prior to sample collection, the water elevation was recorded in each well and the well was purged to ensure a representative groundwater sample. Purging was accomplished using low-flow purging/sampling techniques as described in the FOPs of the QAPP which references the USEPA Region II Low Flow Standard Operating Procedure.

The intake of the pump was placed approximately in the middle of the well screen. The pumping rate was measured and maintained between 100 and 500 milliliters (ml) per minute. During pumping, the water level measurements were recorded to avoid dropping the water elevation more than 0.3-feet below the static water elevation.

During the first sampling event, several wells were determined not suitable for low-flow sampling techniques. As described in Section 2.4.4, MW-4D2, MW-7S, and MW-8D were extremely slow to recover. As such, each well was completely evacuated over a three day period and a sample was collected using a bailer.

During the second sampling event, wells MW-7S and MW-8D were able to maintain low-flow purging rates as described in the Work Plan and the FOPs in the QAPP. However, groundwater monitoring well MW-4D2 was purged and sampled with a dedicated bailer.

Monitoring wells MW-2S(R), MW-3(R), and MW-6 were sampled during both sampling rounds using a bailer after slow purging with a peristaltic pump based on the very low yield of the wells.

Hand held field instruments were calibrated daily in accordance with the FOPs of the QAPP to measure groundwater parameters. Field measured parameters (temperature, pH, specific conductivity, dissolved oxygen, oxidation-reduction potential and turbidity) were measured every three minutes until parameters were stabilized. Stabilization is achieved after three field parameter readings are within ± 0.1 unit for pH, ± 3% for specific conductivity, ± 10 millivolts for oxidation-reduction potential, and ± 10% for turbidity and dissolved oxygen.

Samples were collected from the dedicated tubing or dedicated/disposable bailers in the order of volatilization sensitivity. Where groundwater samples collected for total metals analysis had field measured turbidity values exceeding 50 NTU, a second sample was collected and filtered in the field using a 0.45 micron water filter for soluble metals analysis. Groundwater samples were collected in pre-preserved, laboratory provided, certified clean sample containers and labeled with a unique nine-digit sample identification code and placed on ice until a laboratory provided courier picked up the samples under chain-of-custody procedures, as described in the FOPs of the QAPP.

2.4.8 Methods of Chemical Analysis

2.4.8.1 First Sampling Event

Groundwater samples from the Inactive Landfill Area were analyzed for the following constituents, as described in the September 28, 2000 letter to the USEPA (Appendix G):

- Aromatic Hydrocarbon VOCs by EPA Method 8260B (defined in Section 2.4.1.6);
- SVOCs by EPA Method 8270C;
- Total COPC Metals by EPA Methods 6010B, 7470, and 7196 (arsenic, chromium, hexavalent chromium, and zinc);
- Dissolved COPC Metals by EPA Methods 6010B, 7470, and 7196 (arsenic, chromium, hexavalent chromium, and zinc) when field turbidity measurements were over 50 NTUs; and,
- Water Quality Parameters.

Groundwater samples from the Former Manufacturing Plant Area were analyzed for the following constituents, as presented in the Work Plan:

- TCL VOCs by EPA Method 8260B;
- TCL SVOCs by EPA Method 8270C;
- Total TAL Metals by EPA Methods 6010B, 7470, and 7196;

- Dissolved TAL Metals by EPA Methods 6010B, 7470, and 7196 when field turbidity measurements were over 50 NTUs; and,
- Water Quality Parameters.

2.4.8.2 Second Sampling Event

Groundwater samples from the Inactive Landfill Area were analyzed for the same constituents identified for the first sampling event.

Groundwater samples from the Former Manufacturing Plant Area were analyzed for the following constituents, as presented in the April 12, 2001 letter to the USEPA (Appendix I) based on the results of the pathways analysis assessment and reported in the Pathways Analysis Report (PAR). The Chemicals of Potential Concern (COPCs) identified in the PAR were selected as proposed Target Analytes for the second groundwater sampling event within the Former Manufacturing Plant Area. These constituents included:

- Select VOCs by EPA Method 8260B
  Benzene
  Carbon tetrachloride
  Chloroform
  Tetrachloroethene
  Trichloroethene;
- Select SVOCs by EPA Method 8270C
  Benzo(a)anthracene
  Benzo(a)pyrene
  Benzo(b)fluoranthene
  Indeno(1,2,3-cd)pyrene
  Benzo(a,h)anthracene; and
- Water Quality Parameters

2.5 SEEPS

Groundwater seeps discharging north of the Inactive Landfill Area were sampled to characterize a potential chemical constituent migration pathway from groundwater to surface water and support human health and ecological risk assessments.

2.5.1 Rationale for Sampling Locations

Based on an inspection of groundwater seepage along the northern border of the Inactive Landfill Area, three seep locations appeared to be conducive to sampling (adequate volume of seepage to fill sample containers with visible precipitate). Sample locations are shown on Figure 2-6.

2.5.2 Seep Sampling

Seep samples (Seep L-1 through Seep L-3) were collected concurrent with the first and second groundwater sampling event (November 8, 2000 and May 2, 2001, respectively) during dry weather to avoid sample dilution. A soil pick was used to carve a channel in the weathered bedrock surface and direct seepage into a shallow depression at each location. Seep samples were collected from the shallow depressions using disposable, laboratory-provided, sample containers (i.e., unpreserved 40 ml vials). The seep water was transferred to appropriate pre-preserved sample containers. Field measured parameters included temperature, pH, oxidation-reduction potential, and specific electrical conductance.

Samples for laboratory analysis were each given a unique nine-digit sample identification code and placed on ice for a laboratory provided courier to pick up under chain-of-custody procedures, as described in the FOPs of the QAPP.

2.5.3 Methods of Chemical Analysis

Seep samples were analyzed for the identical list of parameters assigned to the Inactive Landfill Area groundwater.

2.6 SURFACE WATER

Surface water samples located in Cattaraugus Creek were sampled to characterize surface water chemistry to support human health and ecological risk assessments.

2.6.1 Rationale for Sampling Locations

A total of four surface water sample locations were selected in Cattaraugus Creek to be sampled concurrent with the first and second groundwater sampling event (Figure 2-6). One location (SW-1) was selected upstream of the Peter Cooper Site to represent the background water quality of the Creek. Sample location, SW-2, was upstream of the approximate division between the Inactive Landfill Area and the Former Manufacturing Plant Area. Sample location, SW-3, was selected immediately downstream from the sludge fill disposal area of the Inactive Landfill Area and SW-4 was selected at a location approximately 400-feet downstream of the Inactive Landfill Area. Sample locations are shown on Figure 2-6.

2.6.2 Surface Water Elevation

Surface water elevations of the Creek were collected beginning in December 2000, concurrent with the groundwater elevation measurements described above. Two surface water elevation locations were selected, SW-1 and SW-4, to assess the interaction between groundwater and surface water.

2.6.3 Surface Water Sampling

Surface water samples were collected concurrent with the first and second groundwater sampling event (November 8, 2000 and May 2, 2001, respectively). Surface water samples were collected from the downstream location first and progressively moving to upstream locations. The samples were collected by slowly dipping a non-preserved, laboratory provided, sample bottle into the creek with minimal disturbance. Field measured parameters included temperature, pH, oxidation-reduction potential, and specific electrical conductance.

Samples for laboratory analysis were each given a unique nine-digit sample identification code and placed on ice for a laboratory provided courier to pick up under chain-of-custody procedures, as described in the FOPs of the QAPP.

2.6.4 Methods of Chemical Analysis

Surface water samples for the first sampling event were analyzed for the identical list of parameters and methods as the Former Manufacturing Plant Area groundwater described above.

Surface water samples for the second sampling event were analyzed for a constituent list inclusive of both the Inactive Landfill Area and Former Manufacturing Plant Area target analytes as described in the April 12, 2001 letter to the USEPA.

2.7 SEDIMENT

Sediment samples were collected from Cattaraugus Creek and the wetland adjacent to the Inactive Landfill Area. Sediment samples were collected to determine if chemical constituents from the Site affected sediment quality and to support human health and ecological risk assessments.

2.7.1 Rationale for Sampling Locations

Sediment samples collected from the Creek were collected at the same locations as the surface water samples for the same rationale. Sample locations are shown on Figure 2-6. Sediment samples collected from the wetland adjacent to the Inactive Landfill Area were collected in a grid-like pattern to achieve a uniform characterization of sediment quality data. Sediment sample locations are shown with surface soil sample locations in the Inactive Landfill Area shown on Figure 2-2.

2.7.2 Sediment Sampling

Ten sediment samples (WSS-1 through WSS-10) were collected from the wetland on October 10, 2000 using surface soil sample methods employed across the Inactive Landfill Area. Creek sediments were collected concurrent with the first groundwater sampling event on November 7, 2000. Sediment samples were collected using dedicated and disposable stainless steel sampling equipment in accordance with the FOPs in the QAPP. Sediment samples were collected from sandbars downstream to upstream to avoid disturbing the quality of the sediment samples.

Samples for laboratory analysis were each given a unique nine-digit sample identification code and placed on ice for a laboratory provided courier to pick up under chain-of-custody procedures, as described in the FOPs of the QAPP.

2.7.3 Methods of Chemical Analysis

Surface water sediment samples were analyzed for TCL VOCs (EPA Method 8260B), TCL SVOCs (EPA Method 8270C), and Total TAL Metals (EPA Methods 6010B, 7470, and 7196), TOC (Walkley Black Titration Method) and pH.

Additional sediment samples were sent to the geotechnical laboratory for grain size distribution.

2.8 QUALITY ASSURANCE/QUALITY CONTROL MEASURES

Field investigation data were collected and processed using the procedures outlined in the QAPP and the Work Plan to ensure representative sample collection and to achieve the data quality objectives of the Remedial Investigation. The field activities were recorded in bound project field books consisting of field forms from the FOPs in the QAPP. Any deviation from the Work Plan or the QAPP procedures was recorded in the Variance Log shown in Appendix J.

As part of the quality assurance/quality control (QA/QC) measures, the Project Quality Control Officer conducted a QA/QC audit of sample collection activities during the first and second groundwater sampling events. The audit did not identify any procedures or activities that deviated from the QAPP or impacted the quality of the data.

A Site sampling inspection visit was also conducted by Ms. Sherrel Henry of the USEPA on November 8, 2000 during the first sampling event. The inspection did not identify any procedures or activities that would adversely affect the quality of the data.

The entire field investigation program was conducted with USEPA contractor oversight provided by TAMS. The TAMS oversite person recorded field data (sample locations, depths of borings, soil classifications, etc.) and collected several split samples of environmental media. The samples collected by TAMS were sent to a USEPA selected laboratory for analysis of select parameters.

Geomatrix collected blind duplicates and matrix spike/matrix spike duplicates (MS/MSD) at a quantity of one in every 20 samples for each environmental media. A trip blank, analyzed for the most comprehensive VOC list accompanied each cooler of aqueous media to be analyzed for VOCs. An equipment blank was collected on non-dedicated equipment prior to collection of Site environmental media samples. The equipment blank was analyzed for the COPC list requested for the Site sample. Table 2-2 summarizes the QA/QC sample locations. The correlation between samples and duplicate samples are provided in Table 2-3. The relative percent difference (RPD) between detected compounds in landfill gas media are fairly large. This is likely due to the removal and uptake of more ambient quality air in the gas probe riser pipe during collection of the first gas sample using the Summa canister compared with more concentrated gas that entered the gas probe during duplicate sample collection (second sample collected from the same gas probe).

The laboratory provided complete data packages suitable for full data validation. Data packages were validated by a third party data validator, Ms. Judy Harry of Data Validation Services in North Creek, New York. Data validation reports are provided in Appendix K.

Data validation reported usable data with minor qualifications with the exception of several non-detect total hexavalent chromium and soluble hexavalent chromium values during the second groundwater sampling event (April/May 2001). The rejection of the data was based on low percent recovery of hexavalent chromium in the matrix spike sample. The matrix spike sample was selected from groundwater in the Inactive Landfill Area. The matrix spike sample was spiked with a known concentration of hexavalent chromium and the sample analyzed to determine the concentration of the spike. The laboratory indicated poor to no recovery of the matrix spike (100 mg/l of hexavalent chromium). Negative matrix interference can be caused by numerous factors including certain chemical presence (i.e., sulfate compounds) and organic matter in the sample media. However, it was determined that the redox conditions of the sample (negative Eh values, low dissolved oxygen) naturally caused reducing conditions in the sample to exist thereby converting the hexavalent chromium spike to trivalent chromium.

The data validator indicated that the laboratory was operating with proper procedures and made an effort to verify negative interference through multiple analysis of project specific samples, additional project specific sample spikes, and laboratory blanks (beyond requirements). However, because of the negative matrix interference effects, the data validator qualified all laboratory-reported non-detects of hexavalent chromium as unusable data (R). Laboratory reported detected values of hexavalent chromium may have low bias and are therefore qualified as estimated (J). The data validator did not reject these values.

Although some hexavalent chromium data are considered not usable (R), where total chromium values were reported as non-detect, it can be assumed that hexavalent chromium is not present above the detection limit in the sample. Samples in which the total chromium was reported as non-detect and the hexavalent chromium was reported slightly above detection limits are likely a result of the difference in method techniques. In these cases, the hexavalent chromium result is qualified by the data validator as estimated (J). USEPA split samples were analyzed using a different analytical method and either did not detect hexavalent chromium, or, when detected, was present at concentrations substantially below groundwater standards.

Matrix interference effects were not identified during the first sampling event because the matrix spike samples were collected from Cattaraugus Creek and the Former Manufacturing Plant Area. These sample locations are not subject to the stronger reducing conditions present in groundwater at the Inactive Landfill Area.

Based on an assessment of precision, accuracy, and completeness, sample collection and laboratory analyses met data quality objectives of the remedial investigation with the exception of certain data rejections for hexavalent chromium. However, the overall characterization of metal constituent concentrations in groundwater was not compromised based on the data quality of total chromium analysis.

3.0 LAND USE AND PHYSICAL CONDITIONS OF THE SITE

As discussed in Section 1.0, the 26-acre Peter Cooper Gowanda Site is comprised of the 15.6-acre Inactive Landfill Area and the 10.4-acre Former Manufacturing Plant Area. The site is located in the Village of Gowanda in Cattaraugus County, NY approximately 30 miles south of Buffalo, New York, and 20 miles east of Lake Erie. The site surroundings include Cattaraugus Creek to the north, Palmer Street to the south, remnants of a former hydroelectric dam and wetland area to the west, and residential properties to the east (see site location map shown on Figure 1-1).

Regionally, the Village of Gowanda is located both in Erie County and Cattaraugus County and is bisected by Cattaraugus Creek. In Erie County, the Village of Gowanda is included in the Town of Collins. The Town of Collins is bordered by the Town of North Collins to the north, to the east by the Town of Concord, to the south by the Cattaraugus Creek and Cattaraugus County (Towns of Otto and Persia) and the Seneca Nation of Indians Cattaraugus Indian Reservation to the west. In Cattaraugus County, the Village of Gowanda is located in the Town of Persia. The Town of Persia is bordered by the Cattaraugus Creek and Erie County to the north, to the east by the Towns of Otto and Perrysburg, to the south by the Town of New Albion, and the Town of Dayton to the west.

3.1 POPULATION AND LAND USE

Historical population of the Village of Gowanda from 1940 to 2000 is presented in tabular and graphical form on Table 3-1. According to 2000 Census data, the Village of Gowanda has approximately 2,842 residents. This represents a net reduction of 59 residents from the 1990 Census count of 2,901, with the portion of the Village within Erie County accounting for a decrease of 4 persons and the portion of the Village within Cattaraugus County experiencing a population decrease of 55 persons from the 1990 census data. Census data presented on Table 3-1 also indicate an approximately 13% decrease in population from the period high of 3,352 residents in 1960. Although the Master Plan for the Town of Collins and the Village of Gowanda (Erie County Department of Environment and Planning, August 1999) predicts a population increase in the Village to 3,374 persons through the year 2020, historic census data support a steady to declining population base.

Total populations of all townships surrounding the Village of Gowanda, including the Seneca Nation Cattaraugus Indian Reservation, are presented in Table 3-2. Population figures for two of the six surrounding Cattaraugus County townships declined while the remaining townships have increased slightly since 1990. In addition, the Cattaraugus Indian Reservation population has increased from a population of 1,789 to 2,001 over the same ten-year period. Population figures for two of the four surrounding Erie County townships indicate a decline while the remaining townships have increased since 1990. While most of the Township population changes are minor, the Town of Collins experienced a 38% increase in population over the period. However, this increase is entirely attributable to increased population at the Collins Correctional Facility, a minimum-security correctional facility located approximately 1.5 miles north of the Village of Gowanda within the Town of Collins.

Zoning surrounding the Village of Gowanda is primarily agriculture, including dairy farming, forestry and minor crop production. Agriculture is the largest industry in towns of Cattaraugus and Erie Counties adjacent to the Village of Gowanda. However, the Village is an urbanized community zoned for a mixture of residential, commercial and industrial land uses. Residential zoning is the dominant parcel designation within the Village. Industrialized zones are primarily concentrated in the southeast portion of the Village, primarily along the Cattaraugus Creek. The Site is located in an area zoned industrial. Appendix L provides a tabular breakdown of land uses and a zoning map for the Village as presented in the 1999 Master Plan for the Village of Gowanda and Town of Collins.

3.2 SITE PHYSIOGRAPHY AND CLIMATE

3.2.1 Site Physiography

The Village of Gowanda is located within a valley and is surrounded by rolling hills with steep slopes. The southeastern portion of the Town of Collins contains the largest area of steep slopes with grades greater than 15%. Cattaraugus Creek bisects the Village and provides the natural boundary between Erie and Cattaraugus Counties. Cattaraugus Creek features are discussed in detail in Section 3.3 below.

Plate 1 presents site topography and surface features for the Site and immediately surrounding property. Within the Inactive Landfill Area of the Site, topography is generally flat with a slight (<1-3%) slope from Palmer Street to the north toward Cattaraugus Creek. An approximately 5-acre elevated fill area is present in the northwestern portion of the Inactive landfill Area. The top of the Cattaraugus Creek bank and remnants of a former hydroelectric dam bound the elevated fill area on its northern and northwestern sides, respectively. The elevated fill area is mounded approximately 10 feet above its surroundings.

Former Manufacturing Plant Area topography also presents a slight (<1 - 4%) grade toward the creek in most locations, with low topographic relief across several large areas in the eastern side of the site where the foundations of former buildings remain.

Vegetative cover, including a mix of low-lying scrub, brush and mature trees characterizes most areas of the site. A cover-type map for the site developed in support of the ecological risk assessment identifies vegetative cover over the Site. Three federal wetland communities were delineated within the boundaries of the Site. An approximately 0.25-acre wetland area, characterized as a combination forested/scrub-shrub wetland, is present at the northeastern limit of the site on the eastern side of the former hydroelectric dam. A 36-inch municipal storm water outfall pipe discharges into the southern portion of this wetland area near the base the adjacent cemented-stone remnants of the former hydroelectric dam. Elsewhere, a small (less than 1,200 square foot) emergent wetland exists in a depression along the southern side of the elevated fill area, and an approximately 3,000 square foot scrub-shrub wetland is located in the center portion of the site. This scrub-shrub wetland appears to have been created as a result of storm water drainage to the Site. A 12-inch storm water outfall, which drains a small section of ditch along the south side of Palmer Street near the former Peter Cooper office entrance drive, discharges to the site at the southern end of the scrub-shrub wetland.

In addition to the former hydroelectric dam remnants, other surface features present at the site include an approximately 150-foot long riprap revetment wall along the Creek Bank adjacent to the elevated fill area of the site. The riprap was constructed in January 1997 to prevent erosion of the elevated fill area by Cattaraugus Creek. In addition, a former concrete sluiceway and retaining wall are present along the majority of the creek bank in the Inactive Landfill Area and Former Manufacturing Plant Area of the site, respectively. The inner wall and base of the former sluiceway are covered with the exception of an approximately 5-foot section of the sluiceway near the upstream limit (i.e. sluiceway entrance). As indicated above, several former building foundations and slabs are present across the Former Manufacturing Plant Area of the Site. Masonry, lumber and other construction demolition debris are also piled on the Former Manufacturing Plant Area in significant quantities.

3.2.2 Climate

The Site is located in the southeastern portion of the Village of Gowanda, which lies in both Erie and Cattaraugus counties of western New York State. This area of New York has a cold continental climate. Moisture evaporating from Lake Erie causes heavy winter snowfalls along the high ridges closest to the lake, averaging approximately 165.5 inches per year (NOAA, 1998). Annual precipitation averages approximately 49 inches per year (NOAA, 1998). Average temperatures range from 21 degrees Fahrenheit in January to 66 degrees Fahrenheit in July (NOAA, 1998). The ground surface and lakes generally remain frozen from December to March. Natural stream temperatures range from 32 degrees Fahrenheit in winter to 81 degrees Fahrenheit in summer (O' Brien & Gere, 1989). Winds are generally from the southwest (240 degrees) with a mean velocity of 11.6 miles per hour (Buffalo Airport, 1998).

3.3 SURFACE WATER

3.3.1 Storm water

The majority of storm water generated at the site and surrounding property drains through a combination of infiltration and/or overland flow toward Cattaraugus Creek. With the exception of the 12-inch outfall present at the head of the above-described scrub-shrub wetland, engineered storm water conveyance in the vicinity of the site is generally limited to the areas near the intersection of Palmer and Broadway Streets. During the 1990s, the Village of Gowanda installed a storm water collection and conveyance system that services Broadway Street. The collection and conveyance system discharges to a 36-inch PVC conveyance line that runs beneath the open lot area on the southwest side of the Site, and discharges to the forested/scrub-shrub wetland on the northwest side of the Site. Accordingly, the wetland serves as a sediment settling area for storm water discharge. The wetland drains in a northerly direction via overland flow into the Cattaraugus Creek.

3.3.2 Cattaraugus Creek

The Cattaraugus Creek is a surface water body suitable for fishing and secondary recreation (not primary contact recreation such as swimming) but not as a drinking water supply (NYSDEC designated Class C(T)). The Cattaraugus Creek watershed predominantly drains a rural environment that varies in topographic nature from hilly terrain, steep slopes and narrow valleys upstream of the Village to a generally flat slope and wide valley downstream of Gowanda (Wendell-Duchscherer, Flood and Hazard Mitigation Plan for the Village of Gowanda, April 2001). The drainage area of the Creek is approximately 436 square miles and its length is approximately 70 miles. In the vicinity of the Site, the Creek meanders through an incised bedrock valley cut by thousands of years of stream flow. The Creek channel width is 130 feet and of variable depth in the area forming the northern Site property boundary. Cattaraugus Creek flows in a westerly direction eventually discharging into Lake Erie at Irving.

A USGS Gauging Station (#04213500) is located on Cattaraugus Creek west of the Route 62 bridge after the confluence of the east and west branches of Cattaraugus Creek. Stream flow data collected from the USGS gauging station indicates a mean annual stream flow of 1,030 cubic feet/second (USGS, 2001). No significant discharges occur to the Creek within a few miles of the Site from upstream sources. Presently, the Village of Gowanda sewage treatment plant outfall discharges to Cattaraugus Creek approximately 2 miles downstream of the Peter Cooper Gowanda site. A mean annual stream flow near the Peter Cooper Site of approximately 600 cubic feet/second is reported by O'Brien & Gere in the 1989 RI Report. However, this flow rate has not been confirmed.

The 100-year and 500-year floodplain areas for the Village are mapped in Appendix M. The flood plains are located at varying distances and elevations from the banks of Cattaraugus Creek and are positioned along the entire length of the Creek as it bisects the Village. The elevation of the 100-year flood elevation is approximately is 768 feet mean sea level. Within the Village all water is drained to three different watersheds, the Grannis Brook watershed, Thatcher Brook watershed and the Cattaraugus Creek watershed (Wendell-Duchscherer, Flood and Hazard Mitigation Plan for the Village of Gowanda, April 2001). The Village's primary municipal water supply, the Point Peter Reservoir, is located approximately 1.6 miles south of the site in the Point Peter watershed.

3.4 REGIONAL GEOLOGY AND HYDROGEOLOGY

The Peter Cooper Gowanda Site is situated within the uplands of the Allegheny Plateau. The bedrock geology of the area consists of Upper Devonian age shales and siltstones of the upper Canadaway Group (Hazen and Sawyer, 1969). According to the Geologic Map of New York - Niagara Sheet (1970), the Canadaway Group ranges in thickness from 700 to 1,200 feet. The Canadaway Group consists of the following bedrock units, from oldest to youngest: Northeast Shale; Shumla Siltstone; Westfield Shale; Laona Shale; Gowanda Shale; South Wales Shale; Dunkirk Shale and the Machias Formation. The Geologic Map of New York shows the site to be underlain by the Machias Formation, which consists primarily of shales and siltstones, with some sandstones. The bedrock dips uniformly south at 31 to 58 ft/mile (Hazen and Sawyer, 1969) and is cross-cut by a near perpendicular regional joint set oriented northeast-southwest and northwest-southeast. Bedrock topography varies considerably across the area resulting from Wisconsinan age glaciation (13,000-14,000 ybp). Glacial advance and recession resulted in broad river valleys, separated by extensive uplands.

Overburden deposits vary considerably across the region, and reflect the glaciation and subsequent deglaciation of the area. Basal till and glacial moraines consisting of sand, silt and gravel, mark the advance of the ice sheet across the southern tier of Western New York State.

One such glacial moraine cuts across the Village of Gowanda at Cattaraugus Creek east of Route 62 (Yager, et al.,1997). Locally, finer grained deposits (silt/clay) often predominate where glacial melt water remained. Alluvial deposits derived from re-worked glacially-derived soil occur along major streams and creeks in the area.

Groundwater flow occurs both in the unconsolidated glacial deposits across the region, and along bedding plane partings and joints in the bedrock. Confined water table conditions exist where glaciolacustrine deposits (silt/clay) overlie the coarser sand and gravel water bearing units. Buried ancestral river valleys are often floored by the coarser grained deposits associated with glacial advance, which are then overlain by lacustrine fine sand, silt and clay (Yager et al., 1997). Where these coarse-grained deposits are nearer the surface, unconfined conditions predominate.

Domestic water supply well and gas well test hole data located approximately 1-mile northeast of the Village of Gowanda identify the presence of a buried bedrock valley partially filled with glacial drift. The bedrock valley which extends to depths of more than 400 feet below ground surface is overlain by a relatively shallow unconfined deltaic aquifer (Todd, 1998). Recharge to the unconfined aquifer occurs from precipitation that infiltrates the surface soil and from upland sources along the southeastern border of the aquifer, such as runoff from hillsides and seepage from the overburden. The elevation of the upper and lower bounds of the aquifer is higher than the elevation of Cattaraugus Creek. No other widespread deposits that could be considered a high yield aquifer exist in the Gowanda area.

3.4.1 Site Geology

The Site is underlain by shale bedrock of the Canadaway Formation. Shale outcrops in and along Cattaraugus Creek, across the northern site perimeter, and the hill slope south of Palmer Street. The elevation of the bedrock surface generally slopes in a northwesterly direction, toward the Creek. The bedrock topography for the Inactive Landfill Area and Former Manufacturing Plant Area are shown on Figures 3-1A and 3-1B. The topographically flat area between the elevated areas south of Palmer Street and the Creek is a broad alluvial valley with a relatively thin layer of alluvial deposits (approximately 10 feet or less) mantling the bedrock valley floor. Anthropogenic activities have deposited fill above the alluvium. In some areas, excavations have removed alluvial soils and fill materials backfilled the excavations. Collectively, the alluvial soil and fill materials comprise the overburden at the Site. The Site stratigraphy is illustrated in cross section on Figures 3-2, 3-3 and 3-4. Cross section profile lines for each cross-section are shown on Figures 2-3 and 2-4. Based on boring data summarized in Table 3-3, the thickness of the overburden varies from a few feet to more than 23 feet (GMW-1). The presence and thickness of fill also varies depending on location. The fill is characterized in this RI as sludge fill and cindery fill. Each fill type is usually covered with a topsoil-rich, vegetated layer. The sludge fill, which is located in the Inactive Landfill Area, is a focus of the RI as a potential source for chemical constituents that may impact environmental media. The sludge fill is characterized in more detail in Section 3.5. The cindery fill consists of silt, sand, and gravel with variable amounts of cinders, ash, and construction and demolition materials. The depth to bedrock and the thickness of cover soil and fill at soil boring, monitoring well, piezometer, and gas monitoring well locations is summarized in Table 3-3.

3.4.2 Site Hydrogeology

The overburden and upper bedrock water bearing zones were investigated. The spatial relationship between these two zones is shown in the cross sections referred to in Section 3.4. Groundwater from both zones discharges to Cattaraugus Creek. Seeps are observed at the overburden/bedrock contact and in the bedrock outcrop along the Creek.

3.4.2.1 Hydraulic Properties

Synoptic rounds of water levels taken from site monitoring wells and piezometers during the RI are summarized in Table 3-4. Water levels coincident with groundwater sampling events representing seasonal low and seasonal high water table conditions were used to prepare potentiometric surface maps of overburden and bedrock groundwater. Figures 3-5A and 3-5B present overburden groundwater contour maps respectively for the Inactive Landfill Area and the Former Manufacturing Plant Area during the November 2000 sampling event (representative of low water table conditions). Figures 3-6A and 3-6B present bedrock groundwater contour maps respectively for the same areas during the same sampling event. Figures 3-7A and 3-7B present overburden groundwater contour maps respectively for the Inactive Landfill Area and the Former Manufacturing Plant Area during the April 2001 sampling event (representative of high water table conditions). Figures 3-8A and 3-8B present bedrock groundwater contour maps respectively for the same areas during the April 2001 sampling event.

The horizontal hydraulic gradient in the overburden is less than 0.01 across much of the Site and is higher near the bank of Cattaraugus Creek as discharge occurs via seeps. Groundwater is not present in the thin overburden deposits in the southeastern portion of the Former Manufacturing Plant Area near Palmer Street. Measured groundwater elevations ranged from

762.49 to 775.35 in overburden monitoring wells in measurements taken in November 2000 and April 2001. The change in groundwater elevation between the two measurements, which were taken approximately 5 months apart, was typically less than 2 feet. Groundwater elevations in monitoring well MW-6, a relatively steep hydraulic gradient between PZ-1 and DP-1 (ranging from 0.12 to 0.31), groundwater in gas monitoring wells, and groundwater seepage into test pit excavations, all suggest an area of elevated head occurring in the landfill sludge fill area of the Inactive Landfill Area. The elevated head produces a slight radial overburden groundwater flow pattern in the northwestern portion of the Inactive Landfill Area. Factors causing the elevated head include: the elevated topography of the area, the restriction of groundwater flow in an easterly direction due to the presence of the concrete foundation from the former hydroelectric dam, and the apparent higher permeability of the sludge fill compared to the surrounding soil/fill. The head variation between seasonal low and high water table conditions are substantially greater for wells screened in the sludge fill vs. wells screened in the cindery fill or native soil. This indicates a seasonal buildup and slow release of groundwater in and from the sludge fill.

The hydraulic conductivity of the overburden, based on slug tests, ranges from 2.9×10^{-6} (MW-7S) to 2.2×10^{-2} (MW-5S) cm/sec. Hydraulic conductivity testing results are summarized in Table 3-5. The table presents ranges of hydraulic conductivity values estimated for the two fill types (sludge fill and cindery fill) and the native alluvial soil. The fairly wide variation in hydraulic conductivity reflects the variable consistency of overburden material, which includes fill, silt, sand, and gravel.

The horizontal hydraulic gradient in the bedrock is higher than in the overburden, ranging from 0.02 to 0.03 across the Site. Measured groundwater elevations ranged from 753.44 to 777.49 feet above mean sea level. The fluctuation in groundwater elevation between the two measurements was less than in the overburden, and was typically less than 1.5 feet. The calculation of vertical hydraulic gradients is also shown on Table 3-4. With the exception of MW-5S and MW-5D, vertical gradients are downward between the overburden and bedrock.

Anomalously high bedrock water levels were measured in monitoring well MW-5D. Based on the hydraulic gradient established for the bedrock at other areas of the Site and the downward vertical head potential between the overburden and bedrock, a lower head level at MW-5D is expected. However, the similarity in groundwater elevations between MW-5S and MW-5D and the hydrochemistry of the wells (Piper diagrams are further discussed in Section 5.0) suggest that the shallow bedrock and the overburden are locally hydraulically connected. The hydraulic conductivity of the bedrock at MW-5D location was the highest measured on-Site. Similarly, the hydraulic conductivity of the overburden at that location was also relatively high. A localized area of higher hydraulic conductivity in the bedrock is likely responsible for the elevated bedrock head. Therefore, the hydraulic influence from the elevated head is local to the area of MW-5D.

The vertical hydraulic gradient within the bedrock is upward based on head data for MW-4D(R) and MW-4D2. The upward vertical gradient suggests that bedrock groundwater discharges to Cattaraugus Creek from at least the upper 35 feet of bedrock.

The hydraulic conductivity of the bedrock, based on slug tests, ranges from 2.2 x 10^{-6} (MW-8D) to 3.4 x 10^{-2} (MW-5D) cm/s. The hydraulic conductivity generally decreases with increasing depth in the shale. Estimated hydraulic conductivity values in the shallow zone were in the approximate range of 1 x 10^{-4} to 1 x 10^{-2} cm/s. However, estimated hydraulic conductivity values in the deep bedrock wells, such as MW-4D2 and MW-8D are less than the range of shallow bedrock hydraulic conductivity values. Lower hydraulic conductivity with increasing depth is also supported with packer testing results. Packer test estimated hydraulic conductivity values are summarized below.

Test Interval (feet bgs)	**Hydraulic Conductivity (cm/s)**
18 to 23	3.6 X10-5
23 to 28	Not quantifiable; likely less than 1 X 10-6
28 to 33	1.6 X 10-5
33 to 38	Not quantifiable; likely less than 1 X 10-6

Based on this vertical variation in hydraulic conductivity, the uppermost 10 to 15 feet of bedrock appears to be more permeable than deeper bedrock.

3.4.2.2 Description of Conceptual Groundwater Flow

The overall groundwater flow system at the site consists of two primary zones: groundwater in the overburden and bedrock groundwater. This division is based on stratigraphy, groundwater elevation and hydraulic conductivity data. Groundwater flow in the overburden is controlled by elevation, bedding surfaces, variation in grain size, the presence of fill, and the bedrock surface. Within the overburden, there is a horizontal hydraulic potential toward the Creek and a downward hydraulic potential from the overburden into the bedrock across the Site, based on a comparison of groundwater elevations in paired overburden/bedrock monitoring wells. A localized westerly flow direction occurs in the overburden near the elevated portion of the Inactive Landfill Area. This flow component is limited in a westerly direction due to the relatively rapid ground surface elevation change that occurs between Palmer Street, the landfill area, and the wetland area adjacent to the Creek. The presence of seeps along the overburden/shale contact along the Creek and the downward vertical hydraulic gradient potential indicate that the physical characteristics of the shale pose a hindrance to groundwater flow from the overburden into the shale. Groundwater flow in the bedrock is primarily along fractures, joints, and bedding planes, which tend to be strongly horizontally oriented. The range of hydraulic conductivity in the upper bedrock is comparable to that of the overburden, where the hydraulic conductivity of the deeper bedrock is orders of magnitude lower. These results suggest that the upper bedrock is more transmissive than the deeper bedrock and the majority of bedrock groundwater receiving recharge from the on-Site overburden discharges to Cattaraugus Creek from the upper 10 to 15 feet of bedrock.

An estimate of Site groundwater contribution (groundwater flux) to surface water in Cattaraugus Creek was prepared using Darcy flux calculations for the overburden and upper bedrock (upper 35 feet) across the northern Site boundary. Darcy flux calculations are provided in Appendix N. The groundwater flux from the overburden for the combined Inactive Landfill Area and the Former Manufacturing Plant Area was estimated to be approximately 550 ft^3/day. The groundwater flux from the bedrock for both the Inactive Landfill Area and the Former Manufacturing Plant Area was estimated to be approximately 2,500 ft^3/day. The comparatively larger groundwater flux from the bedrock primarily results from the assumption of a substantially greater saturated thickness (35 feet in the bedrock vs. 4 to 6 feet in the overburden) since the geometric mean hydraulic conductivity for the overburden and bedrock are similar. The combined groundwater flux of approximately 3,050 ft^3/day from the Site is minor compared to the mean annual stream flow of Cattaraugus Creek. The mean annual stream flow for the Creek near the Site is over 600 ft^3/s where as the flux from the Site to the Creek is approximately 0.035 ft^3/s.

3.5 CHARACTERIZATION OF SOIL/FILL/SEDIMENT

The Remedial Investigation characterized the physical properties of the various fill types and soil, Creek and wetland sediments. Characterization of the sludge fill and soil cover in the

Inactive Landfill Area, cindery fill and soil in the Former Manufacturing Plant Area, wetland sediment, and Creek sediment is described below.

3.5.1 Characterization and Delineation of the Sludge Fill

Sludge fill was disposed of in the topographically elevated area of the Inactive Landfill Area. The fill appears to extend down to the weathered bedrock surface near the Creek side of the Site. Farther from the creek, the sludge fill is under lain by native alluvial soil. The lateral limits of the buried sludge fill are illustrated on Figure 3-9. The limits of the sludge fill were based on observations made during the excavation of test pits near the perimeter of the elevated fill area. Table 3-6 summarizes test pit soil descriptions for test pits TP-A through TP-E. The results of surface geophysical survey (EM) show anomalously elevated soil conductivity values associated with fill materials buried in the Inactive Landfill Area. However, the conductivity of the sludge fill did not significantly contrast from the conductivity of other fill material observed at the Site and its usefulness in delineating the sludge fill at the Inactive Landfill Area is limited. EM survey results are presented in Appendix C. The thickness of the sludge fill ranges from 5 to 23 feet. An isopach map illustrating the thickness of the sludge fill is shown on Figure 3-10. Approximately 100,000 cubic yards of sludge fill is present at the Inactive Landfill Area.

The sludge fill consists primarily of a black, silt and fine sand matrix with various mixtures of animal hair, ash and cinders, gravel, and construction and demolition debris (bricks, glass, concrete, wood) and is associated with a strong ammonia and sulfurous-type odor. Geotechnical testing information for the sludge fill is presented in Appendix O and is summarized in Table 3-7. Grain size analysis of the sludge fill indicates the material is well graded consisting of nearly equal parts of gravel, sand, and silt size particles. The high liquid limit of the sludge is unlike natural soil and indicates a high water-bearing capacity of the material. The composite sample tested has a relatively high water content (approximately 41%) and a vertical conductivity (Shelby tube) of 1.7×10^{-5} cm/s. Based on the rapid infiltration of water into several test pits, however, the bulk hydraulic conductivity of the sludge fill is likely higher. Test pits excavated into the sludge fill, TP-1/G through TP-5/G indicate water rapidly infiltrated the excavations at depths of four feet and deeper. Test pit side walls often slumped into the excavation during excavation. Strong odors accompanied the excavations.

Section 1.2.1 reports the installation of a soil cover during the early 1970s. The soil cover over the sludge fill area was investigated and ranged in thickness from approximately 10 inches to over 45 inches. However, a localized area near GMW-2 shows vegetative stress and cover soils are very thin to absent. The thickness of the soil cover is illustrated on Figure 3-11. Several test pits encountered a geotextile fabric below the soil cover. Descriptions of top soil and cover soil thickness at each of the 24 test hole locations are summarized in Table 3-8. Geotechnical testing results of the cover soils are presented in Appendix O. Table 3-9 summarizes the physical parameters of the composite cover soil samples and undisturbed (Shelby tube) cover soil samples. The results indicate that the existing cover consists primarily of silt and clay with some fine sand and minor gravel with areas having relatively low hydraulic conductivity. Vertical hydraulic conductivity of cover soil (laboratory analysis from Shelby tubes) ranged from 3.6 X 10^{-5} to 9.0 X 10^{-8} cm/s. Clay content of cover soil ranged from 10.0 to 22.1 percent.

3.5.2 Characterization of Cindery Fill and Soil

A layer of a cindery fill soil mixture is present across most areas of the Peter Cooper Site. The thickness of the fill generally increases in a northerly direction across the Site. The fill extends down to the top of bedrock in several areas of the Inactive Landfill Area and the Former Manufacturing Plant Area. The fill unit is shown on cross-sections presented earlier in this section and its thickness is summarized in Table 3-3. Descriptions of the fill are included in logs for soil borings SB-1 through SB-10 and monitoring wells completed in the Former Manufacturing Plant Area and test pit excavations TP-1 through TP-9. The distribution of the cindery fill soil in the Inactive Landfill Area, containing higher quantities of slag is clearly shown on the results of the EM survey as elevated soil conductivity values (Appendix C)..

The cindery fill soil consists primarily of a dark gray to black, silty sand matrix with various mixtures of gravel, cinders and ash, slag, and construction and demolition debris (bricks, glass, concrete, wood). Geotechnical testing information for the fill is presented in Appendix O and is summarized in Table 3-10. Grain size analysis of the fill indicates the material is highly variable in composition. Generally, coarser grain-size materials are present at shallow depths with many samples containing nearly 50% gravel size material. At depth, grain size decreases and grain size consists primarily of fine sand and fines (silt and clay).

3.5.3 Wetland Sediments

The wetland area resulting from storm water drainage from Palmer and Broadway Streets is underlain by a layer of organic-rich alluvial soil (referred to as wetland sediments). The thickness of the wetland sediments is greater than five feet based on the capability of advancing the drive point piezometer (DP-1) into the sediment without refusal. The sediment is brown to dark brown and contains substantial vegetative matter. Grain size analyses of three samples indicates that the sediments consist primarily of fine sand and silt. Grain size testing results are presented in Appendix O and are summarized in Table 3-11.

3.5.4 Cattaraugus Creek Sediments

Sediment in Cattaraugus Creek is sparse because of the relatively high velocity stream flow and the shale bedrock that forms the side walls and streambed of the Creek. Where present, the sediment occurs as occasional small sandbars located near shore. Sediment was identified and sampled at an upstream (SED-1) and downstream (SED-4) location and two locations across from the Site (SED-2 and SED-3). The sediment consists primarily of sand with little to no gravel. Grain size analysis for the four sediment samples are presented in Appendix O and are summarized in Table 3-11.

4.0 CHEMICAL PRESENCE IN SITE MEDIA

The sampling programs presented in Section 2.0 describe laboratory analysis of Site media to assess chemical presence at the Site. The following subsections describe the chemical analytical results in the following media:

- Sludge fill;
- Surface and subsurface soil/fill;
- Landfill gas;
- Groundwater;
- Seeps;
- Cattaraugus Creek surface water; and
- Sediments in the wetland and Cattaraugus Creek.

4.1 SLUDGE FILL

Chemical analytical results of the sludge fill present in the Inactive Landfill Area are based on three samples (GMW-1 through GMW-3) that were analyzed for VOCs and one composite sample that was analyzed for SVOCs and metals. The chemical data for the sludge fill are presented in Table 4-1 for the VOCs and Table 4-2 for the SVOCs and metals. A summary discussion of analytical results follows.

Samples of the sludge fill contained concentrations of some VOCs. The VOCs detected at the highest concentrations are as follows:

Acetone	15 mg/kg;
2-Butanone	3.2 mg/kg, and
Toluene	1.7 mg/kg.

The following twelve VOCs were also detected, but at only trace (i.e., less than 1 mg/kg) concentrations:

1,1-Dichloroethane;
1,2-Dichlorobenzene;
2-Hexanone;
4-Methyl-2-pentanone;
Benzene;
Carbon disulfide;
Chlorobenzene;
Ethylbenzene;

Xylenes;
Methylcyclohexane;
Styrene; and
Tetrachloroethene.

The composite sample of the sludge fill contained detectable concentrations of SVOCs. The SVOCs and the concentration at which they were detected in the sample are as follows:

4-Methylphenol	150 mg/kg;
Naphthalene	22 mg/kg;
Phenol	15 mg/kg;
Pentachlorophenol	6.8 mg/kg; and
Phenanthrene	1 mg/kg.

The composite sample of the sludge fill contained concentrations of metals that are COPCs. These metals and the concentrations at which they were detected in the sample are as follows:

Arsenic	34.8 mg/kg;
Chromium	9,280 mg/kg (hexavalent chromium was not detected at a detection limit of 6.75 mg/kg); and
Zinc	6,060 mg/kg.

The locations at which the composite sample was collected are illustrated on Figure 2-5A along with the results for the metals COPCs.

The sludge fill sample contained 10.0 percent total organic carbon.

For comparison, maximum concentrations of chemical constituents detected by the USEPA during the 1996 Weston Study are as follows:

4-Methylphenol	6.4 mg/kg;
Phenol	0.79 mg/kg;
Arsenic	33.0 mg/kg;
Hexavalent Chromium	Not detected (10U mg/kg);
Chromium	37,000 mg/kg; and
Zinc	5,200 mg/kg.

Similar compounds were detected during the 1989 investigation completed by OBG (see Appendix B-3).

4.2 SOIL

Chemical data for soil samples collected during the RI are presented in the following sections. Previously-collected chemical data for soil samples, that is, data collected prior to the RI, are provided in Appendix B. The RI analytical data are presented for the Inactive Landfill Area first, followed by the FMP area. USEPA Region 9 Preliminary Remediation Goals (PRGs) for industrial soil from October 2002 (herein referred to as soil criteria) are presented for comparison. PRG soil screening levels (SSLs) for a dilution attenuation factor of 20 are also provided to assess a potential for chemical migration via leaching from soil. Values are shaded on data summary tables if detected organic compound concentrations are above PRG soil criteria. Metals are shaded if detected concentrations are above Eastern U.S. soil ranges referred to by various regulatory agencies and presented in NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046: Determination of Soil Cleanup Objectives and Cleanup Levels (referred to as background values). The Eastern U.S. soil ranges were selected since background metals data specific to the Village of Gowanda were not available.

4.2.1 Inactive Landfill Area

Both surface soil and subsurface soil were sampled in the inactive landfill area.

4.2.1.1 Surface Soil

Chemical data for 20 surface soil samples, including the results of analysis for VOCs and metals, are summarized in Table 4-3. VOCs were not detected at concentrations at or above the guidance values. Hexavalent chromium was not detected in any of the samples.

The predefined COPCs arsenic, chromium and zinc were detected above typical concentrations detected in background values in some samples. Inorganic compound concentrations detected above background values are shaded on Table 4-3. Detected concentrations of these chemicals were as follows (ranges included duplicate sample results):

Arsenic	1,190 mg/kg to 4 mg/kg (background value is 12 mg/kg);
Chromium	772 mg/kg to 10.6 mg/kg (background value is 40 mg/kg); and
Zinc	213 mg/kg to 46.9 mg/kg (background value is 50 mg/kg).

The elevated concentration of arsenic detected in sample LFSS-6 (1,190 mg/kg) could be a result of cindery ash fill present in the area, which also is depicted in the electromagnetic survey. This single sample is not reflective of the arsenic detected elsewhere in the environmental media and, therefore, probably is anomalous. Although surface soil was not collected east of the sludge fill area during the 1996 USEPA Study conducted by Weston, the constituent concentrations detected during this RI are generally consistent with the data from the 1989 RI conducted by OBG (see Appendix B-3).

4.2.1.2 Subsurface Soil

Chemical data for 11 subsurface soil samples, including the results of analysis for VOCs and metals, are summarized in Table 4-4. As was observed in the samples of the surface soil, VOCs were not detected at concentrations at or above the guidance values, and hexavalent chromium was not detected in any of the samples.

The COPCs arsenic, chromium and zinc were detected above guidance values in some samples. Detected concentrations of these chemicals were as follows:

Arsenic	60.5 mg/kg to 4.3 mg/kg (background value is 12 mg/kg);
Chromium	623 mg/kg to 7.9 mg/kg (background value is 40 mg/kg); and
Zinc	1,390 mg/kg to 57.3 mg/kg (background value is 50 mg/kg).

These data are consistent with subsurface soil analytical obtained from the 1996 USEPA study conducted by Weston. Maximum concentrations reported by Weston were:

Arsenic	25 mg/kg;
Chromium	750 mg/kg; and
Zinc	520 mg/kg.

4.2.2 Former Manufacturing Plant Area

The objective of sampling and analysis in the Former Manufacturing Plant Area included determining COPCs as well as characterizing their magnitude and extent, unlike the Inactive Landfill Area, where COPCs had already been determined. As a result, the soil samples collected in the Former Manufacturing Plant Area were analyzed for a more comprehensive list of chemicals than were the soil samples collected in the Inactive Landfill Area.

Both surface and subsurface soil samples were collected in the Former Manufacturing Plant Area.

4.2.2.1 *Surface Soil*

Chemical data for 10 surface soil samples, including the results of analysis for VOCs, SVOCs and metals, are summarized in Table 4-5. Concentrations detected above guidance values are discussed below. The guidance values shown below are USEPA Region 9 Industrial PRGs (October 2002).

VOCs were detected above guidance values at only one location, MWFP-3, with the exception of acetone, which was detected at SB-9 and SB-10, at concentrations of 1.4 and 0.21 mg/kg, respectively. The soil sample from MWFP-3, collected at a depth of between 0.5 to 2.5 feet below ground surface, contained the following VOCs at concentrations above Region 9 PRG values:

Carbon tetrachloride	10 mg/kg (guidance value is 0.55 mg/kg); and
Tetrachloroethene	54 mg/kg (guidance value is 3.4 mg/kg).

The presence of these VOCs in soil at sample location MWFP-3 was further investigated to better ascertain the extent of VOC impact in this area. Appendix P summarizes the investigation methodology and results of an investigation that characterized the lateral and vertical extent of VOC impacts in surface soil. The investigation results indicate an area approximately 20 feet by 40 feet that contains VOC concentrations. Concentrations were below Region 9 Industrial PRG values.

SVOCs were detected above guidance values in several samples. Detected concentrations of these chemicals were as follows:

Benzo (a) anthracene	24 mg/kg to 0.11 mg/kg (guidance value is 2.1 mg/kg);
Benzo (a) pyrene	20 mg/kg to 0.087 mg/kg (guidance value is 0.21 mg/kg);
Benzo (b) fluoranthene	15 mg/kg to 0.079 mg/kg (guidance value is 2.1 mg/kg);
Dibenzo (a,h) anthracene	5.2 mg/kg to 0.076 mg/kg (guidance value is 0.21 mg/kg); and
Indeno (1,2,3-cd) pyrene	13 mg/kg to 0.043 mg/kg (guidance value is 2.1 mg/kg).

The upper range of SVOC concentrations are above SSLs indicating a potential for migration to groundwater. However, these compounds were not detected in groundwater samples collected and analyzed from the are.

Metals were detected above guidance values in several samples. Detected concentrations of these chemicals were as follows:

Arsenic	168 mg/kg to 6.6 mg/kg (background value is 12 mg/kg);
Calcium	44,200 mg/kg to 1,050 mg/kg (background value is 35,000 mg/kg, exceeded in just one sample);
Chromium	198 mg/kg to 9 mg/kg (background value is 40 mg/kg);
Copper	171 mg/kg to 20.9 mg/kg (background value is 50 mg/kg);
Lead	269 mg/kg to 8.2 mg/kg (background value is 200-500 mg/kg);
Magnesium	12,600 mg/kg to 225 mg/kg (background value is 5,000 mg/kg);
Mercury	3.1 mg/kg to < 0.05 mg/kg (background value is 0.2 mg/kg, exceeded in just one sample); and
Zinc	728 mg/kg to 45.6 mg/kg (background value is 50 mg/kg).

Hexavalent chromium was not detected in any of the samples.

4.2.2.2 Subsurface Soil

Chemical data for 12 subsurface soil samples, including the results of analysis for VOCs, SVOCs and metals, are summarized in Table 4-6. Concentrations detected above guidance values are discussed below. The guidance values shown below are USEPA Region 9 Industrial PRG values.

VOC results were below guidance values, except for the detection of 0.49 mg/kg acetone in a soil sample collected at SB-5. The acetone concentration at SB-5 is an estimated value, as it was below the detection limit. The USEPA Region 9 Industrial PRG value for acetone is 620 mg/kg.

SVOCs were detected above guidance values in several samples. Detected concentrations of these chemicals were as follows:

Benzo (a) pyrene	2.3 mg/kg to 0.058 mg/kg (guidance value is 0.21 mg/kg); and
Dibenzo (a,h) anthracene	0.64 mg/kg to 0.11 mg/kg (guidance value is 0.21 mg/kg).

