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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PHASE II INVESTIGATIONS

New Road Landfill
Site No. 932083
City of Niagara Falls, Niagara County

November 1991

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Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233

Thomas C. Jorling, Commissioner

Division of Hazardous Waste Remediation

Michael J. O'Toole, Jr., P.E., Director

Prepared by:

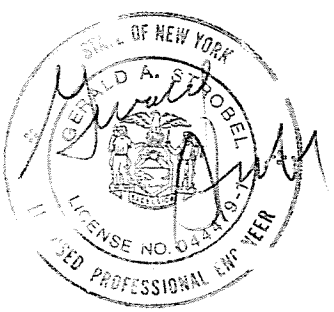
Ecology and Environment Engineering, P.C.

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1. EXECUTIVE SUMMARY

1.1 SITE DESCRIPTION AND BACKGROUND

The 70-acre New Road Landfill site (Site I.D. Number 932083) is located at the intersection of New and Porter roads in the City of Niagara Falls, Niagara County, New York (see Figures 1-1 and 1-2). The eastern portion of the site, consisting of approximately 48 acres, is owned by the Power Authority of the State of New York (PASNY), and the western portion, consisting of approximately 22 acres, has been owned by Niagara Mohawk Power Corporation (NiMo) since the turn of the century. No landfilling has been reported at this portion of the site.

The eastern portion of the site was converted from farm fields to an open solid waste disposal site in the 1950s by the City of Niagara Falls, which owned and operated the site until 1958. Noncombustible refuse and incinerator ash from municipal wastes were reportedly disposed of at the site by the city. Details regarding the types and quantities of the wastes disposed of at the site were not documented. In 1954 or 1955 a fishkill occurred downstream of the site in Gill Creek. The New York State Department of Environmental Conservation (NYSDEC) Interagency Task Force attributed the fishkill to leachate flowing from the site. PASNY acquired the property from the City of Niagara Falls in 1958 and used the site for the disposal of rock spoils and associated clean fill derived from the construction of PASNY's nearby underground aqueducts. These aqueducts transport water from the Niagara River northward to PASNY's power plant reservoir located in the Town of Lewiston, New York. Disposal of "shot rock" by PASNY continued at the site until 1962. From 1962 until 1969 the City of Niagara Falls used the site for periodic burning of materials such as tree limbs, brush, and leaves.

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In 1980, a hydrogeologic study was conducted and an environmental impact statement was prepared by Malcolm Pirnie, Inc. for the City of Niagara Falls. The report was completed in May 1981. The study included the excavation of 10 test pits up to 10 feet deep with soil samples being collected from each pit to characterize the composition and physical properties of the overburden materials. In addition, a total of eight groundwater monitoring wells were installed in both the overburden and bedrock throughout the site. Soil samples were collected during well drilling and analyzed for physical characteristics. Groundwater samples collected from the monitoring wells showed elevated levels of indicator parameters including chlorides, sulfates, and pH. Phenol was also detected in both the upgradient and downgradient wells. Surface water samples were collected from East Gill Creek and elevated levels of chromium and phenol were detected. However, no background (upgradient) samples were collected to determine if the New Road site was the source of these surface water contaminants.

In July 1982, the United States Geological Survey (USGS) collected groundwater samples from three of the eight existing wells as part of a regional study. The samples collected from the New Road site were analyzed for heavy metals and organic compounds. Analytical results indicated concentrations of iron, lead, and manganese exceeding NYSDEC Class GA groundwater quality standards. The only organic priority pollutant compound detected was di-n-butyl phthalate (below the quantifiable detection limit). Four organic nonpriority pollutants were found. However, concentrations were found both up- and downgradient of the site indicating a possible off-site contaminant source or naturally occurring groundwater of poor quality.

In January 1986, a Phase I investigation was completed for NYSDEC by Engineering-Science, Inc. in association with Dames & Moore. The Phase I investigation assessed the hazard to the environment and/or public health posed by the site based on the Hazard Ranking System (HRS) score. No sampling was performed during the Phase I investigation.

Also in 1986, during a site inspection by the Niagara County Department of Health, a fire was observed in the northeast corner of the site. A 55-gallon drum burst because of the heat, leaving an ashy watery residue. Other drums observed included three 20-gallon drums,

two containing hand cleanser and one empty, as well as four 55-gallon steel drums, one containing deodorizer and the other three rusted with unknown contents. These drums were not observed during the Phase II investigation.

With the exception of periodic unauthorized dumping of residential solid refuse and construction and demolition debris, the site has been inactive since 1970. There is no evidence to support the allegation of industrial hazardous waste disposal at the site.

1.2 PHASE II INVESTIGATION

Several investigative tasks were performed at the New Road Landfill site in order to determine if hazardous waste was disposed of at the site, determine the potential risk to human health and the environment, and accurately calculate a final HRS score. The Phase II field investigation was performed by Ecology and Environment Engineering, P.C. (E & E) with assistance from American Auger and Ditching Company, Inc. during monitoring well drilling and installation.

The field investigation was performed from September 1990 to February 1991 and included the following four tasks:

- Site reconnaissance;
- Geophysical survey of proposed well locations;
- Well drilling and installation; and
- Sampling of groundwater, surface water, sediment, and soils.

Prior to the site inspection conducted as part of the site reconnaissance, a detailed record and file search was initiated to review existing data and identify data gaps. A limited air monitoring survey was conducted during the site reconnaissance using flame and photoionization detectors. Two geophysical survey methods were employed to optimize the selection of monitoring well locations and to reduce the risks associated with drilling into unknown terrain. Six groundwater monitoring wells were installed as part of this investigation in both the overburden and bedrock water-bearing zones. The collection and analysis of groundwater, surface water, sediment, and soil samples were

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conducted to determine the presence of contaminants and assess their potential for migration.

1.3 SITE ASSESSMENT

The 70-acre site is located in an industrial/commercial area within the City of Niagara Falls, New York. Generally flat, the site is vacant with the exception of high voltage electrical transmission lines and towers that cross the site in a north-south direction.

Surface water exists on the site in small swampy or ponded areas and drains via East Gill Creek, which is directed through a concrete pipe from east to west across the center of the site. Groundwater is present in a shallow till overburden and in the fractured dolostone bedrock. Well drilling revealed an 11- to 17-foot-thick overburden consisting of three layers, a lower glacial till, a middle lacustrine clay, and an upper fill layer primarily of rock debris from a nearby bedrock aqueduct project. The bedrock beneath the overburden is the fractured Lockport dolostone formation, which dips gently to the south at approximately 40 feet per mile. Water elevations collected from monitoring wells on site indicate a groundwater flow in both the bedrock and overburden to the west-southwest. The water table was encountered as shallow as 10 feet below the ground surface in the overburden. This shallow water zone is separated by a clay confining layer from the bedrock aquifer.

Samples were collected from groundwater, surface water, sediment, and soil and analyzed for Target Compound List (TCL) organics and inorganics, including volatile organics, semivolatile organics, pesticides and polychlorinated biphenyls (PCBs), metals, and cyanide. Soil samples were also tested for EP Toxicity. Analytical results indicate that several contaminants exist at the site in various media. The groundwater was found to contain PCBs. Seven metals were detected at concentrations exceeding NYSDEC Class GA standards or guidance values. Of these, beryllium, iron, lead, manganese, and zinc are considered observed releases from the site. In surface water, only iron was found to constitute an observed release from the site.

In soil samples collected from the 0- to 2-foot interval, low levels of polynuclear aromatic hydrocarbons (PAHs) were found. EP

Toxicity test results were below maximum allowable concentrations. The population within a 3-mile radius of the site obtains its drinking water from municipal surface water intakes located on the Niagara River upstream of the site. Surface water drains from the site via East Gill Creek, which flows into Gill Creek and then into the Niagara River. East Gill Creek and Gill Creek are used for recreational purposes only.

The Phase II investigation did not identify any hazardous waste disposed of at the site. However, low levels of hazardous substances were identified on site and migrating from the site. These substances pose a limited threat to human health and the environment by direct contact with contaminated soil and water media. Potential receptors of the contaminants on site are only those few landowners or trespassers who might enter the unrestricted site on foot from the south or west.

Limiting access and, therefore, contact with contaminated media would greatly reduce, if not eliminate, the threat to human health posed by this site.

1.4 HAZARD RANKING SYSTEM SCORE

The HRS score was computed to quantify risks associated with the New Road Landfill site. The HRS is applied to inactive hazardous waste sites in New York State to prioritize those needing additional investigation and remediation. The system evaluates site characteristics, containment measures, waste types, and potential contaminant receptors.

Under the HRS, three numerical scores are computed to express the site's relative risk or damage to the population and the environment. The three scores are described below:

- S_M reflects the potential for harm to humans or the environment from migration of a hazardous substance away from the facility via groundwater, surface water, or air. It is a composite of separate scores for each of the three routes (Sgw = groundwater route score, S_{sw} = surface water route score, and S_a = air route score);
- S_{FE} reflects the potential for harm from substances that can explode or cause fires; and
- S_{DC} reflects the potential for harm from direct contact with hazardous substances at the facility (i.e., no migration need be involved).

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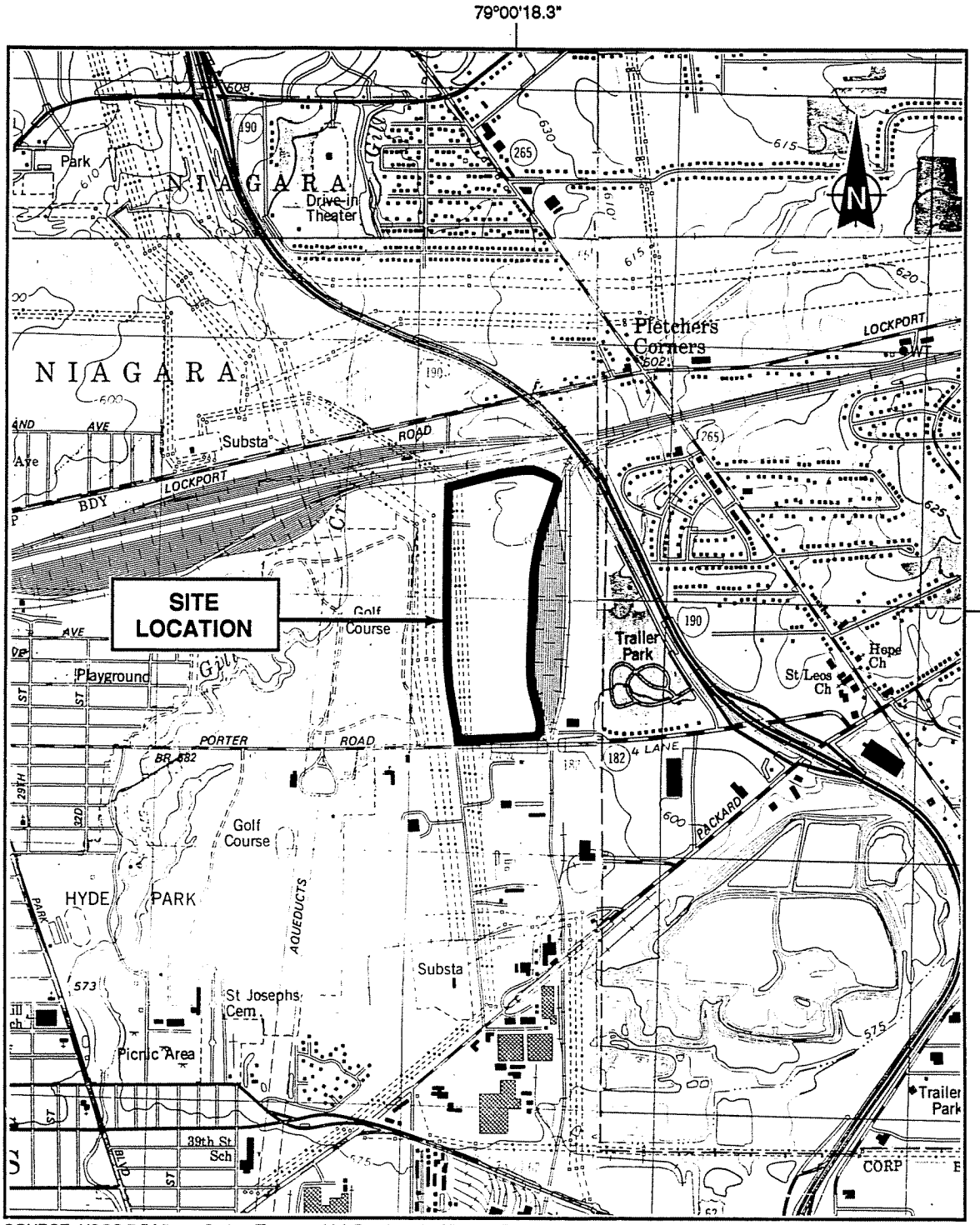
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Based on the results of this and previous studies, the HRS scores for the New Road Landfill site have been calculated as follows:

S_M = 5.28 (S_{gw} = 4.47; S_{sw} = 7.97; S_a = 0)

S_{FE} = 0

S_{DC} = 37.5



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle: Niagara Falls, NY-ONT, 1980; Tonawanda West, NY, 1980; Lewiston, NY-ONT, 1980; Ransomville, NY, 1980.

SCALE 1:25,000

0 ½ 1 Mile

0 .5 1 Kilometer

Figure 1-1
LOCATION MAP, NEW ROAD LANDFILL

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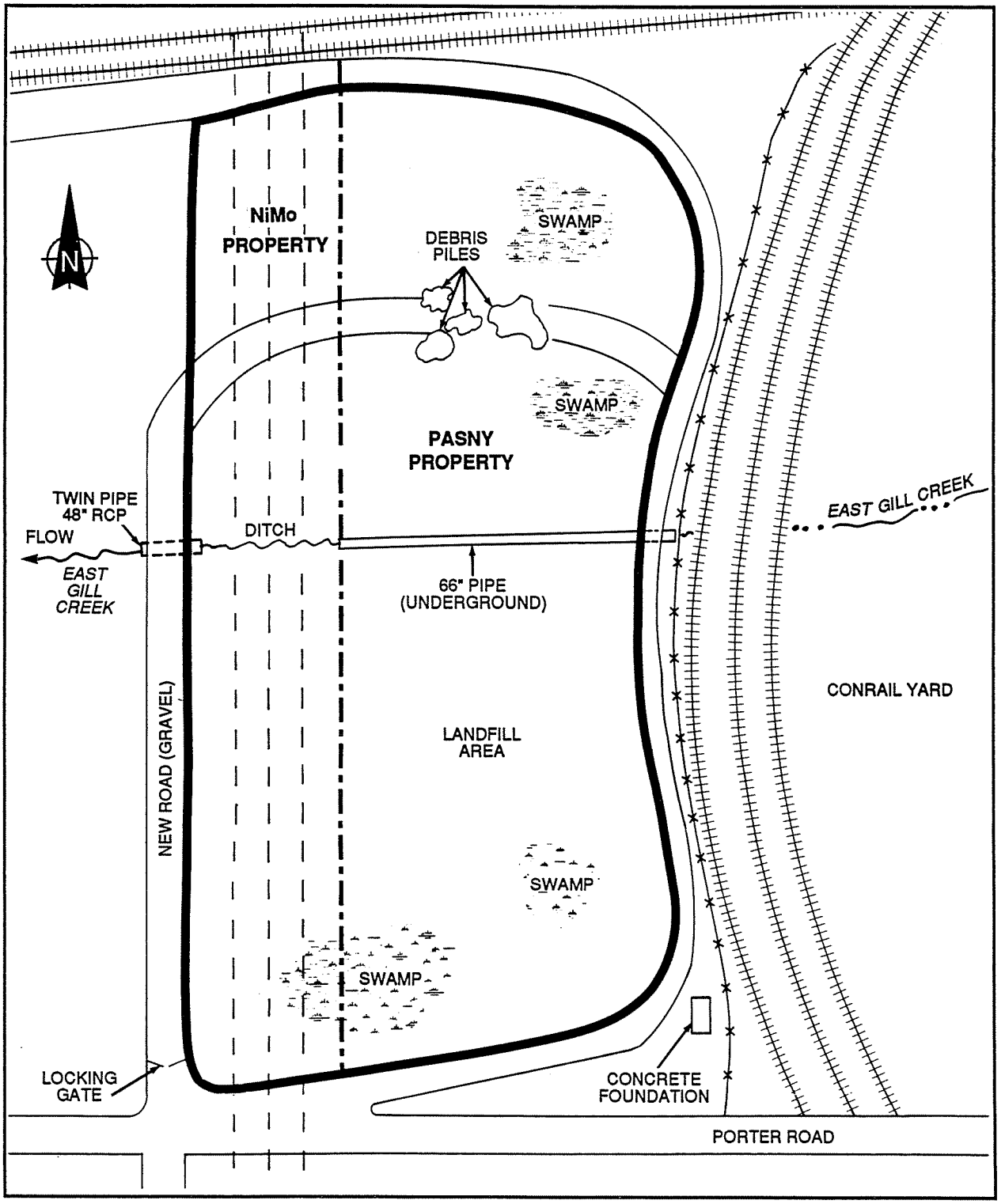


Figure 1-2
SITE MAP, NEW ROAD LANDFILL

47-15-25 (11/90)-9d

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

Original-BHSC
Copy-REGION
Copy-DEE
Copy-DOH
Copy-PREPARER

ADDITIONS/CHANGES TO REGISTRY OF INACTIVE HAZARDOUS WASTE DISPOSAL SITES

1. Site Name	2. Site Number	3. Town	4. County
New Road Landfill	932083	City of Niagara Falls	Niagara

5. Region	6. Classification	7. Activity
9	Current 2A /Proposed D1	[ ] Add [ ] Reclassify [X] Delist [ ] Modify _____

8a. Describe location of site (attach USGS topographic map showing site location).
Located on the north side of Porter Road just east of I-190. East and north sides are bounded by Conrail tracks and the west side is bounded by New Road (48th Street) and a golf course.

b. Quadrangle Niagara Falls c. Site latitude 43°06'44.1" Longitude 79°00'18.3" d. Tax Map Number 1305

9a. Briefly describe the site (attach site plan showing disposal/sampling locations)
Former municipal landfill owned and operated by the City of Niagara Falls. Purchased in 1958 by PASNY for the disposal of "shot rock" generated during the construction of underground conduits. A NiMo ROW occupies the western portion of the site.

b. Area 70 acres c. EPA ID number NYD980507149 d. PA/SI [X] Yes [ ] No

e. Completed: [X] Phase I [X] Phase II [ ] PSA [X] Sampling

10. Briefly list the type and quantity of the hazardous waste and the dates that it was disposed of at this site.

No hazardous waste disposal confirmed.

11a. Summarized sampling data attached

[ ] Air [X] Groundwater [X] Surface Water [X] Soil [ ] Waste [X] EP Tox [ ] TCLP

b. List contravened parameters and values in µg/L:
Groundwater: Fe (1,880 - 56,800); Pb (41.5 - 252); Mg (65,100 -291,000); Mn (435 - 7,210); Na (20,100 - 72,700); Zn (816 - 2,190); Aroclor 1254 (0.8)
Surface water: Fe (667 - 64,800); Hg (0.8); Zn (1,530); Cu (147); Aroclor 1254 (1.2)

12. Site impact data

a. Nearest surface water: Distance On Site ft. Direction Flows west Classification D

b. Nearest groundwater: Depth ~10 ft. Flow direction West- Southwest [ ] Sole source [ ] Primary [ ] Principal

c. Nearest water supply: Distance 11,000 ft. Direction South Active [X] Yes [ ] No

d. Nearest building: Distance 300 ft. Direction Southeast Use Mobile home park

e. Crops/livestock on site? [ ] Yes [X] No

f. Exposed hazardous waste? [ ] Yes [X] No

g. Controlled site access? [ ] Yes [X] No

h. Documented fish or wildlife mortality? [X] Yes [ ] No

i. Impact on special status fish or wildlife resource? [ ] Yes [X] No

j. Within a State Economic Development Zone? [ ] Yes [X] No

k. For Class 2A: Code _____ Health model score _____

l. For Class 2: Priority category _____

m. HRS Score SM = 5.28

n. Significant threat [ ] Yes _____ [X] No [ ] Unknown

13. Site owner's name	14. Address	15. Telephone Number
Power Authority of the State of New York/ Niagara Mohawk Power Corporation	1720 New Road, Niagara Falls, NY/ P.O. Box 277, Niagara Falls, NY 14302	(716) 236-2713/ (716) 285-3211

16. Preparer
James Richert, Geologist, Ecology and Environment Engineering, P.C.
Name, title, and organization

4-5-91
Date

James J Richert
Signature

17. Approved

Name, title, and organization

Date

Signature

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2. PURPOSE

This Phase II investigation was conducted under contract to the NYSDEC Division of Hazardous Waste Remediation, Bureau of Hazardous Site Control. The purpose of the investigation was to determine if hazardous wastes have been disposed of at the site, if contaminants exist in the various media, if contaminants are migrating from the New Road Landfill site, and whether threats to human health and/or the environment exist.