Metals were detected above background values in several samples. Detected concentrations of these chemicals were as follows:

Arsenic	23.6 mg/kg to 3.7 mg/kg (background value is 12 mg/kg);

Cadmium	1.3 mg/kg (exceeded in only one sample, the background value is 1 mg/kg);
Calcium	67,000 mg/kg to 1,270 mg/kg (exceeded in only one sample, the background value is 35,000 mg/kg);
Chromium	155 mg/kg to 6.2 mg/kg (background value is 40 mg/kg);
Copper	187 mg/kg to 11.3 mg/kg (background value is 50 mg/kg);
Lead	1,950 mg/kg to 7.2 mg/kg (background value ranges from 200 mg/kg to 500 mg/kg);
Magnesium	5,620 mg/kg to 851 mg/kg (exceeded in only one sample, the background value is 5,000 mg/kg);
Mercury	3.1 mg/kg to < 0.05 mg/kg (exceeded in only one sample, the background value is 0.2 mg/kg); and
Zinc	605 mg/kg to 37.8 mg/kg (background value is 50 mg/kg).

4.3 LANDFILL GAS

The composition and VOC content in landfill gas samples were evaluated. The evaluation used the results of chemical analysis of gas samples collected from three gas monitoring wells, GMW-1, GMW-2 and GMW–3, placed in the inactive landfill area. The construction of the gas monitoring wells is discussed in Section 2.3. The chemical data are presented in Table 4-7.

The chemical data are summarized as follows:

1. The LEL was exceeded in two of the samples;
2. Hydrogen sulfide was detected at greater than 1,000 ppm in two of the samples and at 710 ppm in the third;
3. Oxygen content was just 0.5 ppm or 0% in one sample, and was depressed to 17.5 ppm in a second sample;
4. Carbon monoxide was detected in two of the samples, at up to 6 ppm;
5. Carbon dioxide was detected at relatively high concentrations in two of the samples, up to 11.2 percent; and
6. Methane was detected in two of the samples, up to 31.1 percent.

The following VOCs were detected in the gas samples:

Acetone	1,200 $\mu g/m^3$ to 150 $\mu g/m^3$;

Trichlorofluoromethane	1.7 $\mu g/m^3$ (detected in only one sample);
Carbon disulfide	3,200 $\mu g/m^3$ to 93 $\mu g/m^3$;
2-Butanone	1,100 $\mu g/m^3$ to 43 $\mu g/m^3$;
Benzene	180 $\mu g/m^3$ to < 2 $\mu g/m^3$;
4-Methyl-2-pentanone	370 $\mu g/m^3$ to 3.4 $\mu g/m^3$;
Toluene	2,600 $\mu g/m^3$ to 41 $\mu g/m^3$;
2-Hexanone	7 $\mu g/m^3$ (detected in only one sample);
Ethyl benzene	84 $\mu g/m^3$ to 3.5 $\mu g/m^3$;
Xylenes	130 $\mu g/m^3$ to 1.4 $\mu g/m^3$; and
Styrene	20 $\mu g/m^3$ (detected in only one sample).

The hand held instruments used to measure hydrogen sulfide, methane, and total VOCs (by PID) did not detect these compounds in ambient air.

4.4 GROUNDWATER

Groundwater chemical data were collected during the RI for the overburden and the bedrock groundwater in both the inactive landfill area and the former manufacturing plant area. These data are presented in the following sections. Chemical data for groundwater samples collected prior to the RI are compiled in Appendix B.

The groundwater chemical data are used to compare groundwater chemistry between the bedrock and overburden groundwater, evaluate Site-derived chemical constituents in groundwater, and include parameters that assist in evaluating the fate and transport of chemical constituents in groundwater.

4.4.1 Inactive Landfill Area

Groundwater chemical conditions in the inactive landfill area are presented as follows.

4.4.1.1 Overburden

Chemical data for 16 overburden groundwater samples (i.e., samples from 8 wells in 2 separate sampling events), including the results of analysis for VOCs, SVOCs and metals, and other geochemical data are summarized in Table 4-8. Concentrations detected above guidance values are discussed for VOCs, SVOCs and metals as follows.

VOCs were detected above NYS Division of Water Technical and Operational Series Ambient Water Quality Standards and Guidance Values (groundwater criteria) at four wells, MW-2S, MW-3S, MW-4S and MW-6S. The groundwater samples contained the following VOCs at concentrations above groundwater criteria:

Benzene	1.6 µg/L to not detectable, (groundwater criteria is 1 µg/L);
Chlorobenzene	190 µg/L to not detectable (groundwater criteria is 5 µg/L);
1,2-dichlorobenzene	5 µg/L (detected in just one sample, groundwater criteria is 3 µg/L); and
Toluene	17 µg/L to not detectable; (groundwater criteria is 5 µg/L).

Among the SVOCs, only phenol was detected at a concentration above the groundwater criteria. Phenol concentrations ranged from 480 µg/L to not detectable. Phenol concentrations were above the groundwater criteria of 1 µg/L in samples collected from wells MW-2S and MW-3S in both rounds of sampling. The concentrations of phenol and phenolic compounds detected in the overburden during the RI are substantially lower than part per million level concentrations detected during the 1996 USEPA investigation conducted by Weston.

Metals were detected above groundwater criteria in several samples. Detected concentrations of these chemicals were as follows:

Arsenic	0.196 mg/L to < 0.01 mg/L, (is 0.025 mg/L);
Chromium	0.436 mg/L to < 0.01 mg/L, (groundwater criteria is 0.05 mg/L);
Iron	41 mg/L to < 0.1 mg/L, (groundwater criteria is 0.3 mg/L);
Magnesium	167 mg/L to 16.8 mg/L, (groundwater criteria is 35 mg/L)
Sodium	1,670 mg/L to < 5 mg/L, (groundwater criteria is 20 mg/L).

Hexavalent chromium was not detected in any of the groundwater samples. As discussed in the discussion of sample QC in Section 2.8, there was matrix interference and consequently some hexavalent chromium data are flagged as unusable (R qualifier). The "matrix interference" is the geochemical condition of the groundwater, in which hexavalent chromium is unstable and rapidly reduces to a lower valence state (i.e., +6 to +3). Therefore, while the sample results are technically unusable based on the low recovery of a matrix spike of hexavalent chromium, this condition indicates the likely real absence of hexavalent chromium in these waters.

Geochemical parameters were used to evaluate the potential presence of leachate from the inactive landfill and to evaluate chemical fate. A pattern is observed in the data with comparable (generally elevated) concentrations of several geochemical parameters consistently observed at MW-2S(R), MW-3(R), MW-4S(R), MW-6 and MW-7S. The geochemical data are presented in Table 4-8, and summarized briefly as follows:

> Ammonia ranged from 837 mg/L to 1.05 mg/L, with greatest concentration at MW-2S(R), MW-3(R), MW-4S(R), MW-6, and MW-7S;
>
> Nitrate concentrations were either not detected or at trace concentrations (less than 2 mg/L, except at MW-7S, where nitrate was detected at up to 22.7 mg/L in one sampling event and not detected in the second sampling event;
>
> Total Kjeldahl Nitrogen ranged from 839 mg/L to 1.51 mg/L, with greatest concentrations at MW-2S(R), MW-3(R), MW-4S(R), MW-6, and MW-7S;
>
> Alkalinity (bicarbonate) ranged from 3,850 mg/L to 321 mg/L, with greatest concentration at MW-2S(R), MW-3(R), MW-4S(R), MW-6, and MW-7S;
>
> Chloride concentrations were in the range of 61.5 mg/L to 3.82 mg/L, with the exception of MW-7S, where chloride was detected at up to 2,310 mg/L;
>
> Total and soluble organic carbons were at their greatest concentration at MW-2S(R), MW-3(R), MW-4S(R), MW-6 and MW–7S, ranging up to 187.5 mg/L and 112.75 mg/L, respectively;
>
> Sulfate concentration ranged from 960 mg/L to 2.64 mg/L, with lowest concentration (indicating potential sulfate reduction) at MW-2S(R), MW-3(R), MW-4S(R), MW-6 and MW–7S;
>
> Sulfide concentrations ranged from 55 mg/L to <1 mg/L, and were greatest at MW-2S(R), MW-3(R), and MW-4S(R);
>
> Dissolved oxygen concentrations ranged from 9.34 mg/L to 0.2 mg/L, and was less than 1 mg/L at MW-3(R), MW-6, and MW-8S; and
>
> Oxidation Reduction Potential (ORP) ranged from positive 291.1 mV to negative 371.6 mV. ORP was a negative value (indicating the predominance of reducing conditions) at all sampling locations except MW-1S. Even at MW-1(R), one result showed a relatively low ORP of 11.9 mV.

The downhole inductance survey performed in the core hole of monitoring well MW-4D2 did not assist in characterizing the vertical extent of chemical impacts in bedrock groundwater. The downhole survey results are presented in Appendix C. Similar to the surface electromagnetic survey, chemical constituents in the sludge fill are not sufficiently conductive in order to differentiate the conductivity signature of bedrock groundwater impacted with sludge fill chemicals.

4.4.1.2 Bedrock

Chemical data for 14 bedrock groundwater samples (i.e., samples from 7 wells in 2 separate sampling events), including the results of analysis for VOCs, SVOCs and metals, and other geochemical data are summarized in Table 4-9. Concentrations detected above groundwater criteria are discussed for VOCs, SVOCs and metals as follows.

Among VOCs and SVOCs, only one result exceeded groundwater criteria, that for chlorobenzene in one of the two samples collected at MW-4D. The result was 6.8 µg/L (an estimated value), slightly above the groundwater criteria of 5 µg/L.

Metals, as total, were detected above groundwater criteria in several samples. Detected concentrations of these chemicals were as follows:

Arsenic	0.0483 mg/L to < 0.01 mg/L (groundwater criteria of 0.025 mg/L, exceeded at MW-4D2);
Chromium	0.133 mg/L to < 0.01 mg/L (groundwater criteria is 0.05 mg/L, exceeded at MW-2D(R) and MW-4D(R));
Hexavalent Chromium	0.0592 mg/L to <0.01 mg/L (groundwater criteria is 0.05 mg/L, exceeded at MW-2D(R);
Iron	71.4 mg/L to 0.115 mg/L (groundwater criteria is 0.3 mg/L, exceeded everywhere with the exception of MW-2D(R));
Magnesium	107 mg/L to 2.6 mg/L (groundwater criteria is 35 mg/L);
Sodium	1,030 mg/L to 19.7 mg/L (groundwater criteria is 20 mg/L).

Soluble metals concentrations were detected above groundwater criteria at just two locations, MW-1D and MW-4D(R). Iron and sodium levels were elevated compared to groundwater criteria in samples collected from MW-1D and chromium, iron, magnesium and sodium concentrations were elevated in MW-4D(R).

Geochemical conditions were evaluated for bedrock as in the manner described for the overburden. Parameters were used to evaluate the potential presence of chemical constituents from the inactive landfill and to evaluate chemical fate. The geochemical data are presented in Table 4-9. Inorganic compounds detected at concentrations above groundwater criteria in the overburden in the downgradient wells were also present in the bedrock, but at generally lower concentrations. Compounds detected are summarized briefly as follows:

> Ammonia ranged from 353 mg/L to 0.716 mg/L, with greatest concentration at MW-2D(R), and somewhat lower but still elevated levels at MW-4D2, MW-4D(R), and MW–5D;

Nitrate concentrations were either not detected or at trace concentrations (less than 1 mg/L);

Total Kjeldahl Nitrogen ranged from 359 mg/L to 1.29 mg/L, with greatest concentration at MW-2D, and somewhat lower but still elevated levels at MW-4D2, MW-4D(R), and MW–5D;

Alkalinity (bicarbonate) ranged from 2,010 mg/L to 4.67 mg/L, with greatest concentration at MW-2D, MW-4D2, and MW-4D;

Chloride concentrations were in the range of 914 mg/L to 11 mg/L, relatively high compared to the overburden, with the greatest concentrations detected at MW-4D2 and MW-7D;

Total and soluble organic carbons were at their greatest concentration at MW-2D(R) and MW–4D(R), relatively low compared to the overburden, ranging up to 41.7 mg/L and 42.1 mg/L, respectively;

Sulfate concentration ranged from 1,620 mg/L to 2.07 mg/L, with greatest concentrations at MW-5D, and lower but still elevated concentrations at MW-2D(R) and MW-4D(R);

Sulfide concentrations ranged from 9.7 mg/L to <1 mg/L, and were greatest at MW-2D(R) and MW–4D(R);

Dissolved oxygen concentrations ranged from 8.31 mg/L to 0.45 mg/L, and was less than 1 mg/L on average at MW-7D; and

ORP ranged from 202.5 mV to –330.5 mV. ORP was a negative value (indicating the predominance of reducing conditions) at all sampling locations on at least one of the sampling events and was at its lowest at MW-4D(R) and at its highest at MW-8D.

4.4.2 Former Manufacturing Plant Area

Groundwater chemical conditions in the former manufacturing plant area are presented as follows.

4.4.2.1 Overburden

Chemical data for four overburden groundwater samples collected from down gradient wells (i.e., samples from two wells during two separate sampling events) are discussed below. Groundwater is not present in the overburden at the upgradient location MWFP-1D. Analytical results for VOCs, SVOCs and metals, and other geochemical data are summarized in Table 4-10. Concentrations detected above groundwater criteria are discussed for VOCs, SVOCs and metals as follows.

No VOCs were detected above groundwater criteria except for 5.5 µg/L tetrachloroethene (groundwater criteria of 5 µg/L) in the first round of sampling from MWFP-3S. Cis-1,2-dichloroethene was detected at the groundwater criteria of 5 µg/L in the same sample. Chlorinated aliphatic hydrocarbon compounds were also detected in surface soil collected from the boring.

No SVOCs were detected above groundwater criteria.

Metals were detected above groundwater criteria in several samples. Detected concentrations of these chemicals were as follows:

Iron	16 mg/L to 0.535 mg/L (groundwater criteria is 0.3 mg/L);
Manganese	2.08 mg/L to 0.43 mg/L, (groundwater criteria is 0.3 mg/L); and
Sodium	122 mg/L to 9.98 mg/L, (groundwater criteria is 20 mg/L).

Hexavalent chromium was not detected in any of the groundwater samples. As discussed in the discussion of sample QC in Section 2.8, there was matrix interference and consequently some hexavalent chromium data are flagged as unusable (R qualifier). The "matrix interference" is the geochemical condition of the groundwater, in which hexavalent chromium is unstable and rapidly reduces to a lower valence state (i.e., +6 to +3). Therefore, while the sample results are technically unusable based on the low recovery of a matrix spike of hexavalent chromium, this condition indicates the likely real absence of hexavalent chromium in these waters.

Geochemical parameters were used to help evaluate the chemical fate of COPCs and for comparison to geochemical conditions in the inactive landfill area. The geochemical data are presented in Table 4-10, and summarized briefly as follows:

Alkalinity was bicarbonate type, and ranged from 700 to 435;

Chloride concentrations were in the range of 63.5 to 10;

Total and soluble organic carbons were not present at detectable concentrations;

Sulfate concentration ranged from 651 to 301, higher than the low sulfate areas observed in the inactive landfill area;

Sulfide was not present at detectable concentrations;

Dissolved oxygen concentrations ranged from 4.81 to 0.42, and was less than 1 at MW-FP-3S; and

ORP ranged from 82 to –31.6 mV, and was a negative value at MWFP-3S.

4.4.2.2 Bedrock

Chemical data for six bedrock groundwater samples (i.e., samples from three wells during two separate sampling events), including the results of analysis for VOCs, SVOCs and metals, and other geochemical data are summarized in Table 4-11. Concentrations detected above groundwater criteria are discussed for VOCs, SVOCs and metals as follows.

VOCs were detected at concentrations slightly above groundwater criteria at MWFP-2D and –3D. The groundwater samples contained the following VOCs at concentrations above groundwater criteria (results are in µg/L):

Acetone	80 to not detectable, where the groundwater criteria is 50;
Benzene	3.6 (estimated) to not detectable, where the groundwater criteria is 1;
cis-1,2-dichloroethene	8.2 (estimated, detected in just one sample) to not detectable, where the groundwater criteria is 5;
m/p-Xylene	6.4 (estimated, detected in just one sample), where the groundwater criteria is 5; and
Toluene	6.8 (estimated, detected in just one sample) to not detectable; where the groundwater criteria is 5.

SVOCs were not detected at concentrations above the groundwater criteria in any samples.

Metals were detected above groundwater criteria in several samples. Detected concentrations of these chemicals were as follows (in mg/L):

Iron	21.5 to 0.211, where the groundwater criteria is 0.3;
Manganese	2.06 to 0.0446, where the groundwater criteria is 0.3; and
Sodium	352 to 25, where the groundwater criteria is 20.

Geochemical conditions were evaluated for bedrock as in the manner described for the overburden. The geochemical data are presented in Table 4-11, and summarized briefly as follows (concentrations are expressed in units of mg/L):

Alkalinity was bicarbonate type, and ranged from 575 to 187;

Chloride concentrations were in the range of 166 to 22.5;

Total and soluble organic carbons were not present at detectable concentrations, except for 4.92 mg/L soluble organic carbon in one sample from MWFP-3D;

Sulfate concentration ranged from 695 to 45.5, generally lower than the values observed in the bedrock in the inactive landfill area;

Sulfide was not present at detectable concentrations;

Dissolved oxygen concentrations ranged from 2.07 to 0.29, and was less than 1 at MWFP-2D; and

ORP ranged from –3.2 to –223.5 mV.

4.5 SEEPS

Chemical data for six samples of seeps from the inactive landfill area, including the results of analysis of two sets of data from three sampling locations, are summarized in Table 4-12. The chemical conditions of the seeps are presented to support an evaluation of the presence of chemical constituents in the seep water and geochemical conditions relevant to the fate and transport of COPCs. The seeps are frequently associated with white, calcium-rich precipitates visible at the contact between the overburden and bedrock and along bedrock outcrops in the Creek immediately downgradient from the sludge fill disposal area. Ammonia and sulfurous-type odors are frequently noted near the seeps.

No VOCs or SVOCs were detected above surface water criteria in any of the samples from the seeps. Some metals were detected above surface criteria and the results for these metals are summarized as follows (results are in mg/L):

Chromium	0.423 to 0.0949 (all but one sample exceeded the hardness-based surface water criteria of 0.120); and
Iron	4.78 to < 0.1, where the surface water criteria is 0.3.

Among other geochemical parameters, ammonia and sulfide were present at elevated concentrations. Ammonia concentrations ranged from 891 to 381 mg/L, where the surface water criteria was 1.1 to 1.3 mg/L (the guidance value varies between sampling event depending on pH and temperature of the sample). Sulfide concentrations ranged between 9 and < 1 mg/L, where the guidance value was 2 mg/L.

4.6 SURFACE WATER

Chemical data for eight samples of surface water from Cattaraugus Creek near the Site, including the results of analysis of two sets of data from four sampling locations, are summarized in Table 4-13.

No VOCs or SVOCs were detected above guidance values in any of the samples collected from Cattaraugus Creek. The only metal detected above surface water criteria was iron, which was detected at concentrations ranging from 0.47 to 0.126 mg/L, where the guidance value is 0.3 mg/L. Concentrations were detected above guidance values during the second round of sampling only. These results are for total iron. Ferrous iron was not detected in the either field or laboratory analyses. Sulfide, which was detected in seeps from the inactive landfill area at concentrations above guidance values, was not detected above guidance values in Cattaraugus Creek. The ammonia concentration in the Creek Water #4 sample (0.442 mg/L) was slightly over the calculated surface water criteria of 0.440 mg/L during the second sampling event.

4.7 SEDIMENT

Sediment samples were collected from the wetland area north of the Site and from Cattaraugus Creek at locations adjacent to the Site.

4.7.1 Wetland Area

Chemical data for 10 samples of sediment/surface soil from the wetland area, including the results of analysis for VOCs and metals, are summarized in Table 4-14. Low concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in all of the samples. The low concentration of BTEX in the samples is likely the result of urban runoff since a Village storm sewer discharges to the wetland. None of the VOCs were detected at concentrations above soil criteria.

The results of the chemical analysis for metals COPCs are summarized as follows (results in mg/kg):

Arsenic	16.3 to 5.2, where the background value is 12;
Chromium	55.3 to 6.5, where the background value is 40; and
Zinc	290 to 45.7, where the background value is 50.

Hexavalent chromium was not detected in any of the samples.

4.7.2 Cattaraugus Creek

Chemical data for four samples from the sediment in Cattaraugus Creek are summarized in Table 4-15. Trace concentrations (i.e., less than 1 mg/kg) of several VOCs were detected. No SVOCs were detected. Arsenic concentrations (ranging from 6.7J to 9.6J mg/kg) slightly exceeded sediment screening criteria (6 mg/kg) in the four sediment samples. The nickel concentration (18.2 mg/kg) in creek sediment #4 slightly exceeded the sediment criteria of 16 mg/kg. Hexavalent chromium was not detected and total chromium concentrations were not elevated compared to sediment criteria.

5.0 CHEMICAL MIGRATION ASSESSMENT

The results of the chemical analyses were incorporated with the characterization of the physical setting of the Site to evaluate the fate and transport of chemical constituents in Site media. There are a number of mechanisms by which the chemicals can migrate to other areas or media. These mechanisms are briefly outlined below.

Fugitive Dust Generation. Non-volatile chemicals present in soil can be released to ambient air as a result of fugitive dust generation. Although the majority of the facility is covered by vegetation that would prevent the suspension of surface soil particles, there has been some erosion of surface cover.

Volatilization. Volatile chemicals present in soil and groundwater in certain locations may be released to ambient air through volatilization either from or through the soil or fill. Elevated concentrations of volatile organic compounds are present in an isolated areas of soil/fill at the former manufacturing plant area and in landfill gas. Therefore, the release of these chemicals is relevant to the elevated fill area of the Inactive Landfill Area and a small area of the Former Manufacturing Plant Area. VOCs were also detected in groundwater at the Site. Therefore, the groundwater-to-air pathway may be relevant.

Surface Water Runoff. Chemicals present in on-site soil could be released to Cattaraugus Creek and the adjacent wetland area as a result of surface water runoff. However, the thick grasses and abundant plant growth across the site combined with the site's low topographic relief minimize off-site transport via storm water runoff.

Leaching (percolation). Chemicals present in soil may migrate downward to groundwater as a result of infiltration of precipitation. Chemicals from the site have entered the groundwater system on-site. This potential migration pathway is potentially relevant for the Site.

Groundwater Transport. Groundwater underlying the site discharges to Cattaraugus Creek. Seeps have also been observed along the Creek. Chemicals present in groundwater may be transported to surface water and sediment via this pathway.

5.1 AIRBORNE PATHWAYS

Potential migration pathways involving airborne transport include:

- Wind erosion and transport of soil particles and sorbed chemical constituents in fugitive dust emissions.
- Volatilization of chemical constituents from soils localized in the area of MWFP-3S/D in the Former Manufacturing Plant Area and from the sludge fill in the Inactive Landfill Area and subsequent atmospheric dispersion.

5.1.1 Fugitive Dust

Although the Site is well vegetated and a layer of top soil generally covers the Site, a small amount of fugitive dust emission could occur. The potential significance of fugitive dust emission is evaluated in the Baseline Risk Assessment (BRA) (Geomatrix/Benchmark, November 2002).

5.1.2 Volatilization

Volatile chemical constituents present in Site media could volatilize to the atmosphere and be transported off-site. For surface soils, volatilization of chemicals (if present) would be more or less direct into the atmosphere. For subsurface soils, volatilized constituents would have to diffuse through the overlying soil prior to reaching the atmosphere where off-site transport could occur. Volatilization from surface and subsurface soil in the Inactive Landfill Area and Former Manufacturing Plant Area could result in some chemical migration off-site in air. As described in Section 5.3, the landfill gas monitoring well assessment showed that chemicals are present in the landfill gas generated from decomposition of the waste material. Methane, hydrogen sulfide, and several volatile organic compounds were detected in landfill gas samples collected from the gas monitoring well headspace. In fact, the steel protective well casing covers and locks for wells screened in sludge fill appear to be yellow stained and exhibit corrosive effects believed to be the results of hydrogen sulfide gas reacting with condensed moisture. Hand held air monitoring equipment did not measure detectable concentrations of landfill gases in ambient air. However, landfill gases may slowly diffuse through the cover soils that exist over the sludge fill and may be present at very low concentrations. These pathways are evaluated in the BRA (Geomatrix/Benchmark, November 2002).

Volatilization of chemicals from groundwater is not a significant contributor to volatilization and off-site transport since volatile organic compound concentrations in the groundwater are very low. Volatilization of chemicals from groundwater is therefore not a significant pathway for off-site migration.

5.2 WATERBORNE PATHWAYS

Chemicals in surface soils could be potentially transported off-site via storm water runoff. Chemicals in Site soil could also leach and migrate via groundwater to groundwater discharge areas.

5.2.1 Surface Water Runoff

Erosion and transport of surface soils and associated sorbed chemicals in surface water runoff is a potential migration pathway for the Site. The site's low topographic relief, vegetated nature of the Site, and lack of visible evidence of significant erosion minimize off-site transport via storm water runoff across a majority of the Site. A greater potential for off-site transport via storm water runoff exists along the northern and western perimeter of the sludge fill area where the ground surface slopes rapidly toward the creek and the wetland. However, the generally low chemical concentrations in Site surface soils (see Section 5.0) would not result in significant concentrations in storm water and would not substantially affect off-site surface soil or Cattaraugus Creek. Off-site transport in surface water is therefore not considered to be a significant migration pathway.

5.2.2 Groundwater Migration

Groundwater in overburden and bedrock ultimately discharges to Cattaraugus Creek. In Section 3.5, the total groundwater flow rate from the Site (overburden and bedrock) to Cattaraugus Creek is estimated to be approximately 3,050 cubic feet/day. This rate is less than 0.006 percent of the mean annual stream flow in Cattaraugus Creek indicating that chemical concentrations in discharging groundwater would have to be quite high to result in significant degradation of water quality in Cattaraugus Creek.

Major cation-anion hydrochemistry in Site groundwater was evaluated using trilinear diagrams (Piper plots) to evaluate potential hydrochemical facies changes that may occur as groundwater flows across the site and becomes influenced by different geologic media or groundwater having a different hydrochemical signature. Piper plots are presented in Appendix Q.

The Piper plots show a hydrochemical facies shift in overburden groundwater between upgradient and downgradient wells at the Inactive Landfill Area. The hydrochemistry of overburden groundwater shifts from the no dominant cation-anion facies into the calcium-bicarbonate dominant facies. A facies shift in bedrock groundwater hydrochemistry from the sodium/potassium-chloride dominant facies to the calcium-bicarbonate facies was observed for all bedrock wells downgradient of the sludge fill disposal area except MW-4D2. The shift to the calcium-bicarbonate facies indicates overburden groundwater chemistry in the Inactive Landfill Area affects downgradient shallow bedrock groundwater quality. The lack of a facies shift in MW-4D2 groundwater suggests that deeper bedrock groundwater chemistry is minimally affected by chemistry in overburden and shallow bedrock groundwater. The reason for the lack of hydrochemical impact in the deeper bedrock is likely caused by upward vertical hydraulic gradients in the bedrock.

The hydrochemical facies shift observed in groundwater chemistry between samples collected from monitoring wells (both overburden and bedrock) upgradient of the sludge fill disposal area and downgradient wells is caused by migration of chemical constituents from the sludge fill in groundwater. As a result, chemical compounds such as sulfate, ammonia, and dissolved solids are elevated in overburden and shallow bedrock groundwater downgradient from the sludge fill compared to upgradient.

No significant interpretations can be made from the overburden and bedrock hydrochemistry in the Former Manufacturing Plant Area.

Once chemicals enter the groundwater flow system, the chemical environment of the groundwater influences their fate. The anaerobic and reducing conditions in Site groundwater are amenable to reductive dechlorination and degradation of chlorinated aliphatic compounds such as tetrachloroethene and trichloroethene. However, since reductive chemical transformation compounds were not detected, either complete dechlorination occurs or only attenuation processes of dispersion and dilution are important to their chemical fate. In addition, hexavalent chromium is unstable in a reducing environment. In Site groundwater, the hexavalent species are reduced to trivalent species which are not only less toxic but generally less mobile as well (LaGrega et al., 1994).

As described in Section 4.0, organic chemicals were generally not detected in Site overburden and bedrock groundwater. In the few instances where organic chemicals were detected, concentrations were relatively low. Besides phenol and chlorobenzene, no other organic chemical exceeded the guidance value for groundwater by a factor of more than two and none exceeded guidance values by any amount in more than three monitoring wells. Based on the limited distribution and low concentrations present, organic chemicals in groundwater have limited potential for impacting water quality in Cattaraugus Creek. This is evidenced by the results of water samples obtained from Cattaraugus Creek in which no organic chemicals were measured definitively above detection limits. However, the pathway was considered potentially complete for organic chemicals and was addressed in the Baseline Risk Assessment (see Section 6.0).

Several metals exceeded guidance values in overburden and bedrock groundwater. As with organic chemicals, metals concentrations were generally low and of limited distribution. In Site overburden and bedrock groundwater, concentrations of metals in excess of 1 mg/L were limited to iron, calcium, magnesium and sodium. Based on the limited distribution and low concentrations present, metals in groundwater have limited potential for impacting water quality in Cattaraugus Creek. The only metal measured in Cattaraugus Creek above its surface water guidance value was iron. Iron is naturally occurring and was present in the water sample collected upstream of the Site at a concentration of 0.39 mg/L. Although the groundwater to surface water pathway for metals is not likely significant, it was nonetheless evaluated in the Baseline Risk Assessment (see Section 6.0).

The only Site-related chemical for which the groundwater discharge to Cattaraugus Creek has apparently had a measurable impact on water quality is ammonia. Ammonia was detected in Site groundwater more frequently and at higher concentrations than other Site-related chemicals. The reducing condition of Site groundwater allows ammonia to remain relatively stable and mobile. Ammonia conversion to nitrite and nitrate requires oxidizing groundwater conditions. The absence of nitrate and nitrite, combined with the negative ORP values, ferrous iron presence, and low dissolved oxygen concentrations, indicates a strongly reducing environment. Ammonia concentrations measured were as high as approximately 800 mg/L in overburden monitoring wells downgradient of the landfilled sludge fill. Ammonia was not detected in Cattaraugus Creek water samples upgradient of the Inactive Landfill Area and was detected at a maximum concentration of 0.442 mg/L downstream of the Site. The maximum detected level of 0.442 mg/L is approximately equal to the calculated surface water guidance value for ammonia of 0.44 mg/L. Although ammonia is relatively stable in anaerobic groundwater environments, once in the surface water Cattaraugus Creek, nitrification processes likely occur and ammonia will be rapidly assimilated by microorganisms and other aquatic life. Consequently, the attenuation of ammonia in surface water does not present a substantial concern for exceeding surface water guidance levels at locations farther downstream of the Site.

Total sulfide concentrations were also elevated in groundwater downgradient from the Inactive Landfill Area. Sulfide requires anaerobic conditions for chemical stability and is frequently found in the sodium sulfide form in non-acidic, reducing environments. Sulfide was not detected in surface water samples collected downstream from the Inactive Landfill Area.

Because ammonia and sulfide are relatively stable and mobile in Site groundwater, they behave as non-reactive tracers that can be used to assess groundwater flowpaths in the bedrock. Understanding groundwater flowpaths provides insight into the anticipated depth that Site-derived chemicals present in bedrock groundwater downgradient from the Site would be expected to migrate. Figure 5-1 shows sulfide and ammonia concentrations detected in the monitoring well cluster MW-4S(R), MW-4D(R), and MW-4D2. Each well screen is positioned progressively deeper into the groundwater flow system downgradient of the Inactive Landfill Area. As shown in the figure, the concentrations of both stable constituents decrease to barely detectable levels with depth. The rapid reduction in concentration of these stable chemical constituents indicates that groundwater flowpaths are not downward near the Creek. The upward vertical hydraulic gradient observed within the bedrock between wells MW-4D(R) and MW-4D2 and the lack of hydrochemical facies shift in deeper bedrock groundwater support this conclusion. Since groundwater flow paths are upward near the Creek, chemical constituents would not migrate beyond the Creek because the impacted portion of the bedrock groundwater flow system discharges to the Creek.

5.3 COMPLETE EXPOSURE PATHWAYS

Complete exposure pathways are discussed in the Pathways Analysis Report (PAR) and Baseline Risk Assessment (BRA). Based on the analysis of chemical fate and transport provided above, pathways through which Site COPCs could reach receptors at significant exposure point concentrations include:

1. Fugitive Dust Emissions from Site soils
2. Volatilization from Site soils
3. Direct soil contact (for burrowing animals) from Site soils

These exposure pathways, along with direct contact scenarios for visitors, trespassers and future workers were evaluated in the BRA summarized in Section 6.0. Exposure to chemicals in groundwater, although a highly improbable scenario based on current and anticipated Site use, was evaluated in an addendum to the Baseline Risk Assessment.

The table below summarizes the chemical constituents of potential concern (COPCs) for the Inactive Landfill Area and the Former Manufacturing Plant Area established from investigations conducted at the Peter Cooper Gowanda Site. These results were presented in the PAR and evaluated in the BRA. The selection of the chemical constituents was based on potential human chemical exposure from migration mechanisms described above.

Summary of HHRA COPCs

Media	Inactive Landfill Area	Former Manufacturing Plant Area
Surface Soil	**Metals:** Arsenic	**VOCs:** Carbon tetrachloride, Chloroform, Tetrachloroethene, **SVOCs:** Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, Benzo(a,h)anthracene
Subsurface Soil	**Metals:** Arsenic, Chromium III	**VOCs:** Carbon tetrachloride, Chloroform, Tetrachloroethene **SVOCs:** Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, Benzo(a,h)anthracene **Metals:** Lead
Overburden Groundwater	**VOCs:** Benzene, Chlorobenzene **SVOCs:** 4-Methyl phenol **Metals:** Arsenic	**VOCs:** Tetrachloroethene, Trichloroethene **Metals:** Iron, Manganese
Bedrock Groundwater	**Metals:** Arsenic, Iron	**VOCs:** Benzene **Metals:** Manganese
Landfill Seeps	**Metals:** Iron, Arsenic	
Landfill Gas	**VOCs:** Acetone, Carbon disulfide, 2-Butanone, Benzene, 4-Methyl-2-pentanone, Toluene, 1,4-Dichlorobenzene, hydrogen sulfide	
Cattaraugus Creek Surface Water	None	
Cattaraugus Creek Sediments	**Metals:** Arsenic	
Wetland Sediments	**Metals:** Arsenic	

6.0 SUMMARY OF BASELINE RISK ASSESSMENT

Remedial investigation data were used to prepare a baseline risk assessment (BRA) for the Site. The BRA evaluated the potential human health and ecological risks as a result of potential exposure to chemicals in soil, groundwater, and landfill gas at the Peter Cooper Site and in sediment and seep/surface water at Cattaraugus Creek. The BRA was submitted to the USEPA in November 2002 and included a human health risk assessment (HHRA) prepared by Geomatrix and an Ecological Risk Assessment (ERA) prepared by Vanasse Hanglin Brustlin, Inc. The risk assessments provide a conservative estimate of the nature and extent of the potential cancer and noncancer human health risks and potential ecological risks from chemicals in Site media.

The results of the HHRA indicate the following:

- For adult and adolescent trespassers at the landfill, the HIs (0.1 and 0.2, respectively) and carcinogenic risk estimates ($2x10^{-5}$ and $1x10^{-5}$, respectively) are below and within the acceptable risk levels.
- For adult and adolescent trespassers at the FMPA, the HIs (0.06 and 0.2, respectively) and carcinogenic risk estimates ($2x10^{-5}$ and $1x10^{-5}$, respectively) are below and within the acceptable risk levels.
- For the outdoor park worker at the landfill, the HI (4) and carcinogenic risk estimate ($4x10^{-4}$) exceed the acceptable risk levels. However, the risk is primarily attributed to the unlikely pathway associated with ingestion of groundwater underlying the Site, with arsenic in groundwater accounting for the majority of the risk. In the very likely event that ingestion of groundwater is not a complete pathway, the HI (1) and carcinogenic risk estimate of $8x10^{-5}$ are at or within the acceptable risk levels.
- For the outdoor industrial worker at the FMPA, the HI (4) and carcinogenic risk estimate ($4x10^{-4}$) exceed the acceptable risk levels. The primary chemical contributing the most to the risk is arsenic in groundwater. Again, however, the risk is primarily attributed to the unlikely pathway associated with ingestion of groundwater underlying the Site, with arsenic in groundwater accounting for the majority of the risk. In the event that ingestion of groundwater is not a complete pathway, the HI (1) and carcinogenic risk estimate of $9x10^{-5}$ are at or within the acceptable risk levels.
- For the indoor commercial worker at the FMPA, the HI (0.6) and carcinogenic risk estimate ($5x10^{-6}$) are below and within the acceptable risk levels.
- For the construction worker at the landfill, the HI (3) exceeds the acceptable level while the carcinogenic risk estimate ($6x10^{-6}$) is within the acceptable risk range.

Arsenic in soil is the primary chemical contributing to the HI. At the FMPA, the HI (4) exceeds the acceptable level while the carcinogenic risk estimate (5×10^{-6}) is within the acceptable risk range. Chloroform in soil is the primary chemical contributing to the HI. The analytical results indicate that elevated concentrations of chloroform were limited to one location within the FMPA. Potential exposures likely are overestimated. Exposure for the construction worker was related to specific conditions during potential construction over a continuous one-year period. No construction is currently occurring. Appropriate health and safety precautions can be taken to protect workers during future construction, thereby mitigating any potential exposures and health risk. Under the CT scenario, the total HIs at the inactive landfill and FMPA are both 1.

- For the recreational users at the landfill, adult, adolescent, and child, HIs (0.3, 0.6, and 1, respectively) are at or below the acceptable level. The theoretical excess cancer risks to adult, adolescent, and child recreational users (4×10^{-5}, 3×10^{-5}, and 3×10^{-5}, respectively) are within the acceptable risk range.

- For the recreational user at the FMPA, adult, adolescent, and child, HIs (0.2, 0.6, and 1, respectively) are at or below the acceptable level. The theoretical excess cancer risks to adult, adolescent, and child recreational users (4×10^{-5}, 4×10^{-5}, and 3×10^{-5}, respectively) are within the acceptable risk range.

- The estimated theoretical lifetime excess cancer risks and potential noncancer hazard quotients and HIs associated with exposure to the COPCs in soil and groundwater by a future hypothetical resident (adults and children) exceeds acceptable risk levels established by the USEPA. The assessment of human health risk under this scenario was evaluated after the RI Work Plan was reviewed and approved by the USEPA and is provided for informational purposes. Based on historic and current property uses, existing conditions, surrounding land uses and zoning, no residential use of the Site is anticipated in the future.

The results of the ERA indicate the following:

- The estimated theoretical lifetime excess cancer risks the results of the ecological risk assessment for the Peter Cooper Landfill Site indicate no potential ecological risks from organic chemicals of potential ecological concern (COPECs) to fish, terrestrial plants, wetland plants, benthic invertebrates, terrestrial invertebrates, birds, and mink. With limited exception, benthic organisms and fish in Cattaraugus Creek also show no potential ecological risks from inorganic COPECs in creek sediment and surface water, and where potential risks were modeled the associated chemical was present in upstream samples at similar concentration as downstream samples.

- The toxicological food web model used in this assessment suggests that potential ecological risks may result from exposure to organic chemicals (particularly polynuclear aromatic hydrocarbons, or PAHs) for terrestrial mammalian species.

The model similarly suggests potential risks to several measurement endpoint terrestrial biota from one or more of the inorganic chemicals.

- Site re-development plans expressed by the Village of Gowanda, while not final or fully established, will have a substantial negative impact on the ecology of the site. Wildlife and plant species will be displaced as a result of construction equipment use, disruption of site topography and vegetative cover during clearing and regrading, and ongoing human activities. Buildings and parking facilities will prevent re-establishment of vegetative cover for foraging, nesting and burrow. Continued human use of the site following redevelopment will further limit re-population by terrestrial biota. As such, redevelopment can reasonably be expected to cause substantially more harm to the site wildlife community than would individual exposure to chemical constituents detected on the property.

In summary, under the assumptions and conditions presented in this HHRA, the estimated HI and theoretical excess cancer risk are generally below or within the acceptable levels of concern. In those limited instances where the estimated HI and/or theoretical excess cancer risk are outside acceptable levels, the exceedance is attributable to the hypothetical assumption that future groundwater consumption is a complete pathway. Groundwater in the State of New York is classified as "GA", potential potable water supply, unless it has been designated as saline. Groundwater at the Site is not used as a potable water supply and is not likely to be used as such in the future. A municipal potable water supply is available and used by all existing residences and businesses on Palmer Street. Future use of an on-site groundwater pumping well as a potable water source would be unlikely due to inherent hydrogeologic limitations. If the assumptions and/or conditions change, the results of this HHRA may need to be re-evaluated.

7.0 REFERENCES

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TABLES

TABLE 2-1

GROUNDWATER MONITORING WELL, PIEZOMETER, AND GAS MONITORING WELL CONSTRUCTION DETAILS

Peter Cooper Site
Gowanda, New York

Well I.D.	*Installed By:*	*Surface Elevation* [1] *(famsl)*	*Top of Riser (famsl)*	*Total Depth of Boring (ft)*	*Depth of Well (ft)*	*Screened Interval*		*Depth to Bedrock (fbgs)*	*Formation Screened*
						Elevation (famsl)	*Depth (fbgs)*		
Alluvial Deposits									
MW-1SR	O'Brien & Gere Dec-87	778.1	779.62	10.5	10.5	772.6-767.6	5.5-10.5	10.0	sand, gravel
MW-3(R)	Geomatrix Jul-00	768.1	770.70	9.2	9.0	763.6-759.1	4.5-9.0	7.5	silt, sand and gravel
MW-7S	Geomatrix Sep-00	786.1	787.77	16.6	16.5	782.1-769.6	4.0-16.5	not encountered	silt, sand and gravel
MW-8S	Geomatrix Sep-00	778.1	777.44	16.0	16.0	772.1-762.1	6.0-16.0	not encountered	silt, sand and gravel
MWFP-3S	Geomatrix Oct-00	778.5	780.69	11.5	11.5	773.5-767.0	5.0-11.5	11.5	silt, sand and gravel
Fill									
-Cindery Fill									
MW-5(S)	O'Brien & Gere Aug-86	779.1	781.16	17.0	15.0	766.1-764.1	13.0-15.0	approx. 12	sandfill/bedrock
MWFP-2S	Geomatrix Oct-00	784.3	785.17	12.0	12.0	779.3-772.3	5.0-12.0	11.0	cindery fill
-Sludge Fill									
MW-2S(R)	Geomatrix Jul-00	768.2	770.93	8.7	8.5	763.7-759.7	4.5-8.5	7.5	sludge/ fill
MW-4S(R)	Geomatrix Jul-00	765.2	766.97	9.0	9.0	760.7-756.2	4.5-9.0	9.0	sludge/ bedrock
MW-6	O'Brien & Gere Aug-86	781.5	783.58	18.0	18.0	768.5-763.5	13.0-18.0	18.4	silt and sand
Shallow Bedrock									
MW-1D	O'Brien & Gere Aug-86	777.6	779.49	36.9	36.9	745.7-740.7	31.9-36.9	10.0	shale bedrock
MW-2D	O'Brien & Gere Aug-86	781.3	782.82	38.3	38.3	748.0-743.0	33.3-38.3	18.1	shale bedrock
MW-4D(R)	Geomatrix Jul-00	765	766.36	23.0	23.0	747.0-742.0	18.0-23.0	5.5	shale bedrock
MW-5D	Geomatrix Sep-00	779.3	781.04	28.9	28.5	760.8-750.8	18.5-28.5	15.0	shale bedrock
MW-7D	Geomatrix Sep-00	785.8	787.38	35.5	35.5	760.3-750.3	25.5-35.5	19.5	shale bedrock
MW-8D	Geomatrix Sep-00	778.0	777.64	45.0	45.0	743.0-733.0	35.0-45.0	21.0	shale bedrock
MWFP-1D	Geomatrix Oct-00	785.2	787.30	22.5	22.5	772.7-762.7	12.5-22.5	4.5	shale bedrock
MWFP-2D	Geomatrix Oct-00	784.1	786.00	28.0	28.0	766.1-756.1	18.0-28.0	12.5	shale bedrock
MWFP-3D	Geomatrix Oct-00	778.7	780.51	26.5	26.0	762.7-752.7	16.0-26.0	11.5	shale bedrock
Deep Bedrock									
MW-4D2	Geomatrix Sep-00	765.1	766.36	40.5	40.0	735.1-725.1	30.0-40.0	12.5	shale bedrock
Piezometers/Drive Points									
PZ-1	Geomatrix Oct-00	770.0	772.31	14.0	14.0	766.0-756.0	4.0-14.0	not encountered	silt, sand and gravel
DP-1	Geomatrix Oct-00	759.2	761.38	5.0	5.0	756.7-754.7	2.5-4.5	not encountered	--- [2]
Gas Probes									
GMW-1	Geomatrix Oct-00	787.1	787.76	25.0	10.0	784.6-777.1	2.5-10.0	25.4	sludge/ fill
GMW-2	Geomatrix Oct-00	787.1	789.51	24.0	6.0	784.6-781.1	2.5-6.0	23.9	sludge/ fill
GMW-3	Geomatrix Oct-00	788.4	790.31	21.2	8.0	785.4-780.4	3.0-8.0	21.2	sludge/ fill

Notes:
1. Survey completed by TVGA Engineering, Surveying P.C., August 28, 2000.
2. One-inch diameter drive point piezometer. Native silt, sand and gravel assumed.

famsl: = feet above sea level
fbgs: = feet below ground surface

TABLE 2-2

SUMMARY OF QA/QC SAMPLES

Peter Cooper Site
Gowanda, New York

Sample ID	*Sample Media*	*Sample Location*
Matrix Spike/Matrix Spike Duplicates		
081400001	groundwater	MW-4S(R)
110600086	groundwater	MWFP-1D
043001121	groundwater	MW-8S
050101128	groundwater	MWFP-3S
100500010	soil	SB-4
10060020	soil	TP-9
100900038	soil	MWFP-3
101000047	soil	WSS-1
101100068	soil	LFSS-11
110700092	creek sediments	SED-4
Duplicates		
081400002 081400003	groundwater groundwater	MW-3 Duplicate for MW-3
110700088 110700089	groundwater groundwater	MWFP-3S Duplicate of MWFP-3S
050101126 050101127	groundwater groundwater	MWFP-3D Duplicate of MWFP-3D
110700098 110700099	surface water surface water	SW-3 Duplicate of SW-3
050201134 050201133	surface water surface water	SW-1 Duplicate of SW-1
100600015 100600016	soil soil	MWFP-2 Duplicate for MWFP-2
100900040 100900041	soil soil	SB-6 Duplicate for SB-6
100900026 100900027	soil soil	TP-4 Duplicate for TP-4
101000052 101000053	soil soil	WSS-6 Duplicate for WSS-6
101100069 101100063	soil soil	LFSS-6 Duplicate for LFSS-6
110700093 110700094	creek sediments creek sediments	SED-3 Duplicate for SED-3
101200080 101200079	landfill gas landfill gas	GMW-2 Duplicate for GMW-2
Equipment Blanks		
100900044	water	gas well installation
110900113	water	prior to MW-8D gw
050101129	water	prior to MWFP-2D gw
Trip Blanks		
TB110700	water	--
TB110800	water	--
TB110900	water	--
TB111000	water	--
TB043001	water	--
TB050101	water	--
TB050201	water	--
TB050301	water	--

TABLE 2-3

COMPARISON OF QUALITY CONTROL/QUALITY ASSURANCE SAMPLES - GAS MEDIA

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification and Date Collected [1]		
Constituent	*GMW-2 101200080 10/12/00*	*GMW-2 Dup 101200079 10/12/00*	*Relative Percent Difference*
Field Measured Parameters			
Lower Explosive Limit, %	45	NA	NA
Carbon Monoxide, ppm	0	NA	NA
Hydrogen Sulfide Gas, ppm	>1000	NA	NA
Oxygen %, v/v	21.3	NA	NA
PID Measurements, ppm	325	NA	NA
Laboratory Parameters			
Fixed Gases, percent volume per volume			
Carbon Dioxide	0.136	9.9	194.6
Methane	0.145	17.5	196.7
Nitrogen	77.6	57.8	29.2
Oxygen + Argon	22.1	14.8	39.6
Volatile Organic Compounds, micrograms per cubic meter			
1,1,1-Trichloroethane	2 U	25 U	NA
1,1,2,2-Tetrachloroethane	2 U	25 U	NA
1,1,2-Trichloroethane	2 U	25 U	NA
1,1-Dichloroethane	2 U	25 U	NA
1,1-Dichloroethene	2 U	25 U	NA
1,2-Dibromoethane	2 U	25 U	NA
1,2-Dichlorobenzene	2 U	25 U	NA
1,2-Dichloroethane	2 U	25 U	NA
1,2-Dichloropropane	2 U	25 U	NA
1,3-Dichlorobenzene	2 U	25 U	NA
1,4-Dichlorobenzene	2 U	25 U	NA
2-Butanone	43	25 U	NA
2-Hexanone	7	25 U	NA
4-Methyl-2-pentanone	3.4	25 U	NA
Acetone	150	25 U	NA
Benzene	2 U	73	NA
Bromodichloromethane	2 U	25 U	NA
Bromoform	2 U	25 U	NA
Bromomethane	2 U	25 U	NA
Carbon Disulfide	93	3,000	188.0
Carbon Tetrachloride	2 U	25 U	NA
Chlorobenzene	2 U	25 U	NA
Chloroethane	2 U	25 U	NA
Chloroform	2 U	25 U	NA
Chloromethane	2 U	25 U	NA
cis-1,2-Dichloroethene	2 U	25 U	NA
cis-1,3-Dichloropropene	2 U	25 U	NA
Dibromochloromethane	2 U	25 U	NA
Ethylbenzene	3.5	100	186.5
m- & p-Xylenes	3.3	33	163.6
Methyl tert-Butyl Ether	2 U	25 U	NA
Methylene chloride	2 U	25 U	NA
o-Xylene	1.4 TR	25 U	NA
Styrene	2 U	25 U	NA
Tetrachloroethene	2 U	25 U	NA
Toluene	41	830	181.2
trans-1,2-Dichloroethene	2 U	25 U	NA
trans-1,3-Dichloropropene	2 U	25 U	NA
Trichloroethene	2 U	25 U	NA
Trichlorofluoromethane	1.7 TR	25 U	NA
Trichlorotrifluoroethane	2 U	25 U	NA
Vinyl Acetate	14	25 U	NA
Vinyl Chloride	2 U	25 U	NA

Notes:
1. Sample locations shown on Plate 1.
2. Qualifications reflect the 100% data validation performed by Data Validation Services.

NA = Not applicable; RPD cannot be calculated when analyte is qualified with a U or UJ.
ppm = parts per million.
%, v/v = percent volume per volume
TR = trace value
U = none detected at or above the listed detection limit.

TABLE 2-3

COMPARISON OF QUALITY CONTROL/QUALITY ASSURANCE SAMPLES - SOIL MEDIA

Peter Cooper Site
Gowanda, New York

Constituent[2]	*Sample Location, Identification, and Date*[1]								
	TP-4 *10090026* *7'* *10/9/2000*	*TP-4 DUP* *100900027* *7'* *10/9/2000*	*Relative Percent Difference*	*LFSS-6* *101100069* *0-6 in. bgs* *10/11/2000*	*LFSS-6 DUP* *101100063* *0.5-2.5'* *10/06/00*	*Relative Percent Difference*	*WSS-6* *101000052* *10/10/2000*	*WSS-6 DUP* *101000053* *10/10/2000*	*Relative Percent Difference*
Volatile Organic Compounds, milligrams per kilogram									
1,2-Dichlorobenzene	0.011 UJ	0.01 UJ	NA	(0.015) U J R	0.017 UJ	NA	0.018 UJ	0.0045 J	NA
1,4-Dichlorobenzene	0.011 UJ	0.01 UJ	NA	(0.015) U J R	0.017 UJ	NA	0.018 UJ	0.16 UJ	NA
Benzene	0.0025 J	0.0014 UJ	NA	0.0029 J	0.017 UJ	NA	0.004 J	0.16 UJ	NA
Chlorobenzene	0.011 UJ	0.01 UJ	NA	0.015 U J	0.017 UJ	NA	0.018 UJ	0.16 UJ	NA
Ethylbenzene	0.011 UJ	0.01 UJ	NA	0.015 U J	0.017 UJ	NA	0.018 UJ	0.16 UJ	NA
m-/p-Xylene	0.0036 J	0.0017 UJ	NA	0.015 U J	0.017 UJ	NA	0.0053 J	0.0096 J	57.7
o-Xylene	0.011 UJ	0.01 UJ	NA	0.015 U J	0.017 UJ	NA	0.018 U	0.0062 J	NA
Toluene	0.0054 J	0.0032 UJ	NA	0.015 U J	0.017 UJ	NA	0.0082 J	0.002 J	121.6
Metals, milligrams per kilogram									
Arsenic	4.3	5.9	31.4	919	1140	21.5	15.7	9.8	46.3
Chromium	10.3 J	11.4 J	10.1	341	368	7.6	45.7	37.9	18.7
Hexavalent Chromium	4.78 U	4.74 U	NA	5.17 U	5.08 U	NA	5.87 U	5.8 U	NA
Zinc	57.3	63.1	9.6	165	230	32.9	136	82.6	48.9
Others									
Percent Solids	83.7	84.3	0.7	77.3	78.7 UJ	NA	68.2	69	1.2
pH	8.35	8.44	1.1	5	6.82 UJ	NA	7.74	7.74	0.0
Total Organic Carbon	0.1 UJ	0.62	NA	6.61	4.9 J	2.0	2.70	2.8	3.6

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.

NA = Not applicable: RPD cannot be calculated when analyte is qualified with a U or UJ.

UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitiation necessary to accurately and precisely measure the compound in the sample.

J = indicates an estimated value.

U = indicates compound was not detected at or above the listed detection limit.

D = indicates spike diluted out.

E = indicates compound concentrations exceed calibration range.

TABLE 2-3

COMPARISON OF QUALITY CONTROL/QUALITY ASSURANCE SAMPLES - SOIL MEDIA

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification, and Date[1]								
Constituent[2]	***SB-6*** ***100900040*** ***4-6'*** ***10/9/2000***	***SB-6 DUP*** ***100900041*** ***4-6'*** ***10/9/2000***	***Relative Percent Difference***	***MWFP-2*** ***100600015*** ***0.5-2.5'*** ***10/06/00***	***MWFP-2 DUP*** ***100600016*** ***0.5-2.5'*** ***10/06/00***	***Relative Percent Difference***	***Creek Sed. #3*** ***110700093*** ***0-3 inches*** ***11/7/2000***	***Creek Sed. #3 DUP*** ***110700094*** ***0-3 inches*** ***11/7/2000***	***Relative Percent Difference***
Volatile Organic Compounds, milligrams per kilogram									
1,1,1-Trichloroethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,1,2,2-Tetrachloroethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,1,2-Trichloro-1,2,2-Tricfluoroethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,1,2-Trichloroethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,1-Dichloroethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,1-Dichloroethene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,2,4-Trichlorobenzene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,2-Dibromo-3-Chloropropane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,2-Dibromoethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,2-Dichlorobenzene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,2-Dichloroethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,2-Dichloropropane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,3-Dichlorobenzene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
1,4-Dichlorobenzene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
2-Butanone (MEK)	0.026 J	0.019 J	31.1	0.022 UJ	0.094 J	NA	0.011 U	0.013 U	NA
2-Hexanone	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
4-Methyl-2-Pentanone	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Acetone	0.14 J	0.093 J	40.3	0.056 J	0.064 J	13.3	0.019	0.026	31.1
Benzene	0.013 UJ	0.013 UJ	NA	0.0076 J	0.0039 J	64.3	0.0015 J	0.0018 J	18.2
Bromodichloromethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Bromoform	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Bromomethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Carbon Disulfide	0.024 J	0.027 J	11.8	0.01 J	0.045 J	127.3	0.019	0.017	11.1
Carbon Tetrachloride	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Chlorobenzene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Chloroethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Chloroform	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Chloromethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
cis-1,2-Dichloroethene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
cis-1,3-Dichloropropene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Cyclohexane	0.013 UJ	0.013 UJ	NA	0.0095 J	0.0098 J	3.1	0.0022 J	0.0026 J	16.7
Dibromochloromethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Dichlorodifluoromethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Ethylbenzene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Isopropylbenzene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 J	NA	0.011 U	0.013 U	NA
m-/p-Xylene	0.013 UJ	0.013 UJ	NA	0.0071 J	0.0042 J	51.3	0.0015 J	0.0018 J	18.2
Methyl Acetate	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Methyl tert-Butyl Ether	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Methylcyclohexane	0.0082 J	0.0056 J	37.7	0.015 J	0.011 J	30.8	0.0033 J	0.004 J	19.2

TABLE 2-3

COMPARISON OF QUALITY CONTROL/QUALITY ASSURANCE SAMPLES - SOIL MEDIA

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification, and Date[1]								
Constituent[2]	*SB-6* *100900040* *4-6'* *10/9/2000*	*SB-6 DUP* *100900041* *4-6'* *10/9/2000*	*Relative Percent Difference*	*MWFP-2* *100600015* *0.5-2.5'* *10/06/00*	*MWFP-2 DUP* *100600016* *0.5-2.5'* *10/06/00*	*Relative Percent Difference*	*Creek Sed. #3* *110700093* *0-3 inches* *11/7/2000*	*Creek Sed. #3 DUP* *110700094* *0-3 inches* *11/7/2000*	*Relative Percent Difference*
Methylene Chloride	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
o-Xylene	0.013 UJ	0.013 UJ	NA	0.0039 J	0.0026 J	40.0	0.011 U	0.013 U	NA
Styrene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Tetrachloroethene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Toluene	0.09 J	0.047 J	62.8	0.015 J	0.0061 J	84.4	0.0045 J	0.0047 J	4.3
trans-1,2-Dichloroethene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
trans-1,3-Dichloropropene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 U	NA	0.011 U	0.013 U	NA
Trichloroethene	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.0036 J	NA	0.011 U	0.013 U	NA
Trichlorofluoromethane	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Vinyl Chloride	0.013 UJ	0.013 UJ	NA	0.022 UJ	0.016 UJ	NA	0.011 U	0.013 U	NA
Semi-Volatile Organic Compounds, miligrams per kilogram									
Acenaphthene	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
1,1-Biphenyl	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2,2-oxybis(1-chloropropane)	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2,4,5-Trichlorophenol	1 U	1 U	NA	1.1 U	0.99 U	NA	1 U	1 U	NA
2,4,6-Trichlorophenol	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2,4-Dichlorophenol	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2,4-Dimethylphenol	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2,4-Dinitrophenol	1 U	1 U	NA	1.1 U	0.99 U	NA	1 U	1 U	NA
2,4-Dinitrotoluene	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2,6-Dinitrotoluene	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2-Chloronaphthalene	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2-Chlorophenol	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2-Methylnaphthalene	0.043 J	0.042 J	2.4	0.083 J	0.082 J	1.2	0.4 U	0.4 U	NA
2-Methylphenol	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
2-Nitroaniline	1 U	1 U	NA	1.1 U	0.99 U	NA	1 U	1 U	NA
2-Nitrophenol	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
3,3-Dichlorobenzidine	R	R	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
3-Nitroaniline	R	R	NA	R	R	NA	1 U	1 U	NA
4,6-Dinitro-2-Methylphenol	1 U	1 U	NA	1.1 U	0.99 U	NA	1 U	1 U	NA
4-Bromophenyl-Phenylether	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
4-Chloro-3-Methylphenol	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
4-Chloroaniline	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
4-Chlorophenyl-Phenylether	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
4-Methylphenol	0.47	0.42	11.2	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
4-Nitroaniline	1 U	1 U	NA	1.1 U	0.99 U	NA	1 U	1 U	NA
4-Nitrophenol	1 U	1 U	NA	1.1 U	0.99 U	NA	1 U	1 U	NA
Acenaphthylene	0.4 U	0.41 U	NA	0.29 J	0.39 U	NA	0.4 U	0.4 U	NA
Acetophenone	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Anthracene	0.4 U	0.41 U	NA	0.24 J	0.083 J	97.2	0.4 U	0.4 U	NA
Atrazine	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA

TABLE 2-3

COMPARISON OF QUALITY CONTROL/QUALITY ASSURANCE SAMPLES - SOIL MEDIA

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification, and Date [1]								
Constituent [2]	*SB-6 100900040 4-6' 10/9/2000*	*SB-6 DUP 100900041 4-6' 10/9/2000*	*Relative Percent Difference*	*MWFP-2 100600015 0.5-2.5' 10/06/00*	*MWFP-2 DUP 100600016 0.5-2.5' 10/06/00*	*Relative Percent Difference*	*Creek Sed. #3 110700093 0-3 inches 11/7/2000*	*Creek Sed. #3 DUP 110700094 0-3 inches 11/7/2000*	*Relative Percent Difference*
Benzaldehyde	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 UJ	0.4 UJ	NA
Benzo(a)anthracene	0.4 U	0.41 U	NA	0.47	0.23 J	68.6	0.4 U	0.4 UJ	NA
Benzo(a)pyrene	0.4 U	0.41 U	NA	0.46	0.23 J	66.7	0.4 U	0.4 U	NA
Benzo(b)fluoranthene	0.4 U	0.41 U	NA	0.3 J	0.18 J	50.0	0.4 U	0.4 UJ	NA
Benzo(g,h,i)perylene	0.4 U	0.41 U	NA	0.33 J	0.17 J	64.0	0.4 U	0.4 UJ	NA
Benzo(k)fluoranthene	0.4 U	0.41 U	NA	0.38 J	0.14 J	92.3	0.4 U	0.4 UJ	NA
bis(2-chloroethoxy)methane	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
bis(2-chloroethyl)ether	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
bis(2-Ethylhexyl)phthalate	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Butyl Benzyl Phthalate	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Caprolactam	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Carbazole	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Chrysene	0.058 J	0.41 U	NA	0.6	0.26 J	79.1	0.4 U	0.4 U	NA
Dibenzo(a,h)anthracene	0.4 U	0.41 U	NA	0.13 J	0.051 J	87.3	0.4 U	0.4 UJ	NA
Dibenzofuran	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Diethylphthalate	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Dimethyl Phthalate	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
di-N-Butylphthalate	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
di-n-Octyl Phthalate	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 UJ	NA
Fluoranthene	0.073 J	0.072 J	1.4	0.62	0.31 J	66.7	0.4 U	0.4 U	NA
Fluorene	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Hexachlorobenzene	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Hexachlorobutadiene	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Hexachlorocyclopentadiene	2 U	2 U	NA	0.42 U	0.39 U	NA	0.4 UJ	0.4 UJ	NA
Hexachloroethane	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Indeno(1,2,3-cd)pyrene	0.4 U	0.41 U	NA	0.27 J	0.12 J	76.9	0.4 U	0.4 UJ	NA
Isophorone	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Naphthalene	0.37 J	0.32 J	14.5	0.044 J	0.063 J	35.5	0.4 U	0.4 U	NA
Nitrobenzene	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
n-Nitroso-di-n-Propylamine	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
n-Nitrosodiphenylamine	0.4 U	0.41 U	NA	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Pentachlorophenol	1 U	1 U	NA	1.1 U	0.99 U	NA	1 U	1 U	NA
Phenanthrene	0.088 J	0.073 J	18.6	0.3 J	0.14 J	72.7	0.4 U	0.4 U	NA
Phenol	0.36 J	0.27 J	28.6	0.42 U	0.39 U	NA	0.4 U	0.4 U	NA
Pyrene	0.072 J	0.058 J	21.5	0.86	0.41	70.9	0.4 U	0.4 U	NA
Metals, milligrams per kilogram									
Aluminum	6310	7230	13.6	6490	6420	1.1	5730	5150	10.7
Antimony	7.1 UJ	7.2 UJ	NA	7.6 UJ	7.1 UJ	NA	7 UJ	7.01 UJ	NA
Arsenic	6.1	6.2	1.6	29.9	57.9	63.8	7.1 J	6.3 J	11.9
Barium	54.8	61.3	11.2	64.2	99.3	42.9	38.6	34.8	10.4
Beryllium	0.59 UJ	0.6 U	NA	0.87	1.2	31.9	0.58 U	0.58 U	NA
Cadmium	0.59 UJ	0.6 U	NA	0.64 U	0.59 U	NA	0.58 U	0.58 U	NA

TABLE 2-3

COMPARISON OF QUALITY CONTROL/QUALITY ASSURANCE SAMPLES - SOIL MEDIA

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification, and Date[1]								
Constituent[2]	*SB-6 100900040 4-6' 10/9/2000*	*SB-6 DUP 100900041 4-6' 10/9/2000*	*Relative Percent Difference*	*MWFP-2 100600015 0.5-2.5' 10/06/00*	*MWFP-2 DUP 100600016 0.5-2.5' 10/06/00*	*Relative Percent Difference*	*Creek Sed. #3 110700093 0-3 inches 11/7/2000*	*Creek Sed. #3 DUP 110700094 0-3 inches 11/7/2000*	*Relative Percent Difference*
Calcium	14200	24100	51.7	2490 J	25100 J	163.9	11700	11000	6.2
Chromium	9	11.5	24.4	198 J	57.4 J	110.1	7.1	6.3	11.9
Cobalt	7.5	9.4	22.5	7.1	6.1	15.2	6.7	6.1	9.4
Copper	19	19.6	3.1	29.3	20.2	36.8	13.9	15.3	9.6
Hexavalent Chromium	4.81 U	4.97 U	NA	5.08 UJ	4.77 UJ	NA	4.85 U	4.86 U	NA
Iron	17600 J	20600 J	15.7	18900	14800	24.3	16900	15100	11.3
Lead	8.8	8.7	1.1	41 J	28.5 J	36.0	8.8	7.3	18.6
Magnesium	3070	3500	13.1	1730	4330	85.8	3160	4410	33.0
Manganese	351	554	44.9	160	306	62.7	401	306	26.9
Mercury	0.17	0.13	26.7	0.16 J	0.06 UJ	NA	0.06 U	0.06 U	NA
Nickel	16	21.1	27.5	17.9	14.8	19.0	15.5	13.7	12.3
Potassium	516	486	6.0	542	728	29.3	617	545	12.4
Selenium	2 J	1.9 J	5.1	2.7	2.5	7.7	0.58 U	0.74	NA
Silver	1.2 U	1.2 U	NA	1.3 U	1.2 U	NA	1.17 UJ	1.2 UJ	NA
Sodium	757	829	9.1	411	459	11.0	240	296	20.9
Thallium	1.2 U	1.2 U	NA	1.3 U	1.2 U	NA	1.2 U	1.2 U	NA
Vanadium	12.4	14.7	17.0	15.3	14.3	6.8	12.2	11.6	5.0
Zinc	69.6	77.1	10.2	84.6 J	64.2 J	27.4	47.1	41.8	11.9
Others									
Percent Solids, %	83.1	80.5	3.2	78.7	83.9	6.4	82.5	82.3	0.2
pH	10.1	10	1.0	7.7	8.13	5.4	8.21	8.08	1.6
Total Organic Carbon, %	1.3	2	42.4	1.7	1.3	26.7	0.1 U	0.1 U	NA

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.

NA = Not applicable; RPD cannot be calculated when analyte is qualified with a U or UJ.

UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitiation necessary to accurately and precisely measure the compound in the sample.

J = indicates an estimated value.

U = indicates compound was not detected at or above the listed detection limit.

D = indicates spike diluted out.

E = indicates compound concentrations exceed calibration range.

TABLE 2-3

COMPARISON OF QUALTIY CONTROL/QUALITY ASSURANCE SAMPLES - WATER MEDIA

Peter Cooper Site
Gowanda, New York

Constituent[2]	Sample Location, Identification and Date Collected[1]														
	Creek Water #1 050201134 5/2/2001	Creek Water #1 DUP 050201133 5/2/2001	Relative Percent Difference	Creek Water #3 110700098 11/7/2000	Creek Water #3 DUP 110700099 11/7/2000	Relative Percent Difference	MWFP-3S 110700088 11/7/2000	MWFP-3S DUP 110700089 11/7/2000	Relative Percent Difference	MWFP-3D 050101126 5/1/2001	MWFP-3D DUP 050101127 5/1/2001	Relative Percent Difference	MW-5D 50301141 5/3/2001	MW-5D DUP 050301142 5/3/2001	Relative Percent Difference
Volatile Organic Compounds, micrograms per liter															
1,1,1-Trichloroethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloro-1,2,2-Trifluoroethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	10 U	10 U	NA	2.0 J	2.1 J	4.9	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	10 U	10 U	NA
1,2-Dichloroethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	10 U	10 U	NA
2-Butanone (MEK)	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	10 U	4.0 J	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Benzene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	1.2 J	1.5 J	22.2	10 U	10 U	NA
Bromodichloromethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA
Chlorobenzene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	10 U	10 U	NA
Chloroethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Chloroform	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA
Chloromethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	NA	NA	NA	10 U	10 U	NA	5.0 J	5.1 J	2.0	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	10 U	10 U	NA
Isopropylbenzene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
m-/p-Xylene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	10 U	10 U	NA
Methyl Acetate	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Methyl tert-Butyl Ether	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
o-Xylene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	10 U	10 U	NA
Styrene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	10 U	10 U	NA	10 U	10 U	NA	5.5 J	5.6 J	1.8	10 U	10 U	NA	NA	NA	NA
Toluene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	10 U	10 U	NA
trans-1,2-Dichloroethene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	10 U	10 U	NA	10 U	10 U	NA	2.9 J	2.2 J	27.5	10 U	10 U	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds, micrograms per liter															
1,1-Biphenyl	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
2,2-oxybis(1-chloropropane)	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	26 U	25	NA	25 U	25 U	NA	25 U	R	NA	NA	NA	NA	24 U	24 U	NA
2,4,6-Trichlorophenol	10 U	10	NA	10 U	10 U	NA	10 U	R	NA	NA	NA	NA	9.4 U	9.4 U	NA
2,4-Dichlorophenol	10 U	10 U	NA	10 U	10 U	NA	10 U	R	NA	NA	NA	NA	9.4 U	9.4 U	NA
2,4-Dimethylphenol	10 U	10 U	NA	10 U	10 U	NA	10 U	R	NA	NA	NA	NA	9.4 U	9.4 U	NA
2,4-Dinitrophenol	26 U	25 U	NA	25 U	25 U	NA	25 U	R	NA	NA	NA	NA	24 U	24 U	NA
2,4-Dinitrotoluene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA

TABLE 2-3

COMPARISON OF QUALTIY CONTROL/QUALITY ASSURANCE SAMPLES - WATER MEDIA

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification and Date Collected[1]														
Constituent[2]	*Creek Water #1* *050201134* *5/2/2001*	*Creek Water #1 DUP* *050201133* *5/2/2001*	*Relative Percent Difference*	*Creek Water #3* *110700098* *11/7/2000*	*Creek Water #3 DUP* *110700099* *11/7/2000*	*Relative Percent Difference*	*MWFP-3S* *110700088* *11/7/2000*	*MWFP-3S DUP* *110700089* *11/7/2000*	*Relative Percent Difference*	*MWFP-3D* *050101126* *5/1/2001*	*MWFP-3D DUP* *050101127* *5/1/2001*	*Relative Percent Difference*	*MW-5D* *50301141* *5/3/2001*	*MW-5D DUP* *050301142* *5/3/2001*	*Relative Percent Difference*
2-Chloronaphthalene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	10 U	10 U	NA	10 U	10 U	NA	10 U	R	NA	NA	NA	NA	9.4 U	9.4 U	NA
2-Methylnaphthalene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	10 U	10 U	NA	10 U	10 U	NA	10 U	R	NA	NA	NA	NA	9.4 U	9.4 U	NA
2-Nitroaniline	NA	NA	NA	25 U	25 U	NA	25 U	25 U	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	10 U	10 U	NA	10 U	10 U	NA	10 U	R	NA	NA	NA	NA	9.4 U	9.4 U	NA
3,3-Dichlorobenzidine	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	25 U	25 U	NA	25 U	25 U	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-Methylphenol	26 U	25 U	NA	25 U	25 U	NA	25 U	R	NA	NA	NA	NA	24 U	24 U	NA
4-Bromophenyl-Phenylether	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-Methylphenol	10 U	10 U	NA	10 U	10 U	NA	10 U	R	NA	NA	NA	NA	9.4 U	9.4 U	NA
4-Chloroaniline	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-Phenylether	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	10 U	10 U	NA	10 U	10 U	NA	10 U	R	NA	NA	NA	NA	9.4 U	9.4 U	NA
4-Nitroaniline	NA	NA	NA	25 U	25 U	NA	25 U	25 U	NA	NA	NA	NA	NA	NA	NA
4-Nitrophenol	26 U	25 U	NA	25 U	25 U	NA	25 U	R	NA	NA	NA	NA	24 U	24 U	NA
Acenaphthene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Anthracene	*NA*	*NA*	*NA*	*10 U*	*10 U*	*NA*	*10 U*	*10 U*	NA	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	9.4 U	9.4 U	NA	NA	NA	NA
Benzo(a)pyrene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	9.4 U	9.4 U	NA	NA	NA	NA
Benzo(b)fluoranthene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	9.4 U	9.4 U	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
bis(2-chloroethoxy)methane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
bis(2-chloroethyl)ether	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Butyl Benzyl Phthalate	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	9.4 U	9.4 U	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Dimethyl Phthalate	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
di-N-Butylphthalate	NA	NA	NA	10 U	10 U	NA	1.1 J	10 U	NA	NA	NA	NA	NA	NA	NA
di-n-Octyl Phthalate	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	10 U	10 U	NA	10 U	10 U	NA	10 U	10 U	NA	9.4 U	9.4 U	NA	NA	NA	NA
Isophorone	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-Propylamine	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol[4]	26 U	25 U	NA	25 U	25 U	NA	25 U	R	NA	NA	NA	NA	24 U	24 U	NA
Phenanthrene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Phenol	10 U	10 U	NA	10 U	10 U	NA	10 U	R	NA	NA	NA	NA	9.4 U	9.4 U	NA
Pyrene	NA	NA	NA	10 U	10 U	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA
Metals, milligrams per liter															
Aluminum	NA	NA	NA	0.1 U	0.1 U	NA	0.406	0.557	31.4	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	0.06 U	0.06 U	NA	0.06 U	0.06 U	NA	NA	NA	NA	NA	NA	NA
Arsenic	0.01 U	0.01 U	NA	0.01 U	0.01 U	NA	0.01 U	0.01 U	NA	NA	NA	NA	0.01 U	0.01 U	NA
Barium	NA	NA	NA	0.618	0.0631	162.9	0.103	0.0996	3.4	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	NA	NA	NA	NA	NA	NA

TABLE 2-3

COMPARISON OF QUALTIY CONTROL/QUALITY ASSURANCE SAMPLES - WATER MEDIA

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification and Date Collected[1]														
Constituent[2]	*Creek Water #1 050201134 5/2/2001*	*Creek Water #1 DUP 050201133 5/2/2001*	*Relative Percent Difference*	*Creek Water #3 110700098 11/7/2000*	*Creek Water #3 DUP 110700099 11/7/2000*	*Relative Percent Difference*	*MWFP-3S 110700088 11/7/2000*	*MWFP-3S DUP 110700089 11/7/2000*	*Relative Percent Difference*	*MWFP-3D 050101126 5/1/2001*	*MWFP-3D DUP 050101127 5/1/2001*	*Relative Percent Difference*	*MW-5D 50301141 5/3/2001*	*MW-5D DUP 050301142 5/3/2001*	*Relative Percent Difference*
Cadmium	NA	NA	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	NA	NA	NA	NA	NA	NA
Calcium	51.8	54.1	4.3	58.3	57.6	1.2	360	344	4.5	348	NA	NA	586	NA	NA
Chromium	0.01 U	0.01	NA	0.01 U	0.01 U	NA	0.01 U	0.01 U	NA	0.01 U	0.01 U	NA	0.01 U	0.01 U	NA
Cobalt	NA	NA	NA	0.05 U	0.05 U	NA	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	0.02 U	0.02 U	NA	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA
Hexavalent Chromium	(0.01) R	(0.01) R	NA	0.01 U	0.01 U	NA	0.01 U	0.01 U	NA	(0.01) R	(0.01) R	NA	(0.01) U	(0.01) U	NA
Iron	0.39	0.413	5.7	0.143	0.134	6.5	16	14.8	7.8	17.7	17.6	0.6	71.4	NA	NA
Lead	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	0.005 U	0.005 U	NA	NA	NA	NA
Magnesium	9.25	9.37	1.3	9.88	10	1.2	17.5	16.7	4.7	17.9	NA	NA	35.4	NA	NA
Manganese	0.0161	0.0165	2.5	0.0129	0.0131	1.5	2.08	2.24	7.4	1.96	1.96	0.0	NA	NA	NA
Mercury	NA	NA	NA	0.0003 U	0.0003 U	NA	0.0003 U	0.0003 U	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	0.04 U	0.04 U	NA	0.04 U	0.04 U	NA	NA	NA	NA	NA	NA	NA
Potassium	2 U	2 U	NA	2 U	2 U	NA	6.6	6.63	0.5	5.68	5.68	0.0	2076	NA	NA
Selenium	NA	NA	NA	0.005 U	0.005 U	NA	0.0061	0.005 U	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	0.01 U	0.01 U	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	13.4	13.2	1.5	122	115	5.9	78.9	NA	NA	27	NA	NA
Thallium	NA	NA	NA	0.01 U	0.01 U	NA	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	0.05 U	0.05 U	NA	0.05 U	0.05 U	NA	NA	NA	NA	NA	NA	NA
Zinc	0.02 U	0.02 U	NA	0.02 U	0.02 U	NA	0.0551	0.0412	28.9	NA	NA	NA	0.02 U	22.6	NA
Soluble Metals, milligrams per liter															
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U	NA	NA	NA	NA
Hexavalent Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	(0.01) R	(0.01) R	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	16.4	16	0.6	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005 U	0.005 U	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.89	1.9	0.5	NA	NA	NA
Other Geochemical Parameters, milligrams per liter															
Ammonia	0.05 U	0.05 U	NA	0.234	0.234	0.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bicarbonate Alkalinity	270 J	112 J	82.7	164	164	0.0	558	550	1.4	480	NA	NA	NA	NA	NA
Carbonate Alkalinity	2 U	2 U	NA	2 U	2 U	NA	-2 U	-2 U	NA	-2 U	NA	NA	NA	NA	NA
Chloride	26.4	26.5	0.4	23.4	22.8	2.6	NA	NA	NA	77.7	NA	NA	NA	NA	NA
Ferrous Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate Nitrogen	1.07	1.04	2.8	1.81	1.79	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Soluble Organic Carbon	NA	NA	NA	NA	NA	NA	5.41 U	5.42 U	NA	4.92	NA	NA	NA	NA	NA
Sulfate	24.8	24.7	0.4	27.5	27.6	0.4	651	631	3.1	544	NA	NA	NA	NA	NA
Total Alkalinity	270 J	112 J	82.7	164	164	0.0	558	550	1.4	480	NA	NA	NA	NA	NA
Total Dissolved Solids	216	215	0.5	249	254	2.0	1570	1590	1.3	1350	NA	NA	NA	NA	NA
Total Hardness	166	165	0.6	195	191	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Kjeldahl Nitrogen	0.345	0.281	20.4	0.417	0.239	54.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	1.67	1.73	3.8	2.14	1.99	7.2	5.19 U	5.23 U	NA	4.36 U	NA	NA	NA	NA	NA
Total Sulfide	2 UJ	2 UJ	NA	1 U	1 U	NA	-1.1 U	-1.1 U	NA	-2 UJ	NA	NA	NA	NA	NA
Total Suspended Solids	6.6	6.4	3.1	1.30 J	2.76 J	71.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turbidity, NTU	NA	NA	NA	NA	NA	NA	NA	NA	NA	79.7	51.4	35.5	NA	NA	NA

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.

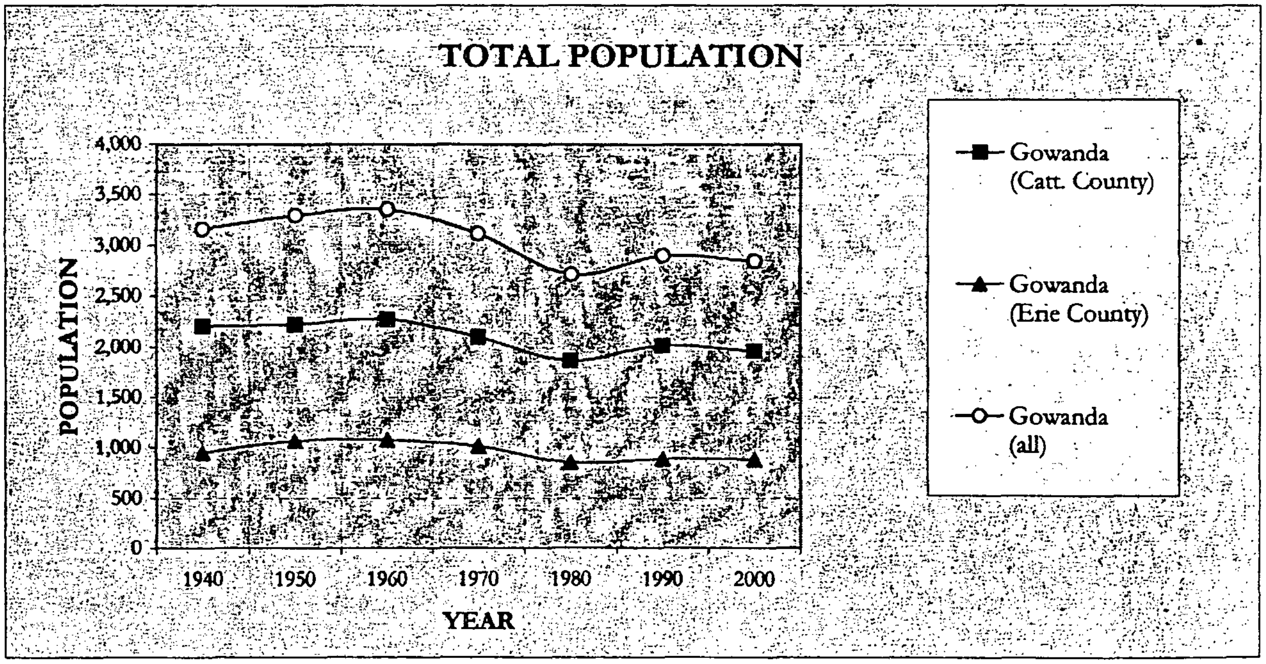
J = indicates an estimated value.
U = indicates compound was not detected at or above the listed detection limit.
R= indicates value was rejected by data validator.
UJ = indicates compound was not detected above the listed detection limit.
However, the reported quantitation limit is approximate and may or may
not represent the actual limit of quantitiation necessary to accurately
and precisely measure the compound in the sample.
NA = Not applicable; RPD cannot be calculated when analyte is qualified with a U or UJ.
NTU = Nephelometric Turbidity Unit

TABLE 3-1

VILLAGE OF GOWANDA
POPULATION - 1940 TO 2000 [1]

Peter Cooper Site
Gowanda, New York

Year	*Gowanda (Catt. County)*	*Gowanda (Erie County)*	*Gowanda (all)*
1940	2,206	950	3,156
1950	2,221	1,068	3,289
1960	2,273	1,079	3,352
1970	2,098	1,012	3,110
1980	1,864	849	2,713
1990	2,016	885	2,901
2000	1,961	881	2,842



Notes:

1. Population data obtained from United States Census Bureau.

TABLE 3-2

VILLAGE OF GOWANDA AND SURROUNDING TOWNSHIPS
POPULATION 1990 - 2000

Peter Cooper Site
Gowanda, New York

Towns (includes Villages)	*Population* [1]		
Census Year	*1990*	*2000*	*change*
Cattaraugus County			
Ashford	2162	2223	61
Dayton	1931	1945	14
East Otto	981	1105	124
Otto	799	831	32
Perrysburg	1838	1771	(67)
Persia	2514	2512	(2)
Erie County			
Brant	2119	1906	(213)
Collins [2,3]	6020	8307	2287
Collins (less V. of Gowanda & CC Facility)	4250	3512	(738)
Concord	8387	8526	139
North Collins	3502	3376	(126)
Cattaraugus Indian Reservation	1789	2001	212
TOTAL	**32,042**	**34,503**	**2,461**

Notes:

1. Population data obtained from United States Census Bureau.
2. The Town of Collins 1990 population data includes data for population in group quarters (i.e., Collins Correctional Facility, pop. 885) and the Village of Gowanda population within Erie County (pop. 885).
3. The Town of Collins 2000 population data includes data for population in group quarters (i.e., Collins Correctional Facility, pop. 3,914) and the Village of Gowanda population within Erie County (pop. 881).

TABLE 3-3

STRATIFICATION SUMMARY

Peter Cooper Site
Gowanda, New York

Boring Number	*Surface Elevation (fmsl)*	*Cover Soil [(1)] Thickness (ft)*	*Fill [(2)] Thickness (ft)*	*Alluvial Deposit [(3)] Thickness (ft)*	*Top of Bedrock*	
					Elevation (fmsl)	*Depth (ft)*
Unit Screened: Alluvial Deposits						
MW-1S	778.1	not encountered	not encountered	10.0	768.1	10.0
MW-3(R)	768.1	0.5	3.5	3.5	760.6	7.5
MW-7S	786.1	2.5	3.5	10.0	not encountered	not encountered
MW-8S	778.1	not encountered	8.5	10.0	not encountered	not encountered
MWFP-3S	778.5	0.5	3.5	7.5	767.0	11.5
Unit Screened: Fill *-Cindery Fill*						
MW-5S	779.1	0.5	11.5*	not encountered	764.1	12.0
MWFP-2S	784.3	0.2	10.8	not encountered	773.3	11.0
-Sludge Fill						
MW-2S(R)	768.2	2.0	5.5	not encountered	760.7	7.5
MW-4S(R)	765.2	0.5	5.0	not encountered	759.7	5.5
MW-6	781.5	3.0	12.0	3.0	763.5	18.0
PZ-1	770.0	0.5	>13.5	not encountered	not encountered	not encountered
GMW-1	787.1	1.0	23.0	1.4	761.7	25.4
GMW-2	787.1	1.0	18.0	5.9	763.2	23.9
GMW-3	788.4	1.5	16.5	3.2	767.2	21.2
Unit Screened: Shallow Bedrock						
MW-1D	777.6	not encountered	not encountered	10.0	767.6	10.0
MW-2D	781.3	3.0	11.0	5.0	763.2	18.1
MW-4D(R)	765.0	0.5	5.0	not encountered	759.5	5.5
MW-5D	779.3	0.5	11.5	not encountered	761.3	12.0
MW-7D	785.8	2.5	3.5	10.0	769.8	16.0
MW-8D	778.0	not encountered	8.5	10.0	759.5	18.5
MWFP-1D	785.2	0.5	not encountered	4.0	780.7	4.5
MWFP-2D	784.1	0.2	10.8	not encountered	773.1	11.0
MWFP-3D	778.7	0.5	3.5	7.5	767.2	11.5
Unit Screened: Deep Bedrock						
MW-4D2	765.1	0.5	5.0	not encountered	759.6	5.5
Former Manufacturing Plant Soil Borings						
SB-1	789.9	1.0	9.0	not encountered	779.0	10.0
SB-2	784.0	not encountered	8.0	not encountered	776.0	8.0
SB-3	782.0	concrete pad	6.0	>2.0	not encountered	not encountered
SB-4	783.6	0.5	9.0	>2.5	not encountered	not encountered
SB-5	785.4	0.5	5.0	>6.5	not encountered	not encountered
SB-6	780.3	concrete pad	4.5	3.5	not encountered	not encountered
SB-7	789.9	0.5	>11.5	not encountered	not encountered	not encountered
SB-8	787.6	0.5	7.5	>4.0	not encountered	not encountered
SB-9	778.4	0.5	4.5	>7.0	not encountered	not encountered
SB-10	779.3	0.5	5.0	>6.5	not encountered	not encountered

Notes:
1. Cover soil consist of sandy silty topsoil layer.
2. Fill consists of poorly graded granular soil with cinders and other anthropogenic material or sludge-like fill found in the Inactive Landfill Area.
3. Alluvial deposits consist of native clay, silt, sand, and gravel.

ft = feet
fmsl = feet mean sea level
* = indicates estimated from O'Brien and Gere boring logs.

TABLE 3-4

SUMMARY OF WATER LEVEL DATA AND VERTICAL HYDRAULIC GRADIENTS

Peter Cooper Site
Gowanda, New York

Measuring Point	*Top of Riser Elevation*[1] *(famsl)*	*Date*									
		8/14/2000	*9/29/2000*	*10/30/2000*	*11/6/2000*	*12/21/2000*	*2/2/2001*	*3/20/2001*	*4/30/2001*	*Max.*	*Min.*
MW-1D	779.49	767.18	766.77	767.28	767.23	767.79	767.65	767.73	767.72	767.79	766.77
MW-1S	779.62	772.04	771.34	771.31	771.01	773.34	773.1	773.88	773.01	773.88	771.01
MW-2S(R)	770.93	763.50	763.26	762.52	762.32	762.73	762.74	762.85	762.70	763.50	762.32
MW-2D	782.82	755.57	755.09	754.90	754.87	755.66	755.62	755.63	755.34	755.66	754.87
MW-3(R)	770.70	763.47	763.18	762.90	762.65	763.12	762.41	763.36	763.31	763.47	762.41
MW-4S(R)	766.97	762.23	762.25	762.57	762.49	762.09	761.67	762.08	762.53	762.57	761.67
MW-4D(R)	766.36	754.38	755.05	753.51	753.46	754.22	754.25	754.14	753.78	755.05	753.46
MW-4D2	766.36			753.86	753.81	754.62	754.62	754.47	753.44	754.62	753.44
MW-5	781.16	771.03	770.63	770.52	770.47	770.92	770.32	771.09	771.38	771.38	770.32
MW-5D	781.04		770.69[2]	770.54	770.22	770.96	770.35	771.16	771.43	771.43	770.22
MW-6[3]	783.58	771.76	771.46	772.07	771.87	773.22	773.04	774.30	773.99	774.30	771.46
MW-7S	787.77		773.18[2]	773.48	773.36	776.63	775.22	775.13	775.35	776.63	773.36
MW-7D	787.38		769.86[2]	765.93	765.89	766.50	766.3	766.49	766.27	766.50	765.89
MW-8S	777.44			770.31	770.09	--	771.72	772.71	771.51	772.71	770.09
MW-8D	777.64			770.30	770.90	--	765.02	774.47*	770.93	770.93	765.02
DP-1	761.38			757.34	757.71	758.68	758.66	758.48	753.37	758.68	753.37
PZ-1	772.31			763.91	763.81	763.97	763.52	764.39	769.26	769.26	763.52
MWFP-1D	787.30			776.12	776.05	777.38	777.14	777.49	777.45	777.49	776.05
MWFP-2S	786.00			774.37	774.09	775.89	774.71	775.70	775.14	775.89	774.09
MWFP-2D	785.17			772.82	772.82	772.46	772.38	772.36	772.22	772.82	772.22
MWFP-3S	780.69			772.51	772.34	773.58	772.6	774.17	773.70	774.17	772.34
MWFP-3D	780.51			765.24	765.20	765.81	765.91	765.87	765.80	765.91	765.20
Creek Upstream						772.40	772.39	772.19	772.08	772.40	772.08
Creek Downstream						754.34	754.49	754.34	754.21	754.49	754.21

Well Pair	*Water Elevation ***	*Top of Screen*	*Bottom of Screen*	*Adjusted Water Elevation for "Delta L" ****	*"Delta L"*	*"Delta H"*	*Vertical Gradient*
MW-1S(R) MW-1D	773.1 767.65	772.6 745.7	767.6 740.7	770.1 743.2	26.9	5.45	-0.20
MW-2S(R) MW-2D	762.74 755.62	763.7 748	759.7 743	762.74 745.5	17.24	7.12	-0.41
MW-4S(R) MW-4D(R)	761.67 754.25	760.7 747	756.2 742	758.45 744.5	13.95	7.42	-0.53
MW-4D(R) MW-4D2	754.25 754.62	747 735.1	742 725.1	744.5 730.1	14.4	-0.37	0.03
MW-5 MW-5D	770.32 770.35	766.1 760.8	764.1 750.8	765.1 755.8	9.3	-0.03	0.003
MW-7S MW-7D	775.22 766.3	782.1 760.3	769.6 750.3	775.22 755.3	19.92	8.92	-0.45
MW-8S MW-8D	771.72 765.02	772.1 743	762.1 733	771.72 738	33.72	6.70	-0.20
MWFP-2S MWFP-2D	774.71 772.38	779.3 766.1	772.3 756.1	774.71 761.1	13.61	2.33	-0.17
MWFP-3S MWFP-3D	772.6 765.91	773.5 762.7	767 752.7	772.6 757.7	14.9	6.69	-0.45

Notes:

(1) Top of riser or staff gage zero elevation as measured by TVGA Engineering, Surveying P.C., August 28, 2000.
(2) Water levels was measured prior to development.
(3) The riser pipe from MW-6 was cut down (approximately 3-inches) on 10/9/00 and the elevation shown is current conditions.
famsl = feet above mean sea level
fbtor = feet below top of riser

-- = water level not collected as a result of snow cover
* = water was observed in the annular space of the road box.
** = (water levels taken 2/2/01)
*** = (The midpoint of the well screen was used for the elevation if the water level was above the well screen)
shaded cells indicate the well was not installed or had been installed less than 24 hours prior to groundwater elevation measurements.

TABLE 3-5

HYDRAULIC CONDUCTIVITY ESTIMATES

Peter Cooper Site
Gowanda, New York

Well I.D.	*Material Screened*	*Screen Interval*		*Estimated Hydraulic Conductivity* [2]	
		Elevation [1] *(famsl)*	*Depth (fbgs)*	*(cm/sec)*	*(ft/day)*
Alluvial Depostits				**Range: $2.9x10^{-6}$ to $4.3x10^{-3}$ cm/sec : 0.008 to 12.2 ft/day**	
MW-1S	sand, gravel	772.6-767.6	5.5-10.5	$4.3x10^{-3}$	12.2
MW-3(R)	silt, sand and gravel	763.6-759.1	4.5-9.0	$6.5x10^{-4}$	1.84
MW-7S	silt	782.1-769.6	4.0-16.5	$2.9x10^{-6}$	0.008
MW-8S	silt, sand and gravel	772.1-762.1	6.0-16.0	$1.8x10^{-3}$	5.10
MWFP-3S	silt, sand and gravel	773.5-767.0	5.0-11.5	$2.4x10^{-3}$	6.80
Fill *-Cindery Fill*				**Range: $1.3x10^{-4}$ to $2.2x10^{-2}$ cm/sec : 0.37 to 62.4 ft/day**	
MW-5S	sandfill/bedrock	766.1-764.1	13.0-15.0	$2.2x10^{-2}$	62.4
MWFP-2S	cindery fill	779.3-772.3	5.0-12.0	$1.3x10^{-4}$	0.37
-Sludge Fill				**Range: $3.8x10^{-4}$ to $3.3x10^{-2}$ cm/sec : 1.08 to 93.6 ft/day**	
MW-2S	sludge fill	763.7-759.7	4.5-8.5	$1.2x10^{-3}$	3.40
MW-4S(R)	sludge/bedrock	760.7-756.2	4.5-9.0	$3.8x10^{-4}$	1.08
MW-6	sludge/silt and sand	768.5-763.5	13.0-18.0	$3.3x10^{-2}$	93.6
Shallow Bedrock				**Range: $2.2x10^{-6}$ to $3.4x10^{-2}$ cm/sec : 0.00615 to 96.4 ft/day**	
MW-1D	shale	745.7-740.7	31.9-36.9	$2.5x10^{-4}$	0.71
MW-2D	shale	748.0-743.0	33.3-38.3	$1.2x10^{-3}$	3.40
MW-4D(R)	shale	747.0-742.0	18.0-23.0	$1.1x10^{-4}$	0.31
MW-5D	shale	760.8-750.8	18.5-28.5	$3.4x10^{-2}$	96.4
MW-7D	shale	760.3-750.3	25.5-35.5	$1.3x10^{-3}$	3.69
MW-8D	shale	743.0-733.0	35.0-45.0	$2.2x10^{-6}$	0.006
MWFP-1D	shale	772.7-762.7	12.5-22.5	$4.1x10^{-4}$	1.16
MWFP-2D	shale	766.1-756.1	18.0-28.0	$6.4x10^{-4}$	1.81
MWFP-3D	shale	762.7-752.7	16.0-26.0	$6.7x10^{-3}$	19.0
Deep Bedrock				**$5.5x10^{-6}$ cm/sec; 0.016 ft/day**	
MW-4D2	shale	735.1-725.1	30.0-40.0	$5.5x10^{-6}$	0.016

Notes:

1. Survey completed by TVGA Engineering, Surveying P.C., August 28, 2000.
2. Hydraulic conductivity estimated by Geomatrix Consultants, Inc. using Bouwer and Rice Methods.

famsl = feet above mean sea level
fbgs = feet below ground surface
cm/sec = centimeters per second
ft/day = feet per day

TABLE 3-6

LANDFILL WASTE LIMITS

Peter Cooper Site
Gowanda, New York

Date	*Test Pit Location*	*Description*
10/05/00	Elevated Fill Area Waste Limit A	0-2' clay cover soil w/some light brown sandy material. Railroad spur and ties encountered at 2 ft w/ black cindery material, creosote-type odor. Transition from black sludge type material to black cindery material at the elevated fill area limit.
10/12/2000	Elevated Fill Area Waste Limit B	Black waste sludge with transition to cindery brick slag material
10/12/2000	Elevated Fill Area Landfill Waste Limit C	Black waste sludge material with transition to ash ballast slag material. Cover soil decrease from approximately 1.5'on the elevated fill area to < 6" off the elevated fill area.
10/12/2000	Elevated Fill Area Landfill Waste Limit D	Silty/clay cover soils w/black sludge material underlying to a transition of cindery sand and gravel cover soils with railroad tie and ballast. Tar-like odor detected.
10/12/2000	Elevated Fill Area Landfill Waste Limit E	Transition of black sludge material to cindery ash ballast material.

TABLE 3-7

SLUDGE FILL MATERIAL TESTING SUMMARY

Peter Cooper Site
Gowanda, New York

Sample Type	*Sample Number*	*Dry Density pcf*		*Water Content %*		*Hydraulic Conductivity cm/s*
		Before	*After*	*Before*	*After*	
Discrete(Shelby Tube)	ST-2	54.2	54.2	40.9	41.0	1.7 E-5

Sample Type	*Sample Number*	*Gravel %*	*Sand %*	*Silt %*	*Clay %*	*Liquid Limit %*	*Plasticity Index %*
Grab	# 1	27.5	33.2	31.3	8	62.1	17.5

TABLE 3-8

SUMMARY OF TEST HOLES TO EVALUATE EXISTING COVER SOIL THICKNESS

Peter Cooper Site
Gowanda, New York

Test Hole No.	*Cover Soil Thickness (inches)*	*Test Hole Depth (inches)*	*Depth Range (inches)*	*Description of Lithology*
TH-1	13	> 13	0-13" 13-?"	Grayish Brown silty sand, trace gravel & sand Waste cinders
TH-2	18	30	0-18" 18-30"	Gray sandy silt, trace clay, gravel Dark brown sand & gravel fill with little brick, wood
TH-3	18	44	0-18" 18-32" 32-44"	Gray silt & fine sand Brown sandy waste material Black waste with sand & brick
TH-4	22	32	0-22" 22-32"	Olive gray sandy silt, trace clay & gravel Brown and rust colored fill with wood, glass, gravel
TH-5	7	10	0-7" 7-10"	Gray silt and sand, trace clay and gravel Black sludge, very strong odor
TH-6	12	13	0-12" 12-13"	Gray & dark gray silt and sand, trace clay and gravel Black sludge
TH-7	48	53	0-48" 48-53"	Gray silt and sand, trace clay and gravel Black sludge
TH-8	38	43	0-38" 38-43"	Olive gray sandy silt, trace clay & gravel Black sludge
TH-9	18	21	0-18" 18-21"	Gray silty sand with trace clay and gravel Black sludge
TH-10	14.4	16.8	0-14.4" 14.4-16.8"	Olive brown to gray silt with trace clay, little sand Grayish black sandy material with odor
TH-11	18	> 18	0-18" 18-?"	Gray silt and sand, trace gravel Black waste
TH-12	15	> 15	0-15" 15-?"	Silt and fine sand, trace gravel Black waste
TH-13	18	24	0-18" 18-24"	Gray fine sand and silt with trace gravel Black sludge
TH-14	18	> 18	0-18" 18-?"	Sand and gray silt, trace gravel Black sludge with odor
TH-15	23	26	0-23" 23-26"	Gray silt and sand, trace clay and gravel Black sludge
TH-16	32	34	0-32" 32-34"	Gray silt and sand, trace clay and trace-little gravel Black sludge
TH-17	31.2	31.2	0-31.2" 31.2"	Brownish gray sandy silt with little gravel & silty sand Refusal on metal, likely bottom of 'cover'
TH-18	17	20	0-17" 17-20"	Brownish gray/gray sandy silt w/trace clay & gravel Black waste
TH-19	12	> 12	0-12" 12-?"	Gray/brown fine sand and silt, trace gravel Black waste sludge with odor
TH-20	24	26	0-24" 24-26"	Gray sand and silt Black sludge
TH-21	18	> 18	0-18" 18-?"	Silt and fine sand, trace gravel Black sludge waste
TH-22	22	25	0-22" 22-25"	Gray sandy silt with trace clay and gravel Black sludge
TH-23	41	44	0-41" 41-44"	Gray silt and fine sand, little gravel, trace clay Black sludge
TH-24	20	25	0-20" 20-25"	Gray sandy silt with trace clay and gravel Cinders

TABLE 3-9

EXISTING COVER SOIL TESTING SUMMARY

Peter Cooper Site
Gowanda, New York

Sample Number [1]	*ASTM* [3] *D421,422*				*ASTM D4318*		*ASTM D1557*		*ASTM D5084*	*Compaction*	*ASTM D2216*	*USCS*
	Gravel %	*Sand %*	*Silt %*	*Clay %*	*Liquid Limit %*	*Plasticity Index %*	*Maximum Dry Density (pcf)*	*Optimum Water Content (%)*	*Recompacted Permeability (cm/s)*	*% of MDD*	*Water Content %*	
Comp-1, TH-1 through TH-4	6.6	38.3	45.1	10	27.4	7.3	125.7	10.3	1.1 E-6	88.5	12.5	CL-ML
Comp-2, TH-5 through TH-8	4.8	26.2	52.6	16.4	25.4	7.9	125.9	10.4	3.9 E-7	89.4	11.3	CL-ML
Comp-3, TH-9 through TH-12	4.1	28.1	45.7	22.1	26.5	9.1	128.0	10.4	9.0 E-7	88.3	12.1	CL
Comp-4, TH-13 through TH-16	2.7	26.8	50.5	20.0	23.0	6.0	130.1	9.0	1.8 E-6	86.5	12.4	CL-ML
Comp-5, TH-17 through TH-20	5.3	36.7	40.8	17.2	23.9	4.7	124.7	11.4	3.2 E-6	85.9	11.6	CL-ML
Comp-6, TH-21 through TH-24	5.4	27.5	45.7	21.4	22.9	6.9	130.3	9.2	3.8 E-7	87.3	10.9	CL-ML

Sample Number [2]	*ASTM D3080*		*ASTM D2216*		*ASTM D5084*
	Dry Density pcf		*Water Content %*		*Hydraulic Conductivity*
	Before	*After*	*Before*	*After*	*cm/s*
ST-1	117.2	115.5	15.9	16.1	1.1 E-5
ST-2	105.6	102.1	20.4	24.5	7.5 E-7
ST-3	112.5	119.2	19.1	15.7	9.0 E-8
ST-4	107.6	114.3	20.5	15.9	1.0 E-6
ST-5	126.2	123.9	11.0	13.1	2.4 E-7
ST-6	103.0	105.1	19.5	20.4	3.6 E-5

Notes:
1. Samples identified as "Comp-#" represent composites of the identified test hole (TH) locations
2. Samples identified as "ST-#" represent shelby tube samples
3. ASTM followed by the letter D#### is the Method used for testing

pcf = pounds per cubic foot	cm\s = centimeters per second
USCS = Unified Soil Classification System	% = percentage
MDD = Maximun Dry Density	

TABLE 3-10

FORMER MANUFACTURING PLANT AREA
GEOTECHNICAL TESTING SUMMARY

Peter Cooper Site
Gowanda, New York

Sample Number	*Depth*	*Strata*	*Gravel* %	*Sand* %	*Fines*	
					Silt %	*Clay* %
Surface						
SB-1	0-2'	Fill	23.9	57.4	14.8	3.9
SB-2	0-2'	Fill	49.3	43.1	7.6*	
SB-4	0-2'	Fill	26.3	35.6	24.6	13.5
SB-5	0-2'	Fill	18.0	30.4	36.6	15.0
SB-6	0-2'	Fill	10.6	24.2	38.4	26.8
SB-7	0-2'	Fill	21.4	52.7	15.4	10.5
SB-8	0-2'	Fill	26.8	30.8	28.7	13.7
SB-10	0-2'	Fill	29.6	37.7	22.4	10.3
Subsurface						
SB-1	5-7'	Fill	27.0	61.1	11.9*	
SB-4	4-6'	Fill	32.5	57.2	10.3*	
SB-2	6-8'	Fill	42.4	43.5	14.1*	
SB-5	6-8'	Alluvial	17.5	62.1	16.4**	4.0**
SB-3	3-5'	Alluvial	0.0	42.0	39.3	18.7
MW-FP-2	0.5-2.5'	Fill	56.3	28.9	14.8*	
MW-FP-2	5-7'	Fill	17.9	69.9	12.2*	
SB-7	7-9'	Fill	15.0	58.8	16.2**	10.0**
SB-8	10-12'	Alluvial	11.8	35.2	39.0	14.0
SB-9	0.5-2.5'	Fill	35.2	29.5	25.0	10.3
SB-9	7-9'	Alluvial	1.1	58.2	32.7**	8**
SB-10	7-9'	Alluvial	0.0	56.6	35.2	8.2
MW-FP-3	0.5-2.5'	Fill	39.5	40.5	16.0	4.0
MW-FP-3	5-7'	Alluvial	17.1	54.0	23.9	5.0
SB-6	4-6'	Fill	15.9	52.4	22.7	9.0
Wetland Sediment						
# 1			0.2	45.8	47.5	6.5
# 2			0.7	35.8	55.9	7.6
# 3			0.3	42.1	44.2	13.4
Creek Sediment						
# 1			16	82.3	1.7	
# 2			20.1	78.9	1	
# 3			3.9	94.5	1.6	
# 4			0.3	95.4	4.3	

Notes:
% = Percent
* Predominantly Silt
** Approximate percentages based on shape of curve.