The Phase II investigation was designed to supplement existing data for the site and update the HRS score. In 1981, Malcolm Pirnie, Inc. conducted a hydrogeologic study for the City of Niagara Falls. The study involved the sampling of subsurface soils from test pits and groundwater from eight monitoring wells. In 1982, the USGS collected groundwater from three of the eight existing wells on site as part of a regional study. A Phase I investigation was conducted by Engineering-Science, Inc. in association with Dames & Moore in 1986. This investigation did not include sample collection. Sampling of soil, groundwater, surface water, and sediment, and analysis for full TCL analytical parameters were implemented in the Phase II investigation. Additionally, the Phase II investigation included geophysical surveying for the presence of buried waste, which had not been conducted previously.

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3. SCOPE OF WORK

3.1 INTRODUCTION

The Phase II investigation at the New Road Landfill site began in April 1990 and was completed in May 1991. The Phase II investigation was performed in accordance with the site-specific Phase II Work Plan written by NYSDEC. A Health and Safety Plan was prepared and submitted to NYSDEC prior to the commencement of any field activities (see Appendix A). A Quality Assurance Project Plan (QAPP) was submitted to NYSDEC for approval prior to the start of field activities, which began in September 1990 and were completed in February 1991. The work plan included a geophysical survey, the installation of six groundwater monitoring wells, and the collection of four surface water, five sediment, four surface soil, and nine groundwater samples. Three of the nine groundwater samples were collected from pre-existing groundwater monitoring wells located on site. With minor exceptions, all field activities were performed in accordance with the Scope of Work prepared by NYSDEC. Variation from the plan occurred as a result of judgments made in the field with the concurrence of NYSDEC representatives.

3.2 PHASE II SITE INVESTIGATION

3.2.1 Records Search/Data Compilation

Available information from state, county, municipal, and private files was collected and reviewed prior to the initiation of field work. Records from local and state agency files were reviewed to supplement the Phase I report prepared by Engineering-Science, Inc. in 1986. The data review allowed for the proper completion of the field investigation, site assessment, and calculation of the final HRS score. Specific contacts are listed in Table 3-1.

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3.2.2 Site Reconnaissance

On September 12, 1990 E & E personnel conducted a site reconnaissance. The purposes of the site visit included:

- Identify drill rig access problems;
- Identify locations for wells and soil, sediment, and surface water samples;
- Visually inspect well locations using a portable magnetometer and contact utility company representatives to determine if underground utilities may impact drilling;
- Identify a nearby water supply for use during well drilling; and
- Conduct a limited air monitoring study using flame (OVA) and photoionization (HNu) detectors, as well as a radiation monitor.

The site-specific Safety Plan developed prior to the site reconnaissance is included in Appendix A. At the beginning of each day of field activities, a site safety meeting was conducted by the site safety officer. Discussions included the contaminants found on site, the routes of exposure, the route to the hospital, location of the nearest phone, and the use of the air monitoring instruments. Also, a general plan of the on-site activities for the day was made. The site-specific Safety Plan was available at all times to all personnel on site.

No readings above background levels were recorded using the air monitoring equipment. As mentioned in Section 1.1, no drums were found during the site reconnaissance.

3.2.3 Geophysical Survey

A geophysical survey utilizing an EM31 (electromagnetic terrain conductivity) survey and portable proton magnetometer survey was performed at the New Road Landfill site on September 12 and 13, 1990. These surveys were conducted at the proposed well locations around the perimeter of the site. The results were used to reduce the risks associated with drilling into unknown terrain; determine vertical and horizontal anomalies that may represent buried waste or underground

utilities; improve the accuracy of and confidence in the investigation; and optimize the locations of the monitoring well borings. Detailed geophysical survey methods and results are presented in Appendix B.

3.2.4 Monitoring Well Installation

Six shallow monitoring wells were installed at the New Road Landfill site between October 22, 1990 and January 9, 1991 by American Auger and Ditching Company. A substantial delay was encountered after drilling had commenced. Due to NiMo's request that a right-of-entry agreement be signed by NYSDEC, the drilling of wells GW-4, GW-5, and GW-6 was delayed for approximately 2 months.

Four overburden and two bedrock wells were installed on the site (see Figure 3-1). Monitoring wells GW-1, GW-2, and GW-3 monitor the conditions of the overburden on the east side of the site whereas well GW-5 monitors the conditions of the water table on the west side of the site.

Existing well 10-R is considered the upgradient bedrock monitoring well while bedrock wells GW-4 and GW-6 and existing well 1-R monitor conditions of the bedrock aquifer downgradient of the site. All wells were drilled and constructed in accordance with NYSDEC guidelines. Split-spoon samples were taken at 5-foot intervals in the unsaturated zone and continuously below the water table during the drilling of all wells.

Wells GW-1, GW-2, GW-3, and GW-5 were completed in the overburden using 2-inch inside diameter (ID) threaded, flush-joint polyvinyl chloride (PVC) pipe and 0.01-inch machine-slotted screens. A minimum 2-foot-thick seal of tamped bentonite was placed directly on a sand pack of number 3 Q-ROK quartz that surrounds the PVC screen.

Wells GW-4 and GW-6 were completed in the bedrock. A 3-inch ID PVC casing was set into an HQ size (3 7/8-inch outer diameter [OD]) rock socket that was cored into the upper 5 feet of competent bedrock. The PVC casing was then grouted to surface. No sooner than 24 hours after grouting, the well was advanced to its total depth using an NQ size (2 7/8-inch OD) rock coring bit. Table 3-2 contains well completion specifications.

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After completion, the wells were developed using bailers and/or centrifugal pumps. After final development of the wells, water levels were recorded. The wells were completed with a vented PVC cap, locking steel protective casing, and concrete drainage pad.

The drill rig and all tools and equipment were decontaminated prior to, between, and following well installations by:

- Removal of foreign matter; and
- Sanitization with a high pressure steam cleaner.

The water used for decontamination and drilling during the installation of wells GW-1, GW-2, and GW-3 was obtained from a hydrant in the Town of Macedon, Monroe County, New York. This water was collected for use at the Macedon Landfill (Site I.D. No. 859007) and the excess was used at the New Road site. A sample of this water was obtained from the driller's holding tank on October 17, 1990 (NYSDEC 1991). The water used for decontamination and well drilling during the installation of wells GW-4, GW-5, and GW-6 was obtained from a nearby fire hydrant. A sample of this water, designated DW-1, was collected from the hydrant on February 15, 1991 for full TCL analysis. The data summary sheets from the Macedon drill water sample and fire hydrant sample are presented in Appendix D.

Boring logs are included in Appendix C and geotechnical analysis results are included in Appendix F.

3.2.5 Subsurface Soil Sampling and Analysis

Soil samples were collected during the drilling of the groundwater monitoring wells by split-spoon samplers in conjunction with a standard penetration test as outlined in American Society for Testing and Materials (ASTM) Designation D 1586-84, "Standard Method for Penetration Test and Split-Barrel Sampling of Soils." A 2-foot by 1.5-inch ID hardened steel split-barrel sampler with shoe was driven in 2-foot depth intervals by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler 6 inches was recorded as the blow count on the subsurface boring logs (see Appendix C). A plastic retainer basket was used where appropriate in order to promote satisfactory sample

recovery. The split-spoon recoveries were logged in the field by an on-site geologist and screened with flame and photoionization detectors (OVA and HNu). No subsurface soil samples exhibited HNu readings of 5 ppm or more above background; so none was retained for chemical analysis. Representative soil samples from each monitoring well were retained for geotechnical analyses (grain size distribution analysis or Atterberg limits testing). Soil sample descriptions and other pertinent information are included on the subsurface boring logs (see Appendix C). Results of the geotechnical analyses are included in Appendix F.

The decontamination of split-spoons was performed both prior to and after each use as described in Section 3.2.4.

3.2.6 Groundwater Sampling and Analysis

As part of the Phase II investigation at the New Road Landfill site, one groundwater sample was collected from each of the six newly installed monitoring wells and three of the eight existing monitoring wells (1-R, 5-R, and 10-R) on February 14 and 15, 1991 by E & E. All groundwater samples were analyzed for TCL organics and inorganics according to NYSDEC's Contract Laboratory Protocol (CLP).

Groundwater samples were collected from the newly installed monitoring wells (GW-1 to GW-6) using dedicated, decontaminated, PVC bailers with new, dedicated polypropylene rope. However, due to the narrow diameter of the existing wells (1-R, 5-R, and 10-R), only one bailer was used to sample these wells. This bailer was decontaminated between uses in accordance with the QAPP. For QA/QC purposes, a rinsate sample, FB-1, was collected from this bailer.

Prior to sample collection, groundwater level and total depth of well measurements were obtained. At least three standing water volumes were purged from each monitoring well prior to sample collection. Water level data are presented in Table 3-2 and groundwater parameters are presented in Table 4-1.

Due to the high turbidity of the groundwater in each well following purging, the suspended sediment was allowed to settle for a period of 24 hours prior to sampling, which occurred on February 14 and 15, 1991. For QA/QC purposes, additional volume was collected from well GW-5 for matrix spike and matrix spike duplicate (MS/MSD) analyses.

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All samples were preserved on ice and delivered to E & E's ASC under proper chain-of-custody procedures. Samples for total metals analysis were also preserved by adding concentrated nitric acid until the sample pH was lowered to less than 2 standard units. Samples for total cyanide analysis were preserved by adding sodium hydroxide until the pH of the sample was raised to greater than 12 standard units.

Analytical results are discussed in Section 4.5 and analytical data summary sheets are included in Appendix D.

3.2.7 Surface Water and Sediment Sampling and Analysis

Four surface water (SW-1 through SW-4) and five sediment (SED-1 through SED-5) samples were collected from the site on February 14 and 16, 1991. During sampling, no surface water was present at the location where sample SED-5 was collected; therefore, proposed sample number SW-5 could not be obtained and only a sediment sample was collected. Figure 3-1 depicts the surface water and sediment sampling locations.

Surface water and corresponding sediment samples SW-1/SED-1 and SW-2/SED-2 were collected up- and downgradient of the site, respectively, from East Gill Creek which flows from east to west through a thick vegetative cover across the site. Surface water and corresponding sediment sample SW-3/SED-3 and SW-4/SED-4 as well as sediment sample SED-5 were collected from low-lying swampy areas throughout the site, as depicted in Figure 3-1.

Surface water samples were drawn directly into appropriate sample bottles, and sediment samples were collected from the 0- to 6-inch interval using precleaned dedicated stainless-steel spoons to fill sample jars. All spoons were precleaned as follows:

- Washed with a trisodium phosphate and water solution;
- Rinsed with potable water;
- Rinsed with pesticide quality methanol;
- Rinsed with deionized water; and
- Allowed to air dry.

For QA/QC purposes, additional volume was collected with samples SED-2, SW-1, and SW-4 for MS/MSD analyses.

Surface water samples were preserved according to the procedures outlined in Section 3.2.6. All samples were preserved on ice and delivered to E & E's ASC under proper chain-of-custody procedures for full TCL analysis. Analytical results are discussed in Section 4.5 and data summary forms are provided in Appendix D.

3.2.8 Soil Sampling and Analysis

Four soil samples (S-1 to S-4) were collected from areas throughout the landfill on February 14 and 19, 1991 (see Figure 3-1). Each sample was a composite of the upper 2 feet of soil and was analyzed by E & E's ASC for TCL organics and inorganics, and EP Toxicity for metals. All samples were collected with a stainless-steel hand auger and dedicated sleeves precleaned according to the procedures described in Section 3.2.7. Samples were preserved on ice and delivered to E & E's ASC under proper chain-of-custody procedures. Analytical results are discussed in Section 4.5 and data summary forms are provided in Appendix D.

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Table 3-1

SOURCES CONTACTED FOR THE NYSDEC PHASE II INVESTIGATION AT THE NEW ROAD LANDFILL SITE

National Heritage Program
700 Troy-Schenectedy Road
Albany, New York 12110
Contact: Burrell Buffington
Telephone: (518) 783-3932
Date: April 10, 1990
Information Gathered: Significant wildlife habitats and endangered species information.

New York State Department of Environmental Conservation
Division of Solid and Hazardous Waste, Region 9
584 Delaware Avenue
Buffalo, New York 14202
Contacts: Joseph Sciascia, Jaspal Walia, and Martin Doster
Telephone: (716) 847-4585
Date: March 29, 1990 and April 3, 1990
Information Gathered: Phase I reports and pertinent files for Phase II report preparation.

New York State Department of Environmental Conservation
Bureau of Hazardous Site Control
50 Wolf Road
Albany, New York 12233
Contacts: Mike Ryan and Jane Thapa
Telephone: (518) 457-9538
Date: April 3 - 4, 1989
Information Gathered: File search for additional data and NYSDEC Phase I reports.

New York State Department of Health
2 University Place
Albany, New York 12203
Contact: Dawn Hettrick
Telephone: (518) 458-6310
Date: April 10, 1990
Information Gathered: File search for Phase II reports.

Niagara County Department of Health
10th and Falls Streets
Niagara Falls, New York
Contact: Paul Dicky
Telephone: (716) 284-3128
Date: April 2, 1990
Information Gathered: Site background information.

Niagara County Department of Health
5467 Upper Mountain Road
Lockport, New York
Contact: Ronald Gwozdek
Telephone: (716) 439-6109
Date: April 2, 1990
Information Gathered: Locations of water intakes.

Niagara County Environmental Management Council
Niagara County Courthouse
Lockport, New York
Contact: Sue Casey
Telephone: (716) 439-6170
Date: March 30, 1990
Information Gathered: Land use map reviewed.

02[UZ]YQ5080:D3377/5084/24

Table 3-1 (Cont.)

Niagara County Highway Department
225 South Niagara Street
Lockport, New York

Contact:	Carl Allen
Telephone:	(716) 439-6066
Date:	April 3, 1990
Information Gathered:	Viewed aerial photographs of the site.

Soil Conservation Service, Cornell Cooperative Extension
4487 Lake Avenue
Lockport, New York 14094

Contact:	Ed Oliver
Telephone:	(716) 434-4949
Date:	April 3, 1990
Information Gathered:	Soil survey and list of prime farmland soils were obtained.

Town of Niagara Water Superintendent
7105 Lockport Road
Niagara Falls, New York 14305

Contact:	Don Woodcook
Telephone:	(716) 297-2150
Date:	May 14, 1990
Information Gathered:	Groundwater wells in vicinity of the site.

02[UZ]YQ5080:D3377/5084/24

Source: Ecology and Environment Engineering, P.C. 1991.

Table 3-2

NEW ROAD LANDFILL
MONITORING WELL SUMMARY

Well Number	Date Completed	Ground Elevation	Type of Well*	Depth to Bedrock	Total Depth	Depth of Screened Interval	Groundwater Elevation**
GW-1	10-23-90	600.7	Overburden	15.5	15.15	5.0 - 15.0	597.81
GW-2	10-23-90	594.8	Overburden	16.2	16.43	5.5 - 15.5	584.40
GW-3	10-24-90	595.3	Overburden	14.5	13.34	7.7 - 12.7	591.21
GW-4	01-09-91	590.6	Bedrock	12.0	31.61	NA	571.74
GW-5	01-04-91	585.7	Overburden	11.0	11.54	6.03 - 11.03	578.06
GW-6	01-08-91	591.1	Bedrock	17.5	36.05	NA	566.30
1-R	1980	593.5	Interface	--	25.16	--	578.80
5-R	1980	594.5	Interface	--	14.26	--	587.22
10-R	1980	595.9	Interface	--	17.01	--	586.90

02[UZ]YQ5080:D3377/5067/14

Note: Wells 1-R, 5-R, and 10-R were installed in 1980 by Malcolm Pirnie, Inc. as part of a hydrogeologic study. These wells are known to be screened across the bedrock/overburden interface but specific completion data are not available.

All measurements are in feet, all elevations are above mean sea level, and all depths are from below ground surface.

*Overburden wells are screened completely within the overburden.
Interface wells are screened 5 feet in overburden and 5 feet in bedrock across the interface.
Bedrock wells are completed as open-hole (not screened) cored wells.

**All groundwater elevations were measured on February 13, 1991 prior to sampling.

Source: Ecology and Environment Engineering, P.C. 1991.

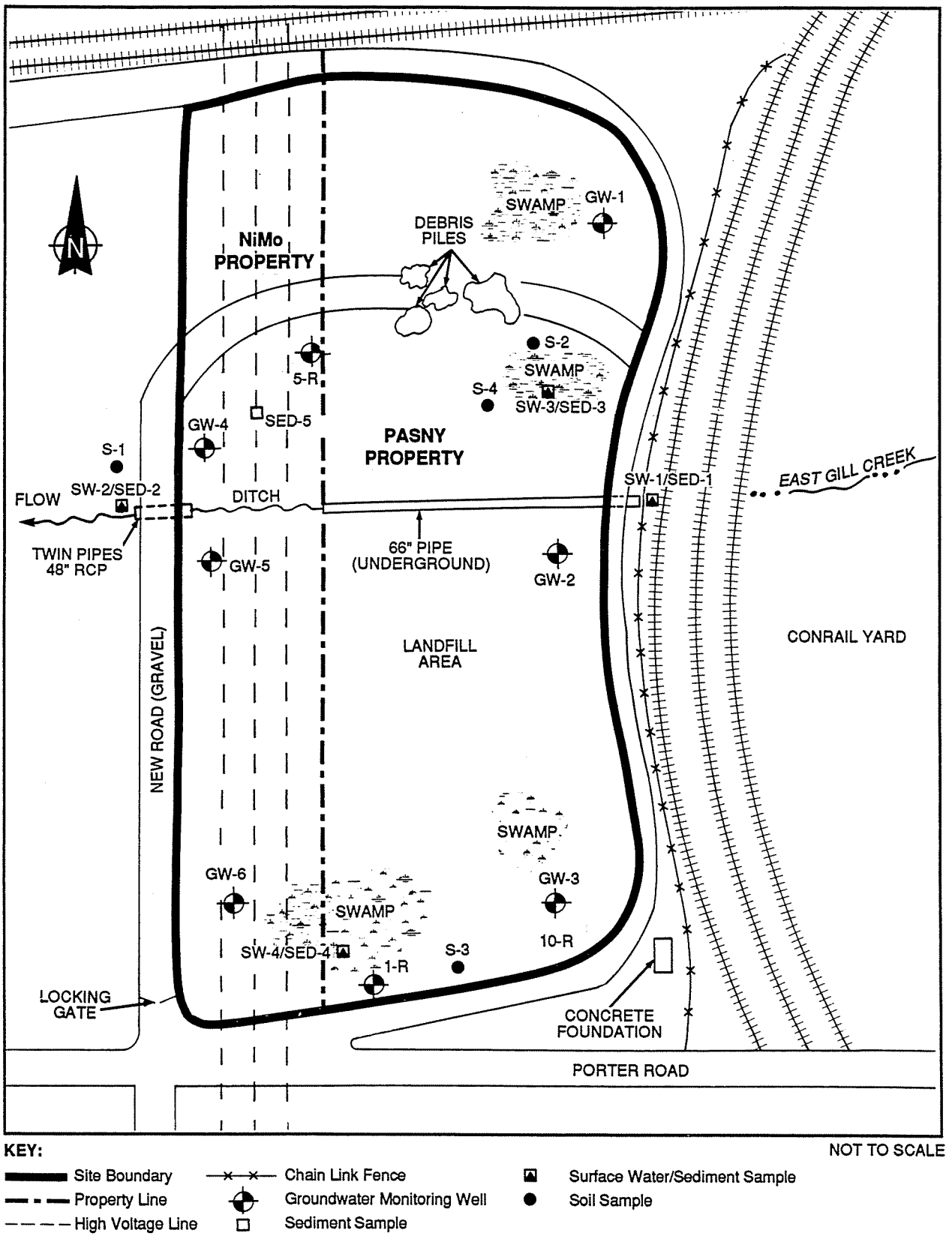


Figure 3-1
MONITORING WELL, SURFACE WATER, SEDIMENT, AND SOIL SAMPLING LOCATIONS AT THE NEW ROAD LANDFILL SITE

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4. SITE ASSESSMENT

4.1 SITE HISTORY

The New Road Landfill site is an approximately 70-acre parcel of undeveloped land located within the City of Niagara Falls, Niagara County, New York. Generally rectangular in shape and oriented north-south, the site is bounded on the south by Porter Road, on the west by New Road (formerly 48th Street), and on the north and east by Conrail property containing several railroad lines.

Presently the site has two owners. The eastern portion, consisting of approximately 48 acres, is owned by PASNY and is currently vacant. The western portion of the site, consisting of approximately 22 acres, is owned by NiMo and has been since the turn of the century. This property contains several overhead high voltage electric power transmission lines and towers.