TABLE 3-11

WETLAND AND CREEK SEDIMENT GEOTECHNICAL TESTING SUMMARY

Peter Cooper Site
Gowanda, New York

Wetland Sediment

Sample Number	*Gravel %*	*Sand %*	*Silt %*	*Clay %*
Wetland Sediment #1	0.2	45.8	47.5	6.5
Wetland Sediment #2	0.7	35.8	55.9	7.6
Wetland Sediment #3	0.3	42.1	44.2	13.4

Creek Sediment

Sample Number	*Gravel %*	*Sand %*	*Silt & Clay %*
Creek Sediment #1	16.0	82.3	1.7
Creek Sediment #2	20.1	78.9	1.0
Creek Sediment #3	3.9	94.5	1.6
Creek Sediment #4	0.3	95.4	4.3

TABLE 4-1

ANALYTICAL RESULTS FOR INACTIVE LANDFILL SLUDGE FILL SAMPLES VOLATILE ORGANIC COMPOUNDS

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification, Depth, and Date Collected [1]		
Constituent	*GMW-3* *100900042* *16-20 (ft-bgs)* *10/9/2000*	*GMW-2* *100900043* *8-12 (ft-bgs)* *10/9/2000*	*GMW-1* *100900045* *4-8 (ft-bgs)* *10/9/2000*
Volatile Organic Compounds, milligrams per kilogram			
Acetone	15 J	15 J	2.5 DJ
Benzene	0.0067 J	0.013 J	0.034 J
Bromodichloromethane	0.026 UJ	0.024 UJ	0.03 UJ
Bromoform	0.026 UJ	0.024 UJ	0.03 UJ
Bromomethane	0.026 UJ	0.024 UJ	0.03 UJ
2-Butanone (MEK)	2.4 J	3.2 J	1 DJ
Methyl tert-Butyl Ether	0.026 UJ	0.024 UJ	0.03 UJ
Carbon Disulfide	0.079 J	0.22 J	0.24 J
Carbon Tetrachloride	0.026 UJ	0.024 UJ	0.03 UJ
Chlorobenzene	0.026 UJ	0.024 UJ	0.059 J
Chloroethane	0.026 UJ	0.024 UJ	0.03 UJ
Chloroform	0.026 UJ	0.024 UJ	0.03 UJ
Chloromethane	0.026 UJ	0.024 UJ	0.03 UJ
1,2-Dibromo-3-Chloropropane	0.026 UJ	0.024 UJ	2.8 UJ
Cyclohexane	0.026 UJ	0.024 UJ	0.03 UJ
Dibromochloromethane	0.026 UJ	0.024 UJ	0.03 UJ
1,2-Dibromoethane	0.026 UJ	0.024 UJ	0.03 UJ
1,2-Dichlorobenzene	0.026 UJ	0.024 UJ	0.54 J
1,4-Dichlorobenzene	0.026 UJ	0.024 UJ	2.2 DJ
1,3-Dichlorobenzene	0.026 UJ	0.024 UJ	2.8 UJ
Dichlorodifluoromethane	0.026 UJ	0.024 UJ	0.03 UJ
1,1-Dichloroethane	0.026 UJ	0.024 UJ	0.01 J
1,2-Dichloroethane	0.026 UJ	0.024 UJ	0.03 UJ
1,1-Dichloroethene	0.026 UJ	0.024 UJ	0.03 UJ
trans-1,2-Dichloroethene	0.026 UJ	0.024 UJ	0.03 UJ
cis-1,2-Dichloroethene	0.026 UJ	0.024 UJ	0.03 UJ
1,2-Dichloropropane	0.026 UJ	0.024 UJ	0.03 UJ
trans-1,3-Dichloropropene	0.026 UJ	0.024 UJ	0.03 UJ
cis-1,3-Dichloropropene	0.026 UJ	0.024 UJ	0.03 UJ
Ethylbenzene	0.019 J	0.054 J	0.12 J
2-Hexanone	0.076 J	0.078 J	0.1 J
Isopropylbenzene	0.026 UJ	0.024 UJ	0.03 UJ
Methyl Acetate	0.026 UJ	0.024 UJ	0.03 UJ
Methylcyclohexane	0.0054 J	0.0096 J	0.03 UJ
Methylene Chloride	0.026 UJ	0.024 UJ	0.03 UJ
4-Methyl-2-Pentanone	0.086 J	0.016 J	0.24 J
Styrene	0.0034 J	0.024 UJ	0.03 UJ
1,1,2,2-Tetrachloroethane	0.026 UJ	0.024 UJ	2.8 UJ
Tetrachloroethene	0.026 UJ	0.024 UJ	0.054 J
Toluene	1.7 DJ	0.12 J	0.37 J

TABLE 4-1

ANALYTICAL RESULTS FOR INACTIVE LANDFILL SLUDGE FILL SAMPLES VOLATILE ORGANIC COMPOUNDS

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification, Depth, and Date Collected [1]		
Constituent	*GMW-3* *100900042* *16-20 (ft-bgs)* *10/9/2000*	*GMW-2* *100900043* *8-12 (ft-bgs)* *10/9/2000*	*GMW-1* *100900045* *4-8 (ft-bgs)* *10/9/2000*
1,2,4-Trichlorobenzene	0.026 UJ	0.024 UJ	2.8 UJ
1,1,1-Trichloroethane	0.026 UJ	0.024 UJ	0.03 UJ
1,1,2-Trichloroethane	0.026 UJ	0.024 UJ	0.03 UJ
Trichloroethene	0.026 UJ	0.024 UJ	0.03 UJ
Trichlorofluoromethane	0.026 UJ	0.024 UJ	0.03 UJ
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.026 UJ	0.024 UJ	0.03 UJ
Vinyl Chloride	0.026 UJ	0.024 UJ	0.03 UJ
m-/p-Xylene	0.014 J	0.046 J	0.16 J
o-Xylene	0.0067 J	0.027 J	0.047 J

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.

J = indicates an estimated value.

U = indicates compound was not at or above the listed detection limit.

D = indicates spike diluted out.

UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the compound in the sample.

TABLE 4-2

ANALYTICAL RESULTS FOR INACTIVE LANDFILL AREA SLUDGE FILL SAMPLES SEMI-VOLATILE ORGANIC COMPOUNDS AND METALS

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification, Depth, and Date Collected[1]
Constituent	*COMP GMW-1,-2-3* *100900046* *Composite 4-20 fbgs* *10/9/2000*
Semi-Volatile Organic Compounds, milligrams per kilogram	
Acenaphthene	5.6 U
Acenaphthylene	5.6 U
Acetophenone	5.6 U
Anthracene	5.6 U
Atrazine	5.6 U
Benzaldehyde	5.6 U
Benzo(a)anthracene	5.6 UJ
Benzo(a)pyrene	5.6 U
Benzo(b)fluoranthene	5.6 UJ
Benzo(g,h,i)perylene	5.6 UJ
Benzo(k)fluoranthene	5.6 UJ
1,1-Biphenyl	5.6 U
Butyl Benzyl Phthalate	5.6 U
di-N-Butylphthalate	5.6 U
Caprolactam	5.6 U
Carbazole	5.6 U
Indeno(1,2,3-cd)pyrene	5.6 UJ
4-Chloroaniline	5.6 U
bis(2-chloroethoxy)methane	5.6 U
bis(2-chloroethyl)ether	5.6 U
2-Chloronaphthalene	5.6 U
2-Chlorophenol	5.6 U
2,2-oxybis(1-chloropropane)	5.6 U
Chrysene	5.6 U
Dibenzo(a,h)anthracene	5.6 UJ
Dibenzofuran	5.6 U
3,3-Dichlorobenzidine	(5600 U) R
2,4-Dichlorophenol	5.6 U
Diethylphthalate	5.6 U
Dimethyl Phthalate	5.6 U
2,4-Dimethylphenol	5.6 U
2,4-Dinitrophenol	14 UJ
2,4-Dinitrotoluene	5.6 U
2,6-Dinitrotoluene	5.6 U
bis(2-Ethylhexyl)phthalate	5.6 U
Fluoranthene	5.6 U
Fluorene	5.6 U
Hexachlorobenzene	5.6 U

TABLE 4-2

ANALYTICAL RESULTS FOR INACTIVE LANDFILL AREA SLUDGE FILL SAMPLES SEMI-VOLATILE ORGANIC COMPOUNDS AND METALS

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification, Depth, and Date Collected [1]
Constituent	*COMP GMW-1,-2-3 100900046 Composite 4-20 fbgs 10/9/2000*
Hexachlorobutadiene	5.6 U
Hexachlorocyclopentadiene	28 U
Hexachloroethane	5.6 U
Isophorone	5.6 U
2-Methylnaphthalene	5.6 U
4,6-Dinitro-2-Methylphenol	14 U
4-Chloro-3-Methylphenol	5.6 U
2-Methylphenol	5.6 U
4-Methylphenol	150 D
Naphthalene	22
2-Nitroaniline	14 U
3-Nitroaniline	(14000 U) R
4-Nitroaniline	14 U
Nitrobenzene	5.6 U
2-Nitrophenol	5.6 U
4-Nitrophenol	14 UJ
n-Nitrosodiphenylamine	5.6 U
di-n-Octyl Phthalate	5.6 UJ
Pentachlorophenol	6.8 J
Phenanthrene	1 J
Phenol	15
4-Bromophenyl-Phenylether	5.6 U
4-Chlorophenyl-Phenylether	5.6 U
n-Nitroso-di-n-Propylamine	5.6 U
Pyrene	5.6 U
2,4,6-Trichlorophenol	5.6 U
2,4,5-Trichlorophenol	14 U
Metals, mg/kg	
Aluminum	3780
Antimony	57.6 J
Arsenic	34.8
Barium	175
Beryllium	0.83 U
Cadmium	1.5
Calcium	122,000
Chromium	9280
Cobalt	8.3 U
Copper	156
Hexavalent Chromium	6.75 U

TABLE 4-2

ANALYTICAL RESULTS FOR INACTIVE LANDFILL AREA SLUDGE FILL SAMPLES SEMI-VOLATILE ORGANIC COMPOUNDS AND METALS

Peter Cooper Site
Gowanda, New York

	Sample Location, Identification, Depth, and Date Collected [1]
Constituent	*COMP GMW-1,-2-3 100900046 Composite 4-20 fbgs 10/9/2000*
Iron	14800 J
Lead	97.4
Magnesium	9740
Manganese	250
Mercury	6.2
Nickel	10.6
Potassium	334 U
Selenium	1.8 J
Silver	1.7 U
Sodium	1020
Thallium	1.7 U
Vanadium	8.3 U
Zinc	6060
Other	
Percent Solids, %	59.3
pH	7.86
Total Organic Carbon, %	10.0

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.

J = indicates an estimated value.

U = indicates compound was not detected.

D = indicates spike diluted out.

UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the compound in the sample.

TABLE 4-3

ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES FROM THE INACTIVE LANDFILL AREA

Peter Cooper Site
Gowanda, New York

Constituent[2]	Soil Criteria[3]			Sample Location, Identification, Depth, and Date Collected[1]									
	Eastern USA Background	Region 9 PRGs	Soil Screening Levels	LFSS-1 101100058 0-6 in. bgs 10/11/2000	LFSS-2 101100059 0-6 in. bgs 10/11/2000	LFSS-3 101100060 0-6 in. bgs 10/11/2000	LFSS-4 101100061 0-6 in. bgs 10/11/2000	LFSS-5 101100062 0-6 in. bgs 10/11/2000	LFSS-6 101100069 0-6 in. bgs 10/11/2000	LFSS-7 101100064 0-6 in. bgs 10/11/2000	LFSS-8 101100065 0-6 in. bgs 10/11/2000	LFSS-9 101100066 0-6 in. bgs 10/11/2000	LFSS-10 101100067 0-6 in. bgs 10/11/2000
Volatile Organic Compounds, milligrams per kilogram													
1,2-dichlorobenzene		370	17	0.013 U J	0.014 U J	0.014 U J	0.012 U	0.01 U	0.015 U J	(0.015 U) R	0.021 U J	0.015 U J	0.014 U J
1,4-dichlorobenzene		7.9	2	0.013 U J	0.014 U J	0.014 U J	0.012 U	0.01 U	0.015 U J	(0.015 U) R	0.021 U J	0.015 U J	0.014 U J
Benzene		1.3	0.03	0.013 U J	0.0016 J	0.0042 J	0.0051 J	0.0032 J	0.0029 J	0.015 U J	0.0022 J	0.015 U	0.014 U J
Chlorobenzene		530	1	0.013 U J	0.014 U J	0.014 U J	0.012 U	0.01 U	0.015 U J	0.015 U J	0.021 U	0.015 U	0.014 U J
Ethylbenzene		20	13	0.013 U J	0.014 U J	0.0018 J	0.012 U	0.01 U	0.015 U J	0.015 U J	0.021 U	0.015 U	0.014 U J
m/p-Xylene		420	210	0.0016 J	0.0023 J	0.006 J	0.0047 J	0.004 J	0.015 U J	0.015 U J	0.0028 J	0.015 U	0.014 U J
o-Xylene		420	210	0.013 U J	0.014 U J	0.002 J	0.0015 J	0.01 U	0.015 U J	0.015 U J	0.021 U	0.015 U	0.014 U J
Toluene		520	12	0.002 J	0.0037 J	0.0082 J	0.0086 J	0.0052 J	0.015 U J	0.015 U J	0.0058 J	0.0016 J	0.014 U J
Metals, milligrams per kilogram													
Arsenic	3-12**	1.6	29.0	9.3	8.7	10.2	6.6	10.6	919	21.1	7.2	11	8.7
Chromium	1.5-40**	210	38	18.4	15.4	267	13	32.8	341	208	550	33.8	36.4
Hexavalent Chromium	--	64	38	5.03 U	5.35 U	5.03 U	5.28 U	5.1 U	5.17 U	5.12 U	5.62 U	5.42 U	5.44 U
Zinc	9-50	100,000	12,000	81.8	79.3	163	55	91.4	165	77.5	137	96.6	89.2
Other													
Percent Solids, %				79.5	74.8	79.5	75.8	78.4	77.3	78.1	71.2	73.8	73.5
Total Organic Carbon, %				2.30	2.40	2.80	2.10	2.70	5	5.60	3.40	2.40	3.70
pH				7.42	7.36	7.78	8.07	7.97	6.61	7.53	7.35	7.18	5.76

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Soil criteria from U.S.EPA, Region 9 Preliminary Remediation Goals (PRGs) for Industrial Soil (October 2002) and from range of background metals concentrations measured in soil found in the eastern United States from NYSDEC Division of Technical and Administrative Guidance Memorandum (TAGM) #4046.

** A New York State Background value

in. bgs =inches below ground surface.
-- = indicates value does not exist.
SB = Site Background
UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the compound in the sample.

J = indicates an estimated value.
U = indicates compound was not detected.
R = indicates data rejected by data validator.
(values) = indicates value reported before rejected.
indicates concentration above soil criteria.

TABLE 4-3

ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES FROM THE INACTIVE LANDFILL AREA

Peter Cooper Site
Gowanda, New York

	Soil Criteria[3]			*Sample Location, Identification, Depth, and Date Collected*[1]											
				LFSS-11	*LFSS-12*	*LFSS-13*	*LFSS-14*	*LFSS-15*	*LFSS-16*	*LFSS-17*	*LFSS-18*	*LFSS-19*	*LFSS-20*		
				101100068	*101100070*	*101100071*	*101100072*	*101100073*	*101100074*	*101100075*	*101100076*	*101100077*	*101200078*		
	Eastern USA	*Region 9*	*Soil Screening Levels*	*0-6 in. bgs*	*0-6 in. bgs*	*0-6 in. bgs*	*0-6 in. bgs*	*0-6 in. bgs*	*0-6 in. bgs*	*0-6 in. bgs*	*0-6 in. bgs*	*0-6 in. bgs*	*0-6 in. bgs*	*Maximum*	*Minimum*
Constituent[2]	*Background*	*PRGs*		*10/11/2000*	*10/11/2000*	*10/11/2000*	*10/11/2000*	*10/11/2000*	*10/11/2000*	*10/11/2000*	*10/11/2000*	*10/11/2000*	*10/12/2000*	*Conc.*	*Conc.*
Volatile Organic Compounds, milligrams per kilogram															
1,2-dichlorobenzene		370	17	0.016 U J	0.015 U J	0.01 U J	0.013 U J	0.012 U J	0.013 U J	0.015 U J	0.012 U J	0.015 U J	0.012 U J	0.021 UJ	0.01 UJ
1,4-dichlorobenzene		7.9	2	0.016 U J	0.015 U J	0.01 U J	0.013 U J	0.012 U J	0.013 U J	0.015 U J	0.012 U J	0.015 U J	0.012 U J	0.021 UJ	0.01 UJ
Benzene		1.3	0.03	0.016 U J	0.015 U J	0.0021 J	0.0025 J	0.0026 J	0.0019 J	0.015 U J	0.0036 J	0.005 J	0.004 J	0.016 UJ	0.0016 J
Chlorobenzene		530	1	0.016 U J	0.015 U J	0.01 U J	0.013 U J	0.012 U J	0.013 U J	0.015 U J	0.012 U J	0.015 U J	0.012 U J	0.021 U	0.01 UJ
Ethylbenzene		20	13	0.016 U J	0.015 U J	0.01 U J	0.0014 J	0.012 U J	0.013 U J	0.015 U J	0.0012 J	0.015 U J	0.001 J	0.021 U	0.0012 J
m/p-Xylene		420	210	0.016 U J	0.015 U J	0.0023 J	0.0041 J	0.0037 J	0.0031 J	0.015 U J	0.0049 J	0.015 U J	0.006 J	0.016 J	0.0016 J
o-Xylene		420	210	0.003 J	0.015 U J	0.01 U J	0.0018 J	0.012 U J	0.013 U J	0.015 U J	0.0016 J	0.015 U J	0.002 J	0.021 U	0.0015 J
Toluene		520	12	0.005 J	0.015 U J	0.0033 J	0.0051 J	0.0051 J	0.0041 J	0.015 U J	0.007 J	0.015 U J	0.01 J	0.015 UJ	0.0016 J
Metals, milligrams per kilogram															
Arsenic	3-12**	1.6	29.0	9.1 J	7.5 J	7.2 J	21.5 J	6.5 J	9.4 J	38.8 J	6.9 J	128 J	4 J	919	4 J
Chromium	1.5-40**	210	38	40.1 J	92 J	15.5 J	134 J	11 J	17.2 J	117 J	17.1 J	169 J	10.6 J	550	10.6 J
Hexavalent Chromium	--	64	38	5.53 U J	5.49 U J	4.67 U J	5.1 U J	4.88 U J	4.94 U J	5.78 U J	4.83 U J	5.31 U J	4.73 U J	5.78 UJ	4.67 UJ
Zinc	9-50	100,000	12,000	75.1 J	96.9 J	54 J	67.1 J	46.9 J	61.3 J	85.9 J	53.8 J	103 J	62.2 J	165	46.9 J
Other															
Percent Solids, %				72.3	72.8	85.6	78.5	82.0	81.0	69.2	82.9	75.3	84.6	85.6	69.2
Total Organic Carbon, %				1.80	2.60	0.680	1.90	1.70	1.90	3.40	1.10	4.10	0.990	5.6	0.68
pH				6.92	7.02	8.23	8.42	8.50	7.92	7.62	8.16	7.31	7.64	8.5	5.76

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Soil criteria from U.S.EPA, Region 9 Preliminary Remediation Goals (PRGs) for Industrial Soil (October 2002) and from range of background metals concentrations measured in soil found in the eastern United States from NYSDEC Division of Technical and Administrative Guidance Memorandum (TAGM) #4046.

** A New York State background value.

in. bgs =inches below ground surface.
-- = indicates value does not exist.
SB = Site Background
UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitiation necessary to accurately and precisely measure the compound in the sample.

J = indicates an estimated value.
U = indicates compound was not detected.
R = indicates data rejected by data validator.
(values) = indicates value reported before rejected.
⁝ indicates concentration above soil criteria.

TABLE 4-4

ANALYTICAL RESULTS FOR SUBSURFACE SOIL FROM THE INACTIVE LANDFILL AREA

Peter Cooper Site
Gowanda, New York

	Soil Criteria[3]			*Sample Location, Identification, Depth and Date Collected*[1]												
Constituent	*Eastern USA Background*	*Region 9 PRGs*	*Soil Screening Levels*	*TP-1 10090025 6.5-7 fbgs 10/6/2000*	*TP-2 10090024 12.5 fbgs 10/6/2000*	*TP-3 10090023 8.5-9 fbgs 10/6/2000*	*TP-4 10090026 7 fbgs 10/6/2000*	*TP-5 10100028 9.5 fbgs 10/6/2000*	*TP-6 10100030 5 fbgs 10/6/2000*	*TP-7 10060022 3-4 fbgs 10/6/2000*	*TP-8 10060021 4-5 fbgs 10/6/2000*	*TP-9 10060020 6.5 fbgs 10/6/2000*	*TP-10 10120031 1 fbgs 10/6/2000*	*settling basin 101060029 7 fbgs 10/6/2000*	*Maximum Conc.*	*Minimum Conc.*
Volatile Organic Compounds, milligrams per kilogram																
Benzene		1.3	0.03	0.021 UJ	0.014 UJ	0.017 UJ	0.003 J	0.0023 J	0.025 U	0.021 UJ	0.013 UJ	0.03 UJ	0.0032 J	0.0046 J	0.03 UJ	0.0023 J
Chlorobenzene		530	1	0.021 UJ	0.014 U	0.017 UJ	0.011 UJ	0.01 UJ	0.025 U	0.021 UJ	0.013 UJ	0.03 UJ	0.017 UJ	(0.012) R	0.03 UJ	(0.012 U) R
1,2-Dichlorobenzene		370	17	0.021 UJ	0.014 U	0.017 UJ	0.011 UJ	0.01 UJ	0.025 U	0.021 UJ	0.013 UJ	0.03 UJ	0.017 UJ	(0.012) R	0.03 UJ	(0.012 U) R
1,4-Dichlorobenzene		7.9	2	0.021 UJ	0.014 U	0.017 UJ	0.011 UJ	0.01 UJ	0.025 U	0.021 UJ	0.013 UJ	0.03 UJ	0.017 UJ	(0.012) R	0.03 UJ	(0.012 U) R
Ethylbenzene		20	13	0.021 UJ	0.014 U	0.017 UJ	0.011 UJ	0.01 UJ	0.025 U	0.021 UJ	0.013 UJ	0.03 UJ	0.017 UJ	0.0013 J	0.03 UJ	0.0013 J
Toluene		520	12	0.031 J	0.0015 J	0.0069 J	0.005 J	0.0039 J	0.029	0.021 UJ	0.013 UJ	0.03 UJ	0.0074 J	0.0082 J	0.031 J	0.0015 J
m-/p-Xylene		420	210	0.021 UJ	0.014 U	0.017 UJ	0.004 J	0.0023 J	0.025 U	0.021 UJ	0.013 UJ	0.03 UJ	0.005 J	0.0063 J	0.03 UJ	0.0023 J
o-Xylene		420	210	0.021 UJ	0.014 U	0.017 UJ	0.011 UJ	0.01 UJ	0.025 U	0.021 UJ	0.013 UJ	0.03 UJ	0.017 UJ	0.0019 J	0.03 UJ	0.0019 J
Metals, milligrams per kilogram																
Arsenic	3-12**	1.6	29.0	13.5	9.1	60.5	4.3	6.5	29.8	58.4	29.2	22.1	67.1 U	9.8	67.1 U	4.3
Chromium	1.5-40**	210	38	270	9.1	137	10.3 J	15.3	149	623	55	7.9	8610 U	12.5	8610 U	7.9
Hexavalent Chromium	--	64	38	5.41 U	4.76 U	5.87 U	4.78 U	4.55 U	5.49 U	4.83 U	4.98 U	4.6 U	5.58 UJ	4.85 U	5.87 U	4.55 U
Zinc	9-50	100,000	12,000	277	58.6	214	57.3	70.2	1390	77.9 J	58.6 J	99 J	445	68.6	1390	57.3
Others																
Percent Solids				74.0	84.1	68.2	83.7	88.0	72.8	82.8	80.4	86.9	71.7	82.5	88	68.2
pH				8.05	7.88	6.61	8.35	8.10	9.24	7.31	8.43	7.47	7.80	8.05	9.24	6.61
Total Organic Carbon				0.900	0.570	2.00	0.1 UJ	0.330	2.80	0.620	1.00	0.220	1.50	0.390	2.8	0.1 UJ

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Soil criteria from U.S.EPA, Region 9 Preliminary Remediation Goals (PRGs) for Industrial Soil (October 2002) and from range of background metals concentrations measured in soil found in the eastern United States from NYSDEC Division of Technical and Administrative Guidance Memorandum (TAGM) #4046.

** A New York State Background value

fbgs = feet below ground surface
SB = Site Background
-- = indicates value does not exist.
J = indicates an estimated value.
U = indicates compound was not detected above the listed detection limit.
R= indicates data rejected by data validator.
UJ = indicates compound was not detected above the listed detection limit.
However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitiation necessary to accurately and precisely measure the compound in the sample.

(value) = indicates value reported before rejected.
▨ indicates concentration above soil criteria.

TABLE 4-5

ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

	Soil Criteria [3]			*Sample Location, Identification, Depth, and Date Collected* [1]											
		Region 9		*SB-1* *1005000006* *0-2'*	*SB-2* *100500008* *0-2'*	*SB-4* *100500010* *0-2'*	*SB-5* *100600012* *0-2'*	*SB-7* *100600018* *0-2'*	*SB-8* *100600032* *0-2'*	*SB-9* *100600034* *0.5-2.5'*	*SB-10* *100600036* *0-2'*	*MWFP-2* *100600015* *0.5-2.5'*	*MWFP-3* *100900038* *0.5-2.5*	*Maximum*	*Minimum*
Constituent [2]	*Eastern USA Background*	*PRGs*	*Soil Screening Levels*	*10/05/00*	*10/05/00*	*10/05/00*	*10/06/00*	*10/06/00*	*10/06/00*	*10/06/00*	*10/06/00*	*10/06/00*	*10/09/00*	*Conc.*	*Conc.*
Volatile Organic Compounds, milligrams per kilogram															
Acetone		6000	16	0.045 J	0.053 J	0.12	0.056	0.053 J	0.058 J	1.4 J	0.21 J	0.056 J	1.4 U	1.4 J	0.045 J
Benzene		1.3	0.03	0.0027 J	0.0021 J	0.01 UJ	0.0036 J	0.0025 J	0.0016 J	0.0023 J	0.0082 J	0.0076 J	1.4 U	1.4 U	0.0016 J
Bromodichloromethane		1.8	0.6	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Bromoform		220	0.8	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Bromomethane		13	0.2	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 UJ	1.4 UJ	0.0094 UJ
2-Butanone (MEK)		27000	--	0.0088 J	0.0094 J	0.018 J	0.011	0.0071 J	0.0057 J	0.28 J	0.017 J	0.022 UJ	1.4 U	1.4 U	0.0057 J
Methyl tert-Butyl Ether		160	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Carbon Disulfide		720	32	0.013 J	0.0023 J	0.0072 J	0.01	0.072 J	0.015 J	0.0031 J	0.016 UJ	0.01 J	1.4 U	1.4 U	0.0023 J
Carbon Tetrachloride		0.55	0.07	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	10	10	0.0094 UJ
Chlorobenzene		530	1	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Chloroethane		6.5	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Chloroform		12	0.6	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	5.7	5.7	0.0094 UJ
Chloromethane		2.6	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
1,2-Dibromo-3-Chloropropane		2	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Cyclohexane		140	--	0.013 J	0.011 J	0.01 UJ	0.0058 J	0.0065 J	0.003 J	0.0036 J	0.016 UJ	0.0095 J	0.47 J	0.47 J	0.003 J
Dibromochloromethane		2.6	0.4	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
1,2-Dibromoethane		0.028	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
1,2-Dichlorobenzene		370	17	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
1,4-Dichlorobenzene		7.9	2	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.0017 J	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0017 J
1,3-Dichlorobenzene		63	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Dichlorodifluoromethane		310	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
1,1-Dichloroethane		1700	23	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	0.16 J	0.16 J	0.0094 UJ
1,2-Dichloroethane		0.6	0.02	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	0.24 J	0.24 J	0.0094 UJ
1,1-Dichloroethene		410	0.06	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
trans-1,2-Dichloroethene		230	0.7	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
cis-1,2-Dichloroethene		150	0.4	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	0.26 J	0.26 J	0.0094 UJ
1,2-Dichloropropane		0.71	0.03	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
trans-1,3-Dichloropropene		1.8	0.004	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
cis-1,3-Dichloropropene		1.8	0.004	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Ethylbenzene		20	13	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
2-Hexanone		--	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.064 J	0.025 J	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Isopropylbenzene		2000	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Methyl Acetate		92000	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.0048 J	0.21 J	0.022 UJ	1.4 U	1.4 U	0.0048 J
Methylcyclohexane		8700	--	0.022 J	0.014 J	0.01 UJ	0.0096 J	0.01 J	0.0042 J	0.0023 J	0.0021 J	0.015 J	1.6	1.6	0.0021 J
Methylene Chloride		21	0.02	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
4-Methyl-2-Pentanone		--	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.005 J	0.039 J	0.022 UJ	1.4 U	1.4 U	0.005 J
Styrene		1700	4	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
1,1,2,2-Tetrachloroethane		0.93	0.003	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Tetrachloroethene		3.4	0.06	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0031 J	0.0094 UJ	0.0097 J	0.18 J	0.022 UJ	54	54	0.0031 J
Toluene		520	12	0.005 J	0.0032 J	0.01 UJ	0.0061 J	0.0046 J	0.0032 J	0.0023 J	0.019 J	0.015 J	0.38 J	0.38 J	0.0023 J
1,2,4-Trichlorobenzene		3000	5	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	0.36 J	0.36 J	0.0094 UJ
1,1,1-Trichloroethane		1200	2	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.0064 J	0.022 UJ	5.5	5.5	0.0064 J
1,1,2-Trichloroethane		1.6	0.02	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ

TABLE 4-5

ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

Constituent [2]	Soil Criteria [3]			Sample Location, Identification, Depth, and Date Collected [1]										Maximum	Minimum
	Eastern USA Background	Region 9		SB-1	SB-2	SB-4	SB-5	SB-7	SB-8	SB-9	SB-10	MWFP-2	MWFP-3		
		PRGs	Soil Screening Levels	1005000006 0-2' 10/05/00	100500008 0-2' 10/05/00	100500010 0-2' 10/05/00	100600012 0-2' 10/06/00	100600018 0-2' 10/06/00	100600032 0-2' 10/06/00	100600034 0.5-2.5' 10/06/00	100600036 0-2' 10/06/00	100600015 0.5-2.5' 10/06/00	100900038 0.5-2.5 10/09/00	Conc.	Conc.
Trichloroethene		0.1	0.06	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	0.51 J	0.51 J	0.0094 UJ
Trichlorofluoromethane		2000	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
1,1,2-Trichloro-1,2,2-Trifluoroethane		5600	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
Vinyl Chloride		0.75	--	0.0094 UJ	0.011 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.0094 UJ	0.014 UJ	0.016 UJ	0.022 UJ	1.4 U	1.4 U	0.0094 UJ
m-/p-Xylene		420	210	0.0045 UJ	0.0031 UJ	0.01 UJ	0.0036 J	0.0048 J	0.0033 J	0.003 J	0.0044 J	0.0071 J	0.52 J	0.52 J	0.003 J
o-Xylene		420	210	0.0014 UJ	0.0011 UJ	0.01 UJ	0.0011 J	0.0015 J	0.00098 J	0.014 UJ	0.004 J	0.0039 J	0.42 J	0.42 J	0.00098 J
Semi-Volatile Organic Compounds, milligrams per kilogram															
Acenaphthene		29000	570	0.37 U	1.8 J	0.16 J	0.36 U	2.6 J	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	2.6 J	0.16 J
Acenaphthylene		--	--	0.37 U	3.9 U	0.4 U	0.36 U	0.4 J	0.38 U	0.41 U	0.39 U	0.29 J	0.38 U	0.41 U	0.29 J
Acetophenone		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Anthracene		100000	12000	0.04 J	5.9	0.47 J	0.36 U	14	0.38 U	0.044 J	0.055 J	0.24 J	0.049 J	14	0.04 J
Atrazine		7.8	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Benzaldehyde		62000	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Benzo(a)anthracene		2.1	2	0.16 J	10	1.6 J	0.36 U	24	0.38 U	0.11 J	0.23 J	0.47	0.26 J	24	0.11 J
Benzo(a)pyrene		0.21	8	0.16 J	8.3	1.5 J	0.36 U	20	0.38 U	0.087 J	0.25 J	0.46	0.27 J	20	0.087 J
Benzo(b)fluoranthene		2.1	5	0.14 J	6.4	1.3 J	0.36 U	15	0.38 U	0.079 J	0.24 J	0.3 J	0.23 J	15	0.079 J
Benzo(g,h,i)perylene		--	--	0.11 J	4.4	1 J	0.36 U	14	0.38 U	0.41 U	0.24 J	0.33 J	0.21 J	14	0.11 J
Benzo(k)fluoranthene		21	49	0.14 J	7.2	1.3 J	0.36 U	18	0.38 U	0.09 J	0.25 J	0.38 J	0.23 J	18	0.09 J
1,1-Biphenyl		350	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Butyl Benzyl Phthalate		100000	930	0.37 UJ	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
di-N-Butylphthalate		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Caprolactam		100000	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Carbazole		86	0.6	0.37 U	2.3 J	0.39 J	0.36 U	3.5 J	0.38 U	0.41 U	0.044 J	0.42 U	0.38 U	3.5 J	0.044 J
Indeno(1,2,3-cd)pyrene		2.1	14	0.084 J	4.0	0.92 J	0.36 U	13	0.38 U	0.043 J	0.19 J	0.27 J	0.19 J	13	0.043 J
4-Chloroaniline		2500	0.7	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
bis(2-chloroethoxy)methane		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
bis(2-chloroethyl)ether		0.55	0.0004	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2-Chloronaphthalene		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2-Chlorophenol		240	4	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2,2-oxybis(1-chloropropane)		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Chrysene		210	160	0.17 J	9.3	1.7 J	0.36 U	22	0.38 U	0.14 J	0.36 J	0.6	0.29 J	22	0.14 J
Dibenzo(a,h)anthracene		0.21	2	0.37 U	1.9 J	0.35 J	0.36 U	5.2	0.38 U	0.41 U	0.076 J	0.13 J	0.078 J	5.2	0.076 J
Dibenzofuran		3100	--	0.37 U	1.1 J	0.12 J	0.36 U	2.2 J	0.38 U	0.41 U	0.055 J	0.42 U	0.38 U	2.2 J	0.055 J
3,3-Dichlorobenzidine		3.8	0.007	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	R	3.9 U	0.36 U
2,4-Dichlorophenol		1800	1	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Diethylphthalate		100000	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Dimethyl Phthalate		100000	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2,4-Dimethylphenol		12000	9	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2,4-Dinitrophenol		1200	0.3	0.93 U	9.8 U	1 U	0.92 U	9.8 U	0.95 U	1 U	0.98 U	1.1 U	0.97 U	3.9 U	0.36 U
2,4-Dinitrotoluene		1200	0.0008	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2,6-Dinitrotoluene		620	0.0007	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
bis(2-Ethylhexyl)phthalate		120	--	0.068 J	3.9 U	0.069 J	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.068 J
Fluoranthene		22,000	4300	0.31 J	23	3.8 J	0.36 U	60	0.38 U	0.26 J	0.51	0.62	0.41	60	0.26 J

TABLE 4-5

ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

	Soil Criteria[3]			Sample Location, Identification, Depth, and Date Collected[1]											
		Region 9		SB-1 1005000006 0-2'	SB-2 100500008 0-2'	SB-4 100500010 0-2'	SB-5 100600012 0-2'	SB-7 100600018 0-2'	SB-8 100600032 0-2'	SB-9 100600034 0.5-2.5'	SB-10 100600036 0-2'	MWFP-2 100600015 0.5-2.5'	MWFP-3 100900038 0.5-2.5	Maximum	Minimum
Constituent[2]	Eastern USA Background	PRGs	Soil Screening Levels	10/05/00	10/05/00	10/05/00	10/06/00	10/06/00	10/06/00	10/06/00	10/06/00	10/06/00	10/09/00	Conc.	Conc.
Fluorene		26,000	560	0.37 U	2.3 J	0.17 J	0.36 U	4.2	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	4.2	0.17 J
Hexachlorobenzene		1.1	2	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Hexachlorobutadiene		22	2	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Hexachlorocyclopentadiene		3700	400	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	1.9 U	3.9 U	0.36 U
Hexachloroethane		120	0.5	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Isophorone		1800	0.5	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2-Methylnaphthalene		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.1 J	0.18 J	0.083 J	0.079 J	3.9 U	0.079 J
4,6-Dinitro-2-Methylphenol		--	--	0.93 U	9.8 U	1 U	0.92 U	9.8 U	0.95 U	1 U	0.98 U	1.1 U	0.97 U	9.8 U	0.92 U
4-Chloro-3-Methylphenol		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2-Methylphenol		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
4-Methylphenol		3100	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.059 J	0.42 U	0.38 U	3.9 U	0.059 J
Naphthalene		190	84	0.37 U	3.9 U	0.051 J	0.36 U	3.9 U	0.38 U	0.069 J	0.11 J	0.044 J	0.047 J	3.9 U	0.044 J
2-Nitroaniline		18	--	0.93 U	9.8 U	1 U	0.92 U	9.8 U	0.95 U	1 U	0.98 U	1.1 U	0.97 U	9.8 U	0.92 U
4-Nitroaniline		--	--	0.93 U	9.8 U	1 U	0.92 U	9.8 U	0.95 U	1 U	0.98 U	1.1 U	0.97 U	9.8 U	0.92 U
Nitrobenzene		100	0.1	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2-Nitrophenol		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
4-Nitrophenol		--	--	0.93 U	9.8 U	1 U	0.92 U	9.8 U	0.95 U	1 U	0.98 U	1.1 U	0.97 U	9.8 U	0.92 U
n-Nitrosodiphenylamine		350	1	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
di-n-Octyl Phthalate		25000	10000	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Pentachlorophenol		9	0.03	0.93 U	9.8 U	1 U	0.92 U	9.8 U	0.95 U	1 U	0.98 U	1.1 U	0.97 U	9.8 U	0.92 U
Phenanthrene		--	--	0.18 J	21	2.4 J	0.36 U	45	0.38 U	0.23 J	0.34 J	0.3 J	0.24 J	45	0.18 J
Phenol		100,000	100	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
4-Bromophenyl-Phenylether		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
4-Chlorophenyl-Phenylether		--	--	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
n-Nitroso-di-n-Propylamine		0.25	0.00005	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
Pyrene		29,000	4,200	0.32 J	20	3.4 J	0.36 U	44	0.38 U	0.22 J	0.49	0.86	0.43	44	0.22 J
2,4,6-Trichlorophenol		62	0.2	0.37 U	3.9 U	0.4 U	0.36 U	3.9 U	0.38 U	0.41 U	0.39 U	0.42 U	0.38 U	3.9 U	0.36 U
2,4,5-Trichlorophenol		62000	270	0.93 U	9.8 U	1 U	0.92 U	9.8 U	0.95 U	1 U	0.98 U	1.1 U	0.97 U	9.8 U	0.92 U
Metals, milligrams per kilogram															
Aluminum	33,000	100,000	--	6210	5440	7570	8000	8280	6810	2010	4220	6490	5190	8280	2010
Antimony	--	410	5	6.5 UJ	6.9 UJ	7.2 UJ	6.5 UJ	6.9 UJ	6.8 UJ	7.2 UJ	7 UJ	7.6 UJ	7 UJ	7.6 UJ	6.5 UJ
Arsenic	3-12**	1.6	29.0	8.5	168	10.7	8	9.5	6.6	16.2	16.2	29.9	22.7	168	6.6
Barium	15-600	67,000	1,600	72.8	65.1	80.2	58.4	92.8	63.9	68.7	59.2	64.2	117	117	58.4
Beryllium	0-1.75	1,900	63	0.54 U	0.58 U	0.6 U	0.54 U	0.57 U	0.57 U	0.6 U	0.58 U	0.87	0.64	0.87	0.54 U
Cadmium	0.1-1	450	8	0.54 U	0.58 U	0.6 U	0.54 U	0.57 U	0.57 U	0.6 U	0.58 U	0.64 U	1.6	1.6	0.54 U
Calcium	130-35,000**	--	--	29000	6880	23800	44200	30200	33600	1050	1870	2490 J	8210	44200	1050
Chromium	1.5-40**	210	38	34.2	59.7	18.2	10.8	33.3	9	59.3	54.5	198 J	52.5	198	9 J
Cobalt	2.5-60**	1,900	--	6.4	6.9	8.2	7.7	7.2	6.6	6 U	6.6	7.1	7.6	8.2	6 U
Copper	1-50	41,000	--	26.6	37	43.6	21	73.3	20.9	56.7	30.7	29.3	171	171	20.9
Hexavalent Chromium	--	64	38	4.46 UJ	4.74 UJ	4.9 UJ	4.42 UJ	4.71 UJ	4.57 UJ	4.92 UJ	4.74 UJ	5.08 UJ	4.66 U	5.08 UJ	4.42 UJ
Iron	2,000-550,000	100,000	--	18200	18900	23000	16900	12600	15300	31300	18500	18900	30100 J	31300	12600
Lead	4-61***	750	--	50.1 J	79.4 J	169 J	8.2 J	74.2 J	8.2 J	193 J	269 J	41 J	202	269 J	8.2 J
Magnesium	100-5,000	--	--	4470	3130	6260	12600	5740	9300	225	1520	1730	2270	12600	225
Manganese	50-5,000	19,000	--	332	251	449	489	451	469	64.7	132	160	314	489	64.7

TABLE 4-5

ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

	Soil Criteria [3]			*Sample Location, Identification, Depth, and Date Collected* [1]										*Maximum Conc.*	*Minimum Conc.*
		Region 9		*SB-1* *1005000006* *0-2'*	*SB-2* *100500008* *0-2'*	*SB-4* *100500010* *0-2'*	*SB-5* *100600012* *0-2'*	*SB-7* *100600018* *0-2'*	*SB-8* *100600032* *0-2'*	*SB-9* *100600034* *0.5-2.5'*	*SB-10* *100600036* *0-2'*	*MWFP-2* *100600015* *0.5-2.5'*	*MWFP-3* *100900038* *0.5-2.5*		
Constituent [2]	*Eastern USA Background*	*PRGs*	*Soil Screening Levels*	*10/05/00*	*10/05/00*	*10/05/00*	*10/06/00*	*10/06/00*	*10/06/00*	*10/06/00*	*10/06/00*	*10/06/00*	*10/09/00*		
Mercury	0.001-0.2	310	--	0.08	0.13	0.13	0.05 U	0.17	0.06 U	3.1	0.47	0.16 J	0.4	3.1	ND
Nickel	0.5-25	20,000	130	17.8	17.9	19.4	18	19.1	15.9	13.1	14.7	17.9	27.2	27.2	13.1
Potassium	8,500-43,900**	--	--	951	527	805	1060	912	755	239 U	399	542	622	1060	239 U
Selenium	0.1-3.9	5,100	5	1.6	1.8	1.3	1.4	0.95	1.6	1.7	2	2.7	2.1 J	2.7	0.95
Silver	--	5100	34	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.2 U	1.2 U	1.3 U	1.2 U	1.3 U	1.1 U
Sodium	6,000-8,000	--	--	377	372	439	425	479	389	398	458	411	514	514	372
Thallium	--	67	--	1.1 U	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U	1.2 U	1.2 U	1.3 U	1.1 U	1.3 U	1.1 U
Vanadium	1-300	7,200	6,000	14.8	12.8	16.7	18	17.7	14.6	17.5	17.8	15.3	20.2	20.2	12.8
Zinc	9-50	100,000	12,000	152 J	109 J	132 J	45.6 J	124 J	51.6 J	116 J	728 J	84.6 J	246	728	45.6 J
Others															
Percent Solids, %				89.7	84.3	81.7	90.6	84.9	87.6	81.3	84.4	78.7	85.8	90.6	78.7
pH				8.01	8.2	8.34	7.85	8.24	7.81	7.34	7.61	7.7	7.46	8.34	7.34
TOC, %				0.47	0.94	1.8	0.25	1.3	0.35	1.1	1.7	1.7	1.5	1.8	0.25

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services. The analytical results for the SVOC, 3-Nitroaniline, was rejected during data validation for each sample.
3. Soil criteria from U.S.EPA, 2000 Region 9 Preliminary Remediation Goals (PRGs) for Industrial Soil (October 2002) and from range of background metals concentrations measured in soil found in the eastern United States from NYSDEC Division of Technical and Administrative Guidance Memorandum (TAGM) #4046.

** A New York State Background value

*** *Background levels for lead vary widely, average levels in undeveloped, rural areas range from 4-61 ppm while metropolitan/suburban areas range from 200-500 ppm.*

J = indicates a laboratory estimated value or estimated as a result of data validation.
U = indicates compound was not detected at or above the listed detection limit.
R= indicates data rejected by data validator.
UJ = indicates compound was not detected above the listed detection limit.
However, the reported quantitation limit is approximate and may or may
not represent the actual limit of quantitiation necessary to accurately
and precisely measure the compound in the sample.

SB = Site Background
-- = indicates value does not exist.
fbgs = feet below ground surface
▨ indicates concentration above soil criteria.

TABLE 4-6

ANALYTICAL RESULTS FOR SUBSURFACE SOILS FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

	Soil Criteria[3]			*Sample Location, Identification, Depth, and Date Collected*[2]													
Constituent[1]	*Eastern USA Background*	*Region 9 PRGs*	*Soil Screening Levels*	*SB-1 100500007 5-7' 10/05/00*	*SB-2 100500009 6-8' 10/05/00*	*SB-3 100600014 3-5' 10/06/00*	*SB-4 100500011 4-6' 10/05/00*	*SB-5 100600013 6-8' 10/06/00*	*SB-6 100900040 4-6' 10/9/2000*	*SB-7 100600019 7-9' 10/06/00*	*SB-8 100600033 10-12' 10/06/00*	*SB-9 100600035 7-9' 10/06/00*	*SB-10 100600037 7-9' 10/06/00*	*MWFP-2 100600017 5-7' 10/06/00*	*MWFP-3 100900039 5-7' 10/09/00*	*Maximum Conc.*	*Minimum Conc.*
Volatile Organic Compounds, milligrams per kilogram																	
Acetone		6000	16	0.07 J	0.033	0.089 J	0.029 J	0.49 J	0.14 J	0.06 J	0.042 J	0.064	0.065 J	0.12	0.098 J	0.49 J	0.029 J
Benzene		1.3	0.03	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.0033 J	0.0021 J	0.014 U	0.011 UJ	0.031 UJ	0.0021 J
Bromodichloromethane		1.8	0.6	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Bromoform		220	0.8	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Bromomethane		13	0.2	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
2-Butanone (MEK)		27000	–	0.0096 J	0.0088 U	0.011 J	0.0069 J	0.12 J	0.026 J	0.01 J	0.0076 J	0.013 J	0.014 J	0.031	0.016 J	0.12 J	0.0069 J
Methyl tert-Butyl Ether		160	--	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Carbon Disulfide		720	32	0.0021 J	0.0088 U	0.0092 UJ	0.0055 J	0.031 UJ	0.024 J	0.017 UJ	0.0044 J	0.032	0.014 J	0.014 U	0.011 UJ	0.032	0.0021 J
Carbon Tetrachloride		0.55	0.07	0.008 J	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.012 J	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.025 J	0.031 UJ	0.008 J
Chlorobenzene		530	1	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Chloroethane		6.5	–	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Chloroform		12	0.6	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.0067 J	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.0081 J	0.031 UJ	0.0067 J
Chloromethane		2.6	--	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
1,2-Dibromo-3-Chloropropane		2	--	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 UJ	0.011 UJ	0.014 UJ	0.011 UJ	0.031 UJ	0.0088 U
Cyclohexane		140	--	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.0047 J	0.0096 UJ	0.0095 J	0.0035 J	0.014 U	0.011 UJ	0.031 UJ	0.0035 J
Dibromochloromethane		2.6	0.4	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
1,2-Dibromoethane		0.028	–	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
1,2-Dichlorobenzene		370	17	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 UJ	0.011 UJ	0.014 UJ	0.011 UJ	0.031 UJ	0.0088 U
1,4-Dichlorobenzene		7.9	2	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 UJ	0.011 UJ	0.014 UJ	0.011 UJ	0.031 UJ	0.0088 U
1,3-Dichlorobenzene		63	--	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 UJ	0.011 UJ	0.014 UJ	0.011 UJ	0.031 UJ	0.0088 U
Dichlorodifluoromethane		310	–	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
1,1-Dichloroethane		1700	23	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.03 J	0.0096 UJ	0.0140 J	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.014 U
1,2-Dichloroethane		0.6	0.02	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
1,1-Dichloroethene		410	0.06	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
trans-1,2-Dichloroethene		230	0.7	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
cis-1,2-Dichloroethene		150	0.4	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.0041 J	0.014 U	0.011 UJ	0.031 UJ	0.0041 J
1,2-Dichloropropane		0.71	0.03	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
trans-1,3-Dichloropropene		1.8	0.004	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
cis-1,3-Dichloropropene		1.8	0.004	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Ethylbenzene		20	13	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
2-Hexanone		--	–	0.0094 J	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.021 UJ	0.0088 U
Isopropylbenzene		2000	--	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Methyl Acetate		92000	-	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Methylcyclohexane		8700	–	0.0029 J	0.0088 U	0.0092 UJ	0.0047 J	0.031 UJ	0.0082 J	0.0076 J	0.0096 UJ	0.015	0.0049 J	0.014 U	0.011 UJ	0.031 UJ	0.0029 J
Methylene Chloride		21	0.02	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
4-Methyl-2-Pentanone		–	–	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Styrene		1700	4	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
1,1,2,2-Tetrachloroethane		0.93	0.003	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 UJ	0.011 UJ	0.014 UJ	0.011 UJ	0.031 UJ	0.0088 U
Tetrachloroethene		3.4	0.06	0.015 UJ	0.0088 U	0.0092 UJ	0.0081 J	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.0038 J	0.011 UJ	0.014 U	1 J	1 J	0.0038 J
Toluene		520	12	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.0310 J	0.09 J	0.017 UJ	0.0038 J	0.0063 J	0.0036 J	0.014 U	0.011 UJ	0.09 J	0.0032 J
1,2,4-Trichlorobenzene		3000	5	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 UJ	0.011 UJ	0.014 UJ	0.011 UJ	0.031 UJ	0.0088 U
1,1,1-Trichloroethane		1200	2	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.023 J	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.055 J	0.055 J	0.0088 U
1,1,2-Trichloroethane		1.6	0.02	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Trichloroethene		0.1	0.06	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Trichlorofluoromethane		2000	–	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
1,1,2-Trichloro-1,2,2-Trifluoroethane		5600	--	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
Vinyl Chloride		0.75	–	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.014 U	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0088 U
m-/p-Xylene		420	210	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.0043 J	0.0029 J	0.014 U	0.011 UJ	0.031 UJ	0.0029 J
o-Xylene		420	210	0.015 UJ	0.0088 U	0.0092 UJ	0.019 UJ	0.031 UJ	0.013 UJ	0.017 UJ	0.0096 UJ	0.0014 J	0.011 UJ	0.014 U	0.011 UJ	0.031 UJ	0.0014 J
Semi-Volatile Organic Compounds, milligrams per kilogram																	
Acenaphthene		29000	570	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Acenaphthylene		--	–	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.061 J	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.061 J
Acetophenone		–	–	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	ND
Anthracene		100000	12000	0.75	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.32 J	0.041 J	0.42 U	0.39 U	0.46 U	0.41 U	0.75	0.041 J
Atrazine		7.8	–	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U

TABLE 4-6

ANALYTICAL RESULTS FOR SUBSURFACE SOILS FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

	Soil Criteria[3]			Sample Location, Identification, Depth, and Date Collected[1]													
				SB-1 100500007	SB-2 100500009	SB-3 100600014	SB-4 100500011	SB-5 100600013	SB-6 100900040	SB-7 100600019	SB-8 100600033	SB-9 100600035	SB-10 100600037	MWFP-2 100600017	MWFP-3 100900039		
	Eastern USA	Region 9	Soil Screening	5-7'	6-8'	3-5'	4-6'	6-8'	4-6'	7-9'	10-12'	7-9'	7-9'	5-7'	5-7'	Maximum	Minimum
Constituent[2]	Background	PRGs	Levels	10/05/00	10/05/00	10/06/00	10/05/00	10/06/00	10/9/2000	10/06/00	10/06/00	10/06/00	10/06/00	10/06/00	10/09/00	Conc.	Conc.
Benzaldehyde		62000	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Benzo(a)anthracene		2.1	2	1.3 J	0.36 U	0.4 U	0.069 J	0.062 J	0.4 U	1.1	0.068 J	0.42 U	0.39 U	0.29 J	0.41 U	1.3 J	0.062 J
Benzo(a)pyrene		0.21	8	2.3	0.36 U	0.4 U	0.45 U	0.067 J	0.4 U	1.2	0.058 J	0.42 U	0.39 U	0.33 J	0.41 U	2.3	0.058 J
Benzo(b)fluoranthene		2.1	5	2.5 J	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	1.1	0.049 J	0.42 U	0.39 U	0.26 J	0.41 U	2.5 J	0.049 J
Benzo(g,h,i)perylene		--	--	1.7 J	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	1.1	0.38 U	0.42 U	0.39 U	0.31 J	0.41 U	1.7 J	0.31 J
Benzo(k)fluoranthene		21	49	2.3 J	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	1.2	0.057 J	0.42 U	0.39 U	0.26 J	0.41 U	2.3 J	0.057 J
1,1-Biphenyl		350	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Butyl Benzyl Phthalate		100000	930	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
di-N-Butylphthalate		--	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Caprolactam		100000	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Carbazole		86	0.6	0.38 U	0.36 U	0.4 U	0.45 U	0.12 J	0.4 U	0.11 J	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.46 U	0.11 J
Indeno(1,2,3-cd)pyrene		2.1	14	1.4 J	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.91	0.38 U	0.42 U	0.39 U	0.24 J	0.41 U	1.4 J	0.24 J
4-Chloroaniline		2500	0.7	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
bis(2-chloroethoxy)methane		--	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
bis(2-chloroethyl)ether		0.55	0.0004	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
2-Chloronaphthalene		--	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
2-Chlorophenol		240	4	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
2,2-oxybis(1-chloropropane)		--	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Chrysene		210	160	1.3	0.36 U	0.4 U	0.088 J	0.061 J	0.058 J	1.4	0.073 J	0.42 U	0.39 U	0.29 J	0.41 U	1.4	0.058 J
Dibenzo(a,h)anthracene		0.21	2	0.64 J	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.37 J	0.38 U	0.42 U	0.39 U	0.11 J	0.41 U	0.64 J	0.11 J
Dibenzofuran		3100	--	0.25 J	0.36 U	0.4 U	0.051 J	0.072 J	0.4 U	0.11 J	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.46 U	0.051 J
3,3-Dichlorobenzidine		3.8	0.007	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	R	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	R	0.48	0.38 U
2,4-Dichlorophenol		1800	1	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Diethylphthalate		100000	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Dimethyl Phthalate		100000	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
2,4-Dimethylphenol		12000	9	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
2,4-Dinitrophenol		1200	0.3	0.96 U	0.91 U	1 U	1.1 U	1.2 U	1 U	1.1 U	0.94 U	1.1 U	0.97 U	1.2 U	1 U	0.48 U	0.36 U
2,4-Dinitrotoluene		1200	0.0008	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
2,6-Dinitrotoluene		620	0.0007	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
bis(2-Ethylhexyl)phthalate		120	--	0.076 J	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.049 J	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.049 J
Fluoranthene		22,000	4300	3.1	0.36 U	0.4 U	0.12 J	0.075 J	0.073 J	2.5	0.15 J	0.42 U	0.39 U	0.38 J	0.41 U	3.1	0.073 J
Fluorene		26,000	560	0.45	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.12 J	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.12 J
Hexachlorobenzene		1.1	2	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Hexachlorobutadiene		22	2	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Hexachlorocyclopentadiene		3700	400	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	2 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	2 U	2 U	0.36 U
Hexachloroethane		120	0.5	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Isophorone		1800	0.5	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
2-Methylnaphthalene		--	--	0.16 J	0.36 U	0.4 U	0.15 J	0.2 J	0.043 J	0.15 J	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.46 U	0.043 J
4,6-Dinitro-2-Methylphenol		--	--	0.96 U	0.91 U	1 U	1.1 U	1.2 U	1 U	1.1 U	0.94 U	1.1 U	0.97 U	1.2 U	1 U	1.2 U	0.91 U
4-Chloro-3-Methylphenol		--	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
2-Methylphenol		--	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
4-Methylphenol		3100	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.47	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Naphthalene		190	84	0.13 J	0.36 U	0.4 U	0.1 J	0.11 J	0.37 J	0.086 J	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.46 U	0.086 J
2-Nitroaniline		18	--	0.96 U	0.91 U	1 U	1.1 U	1.2 U	1 U	1.1 U	0.94 U	1.1 U	0.97 U	1.2 U	1 U	1.2 U	0.91 U
4-Nitroaniline		--	--	0.96 U	0.91 U	1 U	1.1 U	1.2 U	1 U	1.1 U	0.94 U	1.1 U	0.97 U	1.2 U	1 U	1.2 U	0.91 U
Nitrobenzene		100	0.1	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
2-Nitrophenol		--	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
4-Nitrophenol		--	--	0.96 U	0.91 U	1 U	1.1 U	1.2 U	1 U	1.1 U	0.94 U	1.1 U	0.97 U	1.2 U	1 U	1.2 U	0.91 U
n-Nitrosodiphenylamine		350	1	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
di-n-Octyl Phthalate		25000	10000	0.38 UJ	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Pentachlorophenol		9	0.03	0.96 U	0.91 U	1 U	1.1 U	1.2 U	1 U	1.1 U	0.94 U	1.1 U	0.97 U	1.2 U	1 U	1.2 U	0.91 U
Phenanthrene		--	--	3.6	0.36 U	0.4 U	0.12 J	0.14 J	0.088 J	1.6	0.17 J	0.42 U	0.39 U	0.15 J	0.41 U	3.6	0.088 J
Phenol		100,000	100	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.36 J	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 J
4-Bromophenyl-Phenylether		--	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
4-Chlorophenyl-Phenylether		--	--	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
n-Nitroso-di-n-Propylamine		0.25	0.00005	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U
Pyrene		29,000	4,200	2.5	0.36 U	0.4 U	0.1 J	0.09 J	0.072 J	2.2	0.15 J	0.42 U	0.39 U	0.38 J	0.41 U	2.5	0.072 J
2,4,6-Trichlorophenol		62	0.2	0.38 U	0.36 U	0.4 U	0.45 U	0.48 U	0.4 U	0.42 U	0.38 U	0.42 U	0.39 U	0.46 U	0.41 U	0.48 U	0.36 U

TABLE 4-6

ANALYTICAL RESULTS FOR SUBSURFACE SOILS FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

Constituent[2]	*Soil Criteria*[3]			*Sample Location, Identification, Depth, and Date Collected*[1]												Maximum Conc.	Minimum Conc.
	Eastern USA Background	*Region 9 PRGs*	*Soil Screening Levels*	*SB-1 100500007 5-7' 10/05/00*	*SB-2 100500009 6-8' 10/05/00*	*SB-3 100600014 3-5' 10/06/00*	*SB-4 100500011 4-6' 10/05/00*	*SB-5 100600013 6-8' 10/06/00*	*SB-6 100900040 4-6' 10/9/2000*	*SB-7 100600019 7-9' 10/06/00*	*SB-8 100600033 10-12' 10/06/00*	*SB-9 100600035 7-9' 10/06/00*	*SB-10 100600037 7-9' 10/06/00*	*MWFP-2 100600017 5-7' 10/06/00*	*MWFP-3 100900039 5-7' 10/09/00*		
2,4,5-Trichlorophenol		62000	270	0.96 U	0.91 U	1 U	1.1 U	1.2 U	1 U	1.1 U	0.94 U	1.1 U	0.97 U	1.2 U	1 U	1.2 U	0.91 U
Metals, milligrams per kilogram																	
Aluminum	33,000	100,000	--	7210	6570	6700	3210	3940	6310	3280	6670	8050	5990	3900	5890	8050	3210
Antimony	--	410	5	6.6 UJ	6.5 UJ	7.1 UJ	8.3 UJ	8.5 UJ	7.1 UJ	7.4 UJ	6.6 UJ	7.4 UJ	6.7 UJ	9.7 J	7.1 UJ	9.7	6.5
Arsenic	3-12**	1.6	29.0	12.5	8.9	8.8	12.8	3.7	6.1	6.6	5.8	14.6	6.9	23.6	10	23.6	3.7
Barium	15-600	67,000	1,600	76.4	69	56.7	51.4	71.8	54.8	550	53.2	47.2	41.2	145	46	550	41.2
Beryllium	0-1.75	1,900	63	0.55 U	0.54 U	0.59 U	0.69 U	0.71 U	0.59 UJ	0.62 U	0.55 U	0.61 U	0.56 U	0.69 U	0.59 U	0.71	0.54
Cadmium	0.1-1	450	8	0.55 U	0.54 U	0.59 U	0.69 U	0.71 U	0.59 UJ	1.3	0.55 U	0.61 U	0.56 U	0.96	0.59 U	1.3	0.54
Calcium	130-35,000**	--	--	4800	2020	1270	6600	4600	14200	10100	1930	7110	5640	67000	1550	67000	1270
Chromium	1.5-40**	210	38	11.2	9.5	8.9	25.5	6.2	9	48.3	8.2	13.2	8.5	155	10.7	155	6.2
Hexavalent Chromium	--	1,900	--	4.63 UJ	4.4 J	4.9 UJ	5.5 UJ	5.79 UJ	4.81 U	5.07 UJ	4.55 UJ	5.12 UJ	4.67 UJ	5.56 UJ	4.91 U	5.79	4.4
Cobalt	2.5-60**	41,000	--	7.5	7.6	7.6	6.9 U	7.1 U	7.5	6.2 U	6.7	7.5	6.6	6.9 U	7.4	7.6	6.2
Copper	1-50	64	38	17.8	19.9	11.5	111	11.3	19	187	13.5	25.8	15.2	94.6	22.3	187	11.3
Iron	2,000-550,000	100,000	--	18400	19400	18200	12600	6650	17600 J	18100	15800	16800	15700	24900	17800 J	24900	6650
Lead	4-61***	750	--	37 J	8.8 J	8.4 J	37.1 J	7.2 J	8.8	457 J	10 J	12.9 J	11.9 J	1950 J	9.1	1950	7.2
Magnesium	100-5,000	--	--	2370	2760	2340	851	1250	3070	1790	1750	5620	3800	4710	2340	5620	851
Manganese	50-5,000	19,000	--	328	453	366	63.4	59.6	351	173	290	126	278	373	243	453	59.6
Mercury	0.001-0.2	310	--	0.06 U	0.05 U	0.06 U	0.17	0.07 U	0.17	0.18	0.06 U	0.06 U	0.06 U	3.1	0.06 U	3.1	0.05
Nickel	0.5-25	20,000	130	16.5	17.3	16.8	10.5	13	16	13.3	13.7	21.1	15.5	13.1	17.2	21.1	10.5
Potassium	8,500-43,900**	--	--	764	767	675	337	354	516	818	452	767	762	411	534	818	337
Selenium	0.1-3.9	5,100	5	2	1.7	2.2	1.1	1.2	2 J	1.9	1.4	1.6	2	1.5	1.7 J	2.2	1.1
Silver	--	5100	34	1.1 U	1.1 U	1.2 U	1.4 U	1.4 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	1.4 U	1.2 U	1.4	1.1
Sodium	6,000-8,000	--	--	302	345	393	608	538	757	476	409	563	422	762	460	762	302
Thallium	--	67	--	1.2 U	1.1 U	1.2 U	1.4 U	1.4 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	1.3 U	1.2 U	1.4	1.1
Vanadium	1-300	7,200	6,000	15.8	12.3	13.8	13.4	9.3	12.4	10.1	15.5	16.4	13.7	17	12.5	17	9.3
Zinc	9-50	100,000	12,000	81.3 J	405 J	48.7 J	294 J	37.8 J	69.6	154 J	47.7 J	222 J	84.2 J	605 J	64.2	605	37.8
Others																	
Percent Solids, %				86.3	90.9	81.6	72.7	69.1	83.1	78.9	87.9	78.2	85.6	72	81.4	90.9	69.1
pH				8.32	8.46	7.14	8.49	7.05	10.1	7.74	7.69	7.91	7.26	7.95	7.5	10.1	7.05
Total Organic Carbon, %				0.56	0.18	0.5	1.8	1.6	1.3	0.63	0.35	0.49	0.48	1.7	0.29	1.8	0.18

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services. The analytical results for the SVOC, 3-Nitroaniline, was rejected during data validation for each sample.
3. Soil criteria from U.S EPA, Region 9 Preliminary Remediation Goals (PRGs) for Industrial Soil (October 2002) and from range of background metals concentrations measured in soil found in the eastern *United States from NYSDEC Division of Technical and Administrative Guidance Memorandum (TAGM)* #4046.

** A New York State Background value

*** Background levels for lead vary widely, average levels in undeveloped, rural areas range from 4-61 ppm while metropolitan/suburban areas range from 200-500 ppm.

J = indicates a laboratory estimated value or estimated as a result of data validation.
U = indicates compound was not detected at or above the listed detection limit.
UJ = indicates compound was not detected above the listed detection limit.
However, the reported quantitation limit is approximate and may or may
not represent the actual limit of quantitiation necessary to accurately
and precisely measure the compound in the sample.

R= indicates data rejected by data validator.
fbgs = feet below ground surface
SB = Site Background
-- = indicates value does not exist.
indicates concentration above soil criteria.

TABLE 4-7

SUMMARY OF LANDFILL GAS ANALYTICAL RESULTS

Peter Cooper Site
Gowanda, New York

		Sample ID and Landfill Gas Monitoring Well Location		
Constituent	*Unit*	*101200081* *GMW-1* *10/12/00*	*101200080* *GMW-2* *10/12/00*	*101200082* *GMW-3* *10/12/00*
Field Measured Parameters				
Lower Explosive Limit	%	>100	45	>100
Hydrogen Sulfide Gas	ppm	>1000	>1000	710
Oxygen	%, v/v	0.5	21.3	17.5
Carbon Monoxide	ppm	1	0	6
PID Measurements	ppm	2.5	325	13
Laboratory Parameters				
Oxygen + Argon	%, v/v	6.58	22.1	12.9
Nitrogen	%, v/v	52.5	77.6	57.2
Methane	%, v/v	31.1	0.145	18.7
Carbon Dioxide	%, v/v	9.8	0.136	11.2
Chloromethane	ug/m^3	<25	<2	<25
Vinyl Chloride	ug/m^3	<25	<2	<25
Bromomethane	ug/m^3	<25	<2	<25
Chloroethane	ug/m^3	<25	<2	<25
Acetone	ug/m^3	1200	150	2900
Trichlorofluoromethane	ug/m^3	<25	1.7 TR	<25
1,1-Dichloroethene	ug/m^3	<25	<2	<25
Methylene chloride	ug/m^3	<25	<2	<25
Trichlorotrifluoroethane	ug/m^3	<25	<2	<25
Carbon Disulfide	ug/m^3	250	93	3200
trans-1,2-Dichloroethene	ug/m^3	<25	<2	<25
1,1-Dichloroethane	ug/m^3	<25	<2	<25
Methyl tert-Butyl Ether	ug/m^3	<25	<2	<25
Vinyl Acetate	ug/m^3	<25	14	<25
2-Butanone	ug/m^3	290	43	1100
cis-1,2-Dichloroethene	ug/m^3	<25	<2	<25
Chloroform	ug/m^3	<25	<2	<25
1,2-Dichloroethane	ug/m^3	<25	<2	<25
1,1,1-Trichloroethane	ug/m^3	<25	<2	<25
Benzene	ug/m^3	180	<2	74
Carbon Tetrachloride	ug/m^3	<25	<2	<25
1,2-Dichloropropane	ug/m^3	<25	<2	<25
Bromodichloromethane	ug/m^3	<25	<2	<25
Trichloroethene	ug/m^3	<25	<2	<25
cis-1,3-Dichloropropene	ug/m^3	<25	<2	<25
4-Methyl-2-pentanone	ug/m^3	370	3.4	140
trans-1,3-Dichloropropene	ug/m^3	<25	<2	<25
1,1,2-Trichloroethane	ug/m^3	<25	<2	<25
Toluene	ug/m^3	2600	41	270
2-Hexanone	ug/m^3	<25	7	<25
Dibromochloromethane	ug/m^3	<25	<2	<25

TABLE 4-7

SUMMARY OF LANDFILL GAS ANALYTICAL RESULTS

Peter Cooper Site
Gowanda, New York

		Sample ID and Landfill Gas Monitoring Well Location		
Constituent	***Unit***	***101200081 GMW-1 10/12/00***	***101200080 GMW-2 10/12/00***	***101200082 GMW-3 10/12/00***
1,2-Dibromoethane	ug/m^3	<25	<2	<25
Tetrachloroethene	ug/m^3	<25	<2	<25
Chlorobenzene	ug/m^3	<25	<2	<25
Ethylbenzene	ug/m^3	66	3.5	84
m- & p-Xylenes	ug/m^3	99	3.3	130
Bromoform	ug/m^3	<25	<2	<25
Styrene	ug/m^3	<25	<2	20 TR
o-Xylene	ug/m^3	51	1.4 TR	60
1,1,2,2-Tetrachloroethane	ug/m^3	<25	<2	<25
1,3-Dichlorobenzene	ug/m^3	<25	<2	<25
1,4-Dichlorobenzene	ug/m^3	48	<2	<25
1,2-Dichlorobenzene	ug/m^3	<25	<2	<25

Notes:

1. Qualifications reflect the 100% data validation performed by Data Validation Services.
2. Sample locations shown on Plate 1.

< = none detected

TR = trace value

TABLE 4-8

ANALYTICAL RESULTS FOR OVERBURDEN GROUNDWATER SAMPLES FROM THE INACTIVE LANDFILL AREA

Peter Cooper Site
Gowanda, New York

Compound[2]	*Groundwater Criteria*[3]	*Sample Location, Identification and Date Collected*[1]																*Maximum Conc.*	*Minimum Conc.*
		MW-1SR		*MW-2SR*		*MW-3SR*		*MW-4S*		*MW-5S*		*MW-6S*		*MW-7S*		*MW-8S*			
		111000120	*050101123*	*110700108*	*050401147*	*110700109*	*050201136*	*111000117*	*050301144*	*110900112*	*050301143*	*110700110*	*050401152*	*111000116*	*050401151*	*110800091*	*043001121*		
		11/10/2000	*5/1/2001*	*11/7/2000*	*5/4/2001*	*11/7/2000*	*5/2/2001*	*11/10/2000*	*5/3/2001*	*11/9/2000*	*5/3/2001*	*11/7/2000*	*5/4/2001*	*11/10/2000*	*5/4/2001*	*11/8/2000*	*4/30/2001*		
Volatile Organic Compounds, micrograms per liter																			
Benzene	1	10 U	10 U	100 U	10 U	100 U	10 UJ	100 U	1.3 J	10 U	10 U	1.6 J	1.5 J	10 U	10 U	10 U	10 U	100 U	1.3 J
Chlorobenzene	5	10 U	10 U	100 U	10 U	100 U	10 UJ	100 U	47	10 U	10 U	160	190	10 U	10 U	10 U	10 U	190	10 UJ
1,2-Dichlorobenzene	3	10 U	10 U	100 U	10 U	100 U	10 UJ	100 U	5 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	5 J
1,4-Dichlorobenzene	3	10 U	10 U	100 U	10 U	100 U	10 UJ	100 U	2.4 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	2.4 J
Ethylbenzene	5	10 U	10 U	100 U	10 U	100 U	1.6 J	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	1.6
m/p-Xylene	5	10 U	10 U	100 U	10 U	100 U	10 UJ	100 U	1 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	1 J
o-Xylene	5	10 U	10 U	100 U	10 U	100 U	10 UJ	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	10 U
Toluene	5	10 U	10 U	100 U	10	17 J	10 J	100 U	3.2 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100 U	3.2 J
Semi-Volatile Organic Compounds, micrograms per liter																			
2-Chlorophenol	--	R	9.4 U	10 U	9.4 U	20 U	9.7 U	10 U	9.4 U	10 U	9.4 U	1.4 J	1.8 J	10 U	9.4 U	10 U	9.4 U	20 U	1.4 J
2,4-Dichlorophenol	5*	R	9.4 U	10 U	69.4 U	20 U	9.7 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	69.4 U	9.4 U
2,4-Dimethylphenol	50*	R	9.4 U	10 U	9.4 U	2.6 J	3 J	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	2.6 J
2,4-Dinitrophenol	10*	R	24 U	50 U	24 U	100 UJ	24 U	50 UJ	24 U	50 UJ	24 U	50 UJ	24 U	50 UJ	24 U	50 U	24 U	100 UJ	24 U
4,6-Dintiro-2-methylphenol	--	R	24 U	50 U	24 U	100 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	100 U	24 U
4-Chloro-3-Methylphenol	--	R	9.4 U	10 U	9.4 U	20 U	9.7 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	20 U	9.4 U
2-Methylphenol	--	R	9.4 U	1.3 J	8.2 J	18 J	8.1 J	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	18 J	1.3 J
4-Methylphenol	--	R	9.4 U	96	1400 D	210	2400 D	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	2400 D	9.4 U
2-Nitrophenol	--	R	9.4 U	10 U	9.4 U	20 U	9.7 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	20 U	9.4 U
4-Nitrophenol	--	R	24 U	50 U	24 U	100 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	100 U	24 U
Pentachlorophenol	1	R	24 U	50 U	24 U	100 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	100 U	24 U
Phenol	1	R	9.4 U	15	220 DJ	38	480 DJ	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	480 DJ	9.4 U
2,4,6-Trichlorophenol	--	R	9.4 U	10 U	9.4 U	20 U	9.7 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	20 U	9.4 U
2,4,5-Trichlorophenol	--	R	24 U	10 U	24 U	20 U	24 U	10 U	24 U	10 U	24 U	10 U	24 U	10 U	24 U	10 U	24 U	24 U	10 U
Total Metals, milligrams per liter																			
Arsenic	0.025	0.01 U	0.01 U	0.151	0.196	0.0621	0.0479 J	0.0714	0.0582	0.01 U	0.01 U	0.0338	0.025 U	0.0172	0.025 U	0.01 U	0.01 U	0.196	0.01 U
Calcium	--	286	213	160	209	127	164	116	209	323	473	203	213	106	235	179	167	473	106
Chromium	0.05	0.01 U	0.01 U	0.143	0.251	0.436	0.366	0.209	0.371	0.01 U	0.01 U	0.0293	0.0228	0.0137	0.01 UJ	0.01 U	0.01 U	0.436	0.01 U
Hexavalent Chromium	0.05	0.01 U	(0.01 U) R	0.01 U	(0.02 U) R	0.04 U	(0.01 U) R	0.0215	(0.04 U) R	0.01 U	(0.01 U) R	0.01 U	(0.01 U) R	0.01 UJ	0.0172 J	0.01 U	(0.01 U) R	0.04 U	0.01 U
Iron	0.3	0.1 U	0.1 U	0.107	0.1 U	0.1 U	0.13	0.1 U	0.14	23	41	13.4	16.6	9.04	2.29	10.5	11.7	41	0.1 U
Magnesium	35*	25	16.8	90.2	154	167	136	83.6	150	41.6	37	73.9	61.8	22.9	34	25.7	20.7	167	16.8
Potassium	--	6.4	4.28	4.07	5.74	5.83	5.93	8.88	9.49	9.86	7.87	5.85	4.67	37.6	22.2	5.1	4.28	37.6	4.07
Sodium	20	11.6	9.08	17.6	22.1	20.9	18.5	22.1	26.1	25.8	12.4	8.31	5 U	1670	229	28.2	28.6	1670	5 U
Zinc	2*	0.0223	0.0297	0.0208	0.03 U	0.02 U	0.0234 J	0.02 U	0.02 U	0.178	0.02 U	0.02 U	0.03 U	0.151	0.03 U	0.0656	0.204	0.204	0.02 U
Soluble Metals[4], milligrams per liter																			
Arsenic	0.025	NA	NA	NA	NA	NA	0.0538 J	NA	NA	NA	NA	NA	NA	0.0145	NA	NA	NA	0.0538 J	0.0145
Calcium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	114	NA	NA	NA	114	114
Chromium	0.05	NA	NA	NA	NA	NA	0.354	NA	NA	NA	NA	NA	NA	0.01 UJ	NA	NA	NA	0.354	0.01 UJ
Hexavalent Chromium	0.05	NA	NA	NA	NA	NA	(0.01 U) R	NA	NA	NA	NA	NA	NA	0.013 J	NA	NA	NA	0.013 J	0.013 J
Iron	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.61	NA	NA	NA	4.61	4.61
Magnesium	35*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	23.7	NA	NA	NA	23.7	23.7
Potassium	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	38.5	NA	NA	NA	38.5	38.5
Sodium	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1630	NA	NA	NA	1630	1630
Zinc	2*	NA	NA	NA	NA	NA	0.105 J	NA	NA	NA	NA	NA	NA	0.079	NA	NA	NA	0.105 J	0.079

TABLE 4-8

ANALYTICAL RESULTS FOR OVERBURDEN GROUNDWATER SAMPLES FROM THE INACTIVE LANDFILL AREA

Peter Cooper Site
Gowanda, New York

Compound[2]	Groundwater Criteria[3]	*Sample Location, Identification and Date Collected*[1]																Maximum Conc.	Minimum Conc.
		MW-1SR		*MW-2SR*		*MW-3SR*		*MW-4S*		*MW-5S*		*MW-6S*		*MW-7S*		*MW-8S*			
		111000120 *11/10/2000*	*050101123* *5/1/2001*	*110700108* *11/7/2000*	*050401147* *5/4/2001*	*110700109* *11/7/2000*	*050201136* *5/2/2001*	*111000117* *11/10/2000*	*050301144* *5/3/2001*	*110900112* *11/9/2000*	*050301143* *5/3/2001*	*110700110* *11/7/2000*	*050401152* *5/4/2001*	*111000116* *11/10/2000*	*050401151* *5/4/2001*	*110800091* *11/8/2000*	*043001121* *4/30/2001*		
Other Geochemical Data, milligrams per liter																			
Ammonia	2	3.26	1.05	523	633	837	693	NA	810	23.9	6.32	219	153	151	93.7	2.49	2.19	837	1.05
Bicarbonate Alkalinity	--	469	433	2250	3200	3720	3350	2570	3850	622	410	1610	1280	1480	1000	371	321	3850	321
Carbonate Alkalinity	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Chloride	250	8.13	9.74	21.7	17.2	32.8	22.7	NA	26.4	6.82	6.9	10.6	3.82	2310	587	22.3	61.5	2310	3.82
Ferrous Iron	--	NA	0.1 U	0.128 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.128 J	0.1 U
Nitrate Nitrogen	10	1.16	1.72	0.5 U	0.04 U	0.5 U	0.05 U	NA	0.05 U	0.5 UJ	0.05 U	0.5 UJ	0.0502	22.7	0.05 U	0.5 U	0.5 U	22.7	0.04 U
Soluble Organic Carbons	--	4.2225 U	NA	56.0	NA	113	102.5	57.4	NA	5.98	NA	16.5	NA	78.3	NA	5.72 U	NA	112.75	4.2225 U
Sulfate	250	416	168	463	48.2	24.0	99.3	NA	209	575	966	2.64	4.22	127	236	260	181	966	2.64
Total Alkalinity	--	469	433	2250	3200	3720	3350	2570	3850	622	410	1610	1280	1480	1000	371	321	3850	321
Total Dissolved Solids	--	1070	NA	729	NA	995	NA	NA	NA	1290	NA	839	NA	4900	NA	770	NA	4900	729
Total Hardness	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	570	NA	570	570
Total Kjeldahl Nitrogen	--	3.2	1.51	494	625	762	698	NA	839	22.8	6.41	227	148	165	90.3	2.37	2.65	839	1.51
Total Organic Carbon	--	2.8775 U	2.62	56.45	187.50	112.75	105.00	55.35	90.03	5.85 U	7.59	15.45	12.08	70.13	21.25	3.36 U	2.43	187.5	2.43
Total Sulfide	0.05*	1 U	2 U	38.0	55	52.0	37.0 J	34.0	19 J	1 U	2 UJ	1 U	1 UJ	1 U	1 UJ	1.1 U	2 U	55	1 UJ
Total Suspended Solids	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13.1	NA	13.1	13.1
Turbidity, NTU	--	NA	0.37	NA	NA	NA	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	43.8	150	0.37
Field Measured Parameters[5]																			
Conductivity (uS/cm)	--	998	1063	3684	5780	5119	5704	3993	7117	1376	2185	2244	2230	6358	2986	1102	1085	7117	998
Dissolved Oxygen (ppm)	--	4.34	1.04	1.43	3.33	1.63	0.28	3.79	5.37	2.28	5.26	9.34	0.2	--	1.22	0.63	0.5	9.34	0.2
Ferrous Iron (mg/l)	--	0	0	NA	0	0	0	0	0	17.5 (5x dil)	6	12	5	--	2	--	6	17.5 (5X dil)	0
Oxidation Reduction Potential (mV)	--	11.9	291.1	-371.6	-291.4	-369.1	-327.8	-365.5	-356.3	-95.2	-27.9	-196.4	-60.3	-96.9	53.5	-74.7	-37.7	291.1	-371.6
pH (pH units)	--	6.41	6.63	7.03	7.9	7.08	5.21	7.16	6.01	6.68	4.39	6.69	5.55	7.18	5.79	6.71	6.08	7.9	4.39
Temperature (°C)	--	12.91	11.6	14.19	11.32	15.46	15.96	11.77	13.7	15.53	11.35	14.93	10.31	12.81	12.26	16.7	14.93	16.7	10.31
Turbidity, NTU	--	3	127.9	4.72	46.1	3.24	25.5	26	1.5	14	3.4	1.07	--	>1000	--	0.84	70.6	127.9	0.84

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Groundwater critiera for Class GA groundwater as provided in Division of Water Technical and Operational Series (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, October 22, 1993, reissued June 1998.
   * values are guidance values.
4. Samples collected for soluble metals analysis were field filtered.
5. The YSI 600XL was used in the November and May sampling events for temperature, pH, specific electrical conductance, dissolved oxygen,and redox potential measurements.
   Ferrous iron was field measured with the HACH18-R field kit (for QC, 10% were sent to analytical laboratory). The turbidity measurements on the YSI 600 XL were not accurate during the May sampling event and as such, the LaMotte turbidity meter was used to measure turbidity. Turbidity measurements were collected with the TURB2020 meter during the November sampling event.
   November sampling events.

mg/l = milligrams per liter
NA = not analyzed
(values) = laboratory reported value prior to data validation.
NTU = Nephelometric Turbidity Unit
uS/cm = microsiemens per centimeter at 25°C.
mV = millivolts
ppm = parts per million

J = indicates an estimated value.
U = indicates compound was not detected.
D = indicates spike diluted out.
R= indicates value was rejected by data validator.
indicates exceedance of groundwater criteria.
UJ = indicates compound was not detected above *the listed detection limit.*
However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitiation necessary to accurately and precisely measure the compound in the sample.

TABLE 4-9

ANALYTICAL RESULTS FOR BEDROCK GROUNDWATER SAMPLES FROM THE INACTIVE LANDFILL AREA

Peter Cooper Site
Gowanda, New York

		Sample Location and Date Collected[1]															
		MW-1D		*MW-2D*		*MW-4D2*		*MW-4D(R)*		*MW-5D*		*MW-7D*		*MW-8D*			
Constituent[2]	*Groundwater Criteria*[3]	*111000119* *11/10/2000*	*050101124* *5/1/2001*	*110800107* *11/8/2000*	*050401148* *5/4/2001*	*110900115* *11/9/2000*	*050301146* *5/3/2001*	*111000118* *11/10/2000*	*050301145* *5/3/2001*	*110900111* *11/9/2000*	*050301141* *5/3/2001*	*110700105* *11/7/2000*	*050401149* *5/4/2001*	*110900114* *11/9/2000*	*040301122* *4/30/2001*	*Maximum Conc.*	*Minimum Conc.*
Volatile Organic Compounds, micrograms per liter																	
Benzene	1	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	5	10 U	10 U	10 U	10 U	10 U	10 U	10	6.8 J	10 U	10 U	10 U	10 U	10 U	10 U	10	6.8 J
1,2-Dichlorobenzene	3	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	3	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
m/p-Xylene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
o-Xylene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	5	10 U	10 U	10 U	10 U	1.5 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	1.5 J
Semi-Volatile Organic Compounds, micrograms per liter																	
2-Chorophenol	--	10 U	9.4 U	10 U	9.4 U	10 U	10 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U
2,4,5-Trichlorophenol	--	10 U	24 U	10 U	24 U	10 U	26 U	10 U	24 U	10 U	24 U	10 U	24 U	10 U	24 U	26 U	10 U
2,4,6-Trichlorophenol	--	10 U	9.4 U	10 U	9.4 U	10 U	10 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U
2,4-Dichlorophenol	5*	10 U	9.4 U	10 U	9.4 U	10 U	10 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U
2,4-Dimethylphenol	50*	10 U	9.4 U	10 U	9.4 U	10 U	10 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U
2,4-Dinitrophenol	10*	50 UJ	24 U	50 U	24 U	50 UJ	26 U	50 UJ	24 U	50 UJ	24 U	50 U	24 U	50 UJ	24 U	50 UJ	24 U
2-Methylphenol	--	10 U	9.4 U	10 U	9.4 U	10 U	10 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U
2-Nitrophenol	--	10 U	9.4 U	10 U	9.4 U	10 U	10 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U
4,6-Dintiro-2-Methylphenol	--	50 U	24 U	50 U	24 U	50 U	26 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U
4-Chloro-3-Methylphenol	--	10 U	9.4 U	10 U	9.4 U	10 U	10 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U
4-Methylphenol	--	10 U	9.4 U	10 U	9.4 U	10 U	10 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U
4-Nitrophenol	--	50 U	24 U	50 U	24 U	50 U	26 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U
Pentachlorophenol	1	50 U	24 U	50 U	24 U	50 U	26 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U	50 U	24 U
Phenol	1	10 U	9.4 U	10 U	9.4 U	10 U	10 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U	10 U	9.4 U
Total Metals, milligrams per liter																	
Arsenic	0.025	0.01 U	0.01 U	0.0248	0.0283 U	0.01 U	0.0483 J	0.0192	0.01 U	0.01 U	0.01 U	0.01 U	0.025 U	0.01 U	0.01 U	0.0483 J	0.01 U
Calcium	--	18.8	28.3	232	252	49.9	59.8	206	211	562	586	21.6	54	27.5	45.2	586	18.8
Chromium	0.05	0.01 U	0.0113	0.0524	0.0551	0.0134	0.0492	0.133	0.088	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.0155	0.133	0.01 U
Hexavalent Chromium	0.05	0.01 U	(0.01 U) R	40 U	0.0592 J	0.01 U	(0.01 U) R	(0.01 U) R	(0.01 U) R	0.01 U	(0.01 U) R	0.01 U	0.0225 J	0.01 U	(0.01 U) R	40 U	0.01 U
Iron	0.3	13.5	16.1 J	0.146	0.115	8.45	70	1.98	4.81	66.9	71.4	0.378	1.81	6.92	8.4	71.4	0.115
Magnesium	35*	6.81	8.3	104	107	15.9	22.5	89.4	75.2	36	35.4	5.84	15.7	9.05	2.6	107	2.6
Potassium	--	2.59	2.66	24.3	25.2	7.69	13.9	23.7	20.8	3.43	3.76	3.33	4.69	4.24	5.28	25.2	2.59
Sodium	20	154	144	295	297	950	1030	197	185	21.2	27	384	347	163	109	1030	21.2
Zinc	2*	0.042	0.0652	0.14	0.03 U	0.118	0.416	0.02 U	0.0451	0.0348	0.02 U	0.02 U	0.03 U	0.0655	0.561	0.561	0.02 U
Soluble Metals[4]**, milligrams per liter**																	
Arsenic	0.025	0.01 U	0.01 U	NA	NA	NA	0.025 U	0.0152	0.025 U	NA	NA	NA	NA	NA	0.01 U	0.025 U	0.01 U
Calcium	--	14.9	24.5	NA	NA	NA	NA	209	NA	NA	NA	NA	NA	NA	NA	209	14.9
Chromium	0.05	0.01 U	0.01 U	NA	NA	NA	0.0114	0.134	0.0821	NA	NA	NA	NA	NA	(0.01 U) UJ	0.134	0.01 U
Hexavalent Chromium	0.05	0.01 U	(0.01 U) R	NA	NA	NA	0.0103 J	0.01 U	(0.01 U) R	NA	NA	NA	NA	NA	0.0118 J	0.0118 J	0.01 U
Iron	0.3	0.708	0.105	NA	NA	NA	NA	0.926	NA	NA	NA	NA	NA	NA	NA	0.926	0.105
Magnesium	35*	4.76	6.88	NA	NA	NA	NA	90.8	NA	NA	NA	NA	NA	NA	NA	90.8	4.76
Potassium	--	2 U	2.07	NA	NA	NA	NA	24.4	NA	NA	NA	NA	NA	NA	NA	24.4	2 U
Sodium	20	154	140	NA	NA	NA	NA	203	NA	NA	NA	NA	NA	NA	NA	203	140
Zinc	2*	0.02 U	0.0236	NA	NA	NA	0.0784	0.02 U	0.03 U	NA	NA	NA	NA	NA	0.02 U	0.0784	0.02 U

TABLE 4-9

ANALYTICAL RESULTS FOR BEDROCK GROUNDWATER SAMPLES FROM THE INACTIVE LANDFILL AREA

Peter Cooper Site
Gowanda, New York

		Sample Location and Date Collected[1]															
		MW-1D		*MW-2D*		*MW-4D2*		*MW-4D(R)*		*MW-5D*		*MW-7D*		*MW-8D*			
Constituent[2]	**Groundwater Criteria**[3]	*111000119 11/10/2000*	*050101124 5/1/2001*	*110800107 11/8/2000*	*050401148 5/4/2001*	*110900115 11/9/2000*	*050301146 5/3/2001*	*111000118 11/10/2000*	*050301145 5/3/2001*	*110900111 11/9/2000*	*050301141 5/3/2001*	*110700105 11/7/2000*	*050401149 5/4/2001*	*110900114 11/9/2000*	*040301122 4/30/2001*	**Maximum Conc.**	**Minimum Conc.**
Other Geochemical Data, milligrams per liter																	
Ammonia	2	0.826	0.8	353	349	9.35	8.99	241	186	10.4	10.5	1.31	1.8	0.762	0.716	353	0.716
Bicarbonate Alkalinity	--	274	260	1980	1980	1100	2000	2010	1550	289	275	902	620	350	4.67	2010	4.67
Carbonate Alkalinity	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	85.3	85.3	2 U
Chloride	250	111	98.5	177	148	579	914	62.5	44.6	14.2	11	249	464	87.1	148	914	11
Ferrous Iron	--	NA	NA	NA	NA	NA	NA	0.524	NA	NA	22	NA	NA	NA	NA	22	0.524
Nitrate Nitrogen	10	0.5 U	0.5 U	0.5 U	0.0548	0.5 U	0.715	0.5 U	0.05 U	0.5 UJ	0.484	0.5 U	0.0753	0.5 UJ	0.548	0.715	0.05 U
Soluble Organic Carbon	--	1.43 U	7.87 J	42.1	NA	12.275	12.7 J	40.925	39.625 J	3.5325 U	NA	3.835 U	NA	2.5925 U	16.15	42.1	1.43 U
Sulfate	250	2.07	10.4	715	745	13.2	3.4	162	266	1620	1460	30.5	50.8	17.4	30.7	1620	2.07
Total Alkalinity	--	274	260	1980	1980	1100	2000	2010	1550	289	275	902	620	350	90	2010	90
Total Dissolved Solids	--	451	NA	1930	NA	1980	NA	1170	NA	2460	NA	1070	NA	533	NA	2460	451
Total Kjeldahl Nitrogen	--	1.37	1.37	336	351	11.3	10.4	238	181	10.1	10.2	2.06	2.73	1.29	2.05	351	1.29
Total Organic Carbon	--	1.06 U	3.165 J	38.9	31.45	11.675	10.6 J	41.775	31.625 J	3.6975 U	5.31	3.775 U	5.495	1.61	15.45	41.775	1.06 U
Total Sulfide	0.05*	1 U	1.2	9.7	6.4 J	1 U	2 UJ	7.6	6.8	1 U	2 U	1 U	1.2 J	1 U	2 U	9.7	1 U
Field Measured Parameters[5]																	
pH (pH units)	--	7.77	5.98	6.59	6.54	7.2	6.12	6.73	6.47	6.19	4.83	7.23	6.28	7.9	10.68	10.68	4.83
Conductivity (uS/cm)	--	528	826	4802	1595	2454	5006	2672	3214	1920	2538	1689	1642	994	711	5006	528
Temperature (°C)	--	11.37	15.48	13.51	13.59	14.82	12.14	13.01	19.75	13.4	12.23	12.05	12.97	14.94	17.15	19.75	11.37
Turbidity (NTU)	--	>1000	579	2	9.6	51.8	276.5	72	321	3.34	16.1	2.89	35.8	33	1049	1049	2
Oxidation Reduction Potential (mV)	--	-191.6	-149	-283.3	-112.2	-92.8	-46.9	-330.5	-266.6	-94.9	6.6	-146.5	-9.1	-35.9	202.5	202.5	-330.5
Dissolved Oxygen (ppm)	--	2.94	0.77	0.63	7.32	3.1	7.9	8.31	1.26	1.73	0.45	0.91	0.91	4.49	2.82	8.31	0.45
Ferrous Iron (mg/l)	--	0.6	0	0	0	0	0.6	0.2	0	4.5	6.4	0.2	0	0	0	6.4	0

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Groundwater criteria for Class GA groundwater as provided in Division of Water Technical and Operational Series (1.1.1), Ambient Water Quality Standards and Guidance *Values and Groundwater Effluent Limitations*, October 22, 1993, reissued June 1998.
   * Values are guidance values.
4. Samples collected for soluble metals analysis were field filtered.
5. The YSI 600XL was used in the November and May sampling events for temperature, pH, specific electrical conductance, dissolved oxygen,and redox potential measurements. Ferrous iron was field measured with the HACH18-R field kit (for QC, 10% were sent to analytical laboratory). The turbidity measurements on the YSI 600 XL were not accurate during the May sampling event and as such, the LaMotte turbidity meter was used to measure turbidity. Turbidity measurements were collected with the TURB2020 meter during *the November sampling* event.

NA = not analyzed
-- = indicates value does not exist.
mg/l = milligrams per liter
NTU = Nephelometric Turbidity Unit
uS/cm = microsiemens per centimeter at 25°C.
ppm = parts per million
mV = millivolts

J = indicates an estimated value.
U = indicates compound was not detected.
R= indicates data rejected by data validator.
(value) = indicates value reported before data validation.
indicates exceedance of groundwater criteria.
UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent *the actual limit of quantitiation necessary to accurately* and precisely measure the compound in the sample.