The eastern portion of the site (PASNY) was converted from farm fields to an open solid waste disposal site in the 1950s by the City of Niagara Falls, which owned and operated the property until 1958. Non-combustible refuse and municipal waste incinerator ash were reportedly disposed of at the site by the city. Detailed disposal records regarding the type and quantity of waste disposed of at the site were not kept. In 1954 or 1955 a fishkill occurred downstream of the site in East Gill Creek. The NYSDEC Interagency Task Force attributed the fishkill to leachate flowing from the site; however, no leachate seeps were observed during the Phase II investigation. PASNY obtained the eastern portion of the site in 1958 and used it for the dumping of rock spoils ("shot rock") and associated clean fill derived from the construction of nearby underground aqueducts. These aqueducts transport water from the Niagara River northward to PASNY's power plant reservoir

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located in the Town of Lewiston, New York. The shot rock disposed of at the site includes large (6- to 8-foot diameter) boulders of the Lockport Dolostone that resulted from blasting and excavation during the aqueduct construction. Rock disposal continued at the site until 1962. By this time, NiMo had installed the previously mentioned power lines on the western portion of the site. From 1962 until 1969 the City of Niagara Falls again used the site for periodic burning of materials such as tree limbs, brush, and leaves.

In 1980, the City of Niagara Falls proposed the construction of a municipal sewage sludge containment facility at the site. An extensive hydrogeologic study was conducted and an environmental impact statement was prepared by Malcolm Pirnie, Inc. for the city. This report, entitled "Sludge Containment Site Development Plan," was completed in May 1981. The study included the excavation of 10 test pits up to 10 feet deep with soil samples collected from each pit to characterize the composition and physical properties of the overburden materials. In addition, eight groundwater monitoring wells (1-R, 2, 3-R, 4-R, 5-R, 6-R, 8-B, and 10-R) were installed in the overburden and bedrock throughout the site. Six of these were completed as interface wells with a well screen either resting on or crossing the bedrock/overburden contact. The other two wells were screened entirely within the overburden. Soil samples were collected during well drilling and analyzed for physical characteristics. Hydraulic conductivity of the overburden was measured in one of the wells and groundwater measurements and samples were collected from all eight wells. Results of this study have been incorporated into this Phase II investigation report where applicable. Based on Malcolm Pirnie, Inc.'s 1981 study, all required permits for the construction of the sewage plant were approved and issued by NYSDEC in 1981. For economic reasons, the proposed facility was never constructed.

On July 8, 1982 USGS collected groundwater samples from three (4-R, 5-R, and 8-B) of the eight existing wells as part of a regional study called "Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Waste Disposal Sites" published in 1985 (final version). The samples collected from the New Road site were analyzed for heavy metals and organic compounds. Analytical results indicated concentrations of iron, lead, and manganese in exceedance of NYSDEC

Class GA groundwater quality standards. However, such concentrations were found both up- and downgradient of the site indicating a possible off-site contaminant source or naturally poor groundwater quality. Several other metals and organic compounds were detected in the samples but at concentrations below NYSDEC Class GA standards.

In January 1986, a Phase I investigation was completed for NYSDEC by Engineering-Science, Inc., in association with Dames & Moore. The Phase I investigation assessed the hazard posed to public health and the environment by the site based on the HRS score. No sampling was performed during the Phase I investigation.

During a site inspection by the Niagara County Department of Health, a fire was observed in the northeast corner of the site. A 55-gallon drum burst because of the heat, leaving an ashy watery residue. Other drums observed on site included three 20-gallon drums, two containing hand cleanser and one empty, and four 55-gallon steel drums, one containing deodorizer and three with unknown contents.

With the exception of periodic unauthorized dumping of residential solid refuse and construction and demolition debris, the site has been inactive since 1970. No evidence exists supporting the allegation of industrial hazardous waste disposal at the site. The New Road Landfill is near the Forest Glen Mobile Home Park site. Located approximately 500 feet east and upgradient of the site, Forest Glen is a National Priority List (NPL) site for which the United States Environmental Protection Agency (EPA) has approved the federally funded buyout and relocation of all site residents due to significant human health threats caused by several chemical contaminants found in the soil. The site was used as a chemical waste landfill in the 1970s and the extent and nature of subsurface contamination remains unknown at this time. Also, the East Branch of Gill Creek flows from the Forest Glen site through the New Road Landfill.

4.2 REGIONAL GEOLOGY AND HYDROGEOLOGY

Niagara County lies within the Central Lowland physiographic province. Specifically, it lies in the Eastern Lake section and occupies part of the Huron and Ontario Plains (USDA 1972).

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This area, known as the Niagara Frontier, is relatively flat and broken by two east-west trending escarpments: the Niagara Escarpment and the Onondaga Escarpment. The site lies on the flat area between these escarpments called the Tonawanda Plain. This was the site of the postglacial Lake Tonawanda (Tesmer 1981).

Sediments in this area consist mainly of lacustrine deposits and glacial tills. The lacustrine deposits (i.e., silts and clays that settled to the bottom of the postglacial lake) are generally olive and brownish sediments overlying a red clay. The olive and brownish lacustrine sediments were deposited in glacial Lake Tonawanda following the Wisconsin Ice Age. These sediments blanket a red clay that was deposited following an earlier ice age in glacial Lake Lundy, which at one time covered the entire county. Glacial till also occupies a large part of the surface area in the county and underlies most areas of lake sediments. The glacial till deposits consist of ground moraines, drumlins, eskers, and terminal moraines. Ground moraines occupy the low undulating till plain and are approximately 10 to 15 feet thick. Drumlins are rounded hills of bedrock or till that were molded beneath the ice and are elongated in the direction of ice flow. Drumlins in Niagara County are very subdued due to modification by the glacial lakes. Eskers are thin elongated ridges of pebbly till trending northeast-southwest. The terminal moraines have a general east-west trend and were formed when the ice stagnated for a long period of time. Other deposits, consisting of glacial outwash and beach deposits, exist in large belts (up to 8 miles long) and are generally 1 to 10 feet thick (USDA 1972).

Surface drainage of the Ontario Plain is northward into Lake Ontario and soil drainage is relatively poor. Surface drainage of the Huron Plain is southward into Tonawanda Creek and is not well developed. Surface drainage of the Tonawanda Plain is predominantly westward or southwestward into the upper Niagara River (USDA 1972).

The lacustrine sediments and glacial till of the Niagara Frontier are underlain by sedimentary rocks varying in thickness between 1,980 and 4,200 feet (see Figure 4-1) and are Ordovician, Silurian, and Devonian in age. The lower part of the Ordovician system is composed primarily of limestones and dolostones. The upper part is composed

mainly of massive shales, interbedded with thin sandstone layers (Queenston formation).

The Silurian system is composed of the Medina, Clinton, Lockport, and Salina groups. The Medina group consists of sandstones, shales, and siltstones. These are overlain by the limestones, shales, and dolostones of the Clinton, which in turn are overlain by the dolostones and limestones of the Lockport group. Above the Lockport are shales, siltstones and dolostones, gypsum, anhydrite, and salt beds of the Salina group. The poorly drained Tonawanda Plain is formed on the weathered surface of the Lockport and Salina groups.

The Devonian system unconformably overlies Silurian rocks to the south of Niagara County. The formation at the Devonian-Silurian contact is the Onondaga limestone, which is a massive cherty limestone that outcrops across most of northern Erie County (Tesmer 1981).

Niagara County has abundant surface waters bordering it: Tonawanda Creek to the south, the Niagara River to the west, and Lake Ontario to the north. The county's municipal water district draws most of its water from the Niagara River. However, rural residents depend on both bedrock and overburden wells. The bedrock wells north of the Niagara Escarpment are dug or drilled into the Queenston shale. The yields of water are often inadequate during extended dry periods and may contain high levels of salt or sulfate. Bedrock wells to the south of the escarpment are drilled into the Lockport dolomite. Yields are generally higher, but the water is hard from calcium and other base concentrations. Shallow-dug wells and springs are most often completed in one or more of the three most permeable of the 11 soil associations in Niagara County: the Otisville-Altmar-Fredon-Stafford association, the Howard-Arkport-Phelps association, and the Hilton-Ovid-Ontario association. The shallow wells are less desirable than bedrock wells due to increasing pollution of shallow groundwater, primarily by seepage from the surface, and are therefore seldom used (USDA 1972).

4.3 SITE GEOGRAPHY

4.3.1 Topography

The New Road Landfill site is generally flat with a very gentle slope of approximately 1% toward the southwest. The average elevation

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at the site is approximately 593 feet and ranges from approximately 585 to 600 feet for a maximum relief of approximately 15 feet. Variations in the natural slope at the site are minor and include low areas of ponded water and an east/west oriented drainage culvert near the center of the site (East Gill Creek). In addition, piles of debris and large rocks interrupt the site's flat topography.

4.3.2 Soils

The United States Department of Agriculture (USDA) soil survey of Niagara County (1972) describes the soil at the site as cut and fill land and is defined as an area where the original soil has been either stripped away or covered with at least 3 feet of material that is not native to the site. The composition of such material varies from location to location and is not limited to natural material. However, in the general vicinity of the site and adjacent to the cut and fill land are areas underlain by Odessa silty clay loam soils. Based on the soil distribution maps included in the USDA soil survey, it appears that this soil type most likely covered the site prior to filling. Odessa silty clay loam is found south of the Niagara Escarpment on 0% to 2% slopes in areas that were previously occupied by glacial lakes. These soils occupy large oblong areas averaging 50 acres in size. Glacial till is often within 8 feet of the ground surface beneath these soils and drainage is poor.

Subsurface boring logs indicate the presence of varved lacustrine deposits consisting primarily of reddish-brown clay with gray silt interlayers. This silty clay to clayey silt unit extends downward to an average depth of 10 feet where it becomes progressively coarser grained. The results of the geotechnical analyses (Appendix F) confirm this observation. The material collected from GW-4 from 4 to 6 feet is classified as a lean clay with gravel (Unified Soil Classification System [USCS]) or clay (American Association of State Highway and Transportation Officials [AASHTO]). The soil retained from 9 to 11.5 feet in GW-5 is a sandy lean clay (USCS) or sandy clayey silt (AASHTO), while the soil from GW-6 (13 to 15 feet) is coarser grained and is classified as sandy silty clay (USCS) or clayey sandy silt (AASHTO). These soil samples are considered representative of the site. The overburden immediately above bedrock consists of glacial till or outwash

deposits with a loamy texture and a grain size ranging from clay to gravel.

4.4 SITE HYDROGEOLOGY

4.4.1 Site Geology

Subsurface investigations, including the excavation of 10 test pits and the installation of eight groundwater monitoring wells by Malcolm Pirnie, Inc. in 1980 and six additional wells installed by E & E in 1990 and 1991, were performed in part to characterize the stratigraphy, composition, and physical properties of the overburden and underlying bedrock at the site.

The geology at the site can be summarized as a layered blanket of overburden 11 to 17 feet thick over a fractured dolostone bedrock. The overburden consists of three distinct layers, the bottom layer is composed of glacial till and is up to 6 feet thick. The till is composed of a dense, non-stratified mixture ranging in size from clay to boulders. Overlying the till is a 6- to 10-foot-thick layer of lacustrine sediments that were deposited at the bottom of preglacial Lake Tonawanda. The sediments consist of varved reddish-brown clay interlayered with gray silt. The upper 3 to 4 feet of this layer have been altered by weathering, giving it a mottled appearance.

There are sand lenses occasionally found between the glacial till and lacustrine layers. These lenses are estimated to be no more than 2 feet thick and 200 feet in diameter.

Overlaying the lacustrine clay layer, or sand lense where present, is fill material composed primarily of rock spoil from the PASNY aqueduct project as described in Section 4.1. The rock spoil ranges in size from silt to 8-foot diameter boulders. This fill layer ranges in thickness from 0 to 10 feet.

Samples were collected from each of the two natural overburden layers and analyzed for grain size and/or Atterberg limits where appropriate. Results of these tests show that the glacial till layer is classified as poorly sorted clay, silt, sand, and gravel. The glaciolacustrine deposits are classified as both low to medium plastic clays and highly plastic clays, often containing some silt and sand. Geotechnical results are included in Appendix F.

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The bedrock beneath the overburden is the Lockport dolostone of the Silurian age Lockport group. This formation is a gray to dark-gray, fine-grained dolostone with interbedded thin carbonaceous black shale layers. The thin to massive beds generally strike east-west and dip gently to the south at approximately 40 feet per mile. Gypsum is commonly found in the Lockport but is often dissolved leaving void spaces (vugs) in the upper 20 feet of the formation. In addition, the upper 20 feet are more fractured and therefore more transmissive to water flow than deeper portions of the formation. Few fractures were observed in rock cores obtained during well drilling. Appendix C contains the subsurface boring and drilling logs for the six wells installed as part of this investigation.

4.4.2 Surface Water Hydrology

Due to the generally flat topography and the clay-rich upper overburden material at the site, ponded water is present at various locations. The site is poorly drained by a ditch flowing south along the eastern shoulder of New Road, and by East Gill Creek which bisects the site, flowing from east to west. The creek flows within a 66-inch-diameter concrete pipe across PASNY property and in a concrete level ditch across NiMo property (Appendix H). Upstream of the site, this tributary flows unconfined from the Forest Glen Superfund site, through the Conrail yard, and onto the New Road Landfill. From the New Road site, East Gill Creek flows to the southwest through the Hyde Park Golf Course where it flows into Gill Creek. Gill Creek flows through the City of Niagara Falls to its confluence with the Niagara River, downstream of the City of Niagara Falls municipal water intakes.

4.4.3 Groundwater Hydrogeology

Groundwater is present in both the bedrock and the overburden at the site. The Lockport dolostone is the principal aquifer in the area and can yield large quantities of water through secondary porosity features consisting mainly of fracture systems and to a lesser degree vugs within the rock matrix. Well yields from the Lockport range from 2 to 110 gallons per minute and average approximately 35 gallons per minute (Johnston 1964).

Water in the overburden is encountered in the basal till deposits directly above the bedrock. These deposits yield low quantities of groundwater and are not considered a productive aquifer in the Niagara Falls area. The hydraulic conductivity of the till material was not determined, however, typical ranges are from 10^{-6} to 10^{-4} cm/sec (Fetter 1988). Above the till layer the hydraulic conductivity of the lacustrine clay deposits was measured by Malcolm Pirnie, Inc. in 1980 and was found to range from 10^{-8} to 10^{-6} cm/sec. These data, along with supporting water evaluation collected at the site indicate that this clay layer acts as a semi-confining layer over the saturated till.

The groundwater was monitored at the site by existing wells 1-R, 5-R, and 10-R installed by Malcolm Pirnie, Inc. in 1980 and newly installed wells GW-1 through GW-6. Wells GW-1, GW-2, GW-3, and GW-5 are all screened in the lowest 10 feet of overburden in the saturated till and are isolated from the bedrock with a bentonite seal beneath the screen. No water was encountered in the overburden during the drilling of GW-4 and GW-6. Therefore, these wells could not be completed in the overburden as called for in the work plan. With approval from the on-site NYSDEC representative, wells GW-4 and GW-6 were completed as open-hole bedrock wells and monitor the upper portion of the bedrock aquifer. The three existing wells that were sampled, 1-R, 5-R and 10-R, are all screened across the bedrock/overburden interface with a 10-foot PVC screen and are slightly less than 1.5 inches in diameter.

Only three of the old wells could be used for groundwater sampling. In 1989, only four wells, 1-R, 5-R, 8-B, and 10-R were located during a site visit by NYSDEC personnel. However, it was noted that 8-B was badly bent and unusable. In addition, monitoring wells 3-R and 4-R were not found during Phase II site reconnaissance activities.

Based on the groundwater elevations measured prior to sample collection (see Table 3-2 and Figure 4-1) groundwater appears to flow to the west-southwest in the bedrock aquifer and to the west with localized flow toward the drainage culvert in the overburden (see Figure 4-2). The USGS also reports flow as generally west towards the PASNY conduits, due to the conduit backdrain system.

Due to the fact that the nine groundwater monitoring wells sampled during the Phase II investigation were of three different types (overburden, interface, and bedrock), and that these wells are widely spaced

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across the site, it would be misleading to contour the water elevations of all the wells into one potentiometric surface map. Moreover, only the overburden well data can be mapped to provide a map with any degree of validity and only very general flow directions can be inferred from the bedrock and interface well data.

4.5 SITE CONTAMINATION ASSESSMENT

Analytical data for the site contamination assessment are presented in Appendix D. For TCL organic and inorganic analyses, all positive reported values and qualifiers for field samples and field and laboratory QA/QC samples are presented on data summary forms.

All CLP data packages were reviewed to determine whether qualified data were acceptable for the intended use. In general, common laboratory contaminants, including methylene chloride, acetone, and phthalate esters, are considered background contamination and not evaluated if levels in the field samples are less than 10 times the method blank level. TCL organic compounds detected below the sample quantitation limit are not included in the summary tables presented below unless they are included in a total concentration sum. These results, however, are discussed in the text and are presented in Appendix D. Inorganic analytes detected above the instrument detection limit (IDL) but below the contract required detection limit (CRDL) are presented in Appendix D and in the summary tables. Any necessary qualifications based on data validation review are noted in the summary tables and Appendix D.

The water sample collected from the source used for decontamination and drilling during the installation of wells GW-4, GW-5, and GW-6 (DW-1) contained no organic compounds except chloroform, bromodichloromethane, and dibromochloromethane. These trihalomethanes, common in chlorinated water supplies, were detected at a combined concentration of 20 µg/L, below the NYSDOH maximum contaminant level (MCL) of 100 µg/L (NYCCR 1988). No inorganic analytes were detected in this sample at concentrations exceeding the NYSDOH MCLs with the exception of iron at 635 µg/L, which in part could be a result of the steel plumbing used to transport municipal water. The sample of water used during the installation of wells GW-1, GW-2, and GW-3, which was obtained from the Town of Macedon, contained no organic compounds except total trihalomethanes

at an estimated concentration of 57 µg/L, below the NYSDOH MCL. The only inorganic analyte detected above NYSDOH MCLs was iron at 3,280 µg/L (NYSDEC 1991).

4.5.1 Groundwater

One groundwater sample was collected from each of the six newly installed monitoring wells (GW-1 through GW-6) as well as from three of eight existing monitoring wells (1-R, 5-R, and 10-R). All samples remained unfiltered and were analyzed for TCL organics and inorganics.

Prior to sample collection, groundwater parameters were measured and recorded (see Table 4-1). All samples exhibited a nearly neutral pH, relatively high conductivity, and high turbidity.

Analysis of the nine groundwater samples indicated that no organic compounds were present at concentrations significantly greater than those detected in the method blanks with the exception of Aroclor 1254. This compound, a PCB, was detected below the quantitation limit in GW-3 at an estimated concentration of 0.78 µg/L. This concentration exceeds the NYSDEC Class GA groundwater quality standard of 0.1 µg/L. Methylene chloride was detected at 9,300 µg/L in the rinsate blank FB-01, which was collected from the narrow diameter bailer used to sample the three pre-existing wells, 1-R, 5-R, and 10-R. Since methylene chloride was not detected above laboratory background in any of these wells, the methylene chloride detected in FB-1 is considered highly suspect.

Inorganic analytes detected in the groundwater samples are shown in Table 4-2. Of the 24 inorganic analytes tested for, 19 were detected in the groundwater samples. Six of these analytes were found to exceed applicable NYSDEC Class GA groundwater quality standards or guidance values as follows:

- Iron was detected and exceeded the Class GA standard in all nine samples at concentrations ranging from 1,880 to 56,800 µg/L;
- Lead was detected in all samples except GW-4 at concentrations ranging from 10.0 to 252 µg/L and exceeded the Class GA standard in all samples except GW-4 and GW-6;
- Magnesium was detected and exceeded the Class GA guidance value in all nine samples at concentrations ranging from 65,100 to 291,000 µg/L;

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- Manganese was detected in all samples at concentrations ranging from 214 to 7,210 µg/L, exceeding the Class GA standard in all samples except GW-3;

- Sodium was detected in all samples at concentrations ranging from 12,100 to 72,700 µg/L, exceeding the Class GA standard in all samples except 1-R, GW-4, and GW-5; and

- Zinc was detected in all samples at concentrations ranging from 7.0 to 2,190 µg/L, exceeding the Class GA standard only in samples 1-R, 10-R, and GW-2.

4.5.2 Surface Water and Sediment

Four surface water and five sediment samples were collected from East Gill Creek and low-lying swampy areas on site as described in Section 3.2.7. Samples SW-1/SED-1 were collected from East Gill Creek upstream of the site and samples SW-2/SED-2 were collected downstream of the site. Samples SW-3/SED-3, SW-4/SED-4, and SED-5 were collected from low lying areas as depicted in Figure 3-1. Organic compounds detected above quantitation limits in the surface water samples are presented in Table 4-3 and those detected in the sediment samples are presented in Table 4-5. Inorganic analytes detected in the surface water samples are presented in Table 4-4 and those detected in the sediment samples are presented in Table 4-6.