TABLE 4-10

ANALYTICAL RESULTS FOR OVERBURDEN GROUNDWATER FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

		Sample Location, Identification and Date Collected [1]					
		MWFP-2S		*MWFP-3S*			
Constituent [2]	*Groundwater Criteria* [3]	*110700106* *11/7/2000*	*050301140* *5/3/2001*	*110700088* *11/7/2000*	*050201128* *5/2/2001*	*Maximum Conc.*	*Minimum Conc.*
Volatile Organic Compounds, micrograms per liter							
Acetone	50*	22	NA	10 U	NA	22	10 U
Benzene	1	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	50*	10 U	NA	10 U	NA	10 U	10 U
Bromoform	50*	10 U	NA	10 U	NA	10 U	10 U
Bromomethane	5	10 U	NA	10 U	NA	10 U	10 U
2-Butanone (MEK)	50*	10 U	NA	10 U	NA	10 U	10 U
Methyl tert-Butyl Ether	--	10 U	NA	10 U	NA	10 U	10 U
Carbon Disulfide	--	10 U	NA	10 U	NA	10 U	10 U
Carbon Tetrachloride	5	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	5	10 U	NA	10 U	NA	10 U	10 U
Chloroethane	5	10 U	NA	10 U	NA	10 U	10 U
Chloroform	7	10 U	10 U	10 U	10 U	10 U	10 U
Chloromethane	--	10 U	NA	10 U	NA	10 U	10 U
1,2-Dibromo-3-chloropropane	0.04	10 U	NA	10 U	NA	10 U	10 U
Cyclohexane	--	11	NA	10 U	NA	11	10 U
Dibromochloromethane	50*	10 U	NA	10 U	NA	10 U	10 U
1,2-Dibromoethane	--	10 U	NA	10 U	NA	10 U	10 U
1,2-Dichlorobenzene	3	10 U	NA	10 U	NA	10 U	10 U
1,4-Dichlorobenzene	3	10 U	NA	10 U	NA	10 U	10 U
1,3-Dichlorobenzene	3	10 U	NA	10 U	NA	10 U	10 U
Dichlorodifluoromethane	5	10 U	NA	10 U	NA	10 U	10 U
1,1-Dichloroethane	5	10 U	NA	2 J	NA	10 U	2 J
1,2-Dichloroethane	0.6	10 U	NA	10 U	NA	10 U	10 U
1,1-Dichloroethene	5	10 U	NA	10 U	NA	10 U	10 U
trans-1,2-Dichloroethene	5	10 U	NA	10 U	NA	10 U	10 U
cis-1,2-Dichloroethene	5	10 U	NA	5 J	NA	10 U	5 J
1,2-Dichloropropane	1	10 U	NA	10 U	NA	10 U	10 U
trans-1,3-Dichloropropene	0.4	10 U	NA	10 U	NA	10 U	10 U
cis-1,3-Dichloropropene	0.4	10 U	NA	10 U	NA	10 U	10 U
Ethylbenzene	5	10 U	NA	10 U	NA	10 U	10 U
2-Hexanone	50*	10 U	NA	10 U	NA	10 U	10 U
Isopropylbenzene	5	10 U	NA	10 U	NA	10 U	10 U
Methyl Acetate	--	10 U	NA	10 U	NA	10 U	10 U
Methylcyclohexane	--	16	NA	10 U	NA	16	10 U
Methylene Chloride	5	10 U	NA	10 U	NA	10 U	10 U
4-Methyl-2-Pentanone	--	10 U	NA	10 U	NA	10 U	10 U
Styrene	5	10 U	NA	10 U	NA	10 U	10 U
1,1,2,2-Tetrachloroethane	5	10 U	NA	10 U	NA	10 U	10 U
Tetrachloroethene	5	10 U	10 U	5.5 J	3.1 J	10 U	3.1 J
Toluene	5	10 U	NA	10 U	NA	10 U	10 U
1,2,4-Trichlorobenzene	5	10 U	NA	10 U	NA	10 U	10 U
1,1,1-Trichloroethane	5	10 U	NA	10 U	NA	10 U	10 U
1,1,2-Trichloroethane	1	10 U	NA	10 U	NA	10 U	10 U
Trichloroethene	5	10 U	10 U	2.9 J	3.6 J	10 U	2.9 J
Trichlorofluoromethane	5	10 U	NA	10 U	NA	10 U	10 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	5	10 U	NA	10 U	NA	10 U	10 U
Vinyl Chloride	2	10 U	NA	10 U	NA	10 U	10 U
m-/p-Xylene	5	4.6	NA	10 U	NA	10 U	4.6
o-Xylene	5	1.9	NA	10 U	NA	10 U	1.9
Semi-Volatile Organic Compounds, micrograms per liter							
Acenaphthene	20*	10 U	NA	10 U	NA	10 U	10 U
Acenaphthylene	--	10 U	NA	10 U	NA	10 U	10 U
Acetophenone	--	10 U	NA	10 U	NA	10 U	10 U
Anthracene	50*	10 U	NA	10 U	NA	10 U	10 U
Atrazine	7.5	10 U	NA	10 U	NA	10 U	10 U
Benzaldehyde	--	10 U	NA	10 U	NA	10 U	10 U
Benzo(a)anthracene	0.002	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
Benzo(a)pyrene	--	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
Benzo(b)fluoranthene	0.002*	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
Benzo(g,h,i)perylene	--	10 U	NA	10 U	NA	10 U	10 U
Benzo(k)fluoranthene	0.002*	10 U	NA	10 U	NA	10 U	10 U

TABLE 4-10

ANALYTICAL RESULTS FOR OVERBURDEN GROUNDWATER FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

		Sample Location, Identification and Date Collected [1]					
		MWFP-2S		*MWFP-3S*			
Constituent [2]	*Groundwater Criteria* [3]	*110700106 11/7/2000*	*050301140 5/3/2001*	*110700088 11/7/2000*	*050201128 5/2/2001*	*Maximum Conc.*	*Minimum Conc.*
1,1-Biphenyl	5	10 U	NA	10 U	NA	10 U	10 U
Butyl Benzyl Phthalate	50*	10 U	NA	10 U	NA	10 U	10 U
di-N-Butylphthalate	–	10 U	NA	1.1 J	NA	10 U	1.1 J
Caprolactam	–	290 D	NA	10 U	NA	290 D	10 U
Carbazole	–	10 U	NA	10 U	NA	10 U	10 U
Indeno(1,2,3-cd)pyrene	0.002*	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
4-Chloroaniline	5	10 U	NA	10 U	NA	10 U	10 U
bis(2-chloroethoxy)methane	–	10 U	NA	10 U	NA	10 U	10 U
bis(2-chloroethyl)ether	–	10 U	NA	10 U	NA	10 U	10 U
2-Chloronaphthalene	10*	10 U	NA	10 U	NA	10 U	10 U
2-Chlorophenol	–	10 U	NA	10 U	NA	10 U	10 U
2,2-oxybis(1-chloropropane)	–	10 U	NA	10 U	NA	10 U	10 U
Chrysene	0.002*	10 U	NA	10 U	NA	10 U	10 U
Dibenzo(a,h)anthracene	–	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
Dibenzofuran	–	10 U	NA	10 U	NA	10 U	10 U
3,3-Dichlorobenzidine	–	10 U	NA	10 U	NA	10 U	10 U
2,4-Dichlorophenol	5	10 U	NA	10 U	NA	10 U	10 U
Diethylphthalate	50*	10 U	NA	10 U	NA	10 U	10 U
Dimethyl Phthalate	50*	10 U	NA	10 U	NA	10 U	10 U
2,4-Dimethylphenol	50*	10 U	NA	10 U	NA	10 U	10 U
2,4-Dinitrophenol	10*	25 U	NA	25 U	NA	25 U	25 U
2,4-Dinitrotoluene	50	10 U	NA	10 U	NA	10 U	10 U
2,6-Dinitrotoluene	5	10 U	NA	10 U	NA	10 U	10 U
bis(2-Ethylhexyl)phthalate	–	4 J	NA	10 U	NA	10 U	4 J
Fluoranthene	50*	10 U	NA	10 U	NA	10 U	10 U
Fluorene	50*	10 U	NA	10 U	NA	10 U	10 U
Hexachlorobenzene	0.04	10 U	NA	10 U	NA	10 U	10 U
Hexachlorobutadiene	0.5	10 U	NA	10 U	NA	10 U	10 U
Hexachlorocyclopentadiene	5	10 U	NA	10 U	NA	10 U	10 U
Hexachloroethane	5	10 U	NA	10 U	NA	10 U	10 U
Isophorone	50*	10 U	NA	10 U	NA	10 U	10 U
2-Methylnaphthalene	–	10 U	NA	10 U	NA	10 U	10 U
4,6-Dinitro-2-Methylphenol	–	25 U	NA	25 U	NA	25 U	25 U
4-Chloro-3-Methylphenol	–	10 U	NA	10 U	NA	10 U	10 U
2-Methylphenol	–	10 U	NA	10 U	NA	10 U	10 U
4-Methylphenol	–	10 U	NA	10 U	NA	10 U	10 U
Naphthalene	10*	10 U	NA	10 U	NA	10 U	10 U
2-Nitroaniline	5	25 U	NA	25 U	NA	25 U	25 U
3-Nitroaniline	5	25 U	NA	25 U	NA	25 U	25 U
4-Nitroaniline	5	25 U	NA	25 U	NA	25 U	25 U
Nitrobenzene	0.4	10 U	NA	10 U	NA	10 U	10 U
2-Nitrophenol	–	10 U	NA	10 U	NA	10 U	10 U
4-Nitrophenol	–	25 U	NA	25 U	NA	25 U	25 U
n-Nitrosodiphenylamine	50*	10 U	NA	10 U	NA	10 U	10 U
di-n-Octyl Phthalate	–	10 U	NA	10 U	NA	10 U	10 U
Pentachlorophenol	1	25 U	NA	25 U	NA	25 U	25 U
Phenanthrene	50*	10 U	NA	10 U	NA	10 U	10 U
Phenol	1	10 U	NA	10 U	NA	10 U	10 U
4-Bromophenyl-Phenylether	–	10 U	NA	10 U	NA	10 U	10 U
4-Chlorophenyl-Phenylether	–	10 U	NA	10 U	NA	10 U	10 U
n-Nitroso-di-n-Propylamine	–	10 U	NA	10 U	NA	10 U	10 U
Pyrene	50*	10 U	NA	10 U	NA	10 U	10 U
2,4,6-Trichlorophenol	–	10 U	NA	10 U	NA	10 U	10 U
2,4,5-Trichlorophenol	–	25 U	NA	25 U	NA	25 U	25 U
Total Metals, milligrams per liter							
Aluminum	–	0.331	NA	0.406	NA	0.406	0.331
Antimony	0.003	0.06 U	NA	0.06 U	NA	0.06 U	0.06 U
Arsenic	0.025	0.01 U	NA	0.01 U	NA	0.01 U	0.01 U
Barium	1.0	0.112	NA	0.103	NA	0.112	0.103
Beryllium	0.003*	0.005 U	NA	0.005 U	NA	0.005 U	0.005 U
Cadmium	0.005	0.005 U	NA	0.005 U	NA	0.005 U	0.005 U
Calcium	–	313	337	360	312	360	312
Chromium	0.050	0.0114	14	0.01 U	0.01 U	14	0.01 U
Hexavalent Chromium	0.050	0.01 U	(0.02 U) R	0.01 U	(0.01 U) R	0.01 U	(0.01 U) R

TABLE 4-10

ANALYTICAL RESULTS FOR OVERBURDEN GROUNDWATER FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

Constituent[2]	Groundwater Criteria[3]	*Sample Location, Identification and Date Collected*[1]				Maximum Conc.	Minimum Conc.
		MWFP-2S		*MWFP-3S*			
		110700106 11/7/2000	*050301140 5/3/2001*	*110700088 11/7/2000*	*050201128 5/2/2001*		
Cobalt	--	0.05 U	NA	0.05 U	NA	0.05 U	0.05 U
Copper	0.200	0.02 U	NA	0.02 U	NA	0.02 U	0.02 U
Iron	0.300	0.535	4.21	16	5.51	16	0.535
Lead	0.025	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Magnesium	35*	32.8	26.4	17.5	17	32.8	17
Manganese	0.300	0.43	0.68	2.08	1.49	2.08	0.43
Mercury	0.0007	0.0003 U	NA	0.0003 U	NA	0.0003 U	0.0003 U
Nickel	0.100	0.04 U	NA	0.04 U	NA	0.04 U	0.04 U
Potassium	--	10.7	6.41	6.6	4.63	10.7	4.63
Selenium	0.010	0.005 U	NA	0.0061	NA	0.0061	0.005 U
Silver	0.050	0.01 U	NA	0.01 U	NA	0.01 U	0.01 U
Sodium	20	18.7	9.98	122	45.9	122	9.98
Thallium	0.0005*	0.01 U	NA	0.01 U	NA	0.01 U	0.01 U
Vanadium	--	0.05 U	NA	0.05 U	NA	0.05 U	0.05 U
Zinc	2*	0.124	NA	0.0551	NA	0.124	0.0551
Other Geochemical Parameters, milligrams per liter							
Total Organic Carbon	--	8.6375 U	4.77 U	5.19 U	3.15 U	8.6375 U	3.15 U
Bicarbonate Alkalinity	--	700	680	558	435	700	435
Carbonate Alkalinity	--	2 U	2 U	2 U	2 U	2 U	2 U
Chloride	250	NA	10	NA	63.5	63.5	10
Ferrous Iron	--	NA	4.95	NA	NA	4.95	4.95
Solubie Organic Carbons	--	9.22 U	NA	5.405 U	NA	9.22 U	5.405 U
Sulfate	250	346	301	651	448	651	301
Total Alkalinity	--	700	680	558	435	700	435
Total Dissolved Solids	--	1190	1170	1570	1180	1570	1170
Total Sulfide	0.05*	1 U	2 UJ	1.1 U	2 UJ	2 UJ	1 U
Field Measured Parameters[4]							
Conductivity (uS/cm)	--	1588	1559	2136	1513	2136	1513
Dissolved Oxygen (ppm)	--	3.1	4.81	0.35	0.42	4.81	0.42
Ferrous Iron (mg/l)	--	0	3.0	6.50	5.2	5.2	0
Oxidation Reduction Potential (mV)	--	82	-31.6	-89.7	-17	82	-31.6
pH (pH units)	--	7.01	6.16	6.70	5.9	7.01	5.9
Temperature (°C)	--	12.83	13.9	14.27	12	14.27	12
Turbidity (NTU)	--	NA	59	35.1	191	191	59

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Groundwater criteria for Class GA groundwater as provided in Division of Water Technical and Operational Series (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, October 22, 1993, reissued June 1998.
   * Values are guidance values.
4. The YSI 600XL was used in the November and May sampling events for temperature, pH, specific electrical conductance, dissolved oxygen, and redox potential measurements. Ferrous iron was field measured with the HACH18-R field kit (for QC, 10% were sent to analytical laboratory). The turbidity measurements on the YSI 600 XL were not accurate during the May sampling event and as such, the LaMotte turbidity meter was used to measure Turbidity. Turbidity measurements were collected with the TURB 2020 meter during the November sampling events.

mg/l = milligrams per liter
NA = not analyzed
NTU = Nephelometric Turbidity Unit
uS/cm = microsiemens per centimeter at 25°C.
ppm = parts per million
mV = millivolts
(values) = laboratory reported value prior to data validation

J = an estimated concentration.
U = compound was not detected at or above the listed detection limit.
R = value was rejected by data validator.
D = indicates spike diluted out.
-- = indicates value does not exist.
indicates exceedance of groundwater criteria.
UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the compound in the sample.

TABLE 4-11

ANALYTICAL RESULTS FOR BEDROCK GROUNDWATER FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

Compound[2]	*Groundwater Criteria*[3]	*Sample Location, Identification, and Date Collected*[1]						*Maximum Conc.*	*Minimum Conc.*
		MWFP-1D		*MWFP-2D*		*MWFP-3D*			
		110600086 *11/6/2000*	*050101125* *5/1/2001*	*110600087* *11/6/2000*	*050201135* *5/2/2001*	*110700090* *11/7/2000*	*050101126* *5/1/2001*		
Volatile Organic Compounds, micrograms per liter									
Acetone	50*	10 U	NA	80	NA	6.7 J	NA	80	6.7 J
Benzene	1	10 U	10 U	3.6 J	2.4 J	10 U	1.2 J	10 U	1.2 J
Bromodichloromethane	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Bromoform	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Bromomethane	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Butanone (MEK)	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Methyl tert-Butyl Ether	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Carbon Disulfide	--	10 U	NA	1.3 J	NA	10 U	NA	10 U	1.3 J
Carbon Tetrachloride	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Chloroethane	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Chloroform	7	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloromethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,2-Dibromo-3-chloropropane	0.04	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Cyclohexane	--	10 U	NA	14	NA	8.8 J	NA	14	8.8 J
Dibromochloromethane	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,2-Dibromoethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,2-Dichlorobenzene	3	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,4-Dichlorobenzene	3	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,3-Dichlorobenzene	3	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Dichlorodifluoromethane	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1-Dichloroethane	5	10 U	NA	10 U	NA	2.3 J	NA	10 U	2.3 J
1,2-Dichloroethane	0.6	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1-Dichloroethene	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
trans-1,2-Dichloroethene	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
cis-1,2-Dichloroethene	5	10 U	NA	10 U	NA	8.2 J	NA	10 U	8.2 J
1,2-Dichloropropane	1	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
trans-1,3-Dichloropropene	0.4	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
cis-1,3-Dichloropropene	0.4	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Ethylbenzene	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Hexanone	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Isopropylbenzene	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Methyl Acetate	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Methylcyclohexane	--	10 U	NA	15	NA	4.9 J	NA	15	4.9 J
Methylene Chloride	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
4-Methyl-2-Pentanone	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Styrene	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1,2,2-Tetrachloroethane	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Tetrachloroethene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	5	10 U	NA	6.8 J	NA	10 U	NA	10 U	6.8 J
1,2,4-Trichlorobenzene	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1,1-Trichloroethane	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1,2-Trichloroethane	1	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Trichloroethene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Vinyl Chloride	2	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
m-/p-Xylene	5	10 U	NA	6.4 J	NA	10 U	NA	10 U	6.4 J
o-Xylene	5	10 U	NA	3.7 J	NA	10 U	NA	10 U	3.7 J
Semi-Volatile Organic Compounds, microgram per liter									
Acenaphthene	20*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Acenaphthylene	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Acetophenone	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Anthracene	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Atrazine	7.5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Benzaldehyde	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Benzo(a)anthracene	0.002	10 U	9.4 U	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
Benzo(a)pyrene	--	10 U	9.4 U	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
Benzo(b)fluoranthene	0.002*	10 U	9.4 U	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
Benzo(g,h,i)perylene	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Benzo(k)fluoranthene	0.002*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1-Biphenyl	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Butyl Benzyl Phthalate	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
di-N-Butylphthalate	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Caprolactam	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Carbazole	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Indeno(1,2,3-cd)pyrene	0.002*	10 U	9.4 U	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
4-Chloroaniline	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
bis(2-chloroethoxy)methane	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
bis(2-chloroethyl)ether	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Chloronaphthalene	10*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Chlorophenol	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,2-oxybis(1-chloropropane)	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Chrysene	0.002*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U

TABLE 4-11

ANALYTICAL RESULTS FOR BEDROCK GROUNDWATER FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

		Sample Location, Identification, and Date Collected[1]							
		MWFP-1D		*MWFP-2D*		*MWFP-3D*			
Compound[2]	*Groundwater Criteria*[3]	*110600086 11/6/2000*	*050101125 5/1/2001*	*110600087 11/6/2000*	*050201135 5/2/2001*	*110700090 11/7/2000*	*050101126 5/1/2001*	*Maximum Conc.*	*Minimum Conc.*
Dibenzo(a,h)anthracene	--	10 U	9.4 U	10 U	9.5 U	10 U	9.4 U	10 U	9.4 U
Dibenzofuran	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
3,3-Dichlorobenzidine	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,4-Dichlorophenol	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Diethylphthalate	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Dimethyl Phthalate	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,4-Dimethylphenol	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,4-Dinitrophenol	10*	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
2,4-Dinitrotoluene	50	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,6-Dinitrotoluene	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
bis(2-Ethylhexyl)phthalate	--	10 U	NA	3.7 J	NA	10 U	NA	10 U	3.7 J
Fluoranthene	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Fluorene	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Hexachlorobenzene	0.04	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Hexachlorobutadiene	0.5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Hexachlorocyclopentadiene	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Hexachloroethane	5	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Isophorone	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Methylnaphthalene	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
4,6-Dinitro-2-Methylphenol	--	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
4-Chloro-3-Methylphenol	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Methylphenol	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
4-Methylphenol	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Naphthalene	10*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Nitroaniline	5	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
3-Nitroaniline	5	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
4-Nitroaniline	5	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
Nitrobenzene	0.4	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Nitrophenol	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
4-Nitrophenol	--	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
N-Nitrosodiphenylamine	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
di-n-Octyl Phthalate	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Pentachlorophenol	1	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
Phenanthrene	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Phenol	1	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
4-Bromophenyl-Phenylether	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
4-Chlorophenyl-Phenylether	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
n-Nitroso-di-n-Propylamine	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Pyrene	50*	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,4,6-Trichlorophenol	--	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,4,5-Trichlorophenol	--	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
Metals, milligrams per liter									
Aluminum	--	0.12	NA	0.641	NA	0.116	NA	0.641	0.116
Antimony	0.003	0.06 U	NA	0.06 U	NA	0.06 U	NA	0.06 U	0.06 U
Arsenic	0.025	0.01 U	NA	0.01 U	NA	0.01 U	NA	0.01 U	0.01 U
Barium	1	0.275	NA	0.0775	NA	0.0722	NA	0.275	0.0722
Beryllium	0.003	0.005 U	NA	0.005 U	NA	0.005 U	NA	0.005 U	0.005 U
Cadmium	0.005	0.005 U	NA	0.005 U	NA	0.005 U	NA	0.005 U	0.005 U
Calcium	--	62	64.5	18.9	28.8	370	348	370	18.9
Chromium	0.05	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Hexavalent Chromium	0.05	0.01 U	(0.01 U) R	0.01 U	(0.01 U) R	0.01 U	(0.01 U) R	0.01 U	0.01 U
Cobalt	--	0.05 U	NA	0.05 U	NA	0.05 U	NA	0.05 U	0.05 U
Copper	0.2	0.02 U	NA	0.02 U	NA	0.02 U	NA	0.02 U	0.02 U
Iron	0.3	0.417	0.211	1.89	0.348	21.5	17.7	21.5	0.211
Lead	0.025	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Magnesium	35*	11	10.6	4.25	5.97	18.7	17.9	18.7	4.25
Manganese	0.3	0.112	0.122	0.0446	0.0579	2.06	1.96	2.06	0.0446
Mercury	0.0007	0.0003 U	NA	0.0003 U	NA	0.0003 U	NA	0.0003 U	0.0003 U
Nickel	0.1	0.04 U	NA	0.04 U	NA	0.04 U	NA	0.04 U	0.04 U
Potassium	--	2 U	2 U	3.72	3.04	7.04	5.68	7.04	2 U
Selenium	0.01	0.005 U	NA	0.005 U	NA	0.005 U	NA	0.005 U	0.005 U
Silver	0.05	0.01 U	NA	0.01 U	NA	0.01 U	NA	0.01 U	0.01 U
Sodium	20	26.7	25	293	352	119	78.9	352	25
Thallium	0.005*	0.01 U	NA	0.01 U	NA	0.01 U	NA	0.01 U	0.01 U
Vanadium	--	0.05 U	NA	0.05 U	NA	0.05 U	NA	0.05 U	0.05 U
Zinc	2*	0.02 U	NA	0.02 U	NA	0.02 U	NA	0.02 U	0.02 U
Soluble Metals[4], milligrams per liter									
Chromium	0.05	NA	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U
Hexavalent Chromium	0.05	NA	NA	NA	NA	NA	(0.01 U) R	(0.01 U) R	(0.01 U) R
Iron	0.3	NA	NA	NA	NA	NA	16.4	16.4	16.4
Lead	0.025	NA	NA	NA	NA	NA	0.005 U	0.005 U	0.005 U
Manganese	0.3	NA	NA	NA	NA	NA	1.89	1.89	1.89
Other Geochemical Parameters, milligrams per liter									
Total Organic Carbon	--	1.29 U	1.78 U	3.40 U	6.41 U	5.02 U	4.36 U	6.41 U	1.2875 U
Bicarbonate Alkalinity	--	200	187	288	355	575	480	575	187
Carbonate Alkalinity	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U

TABLE 4-11

ANALYTICAL RESULTS FOR BEDROCK GROUNDWATER FROM THE FORMER MANUFACTURING PLANT AREA

Peter Cooper Site
Gowanda, New York

Compound[2]	*Groundwater Criteria*[3]	*Sample Location, Identification, and Date Collected*[1]						*Maximum Conc.*	*Minimum Conc.*
		MWFP-1D		*MWFP-2D*		*MWFP-3D*			
		110600086 *11/6/2000*	*050101125* *5/1/2001*	*110600087* *11/6/2000*	*050201135* *5/2/2001*	*110700090* *11/7/2000*	*050101126* *5/1/2001*		
Chloride	250	NA	22.5	NA	166	NA	77.7	166	22.5
Soluble Organic Carbons	--	9.11 U	NA	3.31 U	NA	6.02 U	4.92	9.1075 U	3.3125 U
Sulfate	250	45.5	47.2	56.7	241	695	544	695	45.5
Total Alkalinity	--	200	187	288	355	575	480	575	187
Total Dissolved Solids	--	290	293	917	1000	1660	1350	1660	290
Total Sulfide	0.05*	1.1 U	2 UJ	1.1 U	2 UJ	1.1 U	2 UJ	2UJ	1.1 U
Turbidity, NTU	--	NA	0.8	NA	NA	NA	79.7	79.7	0.8
Field Measured Parameters[5]									
Conductivity (uS/cm)	--	495	503	1616	1595	2316	2159	2316	495
Dissolved Oxygen (ppm)	--	2.70	0.96	0.29	0.6	0.95	1.70	2.7	0.29
Ferrous Iron (mg/l)	--	0.1	0	0	0	10	6.6	10	0
Oxidation Reduction Potential (mV)	--	-219.5	-3.2	-223.5	-112.2	-94.9	-68.2	-3.2	-223.5
pH (pH units)	--	7.01	5.59	8.62	6.54	6.7	6.61	8.62	5.59
Temperature (°C)	--	13.75	17.47	13.06	13.59	14.35	11.46	17.47	11.46
Turbidity (NTU)	--	3.5	12.2	3.6	9.6	8.55	24	24	3.5

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Groundwater criteria for Class GA groundwater as provided in Division of Water Technical and Operational Series (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, October 22, 1993, reissued June 1998.
   * Values are guidance values.
4. Samples collected for soluble metals analysis were field filtered.
5. The YSI 600XL was used in the November and May sampling events for temperature, pH, specific electrical conductance, dissolved oxygen, and redox potential measurements. Ferrous iron was field measured with the HACH18-R field kit (for QC, 10% were sent to analytical laboratory) The turbidity measurements on the YSI 600 XL were not accurate during the May sampling event and as such, the LaMotte turbidity meter was used to measure turbidity Turbidity measurements were collected with the TURB 2020 meter during the November sampling events.

mg/l = milligrams per liter
NA = not analyzed
NTU = Nepheiometric Turbidity Unit
uS/cm = microsiemens per centimeter at 25°C.
ppm = parts per million
mV = millivolts
(values) = laboratory reported value prior to data validation

J = an estimated concentration
U = compound was not detected at or above the listed detection limit.
R = value was rejected by data validator
-- = indicates value does not exist.
indicates exceedance of groundwater criteria.
UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the compound in the sample.

TABLE 4-12

ANALYTICAL RESULTS FOR SEEP SAMPLES FROM THE INACTIVE LANDFILL AREA

Peter Cooper Site
Gowanda, New York

Constituent[2]	Surface Water Criteria[3]	*Sample Location, Identification and Date Collected*[1]						Maximum Conc.	Minimum Conc.
		Seep #1		*Seep #2*		*Seep #3*			
		110800102 *11/8/2000*	*052001137* *5/20/2001*	*110800103* *11/8/2000*	*052001138* *5/20/2001*	*110800104* *11/8/2000*	*052001139* *5/20/2001*		
Volatile Organic Compounds, micrograms per liter									
Benzene	210*	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ
Chlorobenzene	5	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ
1,2-Dichlorobenzene	5	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ
1,4-Dichlorobenzene	5	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ
Ethylbenzene	17*	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ
Toluene	100*	3.1 J	2.8 J	2 J	3.5 J	10 U	10 UJ	10 UJ	2 J
m/p-Xylene	5	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ
o-Xylene	5	10 U	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 UJ
Semi-Volatile Organic Compounds, micrograms per liter									
2-Chorophenol	--	10 U	9.4 U	10 U	10 U	10 U	16 U	16 U	9.4 U
2,4-Dichlorophenol	--	10 U	9.4 U	10 U	10 U	10 U	16 U	16 U	9.4 U
2,4-Dimethylphenol	--	10 U	9.4 U	10 U	10 U	10 U	16 U	16 U	9.4 U
2,4-Dinitrophenol	--	50 U	24 U	50 U	25 U	50 U	40 U	50 U	24 U
4,6-Dintiro-2-methylphenol	--	50 U	24 U	50 U	25 U	50 U	40 U	50 U	24 U
4-Chloro-3-Methylphenol	--	10 U	9.4 U	10 U	10 U	10 U	16 U	16 U	9.4 U
2-Methylphenol	--	10 U	9.4 U	10 U	10 U	10 U	16 U	16 U	9.4 U
4-Methylphenol	--	10 U	9.4 U	10 U	10 U	10 U	16 U	16 U	9.4 U
2-Nitrophenol	--	10 U	9.4 U	10 U	10 U	10 U	16 U	16 U	9.4 U
4-Nitrophenol	--	50 U	24 U	50 U	25 U	50 U	40 U	50 U	24 U
Pentachlorophenol[4]	20.2	50 U	24 U	50 U	25 U	50 U	40 U	50 U	24 U
Phenol	--	10 U	9.4 U	1.8 J	10 U	1.8 J	16 U	16 U	1.8 J
2,4,6-Trichlorophenol	--	10 U	9.4 U	10 U	10 U	10 U	16 U	16 U	9.4 U
2,4,5-Trichlorophenol	--	10 U	24 U	10 U	25 U	10 U	40 U	40 U	10 U
Total Metals, milligrams per liter									
Arsenic	0.150	0.071	0.052	0.0520	0.038	0.062	0.0314	0.071	0.0314
Calcium	--	156	171	150	156	116	170	171	116
Chromium	0.120	0.374	0.221	0.423	0.312	0.0949	0.129	0.423	0.0949
Hexavalent Chromium	0.011	0.04 U	(0.01 U) R	0.04 U	(0.01 U) R	0.01 U	(0.01 U) R	0.04 U	0.01 U
Iron	0.300	3.01	1.18	28.6	0.1 U	0.39	0.123	28.6	0.1 U
Magnesium	--	190	102	163	123	82.9	90.5	190	82.9
Potassium	--	10.9	7.71	8.79	6.19	3.56	4.12	10.9	3.56
Sodium	--	26.8	18.1	19.7	18.3	17.5	18	26.8	17.5
Zinc	0.200	0.02 U	0.02 U	0.0747	0.02 U	0.02 U	0.02 U	0.0747	0.02 U
Soluble Metals[5], milligrams per liter									
Arsenic	0.15	0.0665	NA	0.0528	NA	0.0599	NA	0.0665	0.0528
Calcium	--	155	NA	132	NA	113	NA	155	113
Chromium	0.120	0.369	NA	0.325	NA	0.0969	NA	0.369	0.0969
Hexavalent Chromium	0.011	0.04 U	(0.01 U) R	0.04 U	(0.01 U) R	0.04 U	(0.01 U) R	0.04 U	(0.01 U) R
Iron	0.3	4.78	NA	0.914	NA	0.107	NA	4.78	0.107
Magnesium	--	184	NA	144	NA	84.1	NA	184	84.1
Potassium	--	10.5	NA	6.4	NA	3.7	NA	10.5	3.7
Sodium	--	26	NA	19.6	NA	17	NA	26	17
Zinc	0.200	0.02 U	NA	0.02 U	NA	0.02 U	NA	0.02 U	0.02 U

TABLE 4-12

ANALYTICAL RESULTS FOR SEEP SAMPLES FROM THE INACTIVE LANDFILL AREA

Peter Cooper Site
Gowanda, New York

Constituent[2]	*Surface Water Criteria*[3]	*Sample Location, Identification and Date Collected*[1]						*Maximum Conc.*	*Minimum Conc.*
		Seep #1		*Seep #2*		*Seep #3*			
		110800102	*052001137*	*110800103*	*052001138*	*110800104*	*052001139*		
		11/8/2000	*5/20/2001*	*11/8/2000*	*5/20/2001*	*11/8/2000*	*5/20/2001*		
Other Geochemical Data, milligrams per liter									
Ammonia	1.1 Nov./1.3 Apr.[6]	891	627	734	678	381	393	891	381
Bicarbonate Alkalinity	--	4000	2800	3150	3100	1340	1550	4000	1340
Carbonate Alkalinity	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Chloride	--	33.9	17.3	29.9	20.6	17.5	20.3	33.9	17.3
Nitrate Nitrogen	--	2.35	0.545	0.746	0.05 U	2.84	1.74	2.84	0.05 U
Soluble Organic Carbon	--	97.875	NA	81.925	NA	31.025	NA	97.875	31.025
Sulfate	--	241	242	157	150	595	632	632	150
Total Alkalinity	--	4000	2800	3150	3100	1340	1550	4000	1340
Total Dissolved Solids	--	1060	NA	1030	NA	855	NA	1060	855
Total Hardness	--	1100	NA	800	NA	608	NA	1100	608
Total Kjeldahl Nitrogen	--	836	602	721	667	380	392	836	380
Total Organic Carbon	--	100.675	55.525	81.425	64.875	NA	38.425	100.675	38.425
Total Sulfide	2	9.00	5.9	3.70	5.2	1 U	2 U	9	1 U
Turbidity, NTU	--	NA	120	NA	137	NA	4.38	137	4.38
Field Measured Parameters[7]	--								
Conductivity (uS/cm)	--	>1990	>1990	>1990	>1990	>1990	>1990	>1990	>1990
Dissolved Oxygen (ppm)	--	7.11	NA	8.48	NA	8.53	NA	8.53	7.11
Oxidation Reduction Potential (mV)	--	<-50 and >1050	<-50 and >1050	<-50 and >1050	<-50 and >1050	75	-40	>1050	<-50
pH (pH units)	--	7.92	7.88	8.21	7.9	8.25	8.2	8.25	7.88
Temperature (°C)	--	11.1	12.8	14.3	20	14.3	18.3	20	11.1
Turbidity (NTU)	--	212	NA	110	NA	5.8	NA	212	5.8

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Surface water criteria for Class A, A-S, AA, AA-S, B, C fresh water fish propogation as provided in Division of Water Technical and Operational Series (1.1 1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, October 22, 1993, reissued June 1998.
   * Values are guidance values.
4. pH dependent criteria; pH = 8.1 was used to calculate Pentachlorophenol guidance value.
5. Samples collected for soluble metals analysis were field filtered.
6. Total Ammonia calculated with the (T) or (TS) Specifications (most conservative) using an average pH of 8.1 (Nov) and 8.0 (Apr) and average temp of 13.2 °C (Nov) and 17.0°C (Apr).
7. The YSI 600XL was used in the November and May sampling events for temperature, pH, specific electrical conductance, dissolved oxygen,and redox potential measurements.
   Ferrous iron was field measured with the HACH18-R field kit (for QC, 10% were sent to analytical laboratory).
   Turbidity measurements were collected with the TURB2020 meter during the November sampling events.

NA = not analyzed
-- = indicates value does not exist.
NTU = Nephelometric Turbidity Unit
uS/cm = microsiemens per centimeter at 25°C.
ppm = parts per million
mV = millivolts

J = indicates an estimated value.
U = indicates compound was not detected.
R= indicates value was rejected by data validator.
UJ = indicates compound was not detected above the listed detection limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitiation necessary to accurately and precisely measure the compound in the sample.
indicates exceedance of surface water criteria.
(values) = laboratory reported value prior to data validation rejection.

TABLE 4-13

ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES FROM CATTARAUGUS CREEK

Peter Cooper Site
Gowanda, New York

		Sample Location, Identification, and Date Collected [1]									
		Creek Water #1		*Creek Water #2*		*Creek Water #3*		*Creek Water #4*			
Constituent [2]	*Surface Water Criteria* [3]	*110700101* *11/7/2000*	*050201134* *5/2/2001*	*110700100* *11/7/2000*	*050201130* *5/2/2001*	*110700098* *11/7/2000*	*050201131* *5/2/2001*	*110700097* *11/7/2000*	*050201132* *5/2/2001*	*Maximum Conc*	*Minimum Conc.*
Volatile Organic Compounds, micrograms per liter											
Acetone	--	3.5 J	NA	10 U	NA	10 U	NA	3.2 J	NA	10 U	3.2 J
Benzene	210*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Bromoform	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Bromomethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Butanone (MEK)	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Methyl tert-Butyl Ether	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Carbon Disulfide	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Carbon Tetrachloride	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Chloroform	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloromethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,2-Dibromo-3-chloropropane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Cyclohexane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Dibromochloromethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,2-Dibromoethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,2-Dichlorobenzene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	5	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Dichlorodifluoromethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1-Dichloroethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,2-Dichloroethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1-Dichloroethene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
trans-1,2-Dichloroethene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
cis-1,2-Dichloroethene	--	2.7 J	NA	10 U	NA	10 U	NA	10 U	NA	10 U	2.7 J
1,2-Dichloropropane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
trans-1,3-Dichloropropene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
cis-1,3-Dichloropropene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Ethylbenzene	17*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Isopropylbenzene	2.6*	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Methyl Acetate	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Methylcyclohexane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Methylene Chloride	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
4-Methyl-2-Pentanone	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Styrene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1,2,2-Tetrachloroethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Tetrachloroethene	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	100*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	5	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1,1-Trichloroethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1,2-Trichloroethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Trichloroethene	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Vinyl Chloride	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
m-/p-Xylene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
o-Xylene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Semi-Volatile Organic Compounds, micrograms per liter											
Acenaphthene	5.3*	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Acenaphthylene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Acetophenone	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Anthracene	3.8*	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Atrazine	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Benzaldehyde	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Benzo(a)anthracene	0.03	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
Benzo(a)pyrene	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
Benzo(b)fluoranthene	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
Benzo(g,h,i)perylene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Benzo(k)fluoranthene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
1,1-Biphenyl	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Butyl Benzyl Phthalate	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
di-N-Butylphthalate	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Caprolactam	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Carbazole	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Indeno(1,2,3-cd)pyrene	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
4-Chloroaniline	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
bis(2-chloroethoxy)methane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
bis(2-chloroethyl)ether	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Chloronaphthalene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Chlorophenol	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U

TABLE 4-13

ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES FROM CATTARAUGUS CREEK

Peter Cooper Site
Gowanda, New York

Constituent[2]	Surface Water Criteria[3]	Sample Location, Identification, and Date Collected[1]								Maximum Conc	Minimum Conc.
		Creek Water #1		Creek Water #2		Creek Water #3		Creek Water #4			
		110700101 11/7/2000	050201134 5/2/2001	110700100 11/7/2000	050201130 5/2/2001	110700098 11/7/2000	050201131 5/2/2001	110700097 11/7/2000	050201132 5/2/2001		
2,2-oxybis(1-chloropropane)	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Chrysene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Dibenzo(a,h)anthracene	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
Dibenzofuran	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
3,3-Dichlorobenzidine	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,4-Dichlorophenol	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
Diethylphthalate	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Dimethyl Phthalate	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,4-Dimethylphenol	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
2,4-Dinitrophenol	--	25 U	26 U	25 U	25 U	25 U	25 U	25 U	24 U	26 U	24 U
2,4-Dinitrotoluene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,6-Dinitrotoluene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
bis(2-Ethylhexyl)phthalate	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Fluoranthene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Fluorene	0.54*	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Hexachlorobenzene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Hexachlorobutadiene	1	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Hexachlorocyclopentadiene	0.45	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Hexachloroethane	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Isophorone	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Methylnaphthalene	4.7*	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
4,6-Dinitro-2-Methylphenol	--	25 U	26 U	25 U	25 U	25 U	25 U	25 U	24 U	26 U	24 U
4-Chloro-3-Methylphenol	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
2-Methylphenol	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
4-Methylphenol	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
Naphthalene	13*	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Nitroaniline	--	25 U	NA	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
3-Nitroaniline	--	25 U	NA	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
4-Nitroaniline	--	25 U	NA	25 U	NA	25 U	NA	25 U	NA	25 U	25 U
Nitrobenzene	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2-Nitrophenol	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
4-Nitrophenol	--	25 U	26 U	25 U	25 U	25 U	25 U	25 U	24 U	26 U	24 U
n-Nitrosodiphenylamine	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
di-n-Octyl Phthalate	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Pentachlorophenol[4]	24.7	25 U	26 U	25 U	25 U	25 U	25 U	25 U	24 U	26 U	24 U
Phenanthrene	5.0*	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Phenol	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	9.5 U	10 U	9.5 U
4-Bromophenyl-Phenylether	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
4-Chlorophenyl-Phenylether	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
n-Nitroso-di-n-Propylamine	--	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
Pyrene	4.6*	10 U	NA	10 U	NA	10 U	NA	10 U	NA	10 U	10 U
2,4,6-Trichlorophenol	--	10 U	10 U	10 U	10	10 U	10	10 U	9.5 U	10 U	9.5 U
2,4,5-Trichlorophenol	--	25 U	26 U	25 U	25	25 U	25	25 U	24 U	26 U	24 U
Metals, milligrams per liter											
Aluminum	0.1	0.1 U	NA	0.1 U	NA	0.1 U	NA	0.1 U	NA	0.1 U	0.1 U
Antimony	--	0.06 U	NA	0.06 U	NA	0.06 U	NA	0.06 U	NA	0.06 U	0.06 U
Arsenic	0.15	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	0.01 U
Barium	--	0.0641	NA	0.0647	NA	0.0618	NA	0.0693	NA	0.0693	0.0618
Beryllium[5]	1.1	0.005 U	NA	0.005 U	NA	0.005 U	NA	0.005 U	NA	0.005 U	0.005 U
Cadmium[5]	0.0035	0.005 U	NA	0.005 U	NA	0.005 U	NA	0.005 U	NA	0.005 U	0.005 U
Calcium	--	57.8	51.8	59.6	51.9	58.3	53.4	59.1	56.6	59.6	51.8
Chromium[5]	0.1200	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	0.01 U
Hexavalent Chromium	0.0110	0.04 U	(0.01 U) R	0.01 U	(0.01 U) R	0.01 U	(0.01 U) R	0.01 U	(0.01 U) R	0.04 U	(0.01 U) R
Cobalt	0.0050	0.05 U	NA	0.05 U	NA	0.05 U	NA	0.05 U	NA	0.05 U	0.05 U
Copper[5]	0.0158	0.02 U	NA	0.02 U	NA	0.02 U	NA	0.02 U	NA	0.02 U	0.02 U
Iron	0.3000	0.129	0.39	0.126	0.403	0.143	0.47	0.151	0.344	0.47	0.126
Lead[5]	0.0078	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Magnesium	--	10.3	9.25	10.3	9.45	9.88	9.21	10.8	9.99	10.8	9.21
Manganese	--	0.0115	0.0161	0.0138	0.0149	0.0129	0.0216	0.0184	0.0206	0.0216	0.0115
Mercury	0.0008	0.0003 U	NA	0.0003 U	NA	0.0003 U	NA	0.0003 U	NA	0.0003 U	0.0003 U
Nickel[5]	0.0915	0.04 U	NA	0.04 U	NA	0.04 U	NA	0.04 U	NA	0.04 U	0.04 U
Potassium	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Selenium	0.0046	0.005 U	NA	0.005 U	NA	0.005 U	NA	0.005 U	NA	0.005 U	0.005 U
Silver	0.0001	0.01 U	NA	0.01 U	NA	0.01 U	NA	0.01 U	NA	0.01 U	0.01 U
Sodium	--	13.7	NA	13.9	NA	13.4	NA	16.2	NA	16.2	13.4
Thallium	0.008	0.01 U	NA	0.01 U	NA	0.01 U	NA	0.01 U	NA	0.01 U	0.01 U
Zinc[5]	0.0094	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Vanadium	0.0140	0.05 U	NA	0.05 U	NA	0.05 U	NA	0.05 U	NA	0.05 U	0.05 U
Other Geochemical Data, milligrams per liter											
Ammonia	0.58 Nov./0.44 Apr.[6]	0.05 U	0.05 U	0.05 U	0.05 U	0.234	0.306	0.17	0.442	0.442	0.05 U
Bicarbonate Alkalinity	--	167	270 J	166	133	164	135	169	140	270 J	133
Carbonate Alkalinity	--	2 U	2 U	2 U	2 UJ	2 U	2 U	2 U	2 U	2 UJ	2 UJ

TABLE 4-13

ANALYTICAL RESULTS FOR SURFACE WATER SAMPLES FROM CATTARAUGUS CREEK

Peter Cooper Site
Gowanda, New York

		Sample Location, Identification, and Date Collected[1]									
		Creek Water #1		*Creek Water #2*		*Creek Water #3*		*Creek Water #4*			
Constituent[4]	*Surface Water Criteria*[3]	*110700101* *11/7/2000*	*050201134* *5/2/2001*	*110700100* *11/7/2000*	*050201130* *5/2/2001*	*110700098* *11/7/2000*	*050201131* *5/2/2001*	*110700097* *11/7/2000*	*050201132* *5/2/2001*	*Maximum Conc*	*Minimum Conc.*
Chloride	--	24	26.4	22.9	27	23.4	27.1	28.7	46.9	46.9	22.9
Ferrous Iron	--	NA	NA	NA	0.1 U	NA	NA	NA	NA	0.1 U	0.1 U
Nitrate Nitrogen		1.78	1.07	1.81	1.11	1.81	1.07	1.9	1.12	1.9	1.07
Sulfate	--	28.8	24.8	27.6	25.9	27.5	24.9	28.5	28	28.8	24.8
Total Alkalinity	--	167	270 J	166	133	164	135	169	140	270 J	133
Total Dissolved Solids	--	254	216	250	221	249	216	255	264	264	216
Total Hardness	--	191	166	198	164	195	161	200	175	200	161
Total Kjeldahl Nitrogen	--	0.308	0.345	0.412	0.2 U	0.417	0.445	0.344	0.648	0.648	0.2
Total Organic Carbon	--	1.975 U	1.665	1.8875	1.6525	2.135	1.675	1.9875	1.7225	2.135	1.6525
Total Sulfide	2	1 U	2 UJ	1 U	2	1 U	2 UJ	1 U	2 UJ	2 UJ	1 U
Total Suspended Solids	--	1.3	6.6	1.6	7.1	1.3 J	8.2	1.9	4.9	8.2	1.3 J
Field Measured Parameters[7]											
Conductivity (uS/cm)	--	440	350	390	340	320	340	340	390	440	320
Dissolved Oxygen (ppm)	--	NA	NA	9.8	NA	8.65	NA	13.6	NA	13.6	8.65
Ferrous Iron (mg/l)	--	NA	NA	NA	0	NA	0	NA	0	0	0
Oxidation Reduction Potential (mV)	--	30	-40	35	-60	35	-60	-5	-45	35	-60
pH (pH units)	--	8.52	8.5	8.3	8.42	8.37	8.4	8.36	8.5	8.52	8.3
Temperature (°C)	--	16.5	14.4	7.9	14.4	7.8	14.4	5.3	14.4	16.5	5.3
Turbidity (NTU)	--	2.43	NA	NA	NA	5.18	NA	4.14	NA	5.18	2.43

Notes:

1. Sample locations provided on Plate 1
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Surface water criteria for Class A. A S. AA. AA-S. B. C fresh water fish propogation as provided in Division of Water Technical and Operational Series (1.1.1). Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. October 22. 1993. reissued June 1998.
   * Values are guidance values.
4. pH dependent criteria: pH = 8.3 was used to calculate Pentachlorophenol guidance value.
5. Hardness dependent criteria: Hardness value of 181 ppm was used.
6. Total Ammonia calculated with the (T) or (TS) Specifications (most conservative) using an average pH of 8.4 (Nov) and 8.5 (Apr) and average temp of 9.4 °C (Nov) and 14.4°C (Apr).
7. The YSI 600XL was used in the November and May sampling events for temperature. pH. specific electrical conductance. dissolved oxygen.and redox potential measurements.
   Ferrous iron was field measured with the HACH18-R field kit (for QC. 10% were sent to analytical laboratory)
   Turbidity measurements were collected with the TURB2020 meter during the November sampling events.

NA = not analyzed
(values) = laboratory reported value prior to data validation.
mg/l = milligrams per liter
NTU = Nephelometric Turbidity Unit
uS/cm = microsiemens per centimeter at 25°C.
-- = indicates guidance value does not exist.
ppm = parts per million
mV = millivolts

J = indicates an estimated value.
U = indicates compound was not detected.
R= indicates value was rejected by data validator
UJ = indicates compound was not detected above the listed detection limit.
However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the compound in the sample.
-- = indicates value does not exist.
indicates exceedance of surface water criteria.

TABLE 4-14

ANALYTICAL RESULTS FOR WETLAND SEDIMENT SAMPLES

Peter Cooper Site
Gowanda, New York

Constituent [2]	Sediment/Soil Criteria [3]				Sample Location, Identification, and Date Collected [1]										Maximum Conc.	Minimum Conc.
	NYSDEC Sediment Criteria	TAGM		Region 9 PRGs	WSS-1 101000047 10/10/2000	WSS-2 101000048 10/10/2000	WSS-3 101000049 10/10/2000	WSS-4 101000050 10/10/2000	WSS-5 101000051 10/10/2000	WSS-6 101000052 10/10/2000	WSS-7 101000054 10/10/2000	WSS-8 101000055 10/10/2000	WSS-9 101000056 10/10/2000	WSS-10 10100057 10/10/2000		
Volatile Organic Compounds, milligrams per kilogram																
Benzene	--	0.06		1.5	0.0065 J	0.0085 J	0.0037 J	0.0058 J	0.005 J	0.004 J	0.0068 J	0.0082 J	0.0035 J	0.0026 J	0.0085 J	0.0026 J
Chlorobenzene	--	1.7		54	0.0120 U	0.023 UJ	0.0063 UJ	0.013 UJ	0.014 UJ	0.018 UJ	0.012 U	0.014 UJ	0.023 UJ	0.017 UJ	0.023 UJ	0.0063 UJ
1,2-dichlorobenzene	--	7.9		370	0.0120 UJ	0.023 UJ	0.0063 UJ	0.013 UJ	0.014 UJ	0.018 UJ	0.012 U	0.014 UJ	0.023 UJ	0.017 UJ	0.023 UJ	0.0063 UJ
1,4-dichlorobenzene	--	8.5		8.1	0.0120 UJ	0.023 UJ	0.0063 UJ	0.013 UJ	0.014 UJ	0.018 UJ	0.012 U	0.014 UJ	0.023 UJ	0.017 UJ	0.023 UJ	0.0063 UJ
Ethylbenzene	--	5.5		230	0.0015 J	0.0034 J	0.0009 J	0.013 UJ	0.014 UJ	0.018 UJ	0.0014 J	0.0021 J	0.023 UJ	0.0033 J	0.023 UJ	0.00094 J
m/p-Xylene	--	1.2		--	0.0082 J	0.015 J	0.0044 J	0.0058 J	0.006 J	0.0053 J	0.0083 J	0.011 J	0.023 UJ	0.017 UJ	0.023 UJ	0.0044 J
o-Xylene	--	1.2		--	0.0027 J	0.0044 J	0.0013 J	0.0017 J	0.0019 J	0.018 U	0.0023 J	0.0033 J	0.023 UJ	0.017 UJ	0.023 UJ	0.0013 J
Toluene	--	1.5		520	0.0120	0.018 J	0.0066 J	0.011 J	0.0082 J	0.0082 J	0.011 J	0.015 J	0.016 J	0.0041 J	0.018 UJ	0.0041 J
Metals, milligrams per kilogram		***Eastern USA***	***Rec. Soil Objective***													
Arsenic	6	3-12	7.5 or SB	2.7	7.4	16.3	8.7	8.5	9.4	10.7	5.2	5.6	9.9	8.6	16.3	5.2
Chromium	26	1.5-40**	10 or SB	450	6.5	44.9	11.8	28.4	30.6	31.2	8.9	13.7	17.2	55.3	55.3	6.5
Hexavalent Chromium	--	--	--	64	5.07 U	7.12 U	5.35 U	5.29 U	5.43 U	5.87 U	4.68 U	5.55 U	6.34 U	5.81 U	7.12 U	4.68 U
Zinc	120	9-50	0.2	100,000	45.7	227	69.8	80.5	74.9	92.5	58.8	65.6	290	110	290	45.7
Other																
Percent Solids, %	--	--	--	--	78.9	56.2	74.8	75.6	73.6	68.2	85.5	72.1	63.1	68.8	85.5	56.2
pH	--	--	--	--	8.17	7.56	7.68	7.76	7.48	7.74	7.91	7.47	7.30	6.92	8.17	6.92
Total Organic Carbon, %	--	--	--	--	0.29	3.4	1.50	1.70	1.90	2.70	0.290	1.50	3.80	4.40	4.4	0.29

Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Soil criteria from NYSDEC Division of Technical and Administrative Guidance Memorandum #4046 (TAGM) and U.S.EPA, Region 9 Preliminary Remediation Golas (PRGs) for Industrial Soil (October 2002).
   Sediment criteria from NYSDEC Technical Guidance for Screening Contaminated Sediments, Division of Fish and Wildlife.

** A New York State Background value

J = indicates a laboratory estimated value or estimated as a result of data validation.
U = indicates compound was not detected at or above the listed detection limit.
UJ = indicates compound was not detected above the listed detection limit.
However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the compound in the sample.

SB = Site Background
-- = indicates value does not exist.
▨ indicates exceedance of upper range of US Eastern Soils.

TABLE 4-15

ANALYTICAL RESULTS FOR CATTARAUGUS CREEK SEDIMENTS

Peter Cooper Site
Gowanda, New York

Constituents [2]	*Sediment Criteria* [3]	*Sample Location, Identification, and Date Collected* [1] *Creek Sed. #1* *110700096* *11/7/2000*	*Creek Sed. #2* *110700095* *11/7/2000*	*Creek Sed. #3* *110700093* *11/7/2000*	*Creek Sed. #4* *110700092* *11/7/2000*	*Maximum Conc.*	*Minimum Conc.*
Volatile Organic Compounds, milligrams per kilogram							
Acetone		0.024	0.078	0.019	0.022	0.078	0.019
Benzene		0.017 U	0.0025 J	0.0015 J	0.0014 J	0.017 U	0.0014
Bromodichloromethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Bromoform		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Bromomethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
2-Butanone (MEK)		0.017 U	0.0095 J	0.011 U	0.011 U	0.017 U	0.0095 J
Methyl tert-Butyl Ether		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Carbon Disulfide		0.01 J	0.025	0.019	0.02	0.025	0.01
Carbon Tetrachloride		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Chlorobenzene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Chloroethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Chloroform		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Chloromethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
1,2-Dibromo-3-Chloropropane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
Cyclohexane		0.017 U	0.0045 J	0.0022 J	0.0022 J	0.017 U	0.0022
Dibromochloromethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
1,2-Dibromoethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
1,2-Dichlorobenzene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
1,4-Dichlorobenzene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
1,3-Dichlorobenzene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
Dichlorodifluoromethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
1,1-Dichloroethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
1,2-Dichloroethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
1,1-Dichloroethene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
trans-1,2-Dichloroethene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
cis-1,2-Dichloroethene		0.017 U	0.0035 J	0.011 U	0.011 U	0.017 U	0.0035
1,2-Dichloropropane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
trans-1,3-Dichloropropene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
cis-1,3-Dichloropropene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Ethylbenzene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
2-Hexanone		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Isopropylbenzene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Methyl Acetate		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Methylcyclohexane		0.017 U	0.0072 J	0.0033 J	0.0034 J	0.017 U	0.0033
Methylene Chloride		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
4-Methyl-2-Pentanone		0.017 U	0.0025 J	0.011 U	0.011 U	0.017 U	0.0025
Styrene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
1,1,2,2-Tetrachloroethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
Tetrachloroethene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Toluene		0.0059 J	0.0068 J	0.0045 J	0.0041 J	0.0068 J	0.0041
1,2,4-Trichlorobenzene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
1,1,1-Trichloroethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
1,1,2-Trichloroethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
Trichloroethene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
Trichlorofluoromethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
1,1,2-Trichloro-1,2,2-Trifluoroethane		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011 U
Vinyl Chloride		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011
m-/p-Xylene		0.017 U	0.0027 J	0.0015 J	0.0015 J	0.017 U	0.0015
o-Xylene		0.017 U	0.012 U	0.011 U	0.011 U	0.017 U	0.011

TABLE 4-15

ANALYTICAL RESULTS FOR CATTARAUGUS CREEK SEDIMENTS

Peter Cooper Site
Gowanda, New York

Constituents [2]	*Sediment Criteria* [3]	*Sample Location, Identification, and Date Collected* [1]				*Maximum Conc.*	*Minimum Conc.*
		Creek Sed. #1 110700096 11/7/2000	*Creek Sed. #2 110700095 11/7/2000*	*Creek Sed. #3 110700093 11/7/2000*	*Creek Sed. #4 110700092 11/7/2000*		
Semi-Volatile Organic Constituents, milligrams per kilogram							
Acenaphthene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Acenaphthylene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Acetophenone		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Anthracene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Atrazine		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Benzaldehyde		0.4 UJ	0.42 UJ	0.4 UJ	0.41 UJ	0.42	0.4
Benzo(a)anthracene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Benzo(a)pyrene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Benzo(b)fluoranthene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Benzo(g,h,i)perylene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Benzo(k)fluoranthene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
1,1-Biphenyl		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Butyl Benzyl Phthalate		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
di-N-Butylphthalate		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Caprolactam		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Carbazole		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Indeno(1,2,3-cd)pyrene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
4-Chloroaniline		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
bis(2-chloroethoxy)methane		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
bis(2-chloroethyl)ether		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2-Chloronaphthalene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2-Chlorophenol		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2,2-oxybis(1-chloropropane)		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Chrysene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Dibenzo(a,h)anthracene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Dibenzofuran		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
3,3-Dichlorobenzidine		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2,4-Dichlorophenol		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Diethylphthalate		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Dimethyl Phthalate		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2,4-Dimethylphenol		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2,4-Dinitrophenol		1 U	1 U	1 U	1 U	1	1
2,4-Dinitrotoluene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2,6-Dinitrotoluene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
bis(2-Ethylhexyl)phthalate		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Fluoranthene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Fluorene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Hexachlorobenzene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Hexachlorobutadiene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Hexachlorocyclopentadiene		0.4 UJ	0.42 UJ	0.4 UJ	0.41 UJ	0.42	0.4
Hexachloroethane		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Isophorone		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2-Methylnaphthalene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
4,6-Dinitro-2-Methylphenol		1 U	1 U	1 U	1 U	1	1
4-Chloro-3-Methylphenol		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2-Methylphenol		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
4-Methylphenol		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Naphthalene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2-Nitroaniline		1 U	1 U	1 U	1 U	1	1
3-Nitroaniline		1 U	1 U	1 U	1 U	1	1
4-Nitroaniline		1 U	1 U	1 U	1 U	1	1

TABLE 4-15

ANALYTICAL RESULTS FOR CATTARAUGUS CREEK SEDIMENTS

Peter Cooper Site
Gowanda, New York

		Sample Location, Identification, and Date Collected [1]					
Constituents [2]	*Sediment Criteria* [3]	*Creek Sed. #1 110700096 11/7/2000*	*Creek Sed. #2 110700095 11/7/2000*	*Creek Sed. #3 110700093 11/7/2000*	*Creek Sed. #4 110700092 11/7/2000*	*Maximum Conc.*	*Minimum Conc.*
Nitrobenzene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2-Nitrophenol		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
4-Nitrophenol		1 U	1 U	1 U	1 U	1	1
n-Nitrosodiphenylamine		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
di-n-Octyl Phthalate		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Pentachlorophenol		1 U	1 U	1 U	1 U	1	1
Phenanthrene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Phenol		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
4-Bromophenyl-Phenylether		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
4-Chlorophenyl-Phenylether		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
n-Nitroso-di-n-Propylamine		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
Pyrene		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2,4,6-Trichlorophenol		0.4 U	0.42 U	0.4 U	0.41 U	0.42	0.4
2,4,5-Trichlorophenol		1 U	1 U	1 U	1 U	1	1
Metals, milligrams per kilogram							
Aluminum		4820	4960	5730	6160	6160	4820
Antimony		6.9 UJ	7.5 UJ	7 UJ	7.04 UJ	7.5	6.9
Arsenic	6	7.2 J	6.7 J	7.1 J	9.6 J	9.6	6.7
Barium		31.5	36.1	38.6	41.4	41.4	31.5
Beryllium		0.57 U	0.63 U	0.58 U	0.59 U	0.63	0.57
Cadmium		0.57 U	0.63 U	0.58 U	0.59 U	0.63	0.57
Calcium		7490	10500	11700	5080	11700	5080
Chromium	26	6.3	6.5	7.1	8.6	8.6	6.3
Cobalt		5.7 U	6.25 U	6.7	7.5	7.5	5.7
Copper	16	13.7	11.3	13.9	14.8	14.8	11.3
Hexavalent Chromium		4.8 U	5.05 U	4.85 U	4.93 U	5.05	4.8
Iron	20000	14400	18100	16900	18400	18400	14400
Lead	31	7.9	9.2	8.8	9.8	9.8	7.9
Magnesium		3290	3240	3160	3350	3350	3160
Manganese	460	250	356	401	246	401	246
Mercury		0.06 U	0.06 U	0.06 U	0.06 U	0.06	0.06
Nickel	16	12.6	13.6	15.5	18.2	18.2	12.6
Potassium		525	591	617	786	786	525
Selenium		1.1	0.71	0.58 U	0.59 U	1.1	0.58
Silver		1.1 UJ	1.3 UJ	1.17 UJ	1.2 UJ	1.3	1.1
Sodium		333	226	240	201	333	201
Thallium		1.1 U	1.3 U	1.2 U	1.17 U	1.3	1.1
Vanadium		10.9	12.3	12.2	13.8	13.8	10.9
Zinc	120	39.2	40.2	47.1	52.8	52.8	39.2
Others							
Percent Solids, %		83.3	79.2	82.5	81.2	83.3	79.2
pH		8.6	8.2	8.21	8.18	8.6	8.18
Total Organic Carbon, %		0.1 U	0.1 U	0.1 U	0.1 U	0.1	0.1

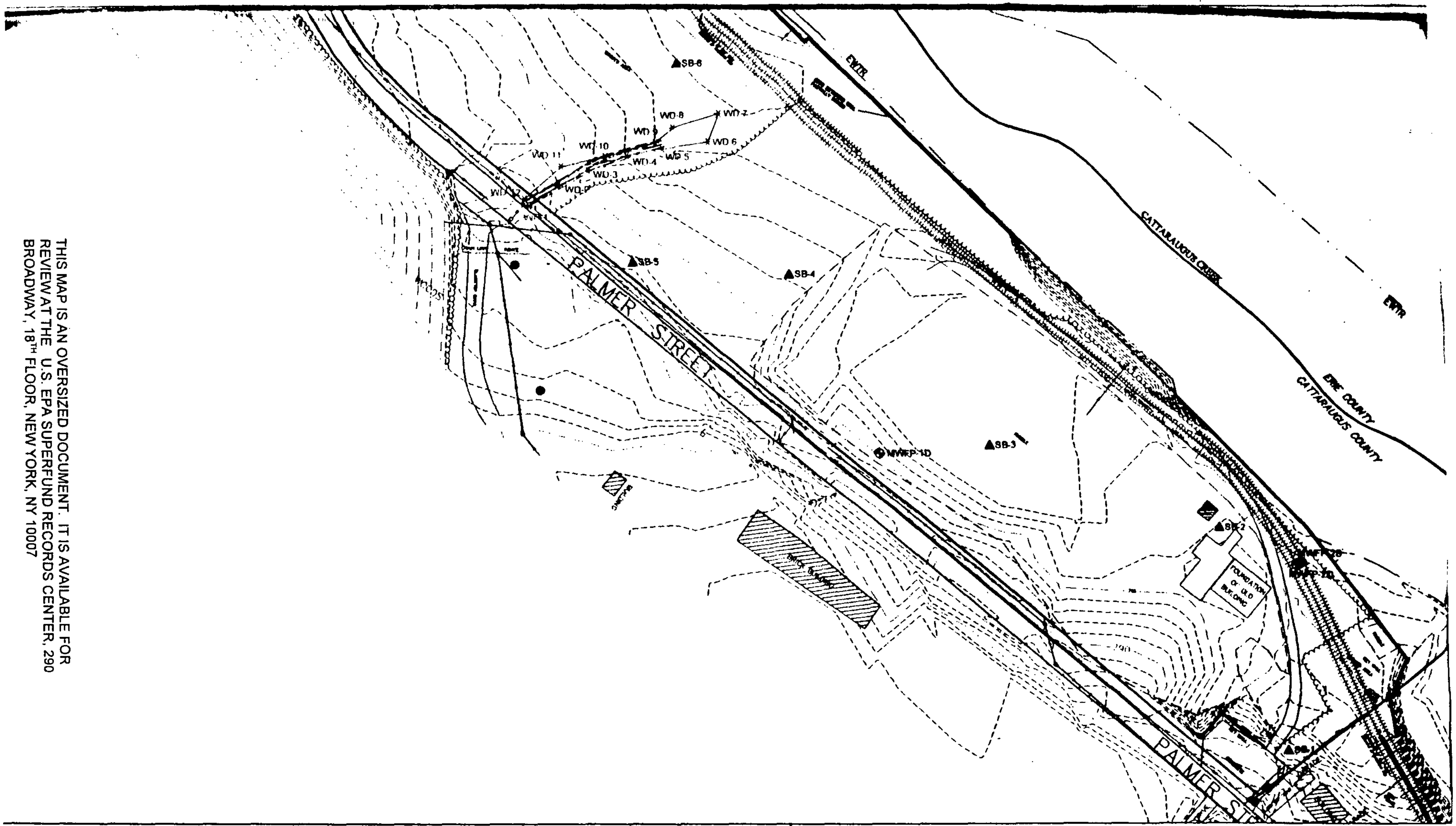
Notes:

1. Sample locations provided on Plate 1.
2. Data qualifications reflect 100% data validation performed by Data Validation Services.
3. Guidance values from NYSDEC Technical Guidance for Screening Contaminated Sediments, Division of Fish and Wildlife

J = indicates an estimated value.
U = compound was not detected at or above the listed detection limit.
UJ = indicates compound was not detected above the listed detection limit.
However, the reported quantitation limit is approximate and may or may
not represent the actual limit of quantitiation necessary to accurately
and precisely measure the compound in the sample.

PLATES

THIS MAP IS AN OVERSIZED DOCUMENT. IT IS AVAILABLE FOR REVIEW AT THE U.S. EPA SUPERFUND RECORDS CENTER, 290 BROADWAY, 18TH FLOOR, NEW YORK, NY 10007



PETER COOPER GOWANDA SITE
GOWANDA, NEW YORK

REMEDIAL INVESTIGATION

SAMPLE LOCATIONS & SITE TOPOGRAPHY

FIGURES

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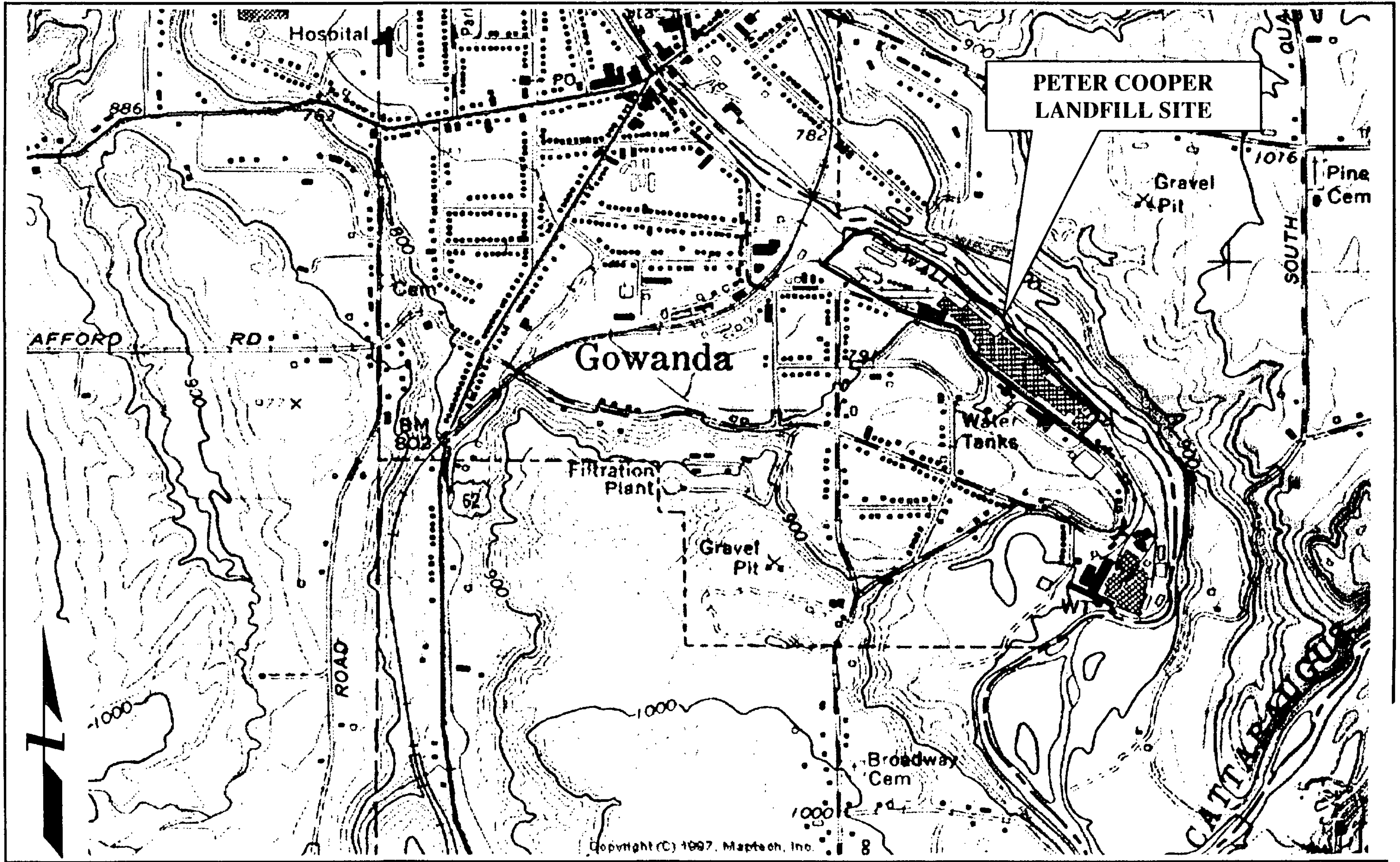
Non-GDS



SITE LOCATION MAP
Peter Cooper Landfill Site
Gowanda, NY

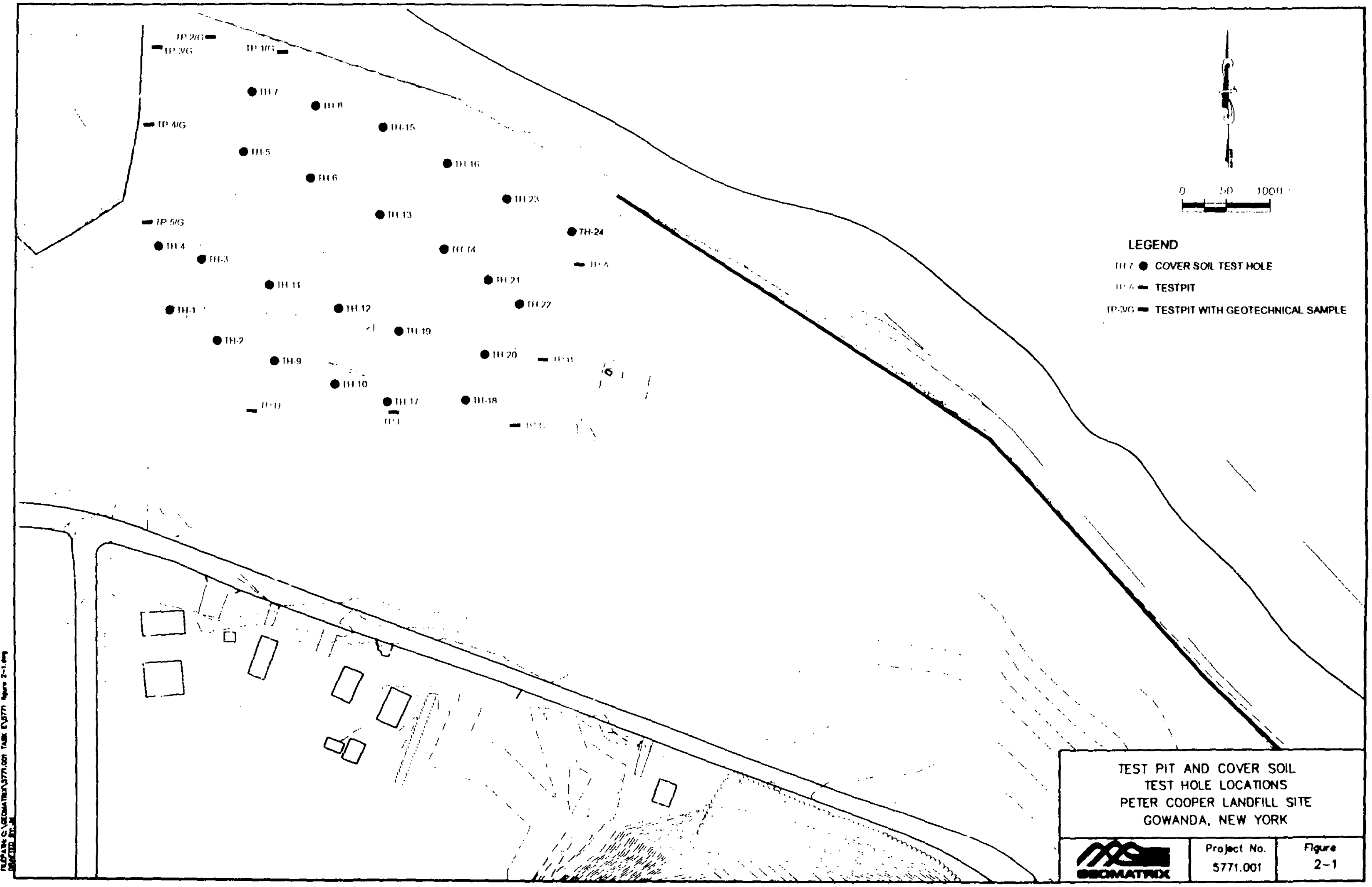
0 1200 Feet

USGS Topographic Map
Gowanda Quadrangle

GEOMATRIX

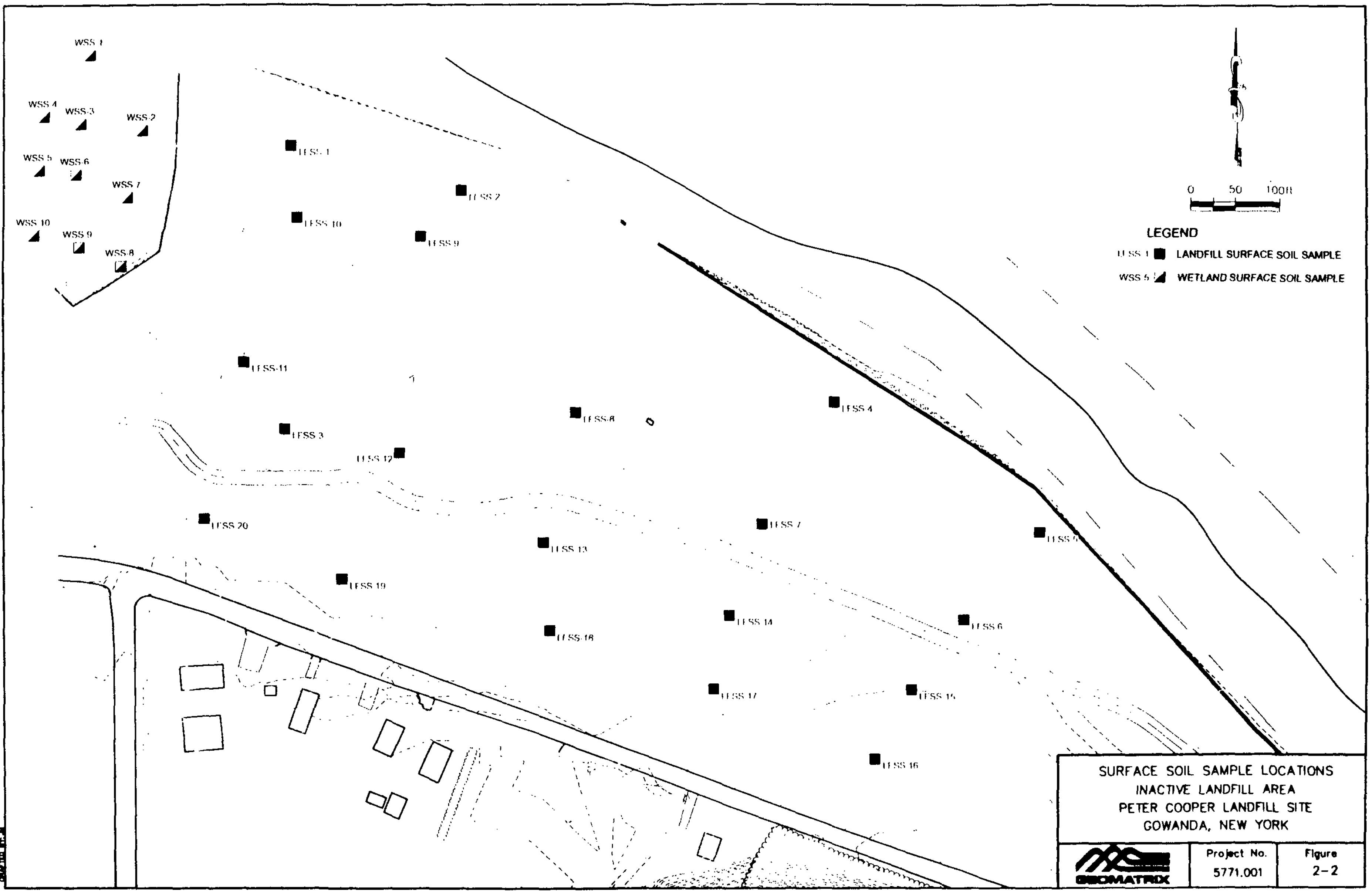
Project No.
5771

Figure
1-1



TEST PIT AND COVER SOIL
TEST HOLE LOCATIONS
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX	Project No.	Figure
	5771.001	2-1



SURFACE SOIL SAMPLE LOCATIONS
INACTIVE LANDFILL AREA
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX

Project No.	Figure
5771.001	2-2

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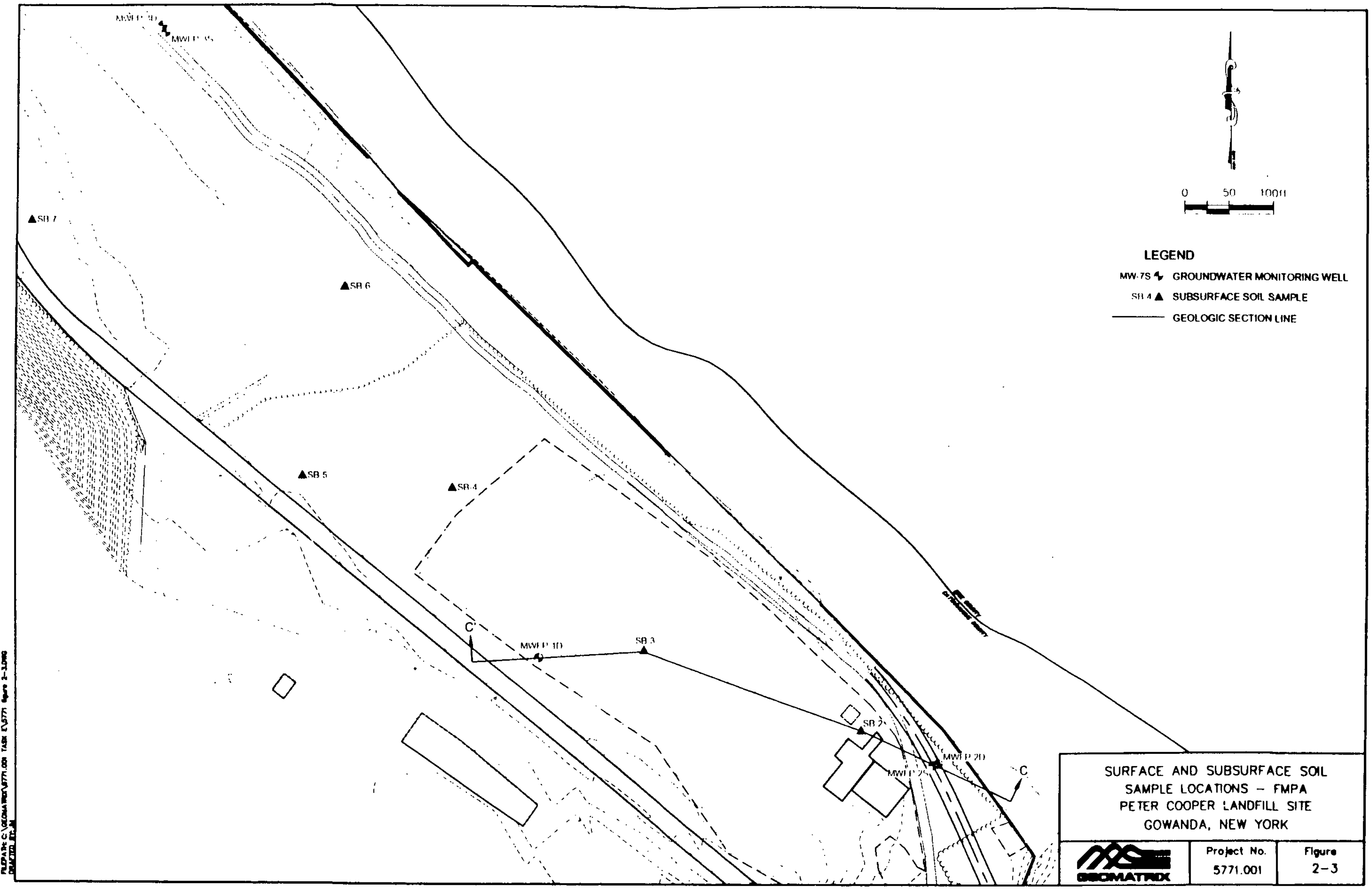
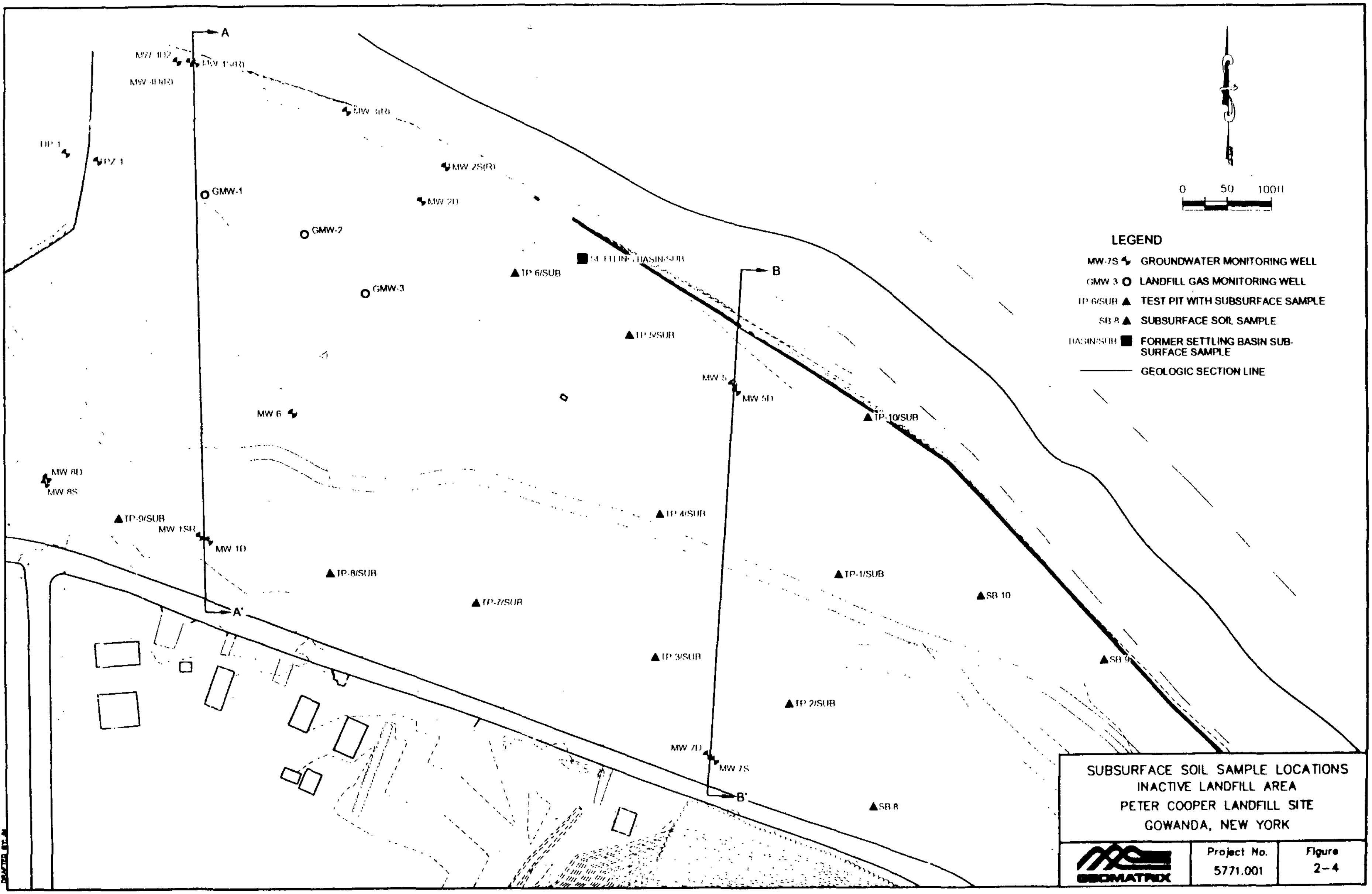


SURFACE AND SUBSURFACE SOIL
SAMPLE LOCATIONS – FMPA
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

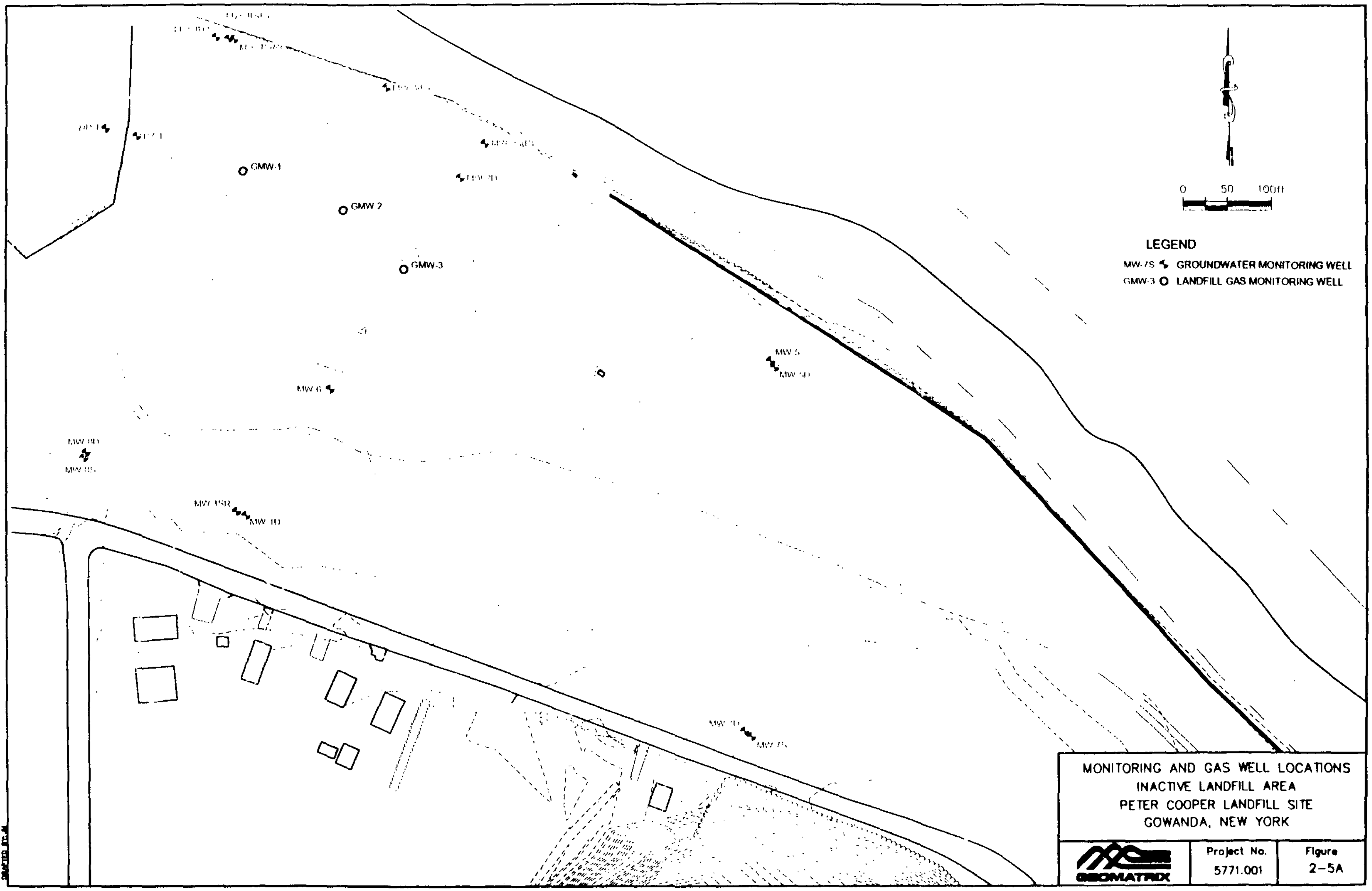
Project No.	Figure
5771.001	2-3



SUBSURFACE SOIL SAMPLE LOCATIONS
INACTIVE LANDFILL AREA
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX

Project No.	Figure
5771.001	2-4



MONITORING AND GAS WELL LOCATIONS
INACTIVE LANDFILL AREA
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX

Project No.	Figure
5771.001	2-5A

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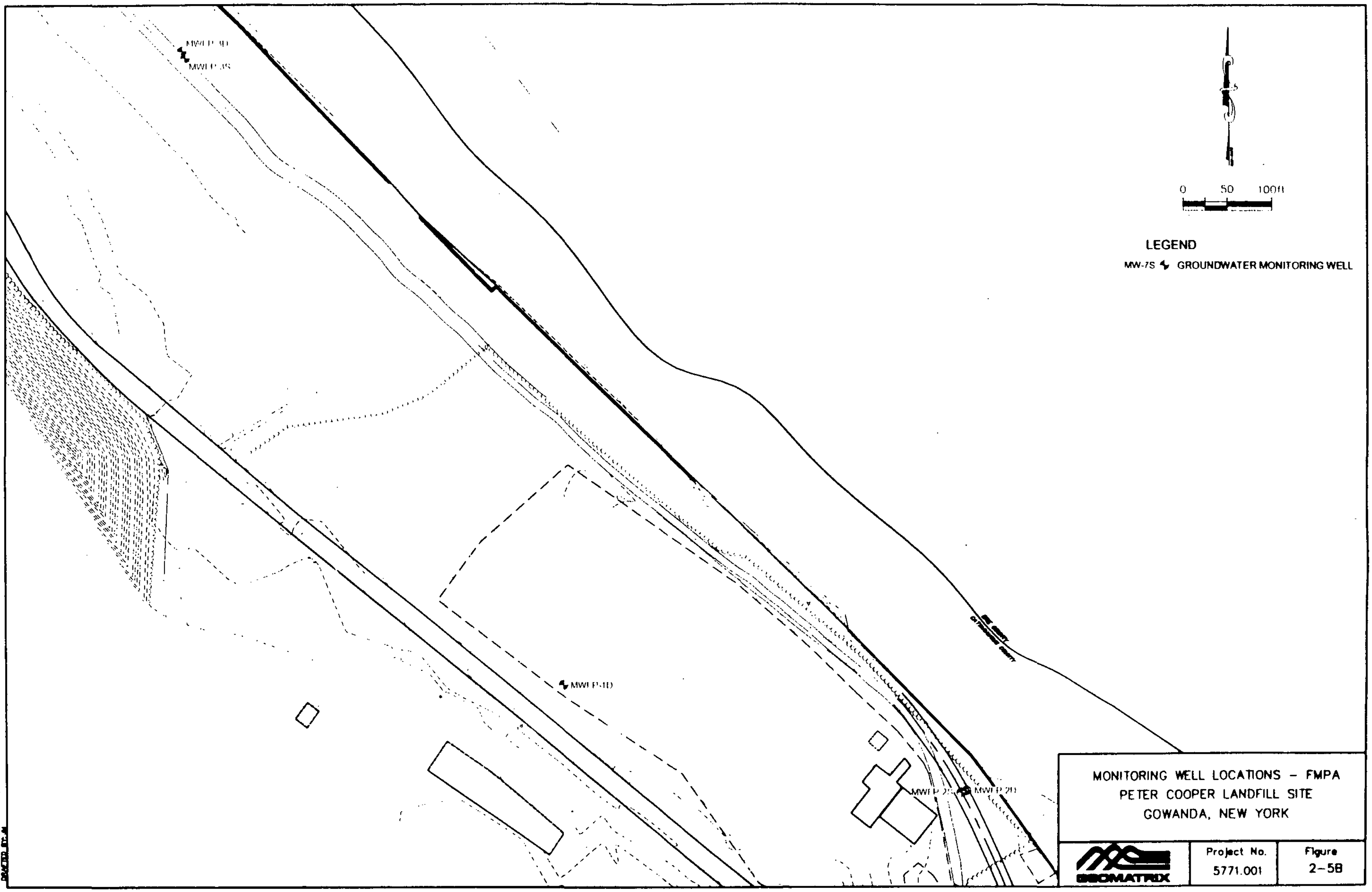

MONITORING WELL LOCATIONS – FMPA
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX

Project No.	Figure
5771.001	2-5B

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SURFACE WATER/SEDIMENT AND
SEEP SAMPLE LOCATIONS
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX

Project No.	Figure
5771.001	2-6

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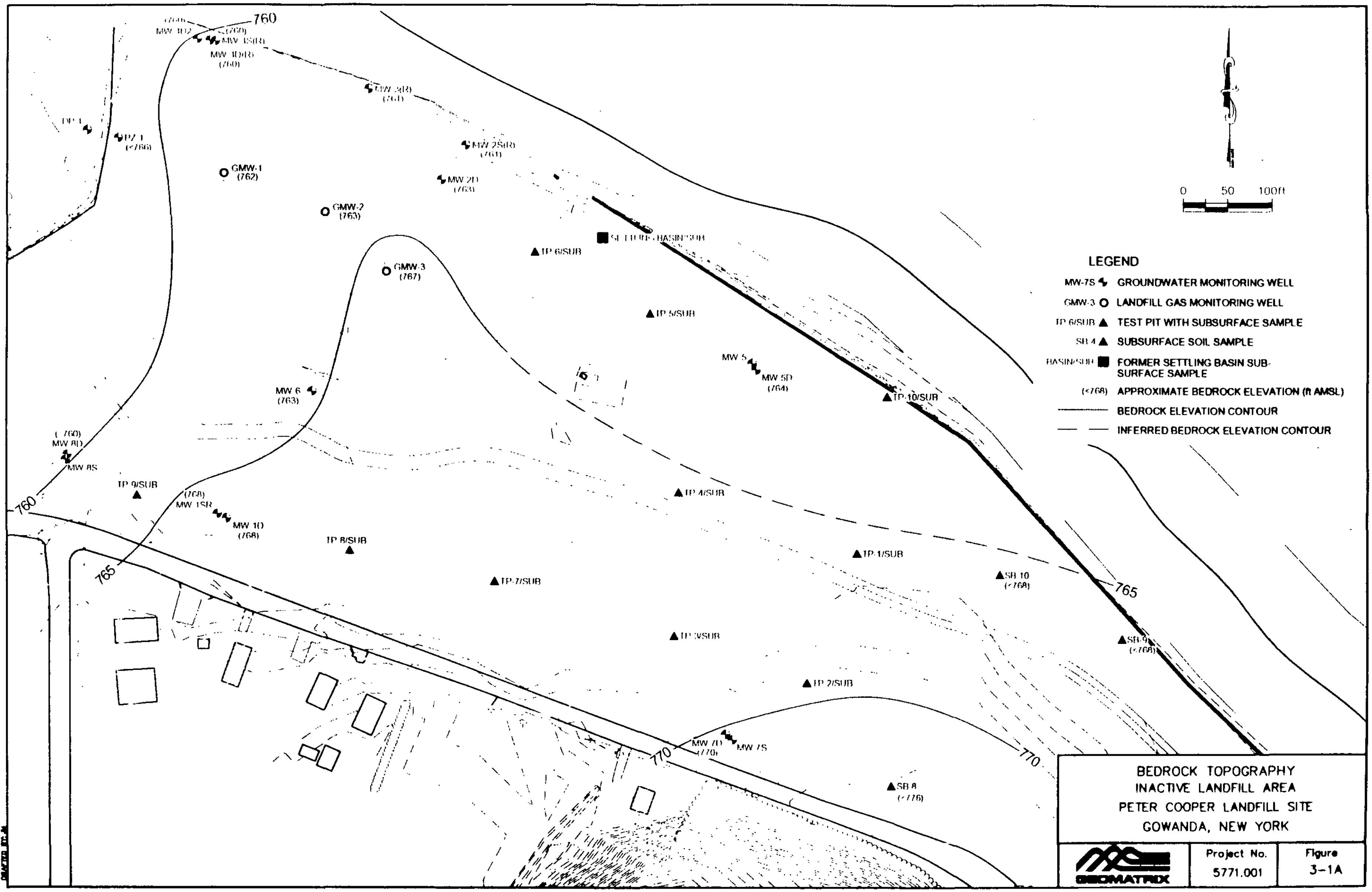

BEDROCK TOPOGRAPHY
INACTIVE LANDFILL AREA
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

Project No.
5771.001

Figure
3-1A

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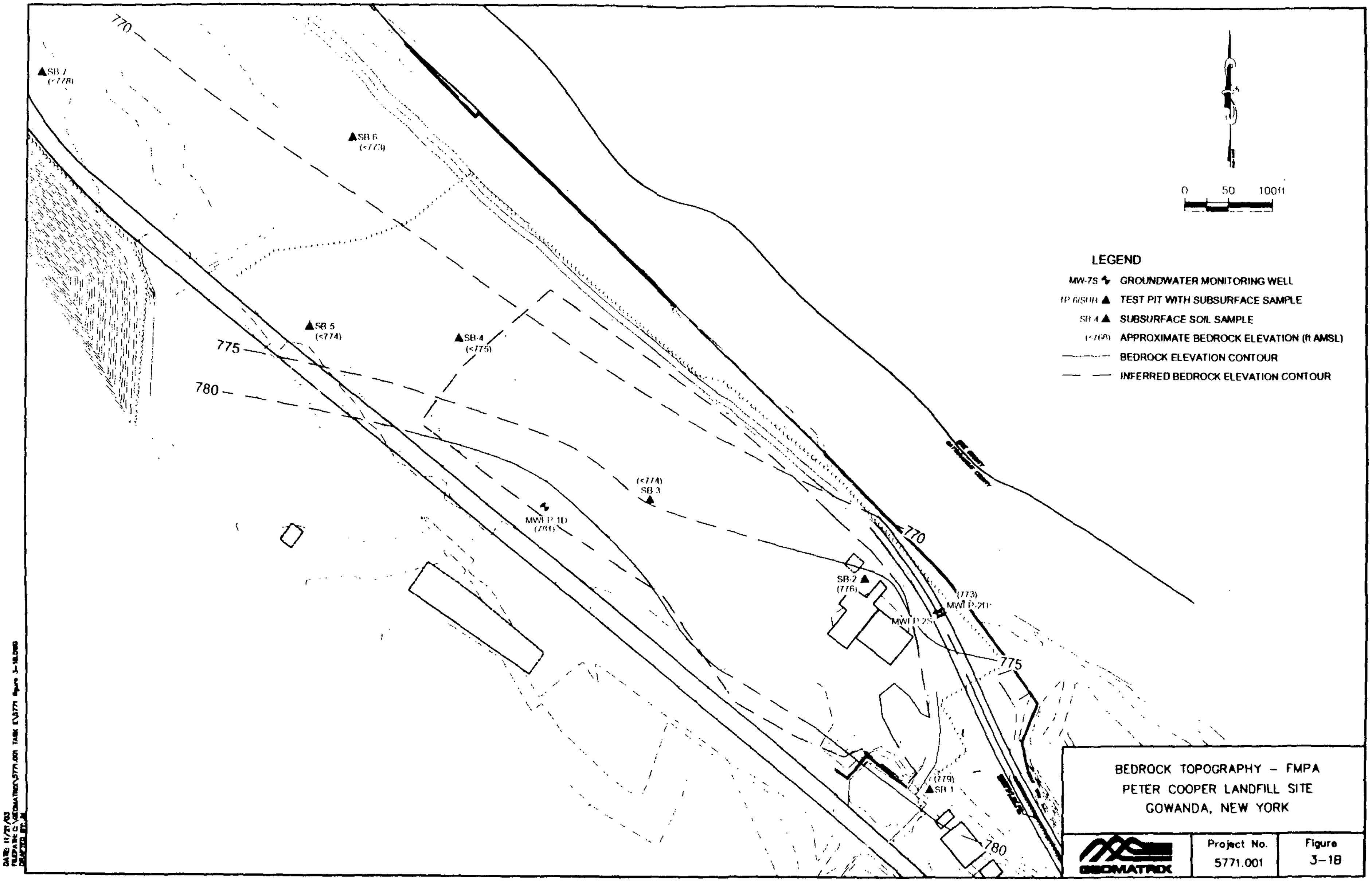

BEDROCK TOPOGRAPHY – FMPA
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

Project No.	Figure
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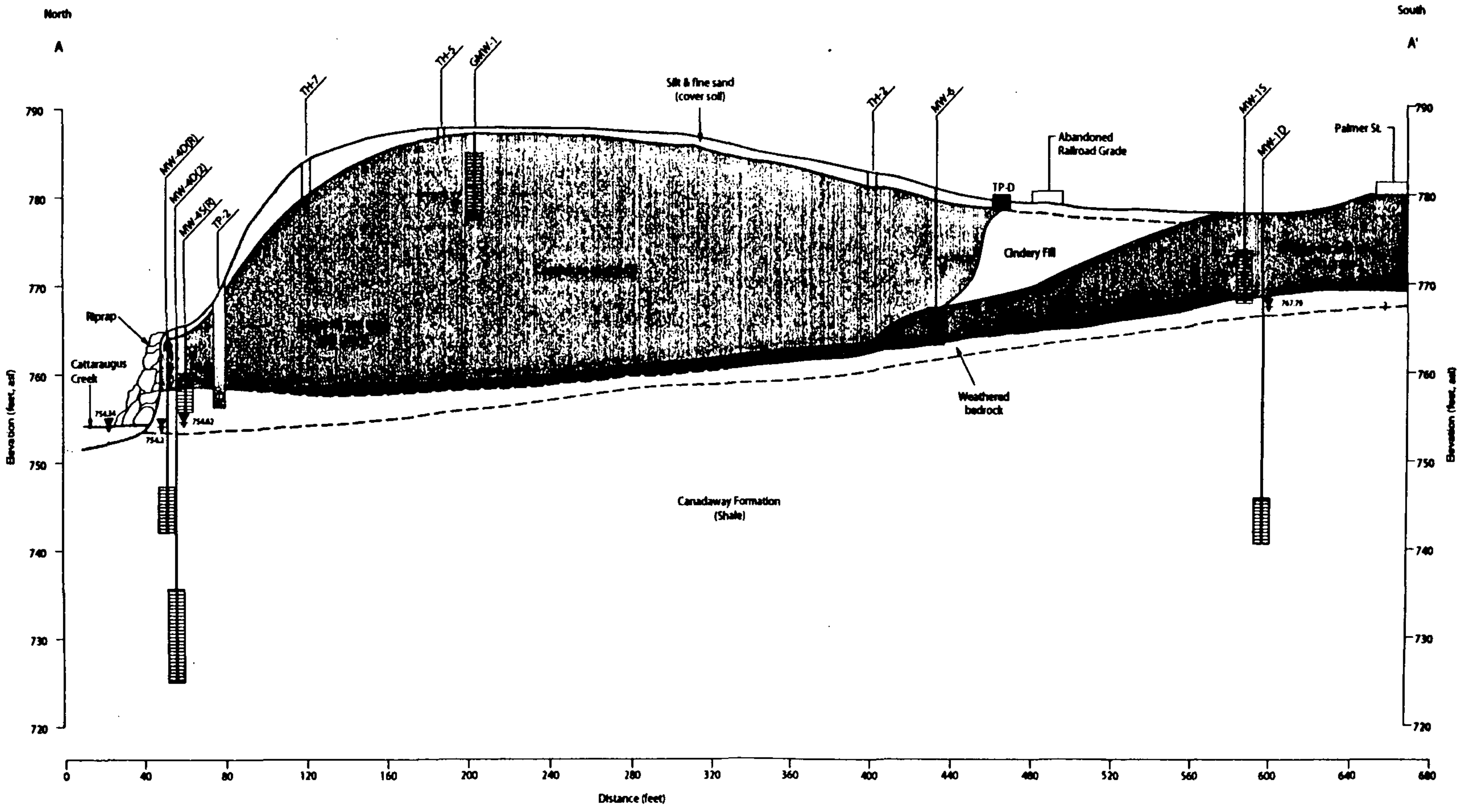


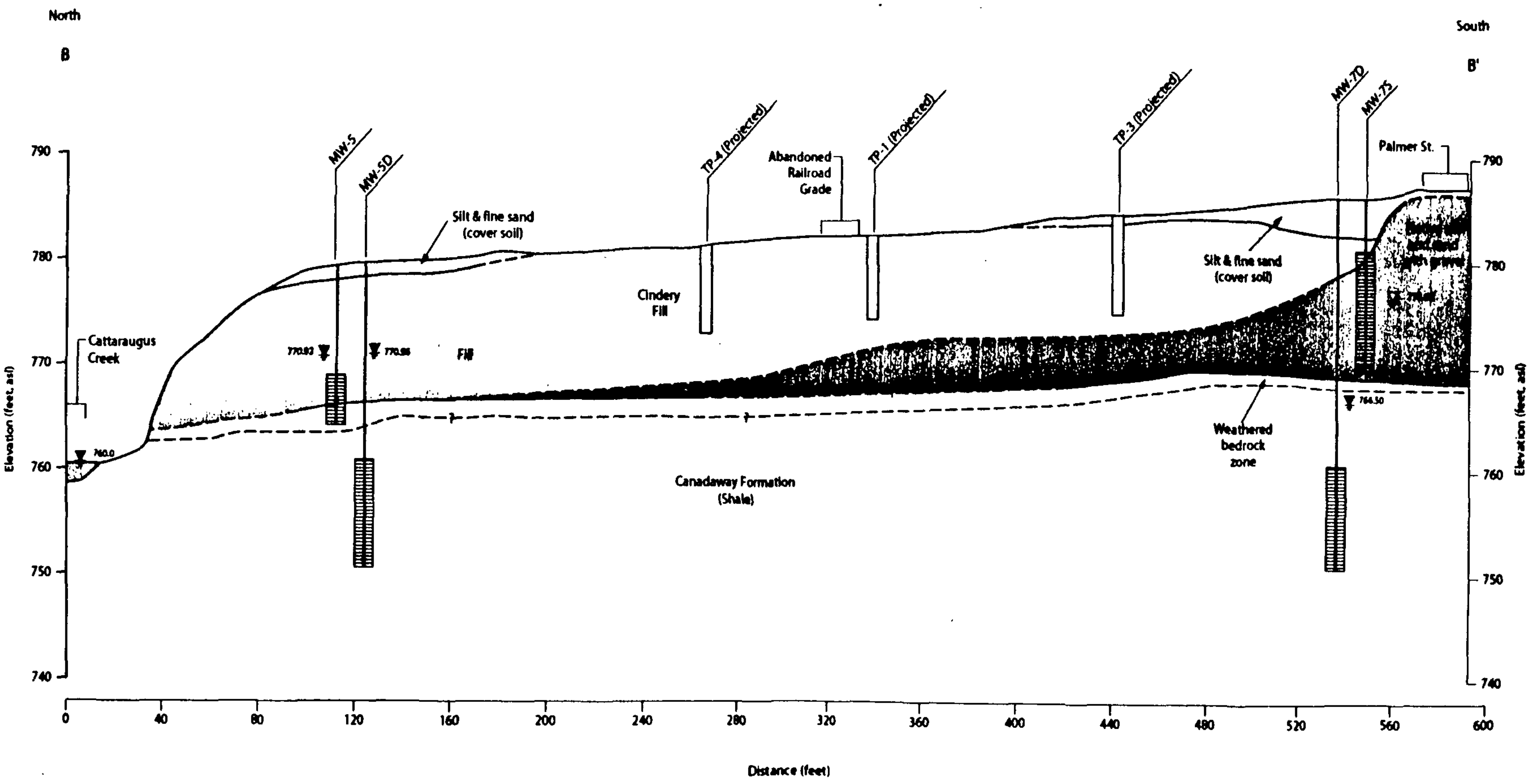
LEGEND

- Water level elevations taken 12/21/00
- Water level in GMW-1 taken 10/00
- ▼ Groundwater elevation
- Screened interval of Monitoring Well