Volatile organic compounds (VOCs) detected in the surface water samples include methylene chloride and tetrachloroethene. Methylene chloride was detected downstream of the site at 2,400 µg/L in SW-2 as well as on site at 550 µg/L in SW-3, and exceeded the general organic guidance value of 50 µg/L in both samples (NYSDEC 1990). These levels of methylene chloride are not directly attributable to laboratory background contamination. However, the lack of methylene chloride in the sediment samples associated with SW-2 and SW-3 and its presence in the rinsate blank (FB-1) at 9,300 µg/L suggest that the surface water methylene chloride results are highly suspect. Tetrachloroethene was detected only in sample SW-1, upstream of the site, below the sample quantitation limit at an estimated value of 4 µg/L. While this compound was detected below quantitation limits, it still exceeded the NYSDEC Class D surface water guidance value of 1 µg/L.

No base/neutral or acid extractables (BNAs) were detected in the surface water samples above quantitation limits; however, several PAHs were detected below quantitation limits in samples SW-2 and SW-4. Sample SW-2 contained only fluoranthene at an estimated concentration of 1 µg/L while SW-4 contained estimated concentrations of the following: phenanthrene (1 µg/L), fluoranthene (2 µg/L), pyrene (2 µg/L), benzo(b)-fluoranthene (2 µg/L), and benzo(a)pyrene (1 µg/L). All of the above compounds were detected at concentrations below NYSDEC Class D surface water quality standards and guidance values with the exception of benzo(a)pyrene which has a standard of 0.0012 µg/L.

One pesticide, beta-BHC, and one PCB, Aroclor 1254, were detected in the surface water samples. Beta-BHC was detected in SW-1 at 0.077 µg/L and in SW-2 at 0.12 µg/L. Aroclor 1254 was detected in SW-3 at 1.2 µg/L, above the NYSDEC Class D surface water standard of 0.001 µg/L.

Of the 24 inorganic analytes tested for, 18 were detected in the surface water samples. Of these, four analytes were found at concentrations exceeding NYSDEC Class D surface water standards or guidance values. Iron was detected and exceeded the Class D standard in all four samples at concentrations ranging from 667 to 64,800 µg/L. Mercury and copper were detected and exceeded the Class D standard or guidance value only in SW-3, at concentrations of 0.80 and 147 µg/L, respectively. Zinc, which was detected in all four samples at concentrations ranging from 41.7 to 1,530 µg/L, exceeded the Class D standard only in SW-3 (see Table 4-4).

Table 4-5 contains the organic compounds detected above quantitation limits as well as PAHs detected below quantitation limits in the sediment samples. PAHs detected below quantitation limits are included on this table since these compounds were found at varying concentrations throughout the site. No VOCs were detected above quantitation limits; however, trichloroethene and tetrachloroethene were detected in SED-1 at estimated concentrations of 2 and 5 µg/kg, respectively. The only BNAs detected above quantitation limits were the PAHs fluoranthrene and benzo(b)fluoranthene in SED-1 at 590 and 600 µg/kg, respectively. Several PAHs were detected below quantitation limits in the sediment samples including fluorene, anthracene, and dibenz(a,h)anthracene in SED-1; benzo(k)fluoranthene in SED-2; phenanthrene in SED-1, SED-2,

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SED-3, and SED-4; and fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene in all five samples. While the majority of these compounds were detected below quantitation limits, the total PAH concentration can be estimated as follows: SED-1, 3,400 µg/kg; SED-2, 2,900 µg/kg; SED-3, 1,200 µg/kg; SED-4, 1,200 µg/kg; and SED-5, 530 µg/kg. In addition to the above compounds, Aroclor 1254 was detected in SED-3 at 1,100 µg/kg.

Table 4-6 contains a summary of the inorganic analytes detected in the sediment samples. Of the 24 analytes tested for, 20 were detected. However, no analytes were detected at concentrations that exceeded the common range found in Eastern United States soils.

4.5.3 Soils

Four soil samples were collected from areas of the site as depicted in Figure 3-1 and described in Section 3.2.8. These samples, which were composites of the top 2 feet of soil, were analyzed for TCL organics and inorganics as well as by the EP Toxicity test for metals. Table 4-7 contains the organic compounds detected in the soil samples. Inorganic analytes detected in these samples are presented in Table 4-8.

No VOCs, pesticides, or PCBs were detected in the soil samples. The only compound detected above sample quantitation limits was the PAH benzo(b)fluoranthene in S-2 at 420 µg/kg. In addition, several other PAHs were detected below quantitation limits including: benzo(a)-anthracene and dibenz(a,h)anthracene in S-2; indeno(1,2,3-cd)pyrene and benzo(g,h,i)perylene in S-2 and S-3; phenanthrene, fluoranthene, pyrene, chrysene, and benzo(a)pyrene in S-1, S-2, and S-3; and benzo(b)fluor-anthene in all four samples.

Of the 24 inorganic analytes tested for, 19 were detected in the soil samples. Of these, only magnesium in two samples was found to exceed the common range for Eastern United States soils. Magnesium was detected at concentrations ranging from 11,600 to 107,000 mg/kg, and exceeded the common range in S-2 and S-4 at 92,900 and 107,000 mg/kg, respectively.

The EP Toxicity results show that no metals were detected in the extract indicating that the soil is not a characteristic hazardous waste for metals.

4.5.4 Contamination Assessment Summary

The principal immediate threat to public health or the environment posed by the New Road Landfill is direct contact with contaminated soil and/or sediment and ingestion of, or direct contact with, surface water. Direct contact with soil and/or sediment is possible because access to the site from the south (Porter Road) and west (golf course) is unrestricted. The surface water at the site is considered a threat due to the presence of PCBs, pesticides, and mercury, which accumulate in aquatic life.

Groundwater from the overburden aquifer at the site was found to contain the PCB Aroclor 1254 in monitoring well GW-3. Since the groundwater samples were not filtered prior to analysis, it is unknown whether this compound is present in a dissolved state or is adsorbed to fine-grained sediment particles. While not detected at a concentration high enough to constitute an observed release, Aroclor 1254 was detected in GW-3 at approximately eight times the NYSDEC Class GA standard.

Six inorganics were detected in the groundwater samples at concentrations exceeding NYSDEC Class GA standards or guidance values. Of these, iron, lead, manganese, and zinc are considered observed releases from the site. Iron and zinc were found in overburden well GW-2 and iron was found in well GW-5 at concentrations significantly greater than iron or zinc in wells GW-1 and/or GW-3, which are presumed to represent background water quality. Lead and manganese were detected in downgradient well 1-R at concentrations significantly greater than in upgradient well 10-R. Since wells 1-R and 10-R are interface wells, it is unknown if lead and manganese constitute observed releases in the overburden or bedrock aquifers.

Groundwater samples collected by Malcolm Pirnie, Inc. in 1980 were analyzed for water quality parameters and some metals. A comparison of Phase II groundwater samples that exceeded class GA groundwater standards to the 1980 samples indicates that:

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- o Iron concentrations were generally lower in the 1980 samples except for one sample, which had concentrations similar to the Phase II samples;

- o All of the 1980 samples were below detection limits of 30 µg/L for lead, however, this detection limit is high and is within the range of concentrations detected in the Phase II samples;

- o Sodium concentrations were generally higher in the 1980 samples; and

- o Magnesium, manganese, and zinc, the other analytes that exceeded NYSDEC groundwater standards for the Phase II samples, were not analyzed for in 1980.

In the surface water, only iron was found to constitute an observed release when the concentrations were compared in the up- and downstream samples collected from East Gill Creek. Iron did not exceed surface water standards in the 1980 MPI samples from the creek. The presence of methylene chloride in SW-2 and SW-3 is not considered an observed release as defined in the HRS User's Manual because its presence is suspect.

The presence of the pesticide beta-BHC is likely attributable to the golf course adjacent to the site. Pesticides are persistent in the environment and are easily transported by wind, water, etc. Also present at a notable concentration in both the surface water and groundwater was Aroclor 1254. This PCB was detected in SW-3, SED-3, and GW-3. Because of their insulating and nonflammable properties, PCBs had been used widely as coolants and lubricants in transformers and other electrical equipment. In 1977, the industrial manufacture of PCBs in the United States stopped after it was discovered that they could have toxic effects on the environment.

In the soil samples, only low levels of PAHs with total PAH concentrations ranging from 43 to 2,000 µg/kg were found. PAHs are commonly found in urban soils and can result from the burning of fossil fuels. With several railroad tracks bordering the site and other transportation and industrial facilities in the vicinity, these low levels are not unusual and are within the typical range for urban soils. Similar concentrations of PAHs were found in sediment samples along with Aroclor 1254 at 1,100 µg/kg. Although no adverse health effects have been

observed in people in the United States with nonoccupational exposure, workers exposed to PCBs at a much higher frequency than the general public have experienced significant adverse health effects such as skin irritations and liver damage.

4.6 CONCLUSIONS AND RECOMMENDATIONS

The New Road Landfill site contains several substances that are known to be hazardous to human health and/or the environment under certain exposure conditions. These substances include PCBs, pesticides, PAHs, and several metals including lead, mercury, and zinc. Only low concentrations of these substances were detected in the various media at the site including groundwater, surface water, sediment, and soils.

In groundwater, a low level (below quantitation limit) of the PCB Aroclor 1254 was found in GW-3, which is a shallow overburden well located in the southeast corner of the PASNY property. This well is presumably upgradient. Five inorganics (iron, lead, magnesium, manganese, and sodium) were found to exceed the NYSDEC Class GA groundwater quality standards or guidance values in both the upgradient and downgradient monitoring wells. Zinc was detected in all of the wells tested but exceeded the NYSDEC Class GA standard only in three wells (1-R, 10-R, and GW-2). Only iron, lead, manganese, and zinc in groundwater are considered as being released from the site.

In surface water, low levels of the PCB Aroclor 1254 were found in one (SW-3) of four surface water samples collected. The sample was taken from the low-lying wet area on the eastern portion of the PASNY property. Low levels of the pesticide beta-BHC was detected in all four surface water samples including the upgradient and downgradient sample locations, all of which exceeded the NYSDEC surface water standards or guidance values. Iron was detected and exceeded the NYSDEC Class D standards in all four samples and is the only inorganic considered as being released from the site. Mercury and copper were detected and exceeded the Class D standard only in SW-3. Zinc was detected in all four surface water samples but exceeded the Class D standard only in SW-3. Low levels of Aroclor 1254 were present in the sediment sample SED-3 and low concentrations of PAHs were found in all sediment samples.

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The highest concentrations were from the upgradient sample location (SED-1) in close proximity to the railroad tracks.

No inorganics were found to exist above the common range for soils in the Eastern United States.

In soil, low levels of PAHs were found to exist in all samples collected. Magnesium exceeded the common range for soils in the Eastern United States in soil from two sample locations (S-2 and S-4). EP Toxicity analyses of the soil indicated that the soil is not a characteristic hazardous waste to metals.

Considering that the site is an inactive, vacant parcel of industrial/commercially zoned land, and the local population does not drink water affected by the site, a minimal health threat is posed to NiMo and PASNY workers and trespassers who may come in direct contact with contaminants in the surface water, sediments, and soils.

The Phase II investigation found no conclusive evidence of hazardous waste disposal at the New Road Landfill site. Only minimal threats to human health and the environment were attributable to the site via direct contact. For this reason, the New Road Landfill site is a candidate for removal from the Registry of Inactive Hazardous Waste Disposal Sites in New York State. In order to reduce the potential threat posed by direct contact with the surface water, sediment, and soils, the site should be referred to the Division of Solid Waste for appropriate action. A closure under Part 6 NYCRR Part 360 including a fence to restrict site access along the western and southern site boundaries is recommended.

Table 4-1

GROUNDWATER PARAMETERS MEASURED DURING WELL SAMPLING

Well Number	Date Sampled	Temperature (C°)	pH	Specific Conductance (μs/cm)	Turbidity (NTUs)*
GW-1	2-15-91	8	6.45	960	>200
GW-2	2-14-91	8	7.15	1,287	>200
GW-3	2-14-91	8	7.20	1,808	>200
GW-4	2-15-91	8	6.95	1,137	>200
GW-5	2-15-91	7	7.35	1,412	>200
GW-6	2-15-91	7	7.70	1,293	>200
1-R	2-15-91	8	6.45	960	>200
5-R	2-15-91	7	6.35	1,947	>200
10-R	2-14-91	7	9.80	427	>200

02[UZ]YQ5080:D3377/5085/23

*NTU = Nephelometric turbidity unit.

Source: Ecology and Environment Engineering, P.C. 1991.

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Table 4-2

GROUNDWATER INORGANIC ANALYSIS SUMMARY

Analyte	Range Detected (µg/L)	NYSDEC Class GA Groundwater Standard or Guidance Value (µg/L)	Sample Exceeding Standard	
			Sample Number	Concentration (µg/L)
Aluminum	ND - 40,100	NA	--	--
Arsenic	ND - 14.9	25	--	--
Barium	[46.2] - 349	1,000	--	--
Cadmium	ND - 7.7	10	--	--
Calcium	128,000 - 471,000	NA	--	--
Chromium	ND - 48.8	50	--	--
Cobalt	ND - [47.0]	NA	--	--
Copper	ND - 75.9	200	--	--
Iron	1,880 - 56,800	300	1-R	50,300
			5-R	6,610
			10-R	14,100
			GW-1	4,420
			GW-2	56,800
			GW-3	1,880
			GW-4	5,440
			GW-5	25,200
			GW-6	11,300
Lead	ND - 252	25	1-R	252
			5-R	33.5
			10-R	55.0
			GW-1	103
			GW-2	165
			GW-3	47.0 J
			GW-5	41.5
Magnesium	65,100 - 291,000	35,000 G	1-R	254,000
			5-R	291,000
			10-R	113,000
			GW-1	125,000
			GW-2	167,000
			GW-3	78,500
			GW-4	65,100
			GW-5	123,000
			GW-6	139,000
Manganese	214 - 7,210	300	1-R	7,210
			5-R	435
			10-R	1,260
			GW-1	725
			GW-2	2,180
			GW-4	2,220
			GW-5	826
			GW-6	497
Mercury	ND - 0.24	2	--	--

02[UZ]YQ5080:D3377/5086/17

Key at end of table.

Table 4-2 (Cont.)

Analyte	Range Detected (µg/L)	NYSDEC Class GA Groundwater Standard or Guidance Value (µg/L)	Sample Exceeding Standard	
			Sample Number	Concentration (µg/L)
Nickel	ND - 57.6	NA	--	--
Potassium	[790] - 8,860	NA	--	--
Selenium	ND - [2.0]	10	--	--
Sodium	12,100 - 72,700	20,000	5-R	72,700
			10-R	20,100
			GW-1	33,200
			GW-2	42,400
			GW-3	35,200
			GW-6	34,100
Vanadium	ND - 63.8	NA	--	--
Zinc	[7.0] - 2,190	300	1-R	1,750
			10-R	816
			GW-2	2,190

02[UZ]YQ5080:D3377/5086/17

Key:

[] = Analyte present. As values approach instrument detection limit, the quantitation may not be accurate.
G = Guidance value.
J = Analyte present. Reported value may not be accurate or precise.
NA = No applicable standard or guidance value.
ND = Not detected.

Source: Ecology and Environment Engineering, P.C. 1991.

Table 4-3

SURFACE WATER ORGANIC ANALYSIS SUMMARY

Organic Compound	Concentration in Affected Sample				NYSDEC Class D Surface Water Standard or Guidance Value
	SW-1	SW-2	SW-3	SW-4	
Methylene chloride*	--	2,400	550	--	50 G
Beta-BHC	0.077	0.12	--	--	50 G
Aroclor 1254	--	--	1.2	--	0.001

02[UZ]YQ5080:D3377/5087/22

Note: Measurements in µg/L.

Key:

G = Guidance value.

*Presence of methylene chloride is considered highly suspect due to its presence at a high concentration in the rinsate blank. See Section 4.5.2.

Source: Ecology and Environment Engineering, P.C. 1991.

Table 4-4

SURFACE WATER INORGANIC ANALYSIS SUMMARY

Analyte	Range Detected	NYSDEC Class D Standard or Guidance Value	Sample Exceeding Standard	
			Sample Number	Concentration
Aluminum	475 - 30,800	NA	--	--
Arsenic	ND - [5.5]	63	--	--
Barium	[46.4] - 538	NA	--	--
Cadmium	ND - 12.4	31*	--	--
Calcium	51,200 - 163,000	NA	--	--
Chromium	ND - 64.8	5,540 - 7,870*	--	--
Cobalt	ND - [29.3]	110 G	--	--
Copper	ND - 147	101*	SW-3	147
Iron	667 - 64,800	300	SW-1 SW-2 SW-3 SW-4	667 2,580 64,800 874
Lead	ND - 381	196 - 855*	--	--
Magnesium	17,000 - 55,100	NA	--	--
Manganese	47.6 - 1,560	NA	--	--
Mercury	ND - 0.80	0.20 G	SW-3	0.80
Nickel	ND - 70.1	7,500*	--	--
Potassium	[2,060] - 11,000	NA	--	--
Sodium	5,710 - 204,000	NA	--	--
Vanadium	ND - 58.1	190	--	--
Zinc	41.7 - 1,530	566 - 1,490*	SW-3	1,530

02[UZ]YQ5080:D3377/5088/17

Note: Measurements in µg/L.

Key:

[] = Analyte present. As values approach instrument detection limit, the quantitation may not be accurate.
G = Guidance value.
ND = Not detected.
NA = No applicable standard or guidance value.

*NYSDEC Class D Surface Water Standard is based on the hardness of the individual samples and derived from the formulas provided in the NYSDEC TOGS (1.1.1), Ambient Water Quality Standards and Guidance Values, 1990.

Source: Ecology and Environment Engineering, P.C. 1991.

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Table 4-5

SEDIMENT ORGANIC ANALYSIS SUMMARY

Compound	Concentration in Affected Sample (µg/kg)				
	SED-1	SED-2	SED-3	SED-4	SED-5
Total PAHs*	3,400	2,900	1,200	1,200	530
Aroclor 1254	--	--	1,100	--	--

02[UZ]YQ5080:D3377/5089/25

*PAH = Polynuclear Aromatic Hydrocarbon. Total concentration is estimated due to the detection of numerous PAHs below quantitation limits.

Source: Ecology and Environment Engineering, P.C. 1991.

Table 4-6

SEDIMENT INORGANIC ANALYSIS SUMMARY

Analyte	Range Detected in Sample (mg/kg)	Common Range for Eastern United States Soils* (mg/kg)	Samples Exceeding Common Range	
			Sample Number	Concentration (mg/kg)
Aluminum	7,990 - 17,300	7,000 - 100,000	--	--
Arsenic	4.2 - 5.5	<0.1 - 73	--	--
Barium	98.4 - 173	10 - 1,500	--	--
Beryllium	ND - [0.26]	<1 - 7	--	--
Cadmium	ND - 4.2 J	--	--	--
Calcium	11,000 - 95,200	100 - 280,000	--	--
Chromium	16.1 L - 193 L	1 - 1,000	--	--
Cobalt	[8.0] - 20	<0.3 - 70	--	--
Copper	17.7 - 58.3	<1 - 700	--	--
Iron	20,400 - 42,600 J	100 - >100,000	--	--
Lead	21.0L - 116 L	<10 - 300	--	--
Magnesium	7,400 - 26,300	50 - 50,000	--	--
Manganese	243 - 1,560 J	<2 - 7,000	--	--
Mercury	ND - 0.34	0.01 - 3.4	--	--
Nickel	18.3L - 28.9 L	<5 - 700	--	--
Potassium	[906] - 2,410	50 - 37,000	--	--
Sodium	ND - [240]	<500 - 50,000	--	--
Thallium	ND - [0.98] L	2.2 - 23	--	--
Vanadium	[16.4] - 34.4	<7 - 300	--	--
Zinc	108K - 348 L	<5 - 2,900	--	--

02[UZ]YQ5080:D3377/5090/17

*After Shacklette and Boerngen 1984.

Key:

[] = Analyte present. As values approach instrument detection limit, quantitation may not be accurate.
J = Analyte present. Reported value may not be accurate or precise.
K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.
ND = Not detected.

Source: Ecology and Environment Engineering, P.C. 1991.

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Table 4-7

SOIL ORGANIC ANALYSIS SUMMARY

Compound	Concentration in Affected Sample (µg/kg)			
	S-1	S-2	S-3	S-4
Total PAHs*	470	2,000	530	43

02[UZ]YQ5080:D3377/5091/31

*PAH = Polynuclear Aromatic Hydrocarbon. Total concentration is estimated and includes numerous PAHs below quantitation limits. Sample S-2 also includes benzo(b)fluoranthene, detected above quantitation limits at 420 µg/kg.

Source: Ecology and Environment Engineering, P.C. 1991.

Table 4-8

SOIL INORGANIC ANALYSIS SUMMARY

Analyte	Range Detected in Samples (µg/kg)	Common Range for Eastern United States Soils* (mg/kg)	Samples Exceeding Common Range	
			Sample Number	Concentration (mg/kg)
Aluminum	749 - 17,800	7,000 - >100,000	--	--
Arsenic	3.0 - 6.9	<0.1 - 73	--	--
Barium	[10.8] - 139	10 - 1,500	--	--
Cadmium	1.1 J - 8.2 J	--	--	--
Calcium	21,900 - 177,000	100 - 280,000	--	--
Chromium	7.6 L - 117 J	1 - 1,000	--	--
Cobalt	ND - [14.5]	<0.3 - 70	--	--
Copper	[3.6] - 23.3	<1 - 700	--	--
Iron	4,380 J - 30,300	100 - >100,000	--	--
Lead	28.5 L - 113 L	<10 - 300	--	--
Magnesium	11,600 - 107,000	50 - 50,000	S-2 S-4	92,900 107,000
Manganese	532 J - 870 J	<2 - 7,000	--	--
Mercury	ND - 0.13	0.01 - 3.4	--	--
Nickel	[2.1] L - 31.1	<5 - 700	--	--
Potassium	[261] - 2,280	50 - 37,000	--	--
Sodium	[105] - [214]	<500 - 50,000	--	--
Thallium	ND - [0.66] L	2.2 - 23	--	--
Vanadium	[3.7] - 37.3	<7 - 300	--	--
Zinc	101 K - 1,760 K	<5 - 2,900	--	--

02[UZ]YQ5080:D3377/5092/17

*After Shacklette and Boerngen 1984.

Key:

ND = Not detected.
[] = Analyte present. As values approach instrument detection limit, quantitation may not be accurate.
J = Analyte present. Reported value may not be accurate or precise.
K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

Source: Ecology and Environment Engineering, P.C. 1991.

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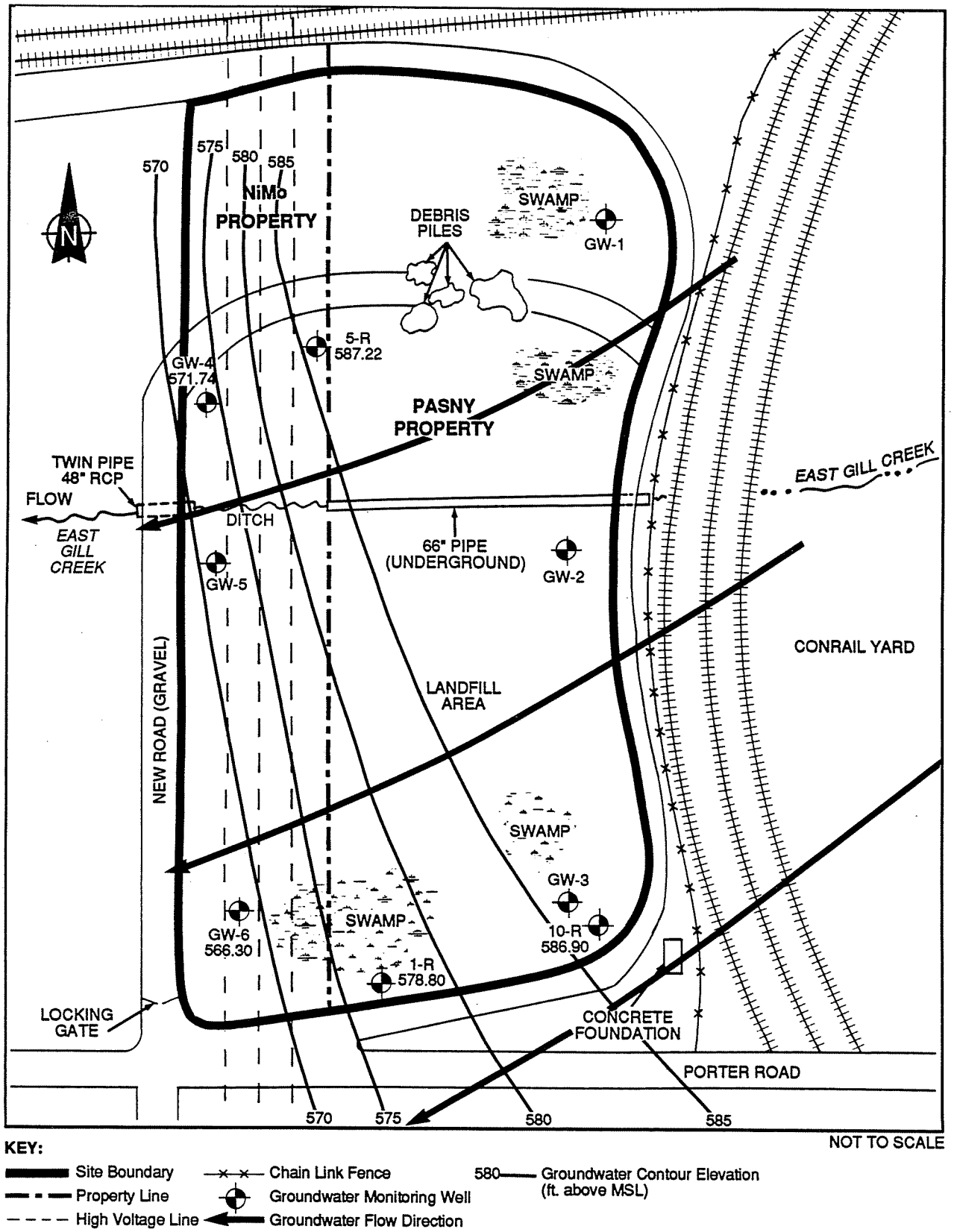


Figure 4-1
POTENTIOMETRIC SURFACE AND FLOW DIRECTIONS OF THE BEDROCK AQUIFER AT THE NEW ROAD LANDFILL SITE

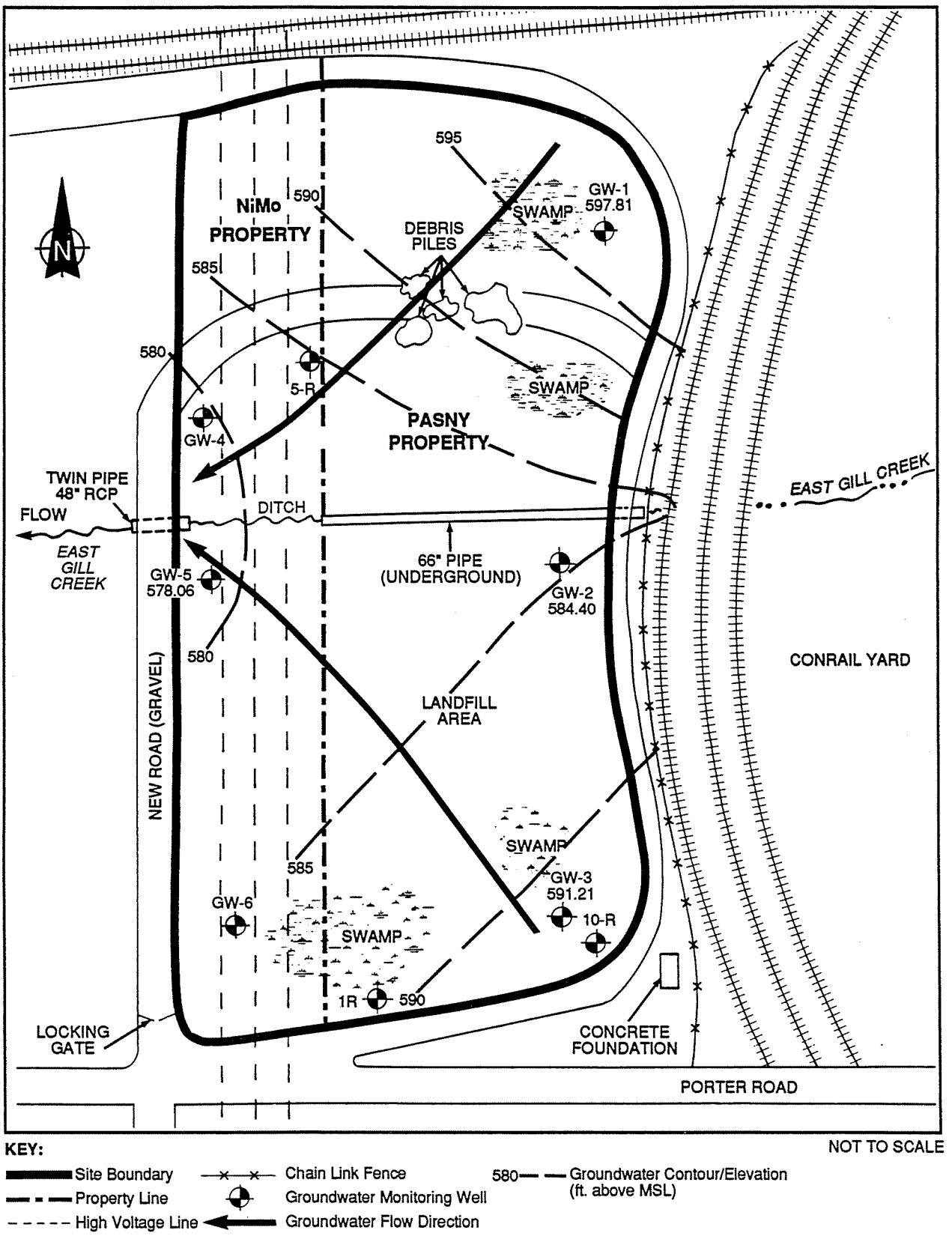


Figure 4-2
MONITORING WELL LOCATIONS AND OVERBURDEN GROUNDWATER CONTOURS AT THE NEW ROAD LANDFILL SITE

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5. FINAL APPLICATION OF HAZARD RANKING SYSTEM

5.1 NARRATIVE SUMMARY

The approximately 70-acre New Road Landfill site is located in an industrial/commercial area of the City of Niagara Falls, New York (see Figure 5-1). The vacant undeveloped site is presently owned by PASNY and NiMo. The western portion of the site is and has been owned by NiMo since the turn of the century and no dumping has been reported on the NiMo side of the site. In the 1950s, the City of Niagara Falls owned and operated the eastern portion of the site as a solid waste disposal site. Noncombustible refuse and municipal waste incinerator ash were disposed of by the City of Niagara Falls and there is no record of industrial or other hazardous waste disposal at the site. In 1954 or 1955 a fishkill occurred in Gill Creek that was attributed to a leachate flow at the site.

Since the City of Niagara Falls sold the site in 1958, it has been used for the dumping of rock spoils from the construction of the nearby underground water aqueducts used by PASNY until 1962. From 1962 to 1969 the city used the site for periodic burning of tree limbs, brush, and leaves. In 1980 a hydrogeologic study was conducted for the City of Niagara Falls, which was considering construction of a municipal sewage sludge containment facility at the site. The study included the installation of eight groundwater monitoring wells and sampling of groundwater and soils from test pits. The facility was permitted but never built. The site has been inactive since 1970, with only periodic unauthorized dumping of solid residential refuse and construction and demolition debris.

Local residents obtain drinking water from municipal surface water intakes in the Niagara River located upstream of the site. There are no

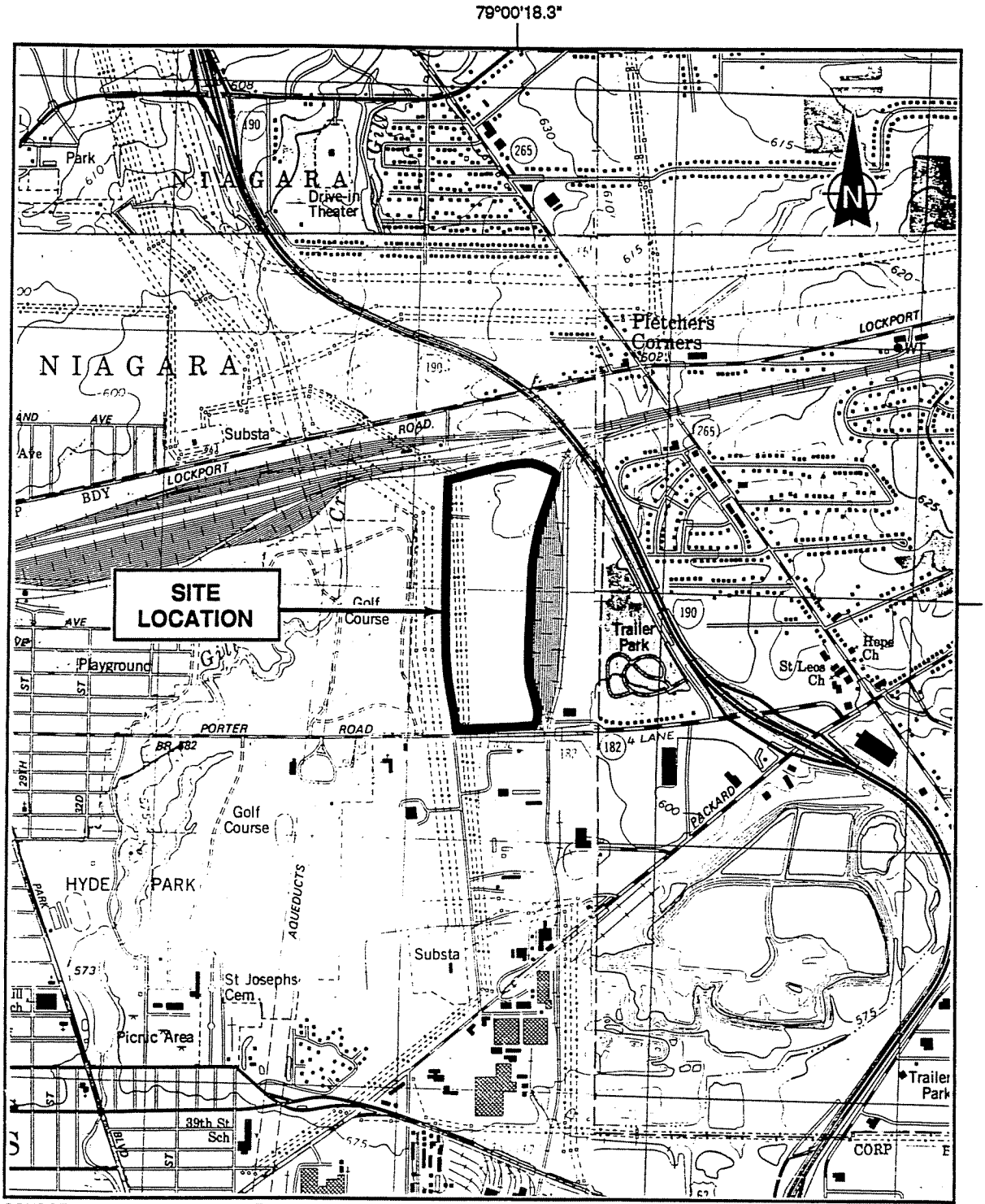
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domestic water supply wells within 3 miles of the site. Approximately 3,854 people live within 1 mile of the site.

Sampling of groundwater, surface water, sediment, and soil performed as part of this Phase II investigation revealed organic and inorganic contaminants at low levels at the site. Attributable to the site are iron in surface water and beryllium, iron, lead, manganese, and zinc in groundwater. PCBs, PAHs, and mercury are present at the site at levels too low to attribute to site origin. Primary routes of exposure are direct dermal contact, inhalation of contaminated dust particles, and ingestion of contaminated water. Primary receptors of site contaminants are property owners and/or authorized personnel and trespassers who could enter the site unrestricted from the south and west perimeters.

5.2



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle: Niagara Falls, NY-ONT, 1980; Tonawanda West, NY, 1980; Lewiston, NY-ONT, 1980; Ransomville, NY, 1980.

SCALE 1:25,000

0 ½ 1 Mile

0 .5 1 Kilometer

Figure 5-1
LOCATION MAP, NEW ROAD LANDFILL

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FIGURE 1

H R S C O V E R S H E E T

Facility Name: New Road Landfill

Location: New Road, north of Porter Road, Niagara Falls, Niagara County, New York

EPA Region: 2

Person(s) in Charge of Facility: The Power Authority, State of New York and the Niagara Mohawk Power Corporation jointly own the site.

Name of Reviewer: Ecology and Environment Engineering, P.C. Date: 4-30-91

General Description of the Facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action; etc.)

The eastern portion of the 70-acre New Road Landfill site was used by the City of Niagara Falls during the 1950s for the disposal of noncombustible refuse and incinerator ash. The Power Authority of the State of New York purchased the site in 1958 and used it for the disposal of rock spoils from the Power project tunnels from 1962 to 1963. In 1969, the City of Niagara Falls used the site for the open burning of combustible materials (i.e., leaves, brush, trees, etc.). It has been inactive since about 1970 except for occasional unauthorized dumping of solid house debris and construction and demolition debris.

Scores: $S_M = 5.28$ ($S_{gw} = 4.47$ $S_{sw} = 7.97$ $S_a = 0$)

$S_{FE} = 0$

$S_{DC} = 37.5$

Ground Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 (45)	1	45	45	3.1
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 (3)	2	6	6	
Net Precipitation	0 1 (2) 3	1	2	3	
Permeability of the Unsaturated Zone	(0) 1 2 3	1	0	3	
Physical State	(0) 1 2 3	1	0	3	
Total Route Characteristics Score			8	15	
3 Containment	0 1 2 (3)	1	3	3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 (1) 2 3 4 5 6 7 8	1	1	8	
Total Waste Characteristics Score			19	26	
5 Targets					3.5
Ground Water Use	0 (1) 2 3	3	3	9	
Distance to Nearest Well/Population Served	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			3	49	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			2,565	57,330	
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} =	4.47		

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
[1] Observed Release	0 **(45)**	1	45	45	4.1
If observed release is given a value of 45, proceed to line [4]. If observed release is given a value of 0, proceed to line [2].					
[2] Route Characteristics					4.2
Facility Slope and Intervening Terrain	**(0)** 1 2 3	1	0	3	
1-yr. 24-hr. Rainfall	0 1 **(2)** 3	1	2	3	
Distance to Nearest Surface Water	0 1 2 **(3)**	2	6	6	
Physical State	**(0)** 1 2 3	1	0	3	
Total Route Characteristics Score			8	15	
[3] Containment	0 1 2 **(3)**	1	3	3	4.3
[4] Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 **(18)**	1	18	18	
Hazardous Waste Quantity	0 **(1)** 2 3 4 5 6 7 8	1	1	8	
Total Waste Characteristics Score			19	26	
[5] Targets					4.5
Surface Water Use	0 1 **(2)** 3	3	6	9	
Distance to a Sensitive Environment	**(0)** 1 2 3	2	0	6	
Population Served/Distance to Water Intake Downstream	**(0)** 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			6	55	
[6] If line [1] is 45, multiply [1] x [4] x [5] If line [1] is 0, multiply [2] x [3] x [4] x [5]			5,130	64,350	
[7] Divide line [6] by 64,350 and multiply by 100		S_{SW} = 7.97			

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
[1] Observed Release	(0) 45	1	0	45	5.1
Date and Location:					
Sampling Protocol: No sample taken. Real time monitoring with HNu and OVA.					
If line [1] is 0, the S_a = 0. Enter on line [5]. If line [1] is 45, then proceed to line [2].					
[2] Waste Characteristics					5.2
Reactivity and Incompatibility	(0) 1 2 3	1	0	3	
Toxicity	(0) 1 2 3	3	0	9	
Hazardous Waste Quantity	(0) 1 2 3 4 5 6 7 8	1	0	8	
Total Waste Characteristics Score			0	20	
[3] Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 (21) 24 27 30	1	21	30	
Distance to Sensitive Environment	(0) 1 2 3	2	0	6	
Land Use	0 1 2 (3)	1	3	3	
Total Targets Score			24	39	
[4] Multiply [1] x [2] x [3]				35,100	
[5] Divide line [4] by 35,100 and multiply by 100		S_a = 0			

FIGURE 9
AIR ROUTE WORK SHEET

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	S	S^2
Groundwater Route Score (S_{gw})	4.47	19.98
Surface Water Route Score (S_{sw})	7.97	63.52
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		83.50
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		9.14
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} \,/\, 1.73 = S_M =$		5.28

FIGURE 10
WORKSHEET FOR COMPUTING S_M

No fire or explosion hazards exist on site.

Fire and Explosion Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Containment	1 3	1		3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 3	1		3	
Ignitability	0 1 2 3	1		3	
Reactivity	0 1 2 3	1		3	
Incompatibility	0 1 2 3	1		3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1		5	
Distance to Nearest Building	0 1 2 3	1		3	
Distance to Sensitive Environment	0 1 2 3	1		3	
Land Use	0 1 2 3	1		3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Total Targets Score				24	
4 Multiply 1 x 2 x 3				1,440	
5 Divide line 4 by 1,440 and multiply by 100		S_{FE} = 0			

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

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Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Incident	(0) 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	0 1 2 (3)	1	3	3	8.2
3 Containment	0 (15)	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 (3)	5	15	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 1 2 (3) 4 5	4	12	20	
Distance to a Critical Habitat	(0) 1 2 3.	4	0	12	
Total Targets Score			12	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			8,100	21,600	
7 Divide line 6 by 21,600 and multiply by 100		S_{DC} =	37.5		

FIGURE 12
DIRECT CONTACT WORK SHEET

DOCUMENTATION RECORDS

FOR

HAZARD RANKING SYSTEM

Instructions: As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,320 drums plus 80 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference. Include the location of the document.