CROSS SECTION A-A'
Peter Cooper Gowanda Site
Gowanda, New York

GEOMATRIX

Project No.	Figure
5771.001	3-2



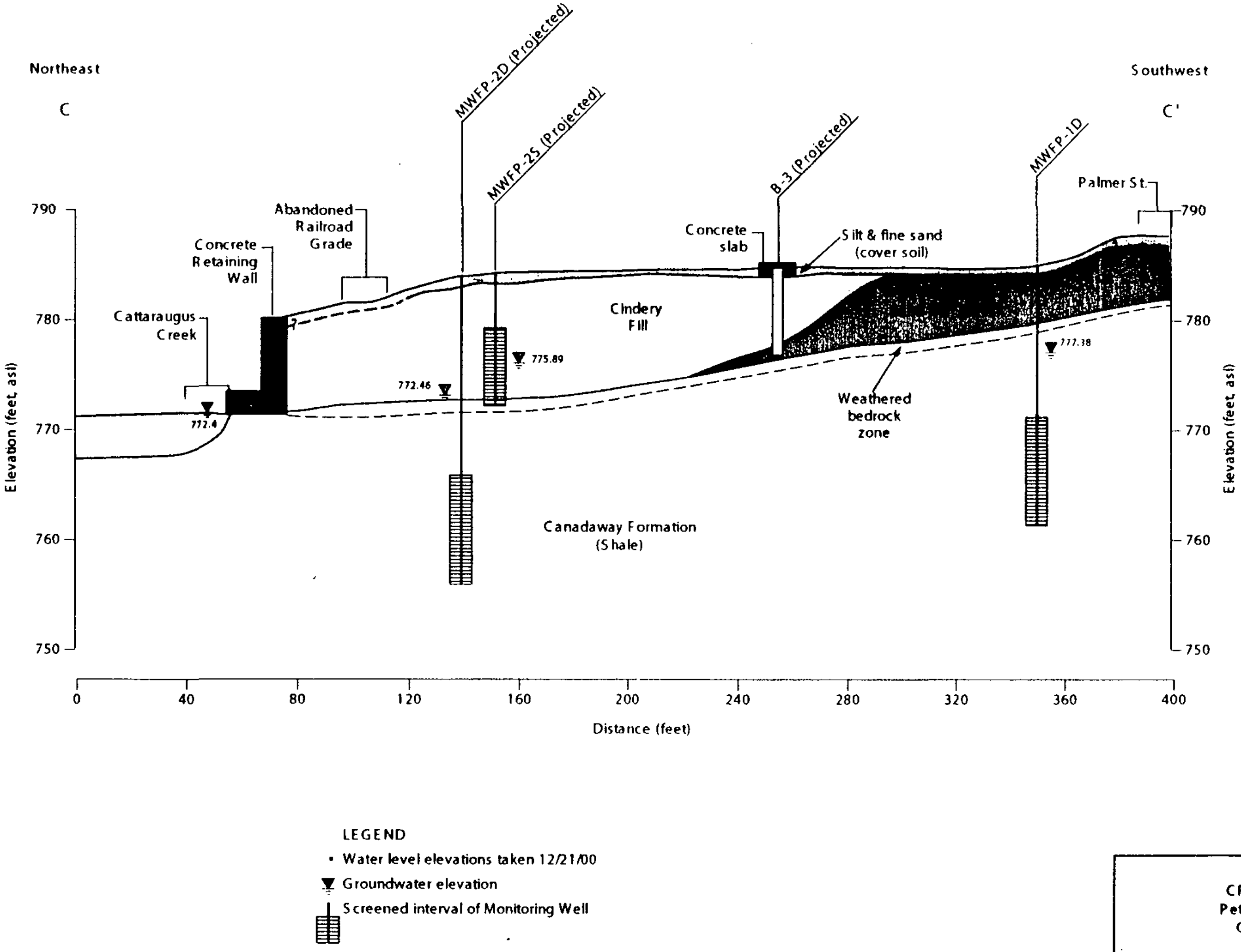
LEGEND

- Water level elevations taken 12/21/00
- Cattaraugus creek level estimated from topographic basemap
- Groundwater elevation
- Screened interval of Monitoring Well

CROSS SECTION B-B'
Peter Cooper Gowanda Site
Gowanda, New York

GEOMATRIX

Project No.	Figure
5771.001	3-3



CROSS SECTION C-C'
Peter Cooper Landfill Site
Gowanda, New York

GEOMATRIX

Project No.	Figure
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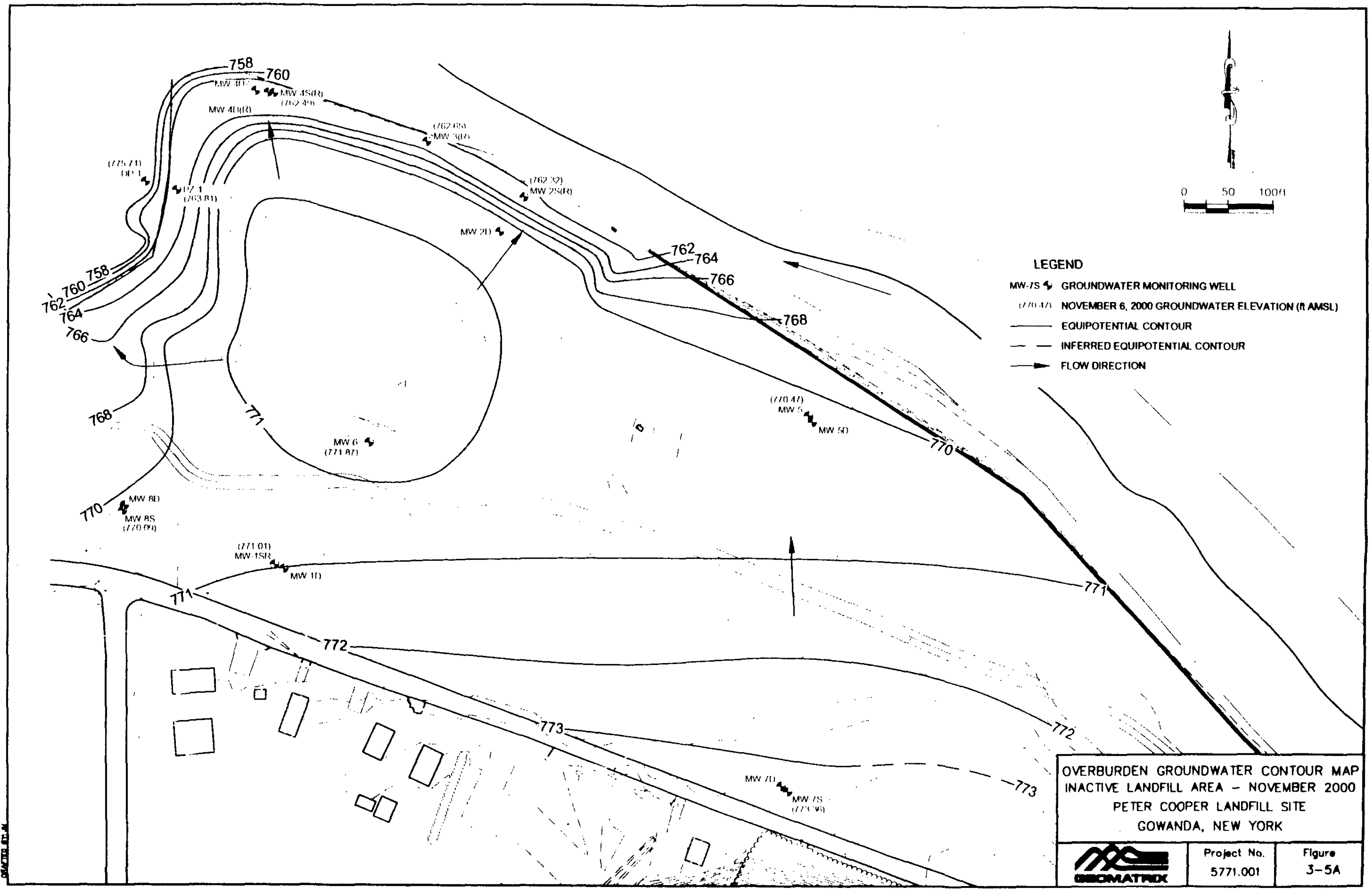

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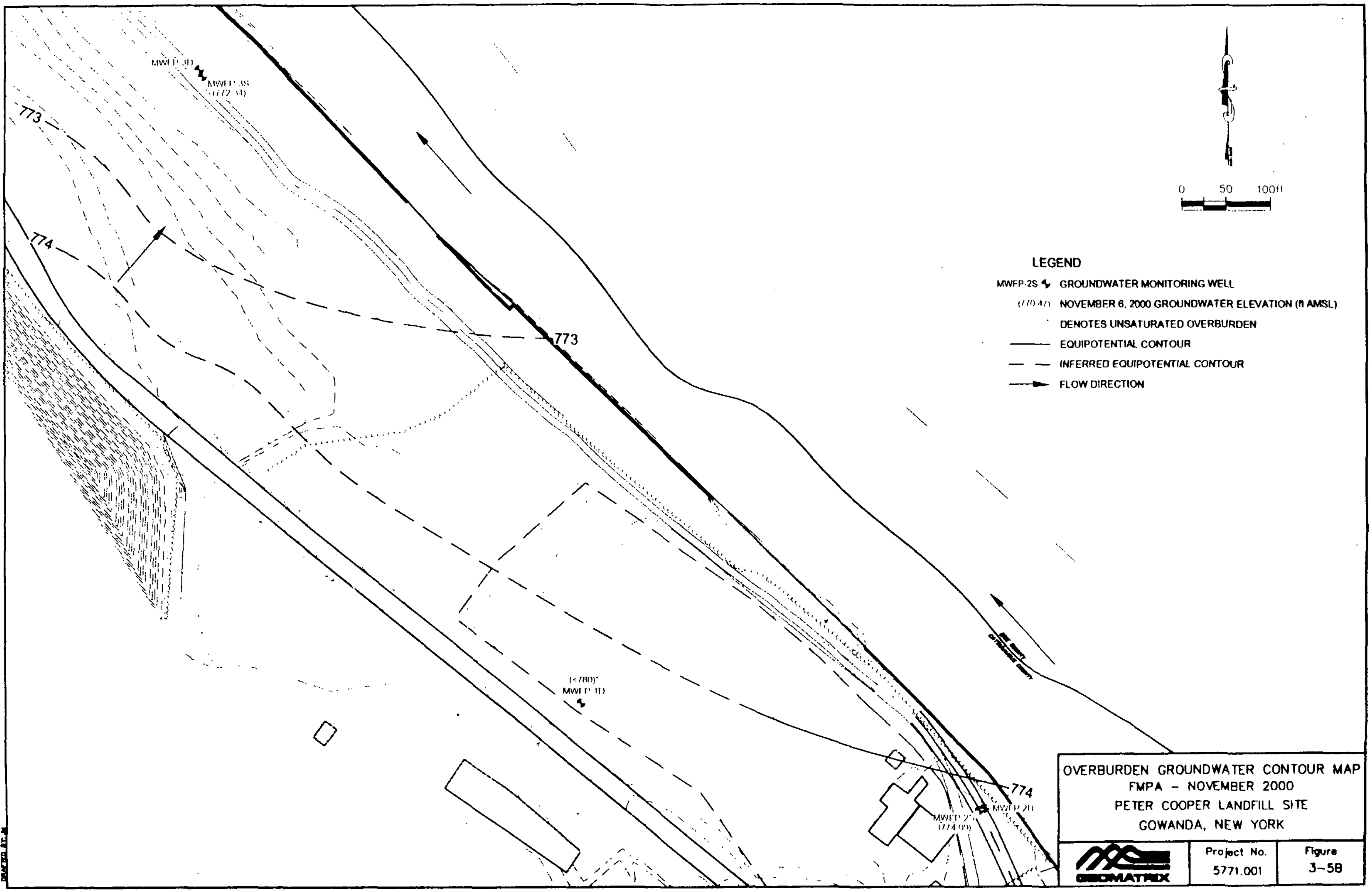
OVERBURDEN GROUNDWATER CONTOUR MAP
INACTIVE LANDFILL AREA – NOVEMBER 2000
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX

Project No.	Figure
5771.001	3–5A



OVERBURDEN GROUNDWATER CONTOUR MAP
FMPA - NOVEMBER 2000
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

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Project No.	Figure
5771.001	3-58

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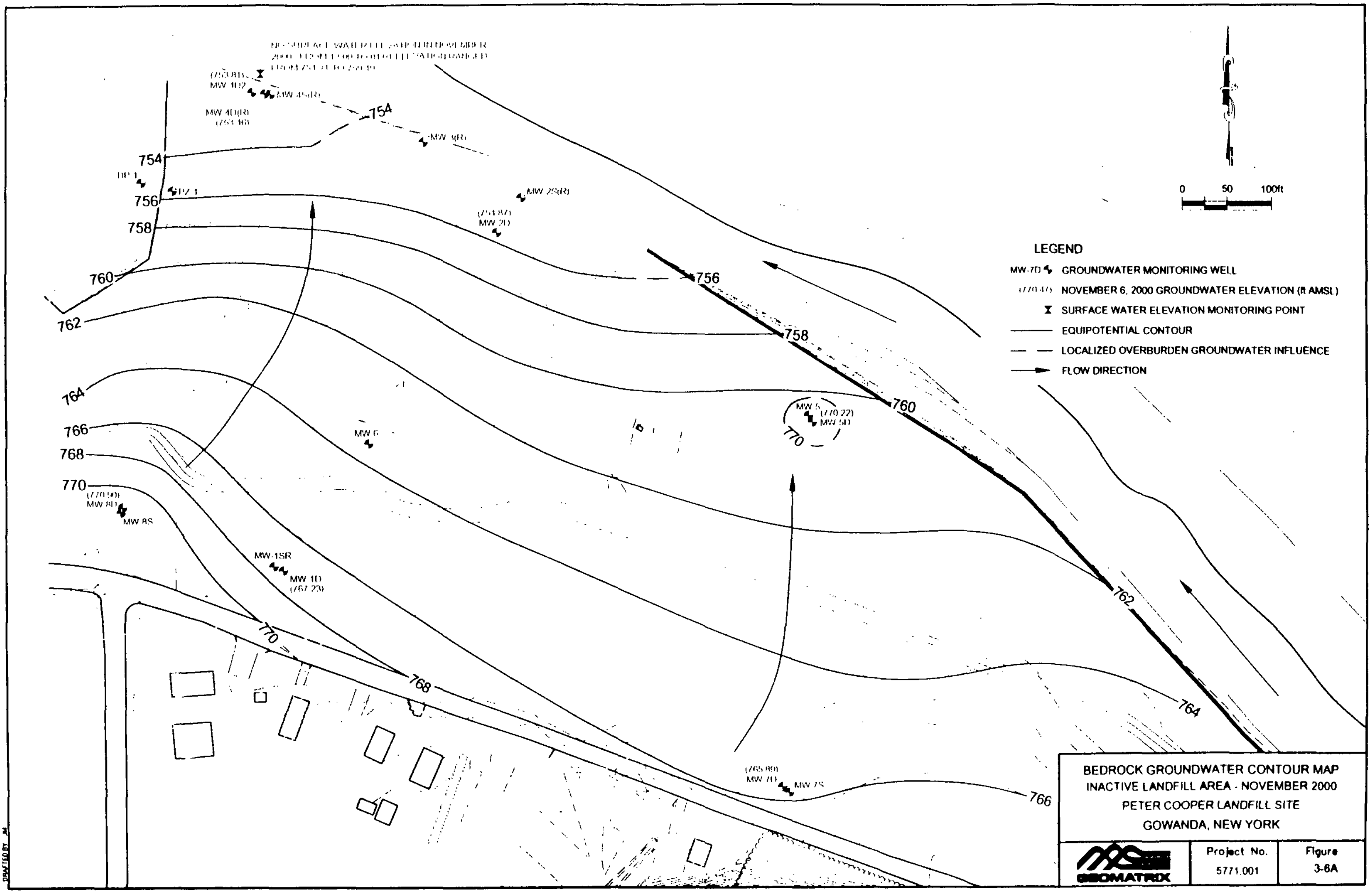
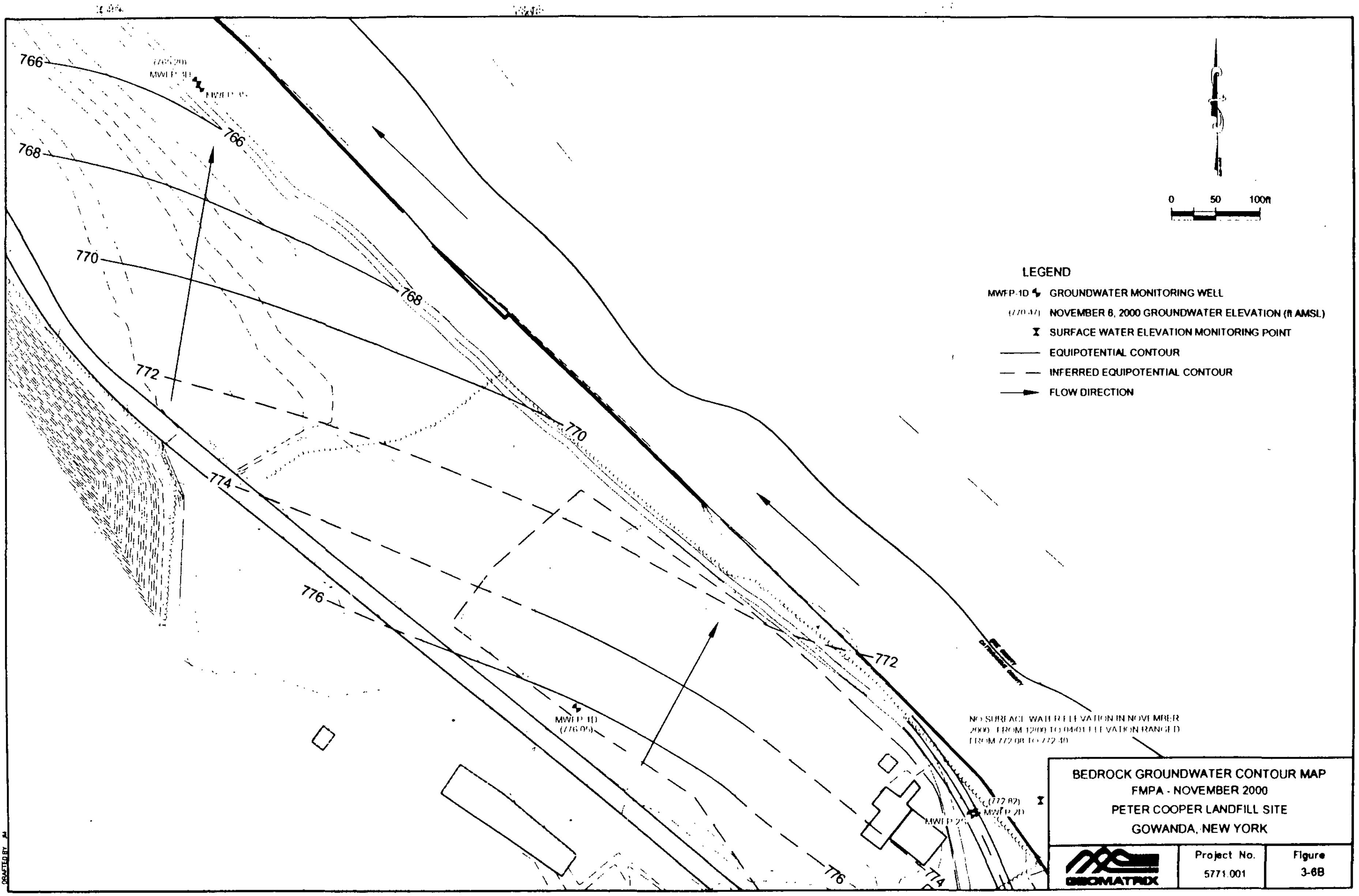


BEDROCK GROUNDWATER CONTOUR MAP
INACTIVE LANDFILL AREA - NOVEMBER 2000
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX

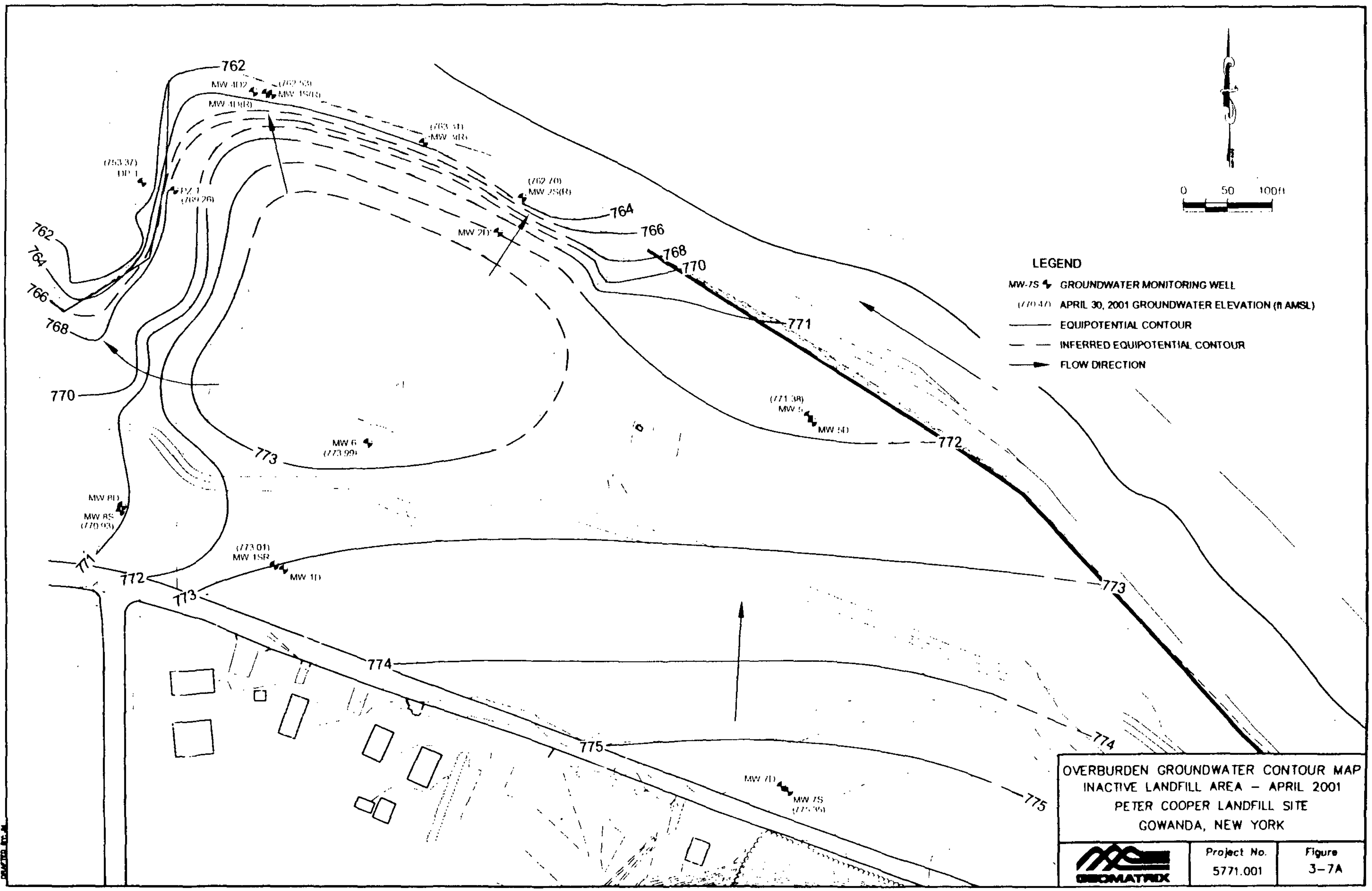
Project No.	Figure
5771.001	3-6A



BEDROCK GROUNDWATER CONTOUR MAP
FMPA - NOVEMBER 2000
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

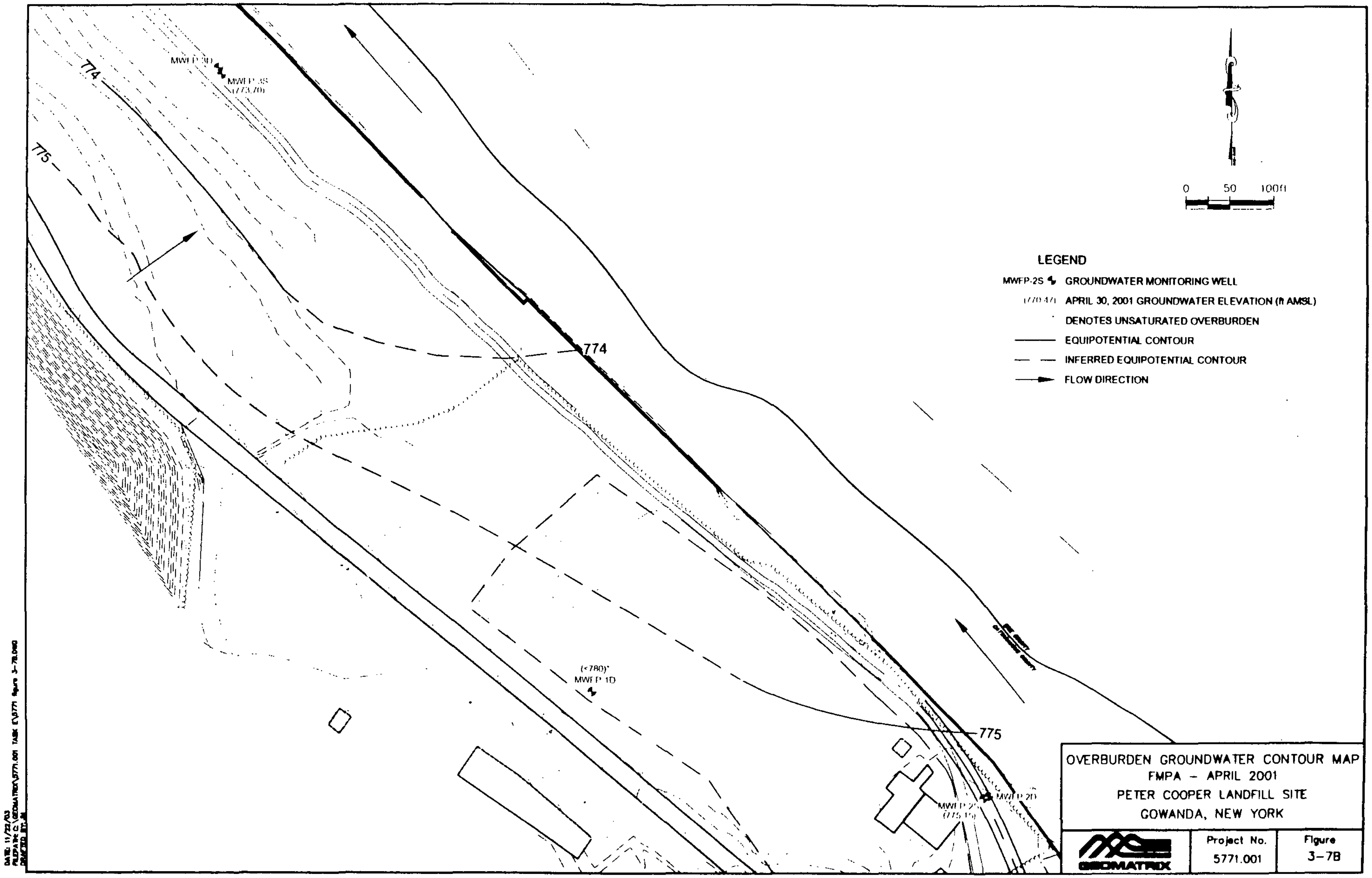
Project No. 5771.001

Figure 3-6B

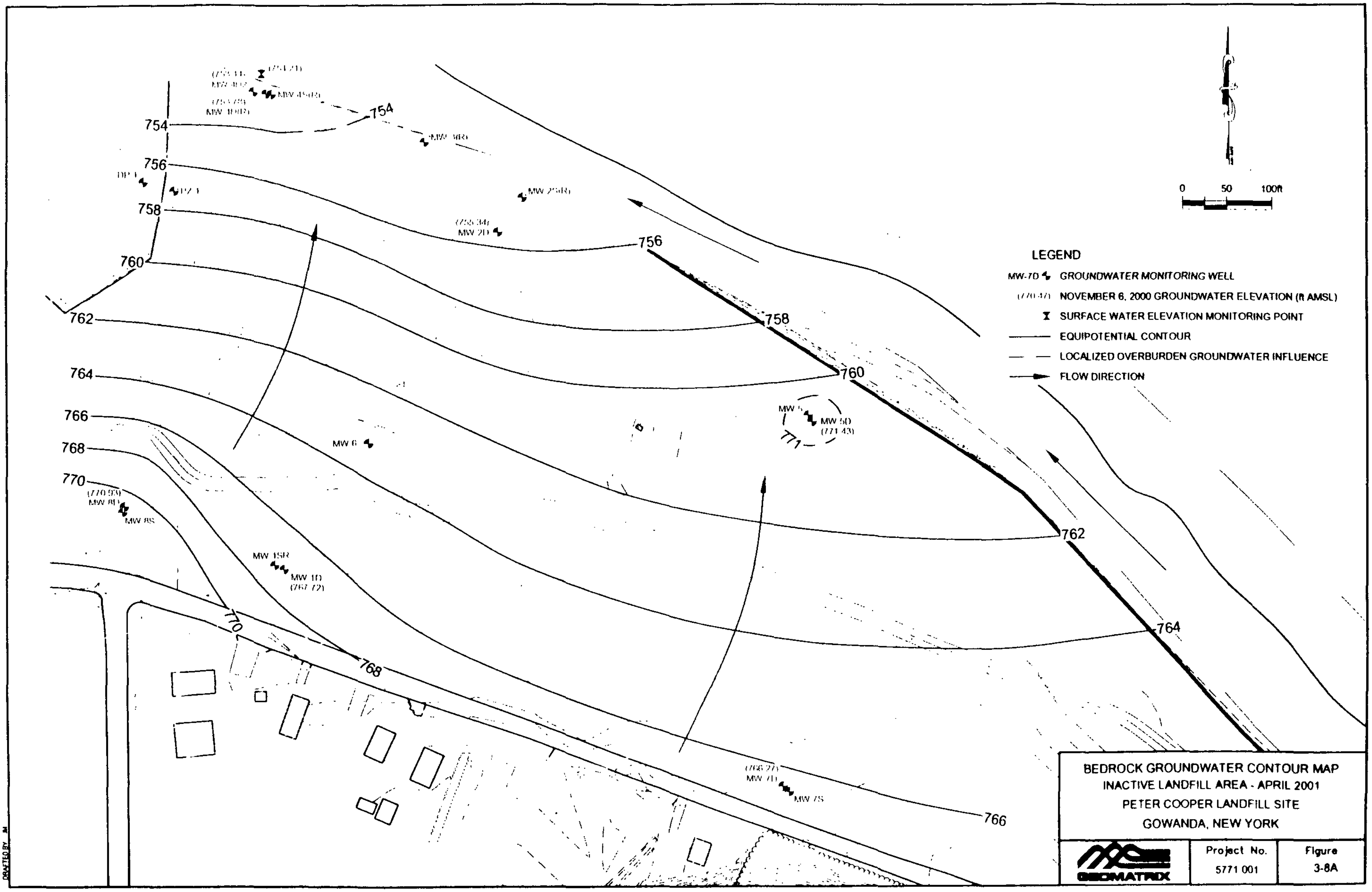


OVERBURDEN GROUNDWATER CONTOUR MAP
INACTIVE LANDFILL AREA – APRIL 2001
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

Project No.	Figure
5771.001	3-7A



OVERBURDEN GROUNDWATER CONTOUR MAP
FMPA - APRIL 2001
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK



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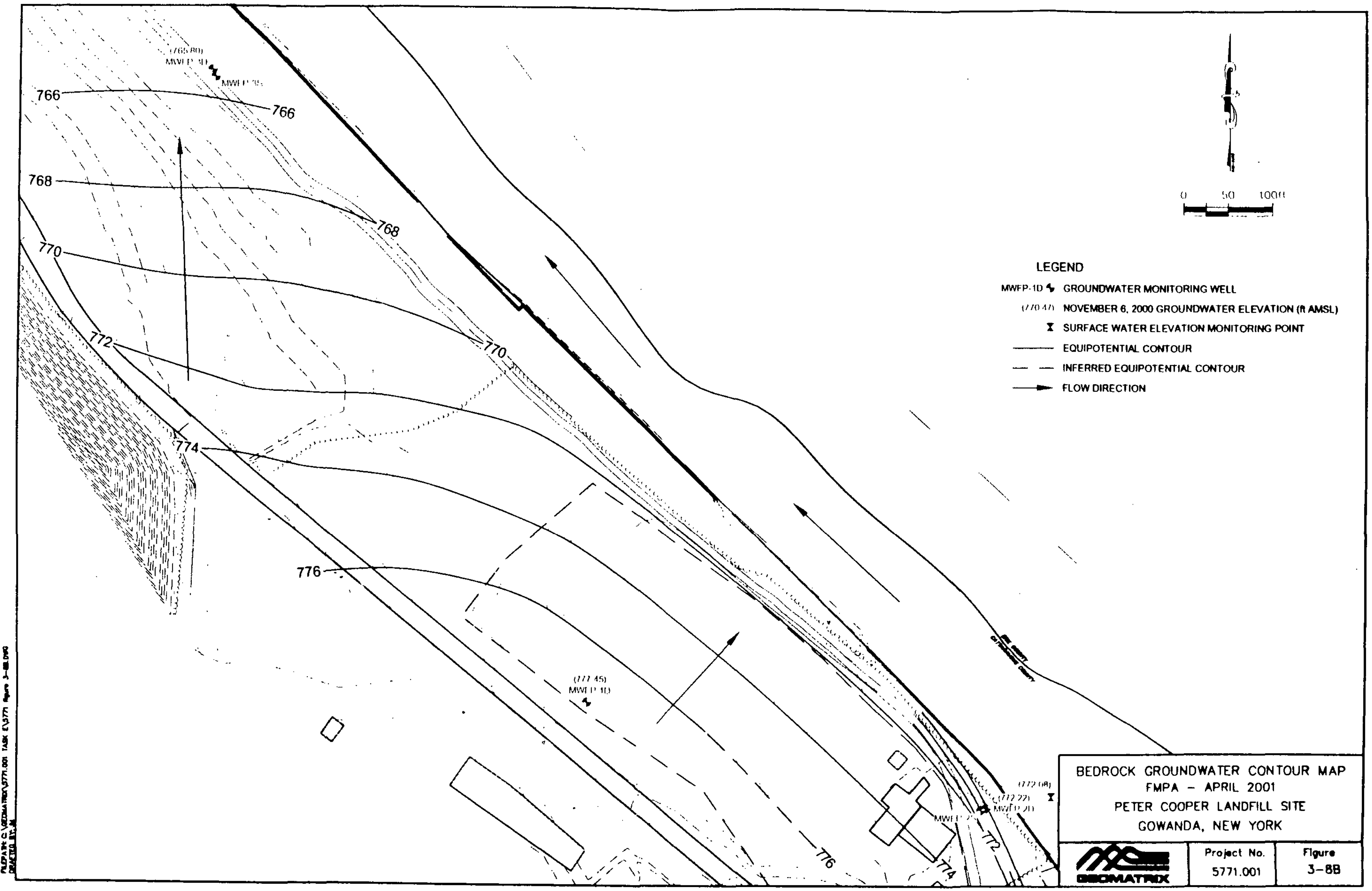
BEDROCK GROUNDWATER CONTOUR MAP
INACTIVE LANDFILL AREA - APRIL 2001
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

Project No.	Figure
5771 001	3-8A



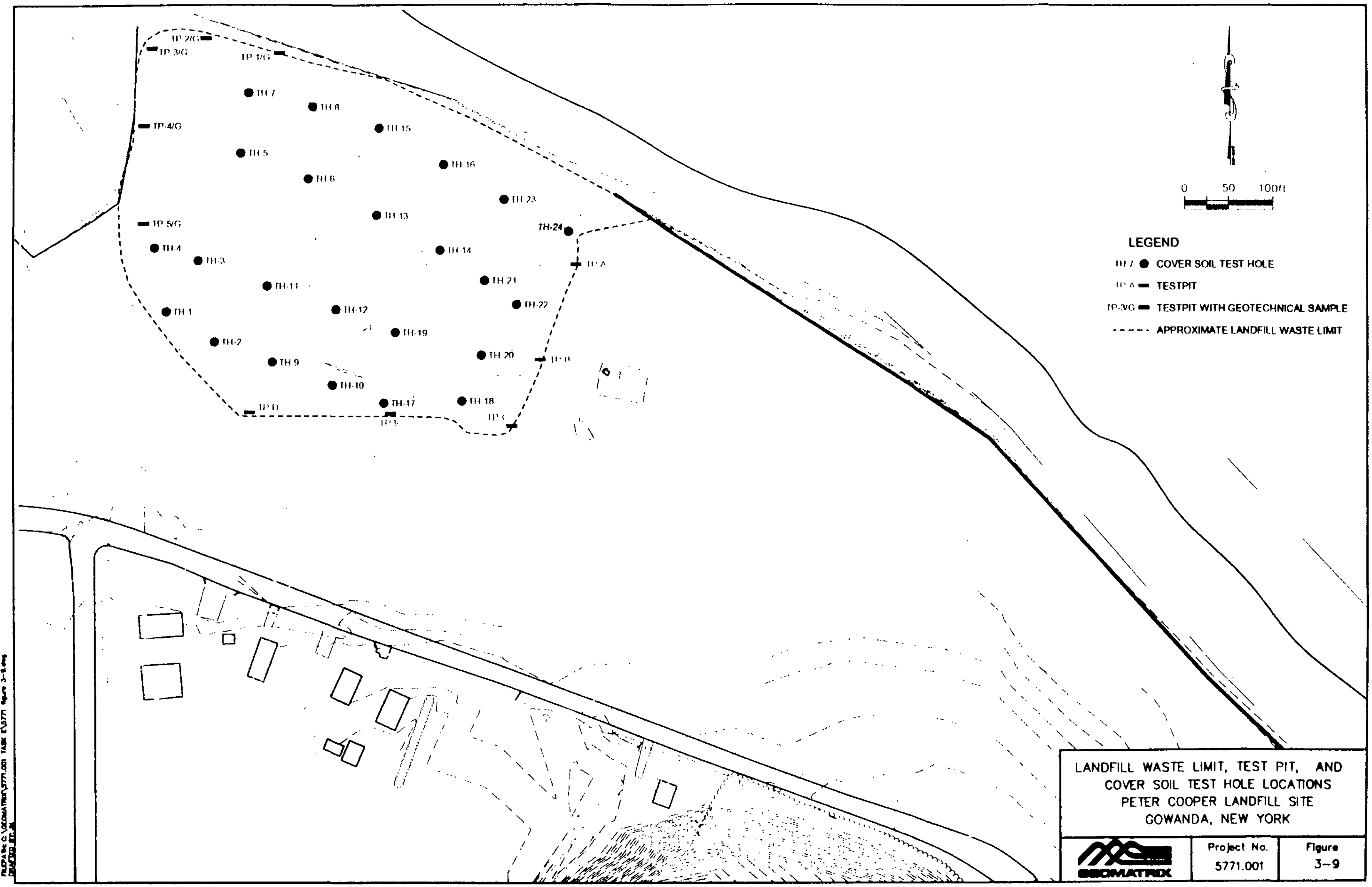
LEGEND

- MWFP-1D ϟ GROUNDWATER MONITORING WELL
- (770.47) NOVEMBER 6, 2000 GROUNDWATER ELEVATION (ft AMSL)
- ⧗ SURFACE WATER ELEVATION MONITORING POINT
- ——— EQUIPOTENTIAL CONTOUR
- — — INFERRED EQUIPOTENTIAL CONTOUR
- ——▶ FLOW DIRECTION

BEDROCK GROUNDWATER CONTOUR MAP
FMPA – APRIL 2001
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX

Project No.	Figure
5771.001	3-8B



LANDFILL WASTE LIMIT, TEST PIT, AND
COVER SOIL TEST HOLE LOCATIONS
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

GEOMATRIX

Project No.	Figure
5771.001	3-9

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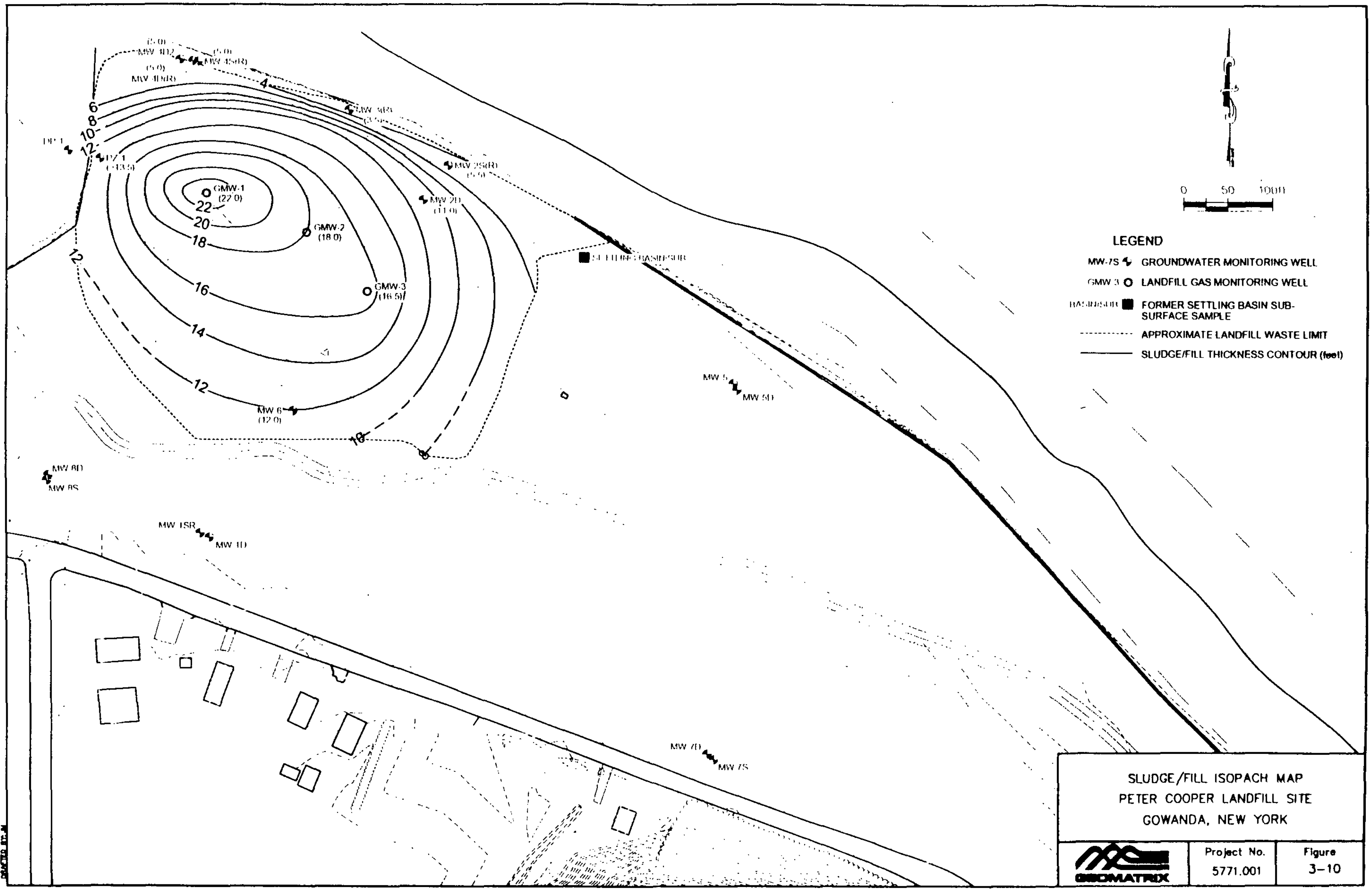

SLUDGE/FILL ISOPACH MAP
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

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Project No.	Figure
5771.001	3-10

DATE: 11/21/93
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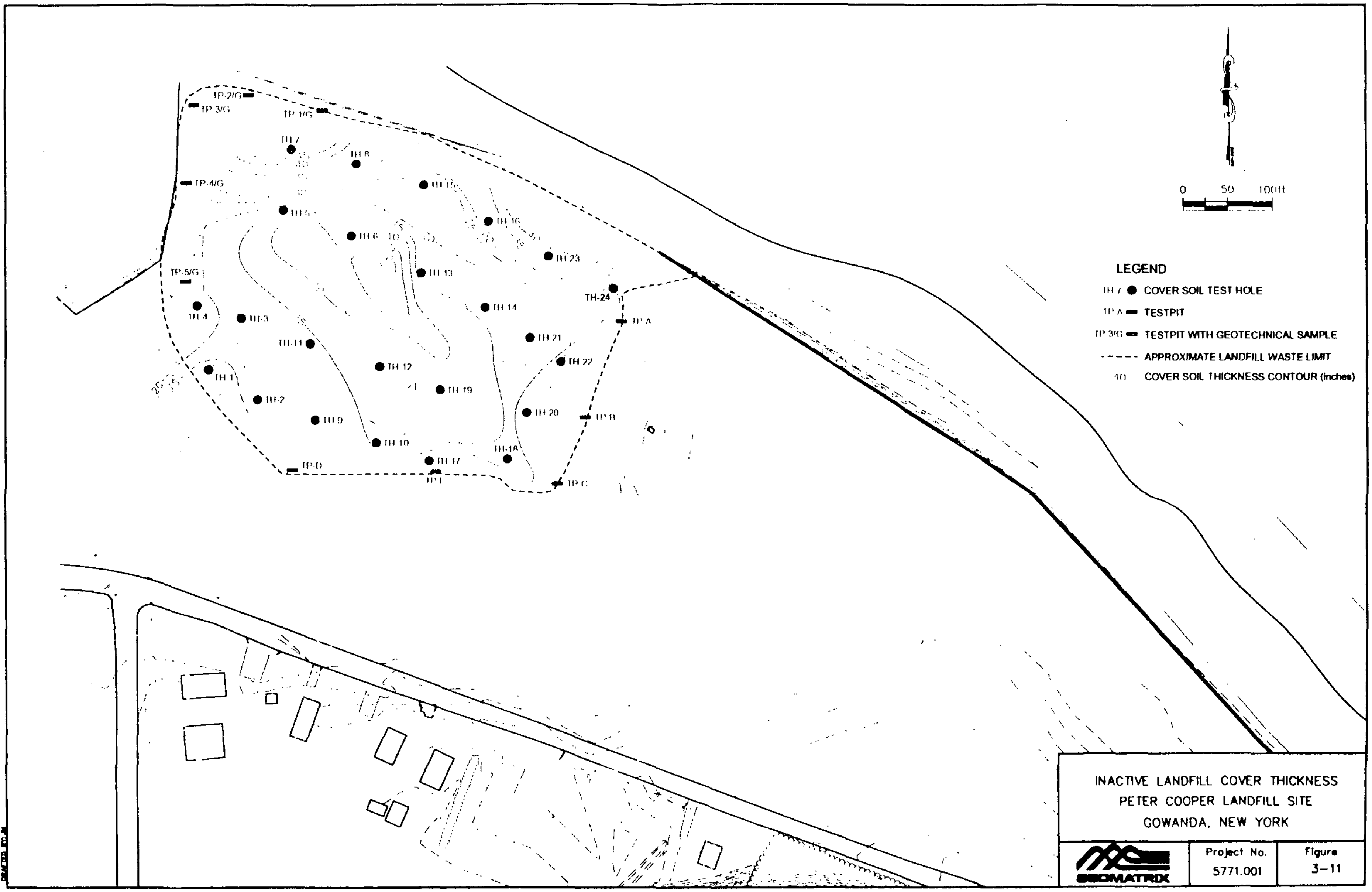
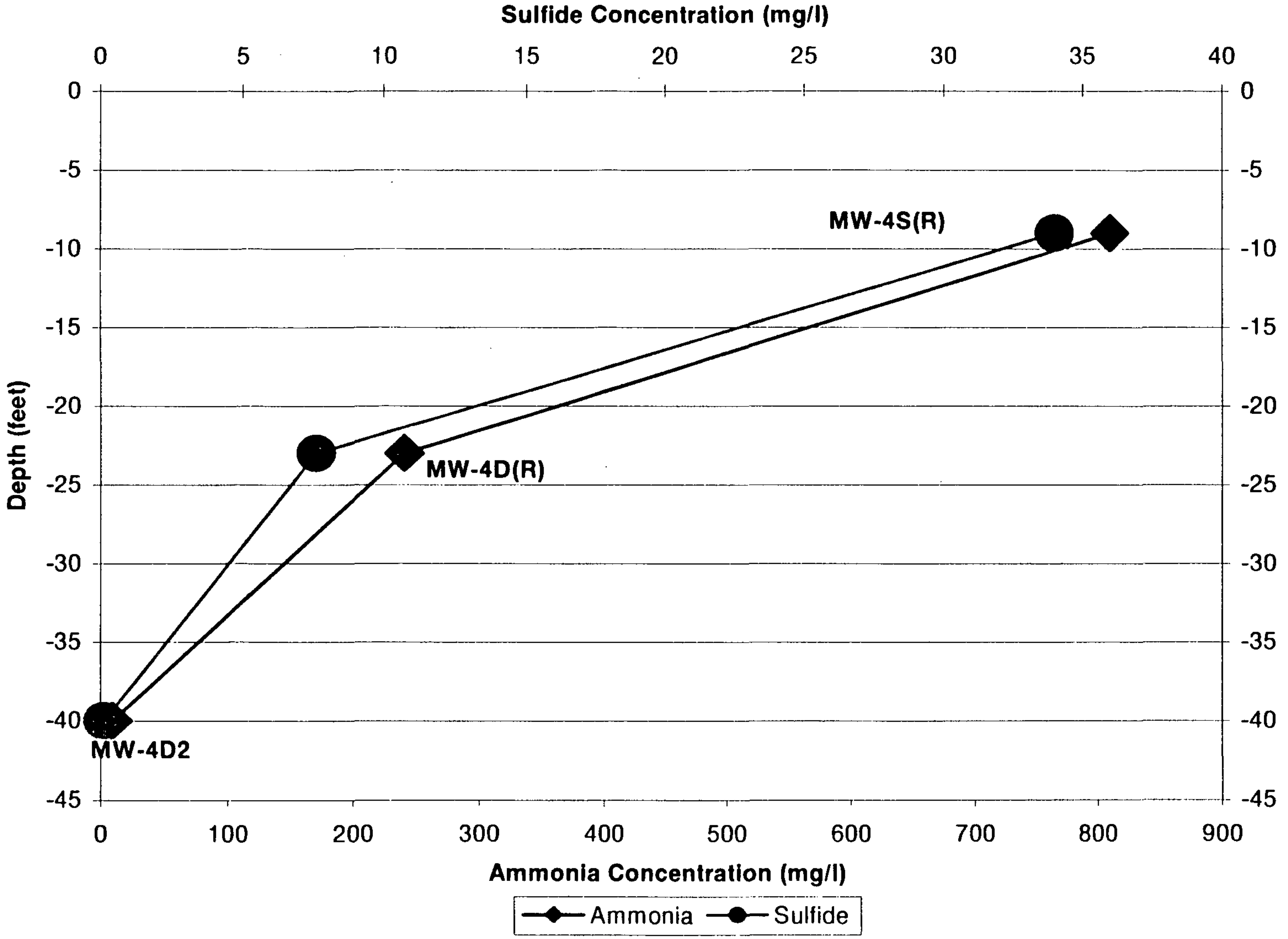


INACTIVE LANDFILL COVER THICKNESS
PETER COOPER LANDFILL SITE
GOWANDA, NEW YORK

Project No.	Figure
5771.001	3-11

Constituent Concentration vs Depth



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CONSTITUENT CONCENTRATION VS DEPTH
Inactive Landfill Area, Peter Cooper Site
Gowanda, NY

Project No.	5771.001
Figure	**5-1**

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