Facility Name: New Road Landfill

Location: New Road north of Porter Road, Niagara Falls, New York

Date Scored:

Person Scoring: John B. Hood

Primary Source(s) of Information (e.g., EPA region, state, FIT, etc.):

NYSDEC records, Ecology and Environment Engineering, P.C. site-specific investigations, previous site studies, published reports.

Factors Not Scored Due to Insufficient Information:

NA

Comments or Qualifications:

NA

02[UZ]YQ5080:D3377/5144

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GROUNDWATER ROUTE

1. OBSERVED RELEASE

Contaminants detected (3 maximum):

Lead, zinc.
Ref. 3

Rationale for attributing the contaminants to the facility:

Found downgradient of the site at least 10 times the upgradient concentration.
Ref. 1

* * *

2. ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) of concern:

Bedrock aquifer in fractured, upper Lockport dolomite.
Ref. 4, 5, 6

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

10 feet.
Ref. 4, 7
Assigned value = 3

Depth from the ground surface to the lowest point of waste disposal/storage:

Unknown (not likely to be greater than top of bedrock; 10 feet).
Ref. 2, 4, 7

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual precipitation is 36 inches.
Ref. 8

Mean annual or seasonal evaporation (list months for seasonal):

Mean annual lake evaporation is 27 inches.
Ref. 4, 8

Net precipitation (subtract the above figures):

9 inches (36 inches - 27 inches = 9 inches).
Ref. 8
Assigned value = 2

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Fill overlying clay.
Ref. 4, 7, 9

Permeability associated with soil type:

Less than 10^{-7} cm/sec
Ref. 4, 10
Assigned value = 0

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Solid.
Ref. 2, 11
Assigned value = 0

* * *

3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Unlined, open dump.
Ref. 2, 4

Method with highest score:

Unlined, open dump.
Ref. 1
Assigned value = 3

* * *

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Lead, zinc, iron.
Ref. 1, 3

Compound with highest score:

All three score the maximum. Score = 18
Ref. 1

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0. (Give a reasonable estimate even if quantity is above maximum.):

Unknown quantity.
Ref. 2, 11
Assigned value = 1

Basis of estimating and/or computing waste quantity:

Records of the quantity of municipal refuse and PASNY wastes were not kept for the New Road Landfill site. No hazardous wastes are known to have been disposed of on site.
Ref. 1

* * *

5. TARGETS

Groundwater Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

An industrial well located at Olin Chemical Corporation on Buffalo Avenue 2.75 miles southwest of the site.
Ref. 2
Assigned value = 1

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Olin Chemical Corporation on Buffalo Avenue 2.75 miles southwest of the site.
Ref. 2

Distance to above well or building:

2.75 miles
Ref. 2
Assigned value = 4

Population Served by Groundwater Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

Olin Chemical Corporation draws cooling water from aquifer. Population using this well for drinking water is 0.
Ref. 2
Score = 0

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

No irrigation wells within 3 miles of the site.
Ref. 2

Total population served by groundwater within a 3-mile radius:

Olin Chemical Corporation employs approximately 200 people; however, none are exposed to aquifer cooling water. Drinking water is obtained from a municipal source.
Ref. 2
Assigned value = 0

SURFACE WATER ROUTE

1. OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

Iron, copper, mercury, Aroclor 1254.
Ref. 1, 3

Rationale for attributing the contaminants to the facility:

Detected over 3 times the upgradient concentration in a downgradient sample or on site.
Ref. 1

* * *

2. ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

0.3%.
Ref. 1, 8, 12
Assigned value = 0

Name/description of nearest downslope surface water:

East Gill Creek.
Ref. 2, 12

Average slope of terrain between facility and above-cited surface water body in percent:

0.4%.
Ref. 2, 12

Is the facility located either totally or partially in surface water?

No.
Ref. 2, 12

Is the facility completely surrounded by areas of higher elevation?

No.
Ref. 2, 12

1-Year 24-Hour Rainfall in Inches

2.1 inches.
Ref. 1, 2, 8
Assigned value = 2

Distance to Nearest Downslope Surface Water

Stream, less than 1,000 feet.
Ref. 2, 12
Assigned value = 3

Physical State of Waste

Solid.
Ref. 2, 11
Assigned value = 0

* * *

3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Landfill not covered, no diversion system.
Ref. 1, 2, 11
Assigned value = 3

Method with highest score:

Landfill not covered, no diversion system.
Ref. 1

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Iron, mercury, copper, Aroclor 1254.
Ref. 1, 3

Compound with highest score:

Iron, mercury, copper, Aroclor 1254 = 18
Ref. 1

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0. (Give a reasonable estimate even if quantity is above maximum.):

Unknown.
Ref. 2, 4
Score = 1

Basis of estimating and/or computing waste quantity:

Records of the quantity of municipal refuse and PASNY wastes were not kept for the New Road Landfill site. No hazardous wastes are known to have been disposed of on site.
Ref. 2, 4, 6, 11

* * *

5. TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

Recreational, Gill Creek is adjacent to two golf courses, Hyde Park and Gill Creek Park.
Ref. 2, 12
Assigned value = 2

Is there tidal influence?

No.
Ref. 8, 12

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

None within 2 miles (western New York State is not a coastal area).
Ref. 8, 12, 13
Score = 0

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

None within 1 mile.
Ref. 13
Score = 0

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None within 1 mile.
Ref. 1, 14
Assigned value = 0

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

None within specified distances.
Ref. 1, 2, 12, 19
Assigned value = 0

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

Not applicable.
Ref. 1

Total population served:

Not applicable.
Ref. 1

Name/description of nearest of above water bodies:

Not applicable.
Ref. 1

Distance to above-cited intakes, measured in stream miles:

Not applicable.
Ref. 1

AIR ROUTE

1. OBSERVED RELEASE

Contaminants detected:

None observed.
Ref. 1, 15

Date and location of detection of contaminants:

NA

Methods used to detect the contaminants:

No samples collected, real time monitoring with HNu and OVA.
Ref. 15

Rationale for attributing the contaminants to the site:

NA

* * *

2. WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

NA

Most incompatible pair of compounds:

NA

Toxicity

Most toxic compound:

NA

Hazardous Waste Quantity

Total quantity of hazardous waste:

NA

Basis of estimating and/or computing waste quantity:

NA

* * *

3. TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

(0 to 4 mi) 0 to 1 mi 0 to 1/2 mi 0 to 1/4 mi

87,069
Ref. 1, 16
Assigned value = 21

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

NA
Ref. 12, 13

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

NA
Ref. 13

Distance to critical habitat of an endangered species, if 1 mile or less:

NA
Ref. 14
Assigned value = 0

Land Use

Distance to commercial/industrial area, if 1 mile or less:

0 miles.
Ref. 2, 6
Assigned value = 3

Distance to national or state park, forest, wildlife reserve, if 2 miles or less:

Reservoir State Park is 1.4 miles north of the site.
Ref. 12, 14
Assigned value = 1

Distance to residential area, if 2 miles or less:

0.17 mile
Ref. 2, 12
Assigned value = 3

Distance to agricultural land in production within past 5 years, if 1 mile or less:

More than 1 mile.
Ref. 2, 17

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

More than 2 miles.
Ref. 2, 17

Is a historic or landmark site (National Register of Historic Places and National Natural Landmarks) within the view of the site?

No.
Ref. 18

FIRE AND EXPLOSION

1. CONTAINMENT

Hazardous substances present:

No known fire or explosion hazards are known to be present at the site.
Ref. 2, 15

Type of containment, if applicable:

NA
Ref. 2, 11

* * *

2. WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

No readings above background levels from the explosimeter during well drilling.
Ref. 15

Ignitability

Compound used:

NA

Reactivity

Most reactive compound:

NA

Incompatibility

Most incompatible pair of compounds:

NA

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

Unknown.
Ref. 2, 4

Basis of estimating and/or computing waste quantity:

Ref. 1

* * *

3. TARGETS

Distance to Nearest Population

Residential area located 0.17 mile from the site.
Ref. 2
Assigned value = 3

Distance to Nearest Building

0.17 mile to residential houses at the Forest Glen Subdivision.
Ref. 2
Assigned value = 1

Distance to a Sensitive Environment

Distance to wetlands:

None within 100 feet.
Ref. 1, 12, 13
Assigned value = 0

Distance to critical habitat:

None within 0.5 mile.
Ref. 2, 14

Land Use

Distance to commercial/industrial area, if 1 mile or less:

0.25 mile
Ref. 2
Assigned value = 3

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

1.4 miles
Ref. 1, 12, 14
Assigned value = 1

Distance to residential area, if 2 miles or less:

0.17 mile to Forest Glen Subdivision
Ref. 14
Assigned value = 3

Distance to agricultural land in production within past 5 years, if 1 mile or less:

More than 1 mile.
Ref. 2, 17
Assigned value = 0

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

More than 2 miles.
Ref. 2, 17
Assigned value = 0

Is a historic or landmark site (National Register of Historic Places and National Natural Landmarks) within the view of the site?

No.
Ref. 18

Population Within 2-Mile Radius

28,778 people.
Ref. 16, 19
Assigned value = 2

Buildings Within 2-Mile Radius

10,392 buildings
Ref. 16, 19
Assigned value = 5

DIRECT CONTACT

1. OBSERVED INCIDENT

Date, location, and pertinent details of incident:

None observed during Phase II site investigation.
Ref. 15
Assigned value = 0

* * *

2. ACCESSIBILITY

Describe type of barrier(s):

Barriers do not surround the facility.
Ref. 2, 15
Assigned value = 3

* * *

3. CONTAINMENT

Type of containment, if applicable:

The landfill site has not been covered with an adequate cover system. Rock spoil from PASNY construction project is the primary material on site.
Ref. 2, 7, 11, 15
Assigned value = 15

* * *

4. WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

Aroclor 1254, lead, zinc.
Ref. 3

Compound with highest score:

All three compounds scored the maximum for toxicity. Score = 3.
Ref. 1

* * *

5. TARGETS

Population Within One-Mile Radius

3,854
Ref. 2, 19
Assigned value = 3

Distance to Critical Habitat (of endangered species)

None within 1 mile.
Ref. 14

02[UZ]YQ5080:D3377/5144

REFERENCES

If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found.

Reference Number	Description of the Reference
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Reference Number	Description of the Reference
12	United States Geological Survey (USGS), 1980, Topographic Maps: Niagara Falls, New York-Ontario, Tonawanda West, New York. Document Location: Ecology and Environment Engineering, P.C., Lancaster, New York.
13	New York State Department of Environmental Conservation (NYSDEC), 1986, New York State Freshwater Wetlands Maps, Niagara County. Document Location: Ecology and Environment Engineering, P.C., Lancaster, New York.
14	Buffington, B., April 10, 1990, personal communication, New York State Department of Environmental Conservation (NYSDEC), Significant Habitat Unit. Document Location: Ecology and Environment Engineering, P.C., Lancaster, New York.
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18	National Register of Historic Places, 1966 to 1988, 1989, American Association for State and Local History. Document Location: Ecology and Environment Engineering, P.C., Lancaster, New York.
19	United States Census Data, 1980. Document Location: Ecology and Environment Engineering, P.C., Lancaster, New York.

REFERENCE 1

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Uncontrolled Hazardous Waste Site Ranking System

A Users Manual
(HW-10)

Originally Published in
the July 16, 1982, *Federal Register*

United States
Environmental Protection
Agency

1984

REFERENCE 2

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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE I INVESTIGATION

New Road
City of Niagara Falls

Site No. 932083
Niagara County

Date: January 1986



Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
Henry G. Williams, *Commissioner*

Division of Solid and Hazardous Waste
Norman H. Nosenchuck, P.E., *Director*

By:
ENGINEERING-SCIENCE
In Association With
DAMES & MOORE

REFERENCE 3

ANALYTICAL DATA

(APPENDIX D OF THIS REPORT)

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REFERENCE 4

4.0 SITE SUITABILITY AND CHARACTERISTICS

4.1 Site Conditions

The site slopes very gently to the west, but has very little topographic relief. Existing site topography is illustrated on Plate 3. The only exceptions are a few anomalies that are the result of random dumping of rock spoil. The lack of topographic relief combined with impermeable soils results in very poor drainage from the site. Depressions, if even just a few inches, will quickly pond up and not dissipate for several days, weeks or even months. The 60-foot wide utility easement which cuts across the site has no rock spoil covering it and is one of the lowest areas within the site. It is covered by phragmites across the entire width of the site, indicative of perennial wet conditions.

4.2 Hydrogeology

4.2.1 Field Exploration

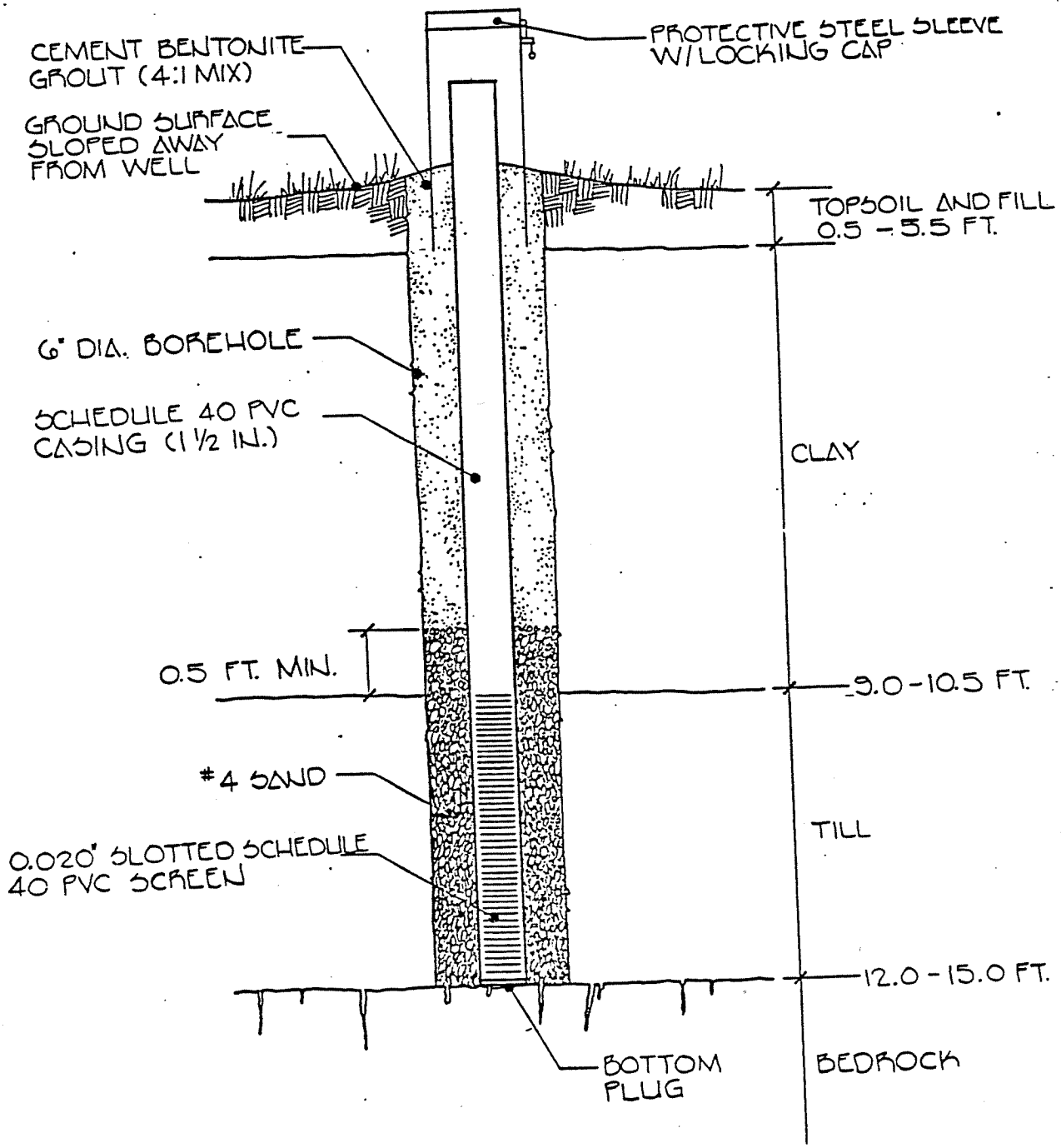
On June 25 and 26, 1980, ten test pits were dug by the City of Niagara Falls under the supervision of MPI. The soils were logged and samples were collected. Three test pits could not penetrate through the rock spoil covering the site. The others penetrated down to a maximum of ten feet.

Sixteen borings were drilled by Anderson Drilling Company of Orchard Park, New York between July 28 and August 6, 1980. Four were unable to penetrate the rock spoil. All but B-8A were advanced with 3½-inch hollow stem augers to refusal. Boring B-8A was advanced with 3-inch flush joint casing driven with a 300 pound hammer. Samples were taken where possible in the rock spoil and continuously in the natural soils

in accordance with the ASTM D-1586 standard penetration test. Undisturbed shelby tubes were taken in two borings. Two samples each of two different clays were collected and two unsuccessful sampling attempts were made on the glacial till with a Dennison core tube. Five-foot runs of Nx rock core were taken in the four corner borings. (See Appendix C for test pit and boring logs and Plate 3 for boring locations).

Field hyraulic conductivity values were measured at three levels in B-8A by the falling head method. The casing was driven to a desired depth and then cleaned flush with the bottom. The casing was filled with clean water and a plastic bag was placed over the top and bound with rubber bands to minimize the loss of water due to evaporation. In the clay soils, a period of at least four hours was given to saturate the soil. Each of the tests were run for a minimum of 24 hours. The calculated values are: 1.4 x 10-7 cm/sec at 3.0 feet (mottled clay), 4.2 x 10-8 cm/sec at 7.0 feet (varved clay) and 3.7 x 10-6 cm/sec at 11.0 feet (glacial till). (See Appendix D for calculations).

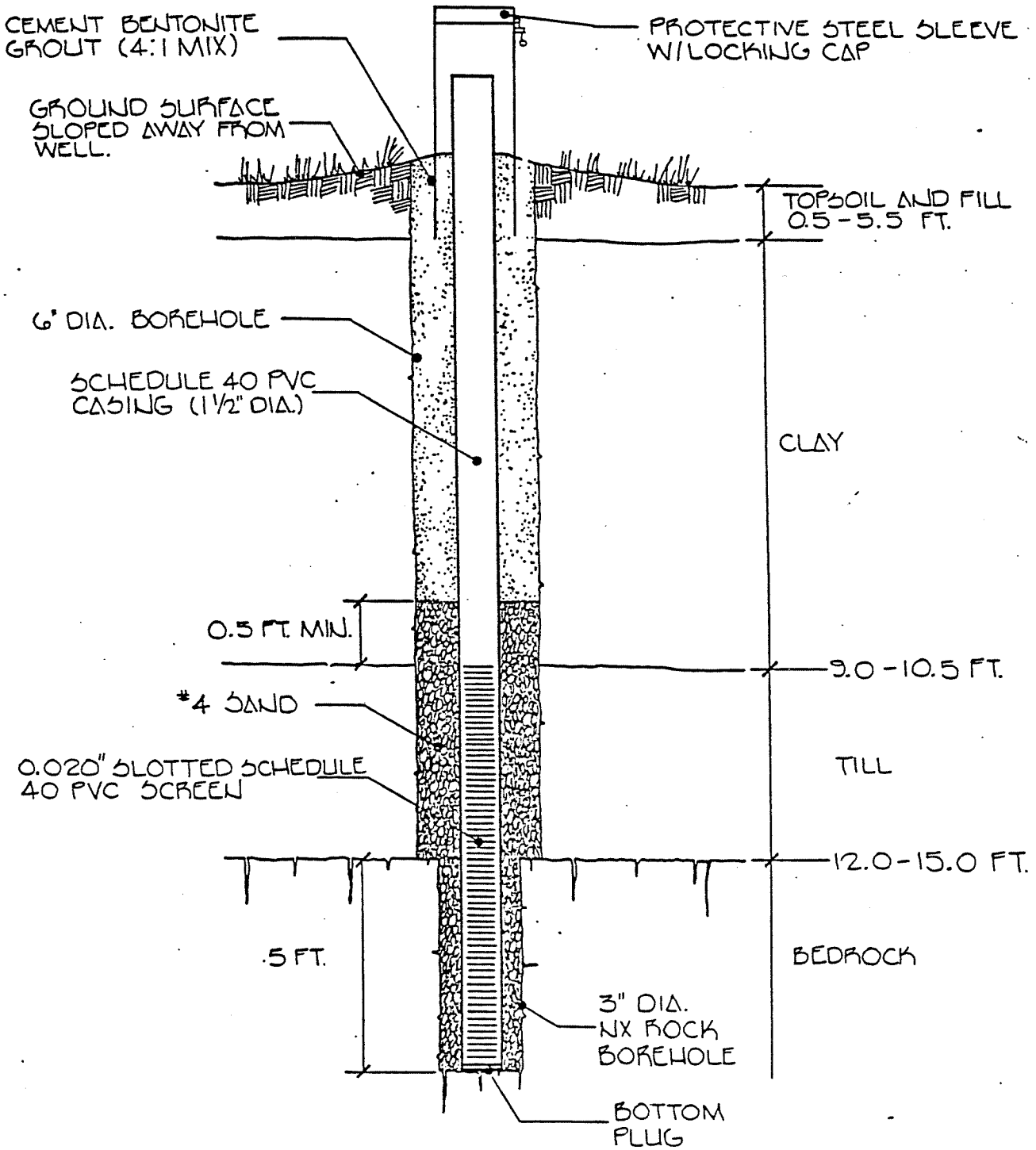
Eight monitoring wells were installed as illustrated in Figures 4-1 and 4-2. All of the wells were constructed of 1½-inch schedule 80 pvc with aluminum rivited flush joints and have 5-foot long continuous slotted 0.020-inch well screens. Three of the corner wells have two well screens end-to-end for a total screen length of ten feet. The annulus around the well screens were backfilled with a well-graded number 4 silica sand to a minimum of one-half foot above the top of the screen. A sieve analysis of the sand (See Appendix E) shows that 99.4 percent is between 0.08 and 0.015 inches in diameter. The rest of each annulus was backfilled to the surface with a cement-



CITY OF NIAGARA FALLS
SLUDGE SITE DEV. PLAN
TYPICAL MONITORING WELL
DETAIL
FINISHED IN TILL

recycled paper

FIGURE 4-2



CITY OF NIAGARA FALLS
SLUDGE SITE DEV. PLAN
TYPICAL MONITORING WELL DETAIL
FINISHED IN ROCK

bentonite slurry. Five-foot long, 4-inch dimeter protective steel sleeves with locking caps were placed over the wells and set into the cement-bentonite backfill.

4.2.2 Laboratory Testing

A summary of the physical characteristics of the soils at the site is presented in Table 4-1. Each of three samples of glacial till, varved clay and mottled clay, and one sample of the sand lens found in Boring B-5R were analyzed for grain size distribution, Atterberg limits and moisture content. Examination of the table indicates that the composition of both the mottled and varved clays is primarily inorganic clay (i.e. 63-88%) with the remaining portion being primarily inorganic silt (i.e. 15-34%). The moisture content of the varved clay (i.e. 23-29%) was found to be slightly higher than that of the mottled clay (i.e. 21-24%). The plasticity index of the clay samples ranged from 21-27 percent. The glacial till was found to be well-graded, containing large amounts of inorganic silt and fine sand with a moisture content ranging from 10 to 20 percent. Composition of the sand lens was found to be primarily sand (i.e. 60%) and silt (i.e. 30%) with a moisture content of 20 percent.

A summary of the chemical characteristics of the soils at the site is presented in Table 4-2. Examination of the table indicates that the soils are characterized by alkaline pH (i.e. 7.3-7.8) and high cation exchange capacity (i.e. 37.3-53.1 meq/100g).

A summary of permeability test results is presented in Table 4-3. In order to determine the permeability

TABLE 4-1

SUMMARY OF LABORATORY TEST RESULTS
CITY OF NIAGARA FALLS SLUDGE SITE DEVELOPMENT
PHYSICAL CHARACTERISTICS OF SOILS

Boring Number	Sample Number	Depth (ft.)	Soil Description	USGS Classification	Mechanical Analysis (% Composition by Weight)** Gravel	Sand	Silt	Clay	Initial Moisture Content (%)	Atterberg Limits: Plastic Limit (%)	Liquid Limit (%)	Plasticity Index (%)
TP-1	S-1	10	Glacial till	ML	15	21	31	33	20	16	18	—
TP-3	S-1	10.5	Varved clay	CH	—	—	12	88	29	23	50	27
B-5R	S-4	7-9	Mottled clay	CL	—	3	34	63	21	20	43	23
B-5R	S-5	9-11	Silty sand	SM	2	60	30	8	20	—	—	—
B-5R	S-6	11-13	Glacial till	ML	18	27	44	11	14	—	—	—
B-6R	S-2	4-6	Verved clay	CL	—	2	28	70	23	21	44	23
B-9	S-3	4-6	Mottled clay	CH	—	2	15	83	24	24	53	27
B-10R	S-5	11.5-13.5	Glacial till	ML	18	29	43	10	10	—	—	—
B-10R*	T-1	2-4	Mottled clay	CL	—	2	23	75	21	24	48	24
B-10R*	T-2	8-9.5	Varved clay	CL	—	2	24	74	27.9	23	44	21

NOTES:

* Tested by Empire Soils Investigations, Inc., all others by Malcolm Pirnie, Inc.

** Gravel (76.2 mm - 4.76 mm)
Sand (4.76 μm - 75 μm)
Silt (75 μm - 5 μm)
Clay (< 5 μm)

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TABLE 4-3

SUMMARY OF LABORATORY TEST RESULTS
CITY OF NIAGARA FALLS SLUDGE SITE DEVELOPMENT
PERMEABILITY TEST RESULTS*

Boring Number	Sample Number	Depth (ft.)	Soil Description	Type of Test	Initial Moisture Content (%)	Specific Gravity	Dry Unit Weight (pcf)	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Hydraulic Conductivity (cm/sec)
B-10R	T-1	2-4	Mottled clay	Constant Head, Undisturbed, Triaxial	21.0	2.71	104.0	—	—	$7.7 \times 10^{-6+}$
B-10R	T-2	8-9.5	Varved clay	Constant Head, Recompacted	20.0	—	104.8	113.8	16.0	$1.98 \times 10^{-8++}$
B-10R	T-2	8-9.5	Varved clay	Constant Head, Undisturbed, Triaxial	27.9	2.71	94.9	—	—	$3.01 \times 10^{-8++}$
B-6R	T-1	2.1-3.9	Mottled clay	Constant Head, Undisturbed, Triaxial	23.8	—	97.5	—	—	$1.02 \times 10^{-7+++}$
B-6R and B-10R (Combined)	T-1	2-4	Mottled clay	Constant Head, Recompacted	23.5	—	101.8	105.3	19.9	$9.90 \times 10^{-9++}$

NOTES: * Samples tested by Empire Soils Investigations, Inc.
+ Avg. value for differential heads of 2, 5, & 10 psi
++ Avg. value for differential heads of 5 & 10 psi
+++ Avg. value for differential heads of 2 & 5 psi

ecology and environment

of the clay beneath the site, constant head, undisturbed (i.e. shelby tube), triaxial tests were performed on two samples of the mottled clay and one sample of the varved clay. As indicated on the table, the average hydraulic conductivity of the mottled clay ranged from 1.02×10^{-7} to 7.7×10^{-6} cm/sec and the average hydraulic conductivity of the varved clay was 3.01×10^{-8} cm/sec. These low hydraulic conductivity values indicate that the clay beneath the site is practically impervious and would be ideally suited as a base for the containment area. Constant head, recompacted tests were also performed on both a mottled and varved clay sample in order to determine the permeability achievable at the optimum moisture content. As indicated on the table, the average hydraulic conductivity for both the mottled (i.e. 9.9×10^{-8} cm/sec) and varved (i.e. 1.98×10^{-8} cm/sec) clay was extremely low. Therefore, recompaction of the clay at the site would make it well suited for use in formation of the clay liner or as a base for the containment area.

The soils laboratory test results, gradation curves, compaction test curves, and hydraulic conductivity test reports are in Appendix F. All of the samples were analyzed according to:

1. Methods of Soil Analysis, Part 2, ASA, ASTM, 1965;
2. ASTM D-422
3. ASTM D-423;
4. ASTM D-424;
5. ASTM D-698;
6. ASTM D-854;
7. ASTM D-2216;
8. U.S. Army Engineering Manual 1110-2-1906, Appendix II 1970; and/or

9. U.S. Army Engineering Manual 1110-2-1906; Appendix VII, 1970.

4.2.3 Geology

The bedrock beneath the proposed landfill site is the Lockport Dolostone. It is a gray to dark-gray, fine-grained dolomite with occasional carbonaceous (1/16-inch thick black shale) partings. It has thin to massive beds which strike approximately east-west and dip to the south at about 40 feet per mile. Gypsum (calcium sulfate) is common in the Lockport Dolostone and usually found in small irregular shaped masses and as selenite (crystalline gypsum). In the upper 15 to 20 feet of the formation, the gypsum commonly is dissolved out of the irregular shapes, and the resulting voids are called "vugs". There are two major vertical joint sets within the Lockport; one set is oriented N. 65° E. and the other N. 30° W. The depth of penetration of the vertical joints varies from a few feet to around 20 feet. There is also a horizontal joint set parallel to the bedding planes. These horizontal joints are found down through the entire formation. The Lockport Dolostone is about 125 feet thick below the proposed landfill.

Rock cores taken in the corners of the site are gray, fine-grained dolostone with black shale partings every one to two feet. There were many vugs noted; most the size of marbles, but one as large as a baseball. No vertical or horizontal joints were found in the cores.

Overlying the bedrock is a thin mantle of glacial till up to 6 feet thick. Glacial till is a dense, heterogeneous, non-stratified mixture of silt, sand, boulders,

gravel and clay deposited as advancing glaciers eroded, crushed and rode over the bedrock surface and overburden. The soil analyses show that the till is well-grade, containing mostly silt and sand with some gravel and clay, has a high attenuation capacity, is mildly alkaline and exhibits low hydraulic conductivity.

Overlying the till is six to ten feet of lacustrine sediments deposited at the bottom of pre-glacial Lake Tonawanda. The soil is characteristically red-brown and varved. The top three to four feet has been physically altered by weathering giving it a mottled appearance. The soil is predominantly clay with some silt, has a high attenuation capacity, is mildly to moderately alkaline, and has an extremely low hydraulic conductivity (See Plates 1 and 2 for geologic cross sections).

There are occasional sand pockets sandwiched between the glacial till and lacustrine sediments. The average diameter of a pocket is estimated to be around 200 feet and no more than two feet thick.

Overlying the lacustrine clays is the rock spoil from the PASNY aqueducts. Based on visual inspection, the particle size ranges from silt to six-foot diameter boulders. The thickness of the deposits ranges from zero to ten feet.

4.2.4 Groundwater

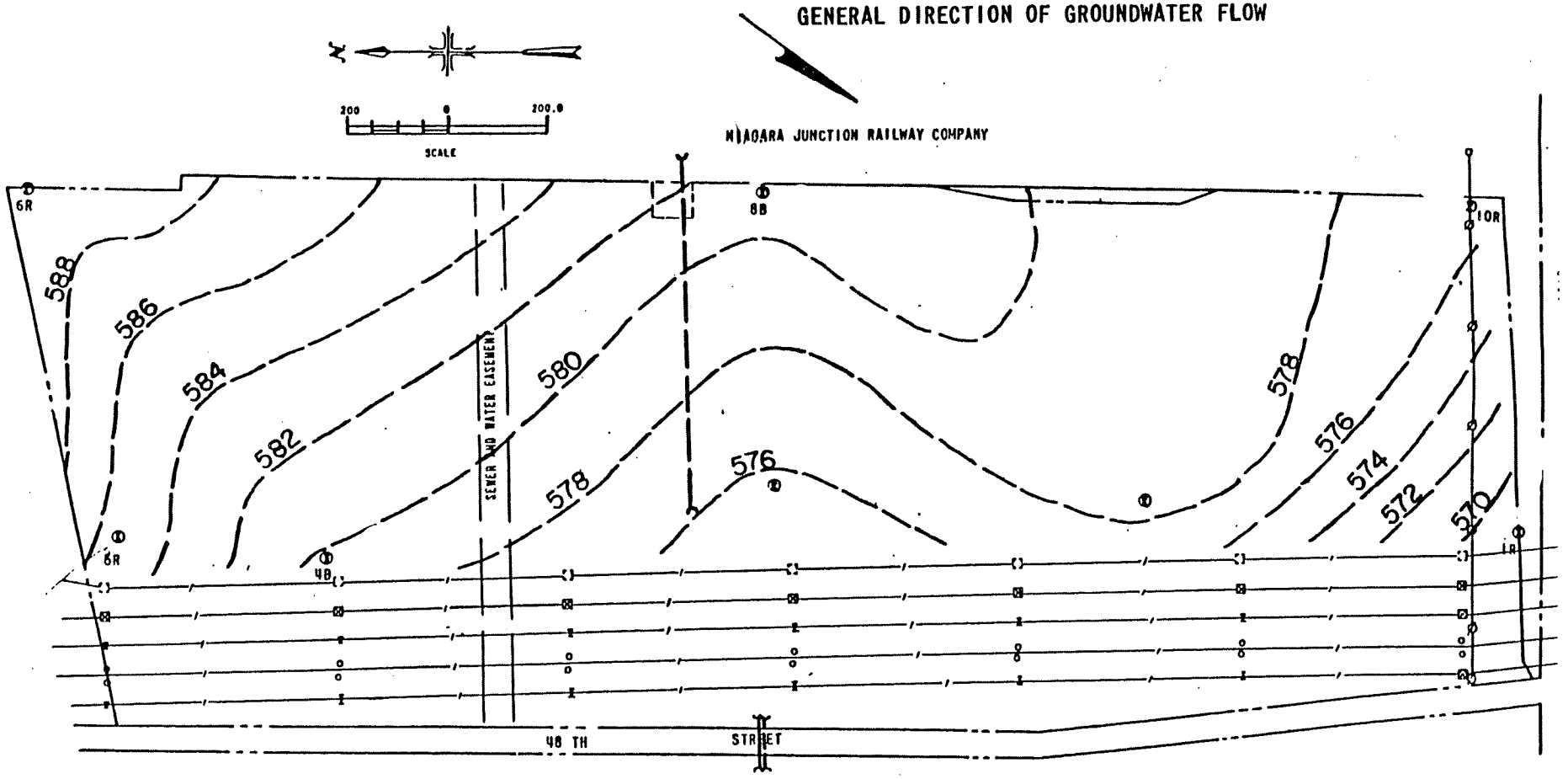
Groundwater exists in the unconsolidated soils and the bedrock. The glacially-derived unconsolidated deposits yield low quantities of groundwater and are not considered aquifers in the Niagara Falls area. The

lacustrine deposits of clay and silt have a high primary porosity, but a very low, if any at all, effective porosity. They yield water very slowly and the unit is actually considered an aquaclude (contains, but does not transmit water).

The dolostone bedrock can yield very large quantities of water and is the principal aquifer in the area. The source of water from this unit is not the rock itself, but the vertical and horizontal joints, and vugs to a lesser degree. Most vugs are found within 15 feet of the bedrock surface and are not a major factor in the water yielding properties of the aquifer. However, vugs that are hydraulically connected with either vertical or horizontal joints contribute to the water yield.

The direction and rate of groundwater flow in the unconsolidated soils and upper portion (15 to 20 feet) of the bedrock is controlled by watertable conditions. The direction of groundwater flow is normal to the watertable contours. The groundwater isopotential map (See Figure 4-3), shows the existing watertable contours based on water level measurements in the monitoring wells. The isopotential map indicates the direction of groundwater flow is primarily to the southwest with some localized flow toward the drainage culvert passing through the center of the site. The rate of groundwater flow, based on Darcy velocity, is equal to the hydraulic conductivity times the hydraulic gradient. Using the steepest hydraulic gradient on the site it would take over 3,000 years for a water particle to travel through four feet of the lacustrine clay.

The direction and rate of groundwater flow deeper within the bedrock is more complex. Generally, the



LEGEND

⊕R ROCK BORING FINISHED AS WELL

⊕ SOIL BORING FINISHED AS WELL

CONTOUR INTERVAL: 2'-0"

SLUDGE CONTAINMENT SITE DEVELOPMENT PLAN GROUNDWATER ISOPOTENTIAL MAP

CITY OF NIAGARA FALLS MARCH 1981

groundwater 15 to 20 feet below the rock surface is under artesian conditions. Water entering a horizontal joint travels southward, parallel to the bedding plane and is confined above and below by impermeable rock. The groundwater monitoring wells installed on the proposed landfill site cannot, nor were they intended to be, used to evaluate groundwater movement in the Lockport Dolostone. According to Johnston (Reference 2), the inferred direction of groundwater movement in the upper water-bearing zones of the Lockport Dolostone in the vicinity of the proposed landfill site is also to the southwest.

4.3 BACKGROUND WATER QUALITY

Under Part 703 of the New York State Code of Rules and Regulations the groundwaters of the State are classified according to best use and all fresh groundwaters are best used as sources of potable water supply. These waters have been given a "GA" classification as defined in Appendix A.

Groundwater quality standards stipulate that no raw or treated sewage, industrial wastes or ineffectively treated effluents, taste or odor producing substances, toxic wastes, thermal wastes, radioactive substances or other deleterious matter may be present which may impair the quality of groundwaters to render them unsuitable for a potable water supply. Additional water quality standards are shown in Table 4-4 indicating maximum allowable concentrations of various contaminants at the point of discharge.

In order to establish baseline groundwater quality at the site, two sets of groundwater samples were collected approximately two weeks apart for five monitoring

wells. Three of the wells were located downgradient from the site with respect to groundwater movement and two were upgradient. Well Nos. 1, 3 and 5R were used as the downgradient monitoring stations and well Nos. 10R and 8B or 6R were used as upgradient monitoring stations. Baseline water quality data is attached as Appendix G.

In addition, two surface water samples were collected from the east branch of Gill Creek at the western mouth of the drainage conduits which pass through the site (See Appendix G).

A summary of baseline water quality sampling results is presented in Table 4-5. Evaluation of these results indicate that the overall groundwater quality is typified by alkaline pH (i.e. 7-8.5), extreme hardness (i.e. 600-1100 mg/l) and high dissolved solids concentrations (i.e. 400-2000 mg/l). The alkaline pH, extreme hardness and high dissolved solids concentration may be attributed to the highly alkaline soils and limestone bedrock with gypsum deposits which are prevalent in the area.

Extremely high pH's (i.e. 8-11) were detected in monitoring wells 5R and 6R located at the north end of the site. The cause of these high pH values is not known. Monitoring well 6R also shows relatively high calcium (640 mg/l) and sulfate (1,590 mg/l) concentrations along with extremely high specific conductance (5000 mmhos/cm). The high specific conductance value is a result of the high dissolved solids. The high sulfate and calcium concentrations are probably a result of the dissolution of gypsum which is deposited in the bedrock.

Samples collected on 9/11/80, showed high concentrations of iron (.79-2.2 mg/l) aluminum (3.5 mg/l). However, samples collected on 10/3/80 indicate that neither heavy metal was present in significant concentrations. The initial detection of these metals is probably a result of colloidal clay present in the first samples due to the recent completion of the wells.

Monitoring well 8B shows relatively low values for specific conductance, hardness and dissolved solids. This may be attributable to the dilution effect of a tributary water source entering the aquifer.

Overall, the baseline water quality data indicate the groundwater under the proposed landfill site is not suitable for domestic or industrial uses due to its high pH, extreme hardness, and high dissolved solids content. Comparison of the baseline groundwater quality data in Table 4-5 to water quality standards presented in Table 4-4 indicates that the groundwater underlying the proposed landfill exceeds New York State Groundwater Quality Standards and/or National Interim Primary Drinking Water Standards for the following parameters:

chloride
sulfate
total coliform bacteria
phenols
chromium (total)

The coliform bacteria are indicators of microbial contamination probably from leaking sewers or failing septic systems in the area. The phenol, chromium, and possibly chloride are of an industrial nature and potential sources cannot be determined at this time. The sulfate and possibly the chloride are believed to be naturally occurring substances in the area.

TABLE 4-4

GROUNDWATER QUALITY STANDARDS

Substance	Maximum Concentration (mg/l)[1] New York State Water Quality Standards For Class "GA" Water	Interim Primary Drinking Water Standards
Arsenic	0.025	0.05
Barium	1.00	1.00
Cadmium	0.01	0.01
Chloride	250.00	--
Chromium	0.05[2]	0.05[3]
Copper	1.00	--
Cyanide	0.20	--
Fluoride	1.50	--
Foaming Agents (MBAS)	0.50	--
Iron[4]	0.30	-- 0.3
Lead	0.025	0.05
Manganese[4]	0.30	--
Mercury	0.002	0.002
Nitrate (as N)	10.00	10.00
Phenols	0.001	--
Selenium	0.02	0.01
Silver	0.05	0.05
Sulfate	250.00	--
Zinc	5.00	--
pH Range	6.5-8.5	--
Endrin	N.D.	0.0002
Lindane	N.D.	0.004
Methoxychlor	0.035	0.10
Toxaphene	N.D.	0.005
2, 4-D	0.0044	0.10
2, 4, 5-TP (Silvex)	0.00026	0.01
Radium 226 and 228	--	5.00[6]
Gross Alpha Activity	--	15.00[6]
Coliform Bacteria[7]	--	4.00
Other[5]	(See Appendix)	--

NOTES:

- \- Not specified
- N.D. Not Detectable
1. Except where exceeded due to natural conditions
2. Hexavalent chromium
3. Total chromium
4. Combined concentration of iron and manganese shall not exceed 0.3 mg/l
5. Specific organic substances as specified in Appendix ____
6. pCi/l
7. #/100ml, arithmetic mean not to exceed 1 per 100 ml

TABLE 4-5

BASELINE WATER QUALITY ANALYSIS

Parameter	Units	Monitoring Location											
		1R	3	5R	6R	10R	Creek	1R	3	5R	8B	10R	Creek
		Sample Date: 9/11/80						Sample Date: 10/3/80					
pH		7.95	7.55	8.10	11.10	8.35	7.80	7.75	7.70	9.95	7.25	7.45	9.10
Specific Conductance	µmhos/cm	1,550	1,950	2,600	5,000	900	1,250	1,500	2,100	3,000	650	1,150	1,100
Color	Pt-Co	23	28	35	30	-	53	680	30	190	15	310	25
Total Coliform	#/100 ml	39	<1	29	<1	<1	100	-	-	<1	<1	<5	1
Total Organic Carbon	mg/l	3	6	5	1	3	6	11	9	8	1	2	<1
Alkalinity (as $CaCO_3$)	mg/l	375	175	1,110	40	225	75	259	227	34	257	342	39
Hardness (as $CaCO_3$)	mg/l	945	840	1,335	1,092	550	359	880	1,020	1,090	240	560	300
Chlorides	mg/l	31	210	279	46	47	142	39	212	420	40	101	161
Sulfates	mg/l	975	813	220	1,590	242	379	730	740	221	217	382	346
Total Solids	mg/l	1,750	1,830	1,830	1,730	-	868	1,290	1,960	2,020	404	912	750
Total Phosphates	mg/l	<0.02	<0.02	0.03	0.02	0.20	0.04	<0.05	<0.1	<0.02	<0.02	0.03	<0.02
Biochemical Oxygen Demand	mg/l	3	4	5	7	4	4	-	-	1	4	3	3
Chemical Oxygen Demand	mg/l	24	18	76	35	11	24	17	22	43	4	9	13
Nitrates	mg/l	<0.03	1.46	<0.03	<0.03	2.30	1.22	<0.27	0.63	<0.19	<0.03	<0.03	4.78
Nitrites	mg/l	<0.01	<0.01	0.06	0.08	<0.01	<0.01	<0.01	<0.01	0.16	<0.01	<0.11	<0.01
Kjeldahl Nitrogen	mg/l	<0.1	<0.25	<0.1	<0.10	-	<0.1	-	-	<0.15	<0.10	0.15	<0.15
Ammonia Nitrogen	mg/l	0.36	-	<0.05	0.18	-	<0.05	-	-	<0.10	0.15	0.10	<0.10
Surfactants (MBAS)	mg/l	<0.02	-	0.05	<0.02	-	<0.02	-	-	<0.02	<0.02	<0.02	<0.02
Phenols	mg/l	0.021	-	0.015	0.011	-	0.036	<0.002	-	<0.002	0.078	<0.002	<0.002
Total Chromium	mg/l	<0.02	<0.02	<0.02	0.21	<0.02	0.22	<0.02	<0.02	<0.02	0.02	<0.02	0.35
Hexavalent Chromium	mg/l	<0.02	<0.02	<0.02	0.035	<0.02	0.055	<0.02	<0.02	<0.02	<0.02	<0.02	0.070
Iron	mg/l	2.2	0.09	0.87	0.17	0.79	0.07	0.10	0.09	0.21	0.08	0.07	0.04
Copper	mg/l	0.02	0.02	0.02	0.02	<0.02	<0.02	0.02	0.02	<0.02	0.02	<0.02	0.02
[illegible]								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
[illegible]	mg/	7	5				1		11	[illegible]	[illegible]	[illegible]	[illegible]
											26	7	5

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REFERENCE 5

GEOLOGIC MAP OF NEW YORK

1970

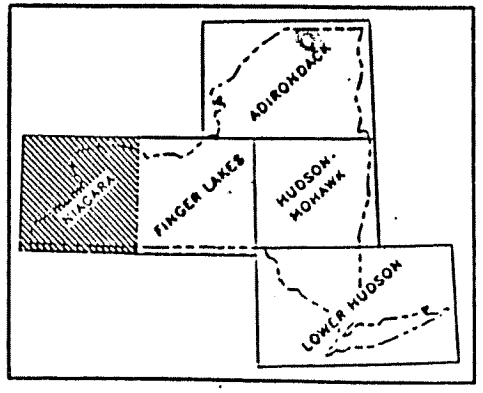
Niagara Sheet

Scale 1:250,000

5 0 5 10 15 State 30

5 0 5 10 15 20 25 Kilometers 30

CONTOUR INTERVAL 100 FEET



recycled paper

5-49

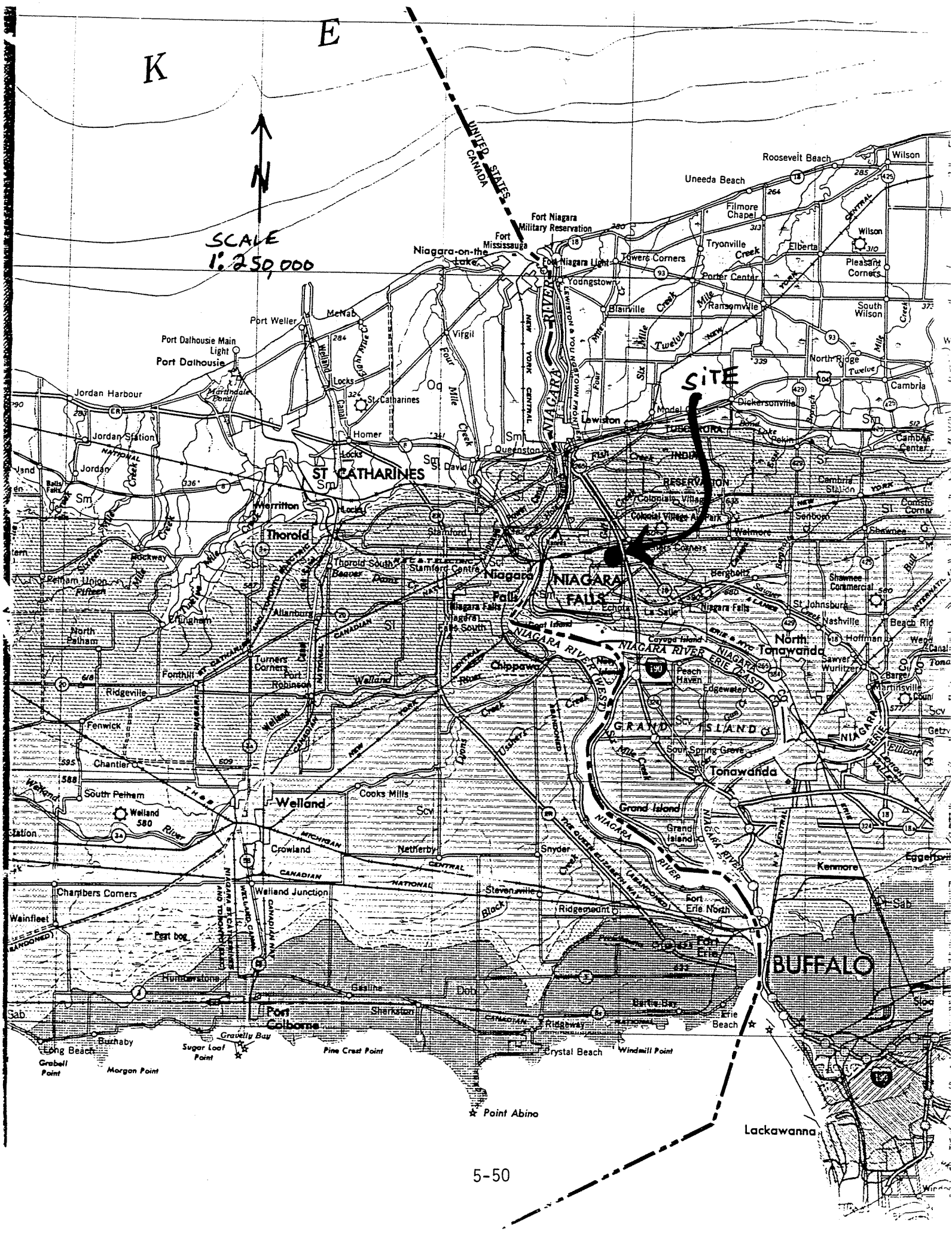
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Topographic Base from AMS Quadrangles 1:250,000 scale.

NEW YORK STATE MUSEUM AND SCIENCE SERVICE
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COMPILED AND EDITED BY
Lawrence V. Rickard
Donald W. Fisher

March, 1970


K
E
N
SCALE
1:250,000
SITE
UNITED STATES
CANADA
NIAGARA RIVER
NIAGARA FALLS
BUFFALO
ST CATHARINES
Niagara-on-the-Lake
Fort Niagara Military Reservation
Fort Mississauga
Fort Niagara Light
Youngstown
Lewiston
Queenston
Homer
St Davis
Port Weller
McNab
Port Dalhousie Main Light
Port Dalhousie
Jordan Harbour
Jordan Station
Jordan
Virgil
Locks
St Catharines
Thorold
Werrittton
Thorold South
Stamford Centre
Niagara Falls
Niagara Falls South
Allanburg
Port Robinson
Turners Corners
Chippawa
Fonthill
Ridgeville
Fenwick
Chantler
South Pelham
Welland
Cooks Mills
Crowland
Netherby
Snyder
Chambers Corners
Wainfleet
Welland Junction
Stevensville
Ridgemount
Fort Erie North
Fort Erie
Humberstone
Gasline
Doty
Sherkston
Ridgeway
Erie Beach
Crystal Beach
Windmill Point
Post Colborne
Gravelly Bay
Sugar Loaf Point
Pine Crest Point
Morgan Point
Grabell Point
Long Beach
Burhaby
Point Abino
Barrie Bay
Grand Island
Tonawanda
North Tonawanda
Kenmore
Eggertsville
Lackawanna
Roosevelt Beach
Uneeda Beach
Wilson
Tryonville
Porter Center
Ransomville
Lewiston
Dickersonville
Cambria
Welmore
Sanborn
Shawnee
Berghoff
Echota
La Salle
Nashville
Hoffman
Sawyer Wurlitzer
Peach Haven
Edgewater
Niagara River West
Niagara River East
Niagara River Erie Canal
Grand Island
South Spring Grove
Tonawanda
Niagara Erie Canal
Welland
Welland Canal
Canadian National
New York Central
Lake Ontario
Lake Erie
Niagara River
Welland River
Chippawa Creek
Four Mile Creek
Twelve Mile Creek
Lyons Creek
Usher's
Black
Point Abino

REFERENCE 6

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87. NEW ROAD SITE (USGS field reconnaissance) NYSDEC 932083

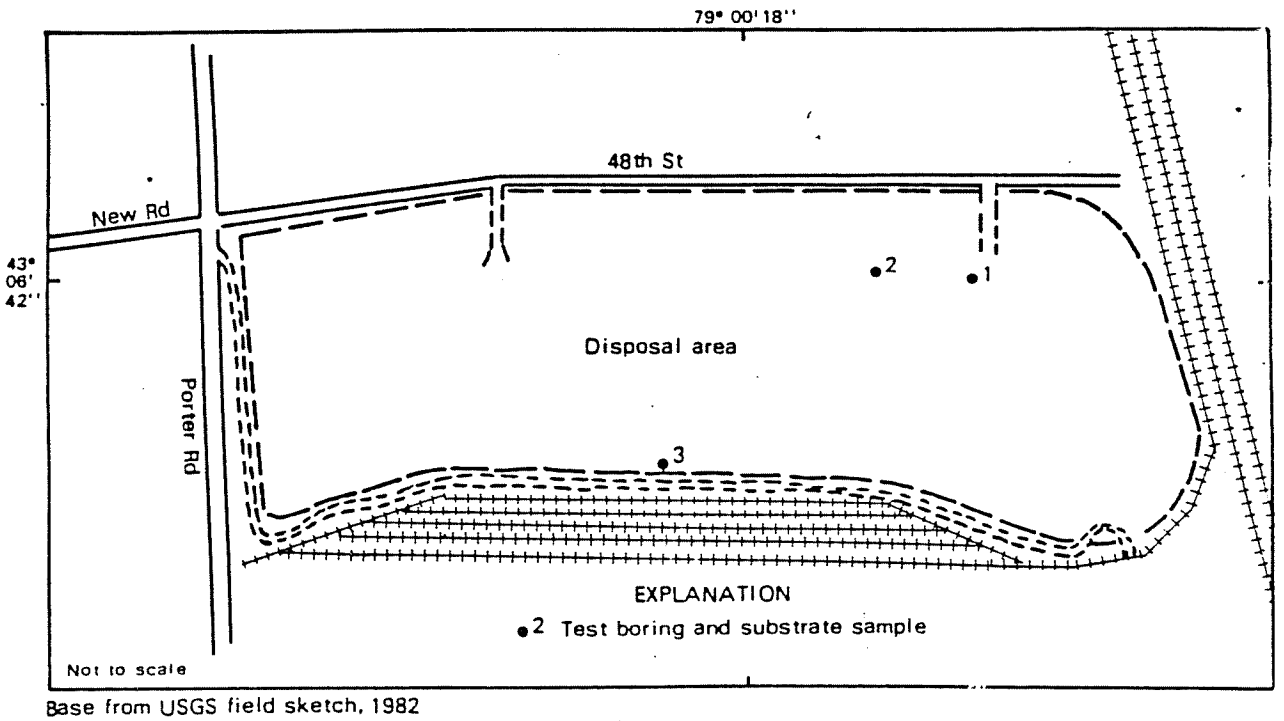
General information and chemical-migration potential.--The New Road site, in the city of Niagara Falls, was used to dispose of an unknown quantity of non-combustibles and incinerator residue. The site contains three monitoring wells (fig. C-46).

The potential for contaminant migration is indeterminable.

Geologic information.--The site is assumed to consist of a glacial ground moraine deposit overlying bedrock of Lockport Dolomite.

Hydrologic information.--The direction of regional ground-water flow is probab southward.

Chemical information.--The U.S. Geological Survey collected a water sample in 1982 from each monitoring well for heavy-metals and organic-compound analyses. Results are given in table C-26. Iron, lead, and maganese concentrations exceeded USEPA criteria for drinking water in all three samples; aluminium was much higher than normal. The only organic priority pollutant found was di-n-butyl phthalate (less than the quantifiable detection limit). Four organic nonpriority pollutants were found.



Base from USGS field sketch, 1982

Figure C-46. Location of monitoring wells at New Road, site 87, Niagara Fall

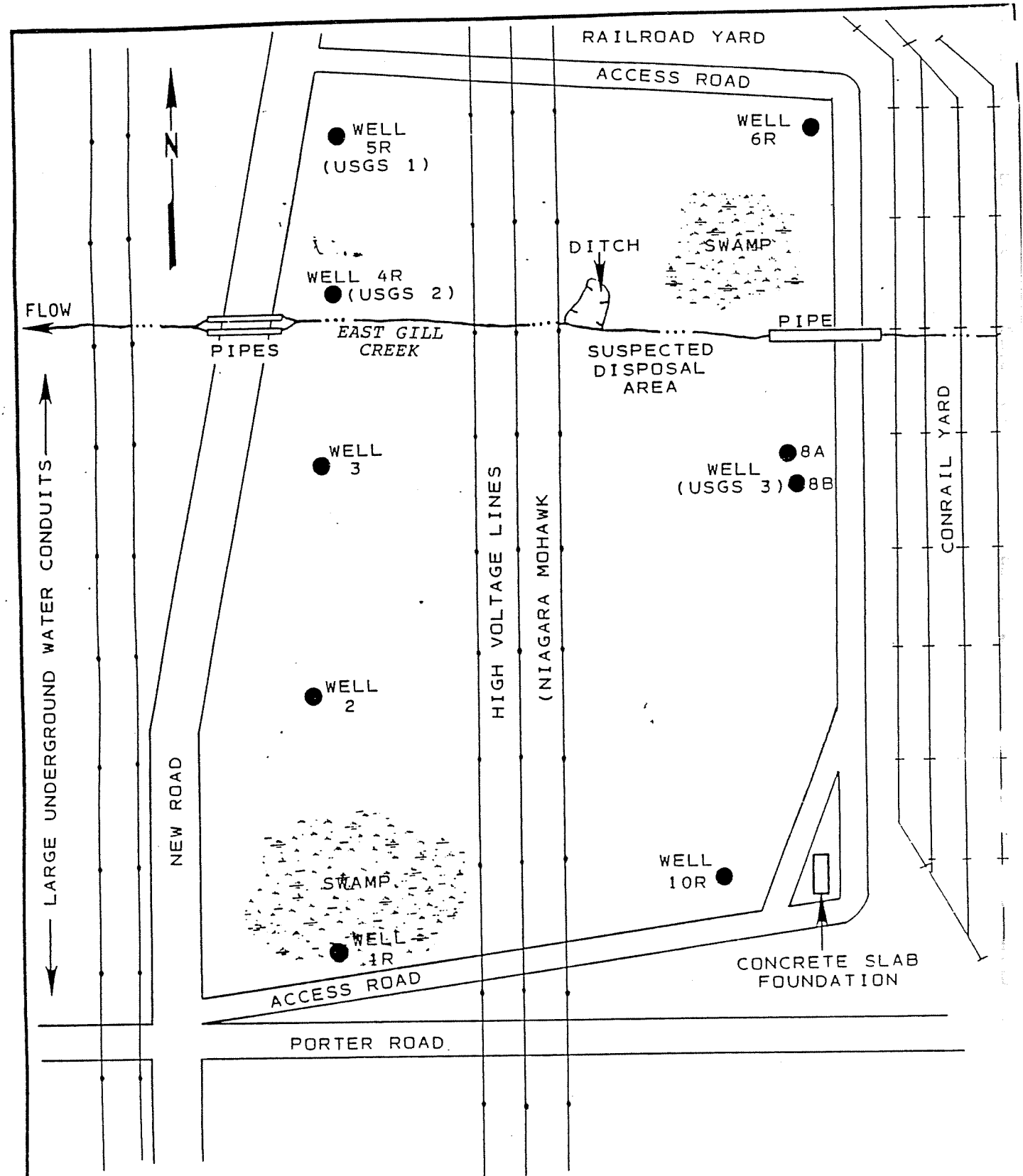
Table C-26.--Analyses of ground-water samples from New Road, site 87, Niagara Falls, N.Y., July 8, 1982.
[Locations shown in fig. C-46. Concentrations are in µg/L; dashes indicate that constituent or compound was not found, LT indicates it was found but below the quantifiable detection limit.]

	Sample number and depth below land surface (ft)		
	1 (20.3)	2 (14.3)	3 (15.8)
pH	6.7	7.0	7.0
Specific conductance (µmho/cm)	3,200	3,260	1,200
Temperature (°C)	12.0	12.0	12.0
Inorganic Constituents			
Aluminum	2,400	1,380	2,220
Antimony	--	--	--
Arsenic	--	--	--
Barium	974	382	454
Beryllium	--	--	--
Cadmium	7	9	13†
Chromium	23	58†	34
Cobalt	--	55	84
Copper	--	83	--
Iron	11,000†	41,900	13,000†
Lead	71†	66†	128†
Manganese	4,940†	1,640†	4,220†
Mercury	--	--	--
Nickel	--	68	77
Selenium	--	--	--
Silver	--	12	15
Tellurium	--	--	--
Vanadium	--	--	--
Zinc	269	209	316
Organic compounds			
Priority pollutant			
Di-n-butyl phthalate	--	LT	--
Nonpriority pollutants			
2,4,6-Trimethyl-1,3,5-trioxane[1]	26	--	--
2-Ethyl-1-hexanol[1]	17	--	--
2-(2-Butoxyethoxy)-ethanol[1]	--	150	--
1,3-Dimethylbenzene[1]	--	--	26

[1] Tentative identification based on comparison with the National Bureau of Standards (NBS) library. No external standard was available. Concentration reported is semiquantitative and is based only on an internal standard. GC/MS spectra were examined and interpreted by GC/MS analysts.

† Exceeds USEPA criterion for maximum permissible concentration in drinking water or New York State standard for maximum concentration in ground water.

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NOT TO SCALE

* NOTE:

Well designations based on Malcolm Pirnie, 1980. R indicates a rock boring finished as a well.

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PHASE I REPORT

PLOT PLAN
NEW ROAD

FIGURE I-2

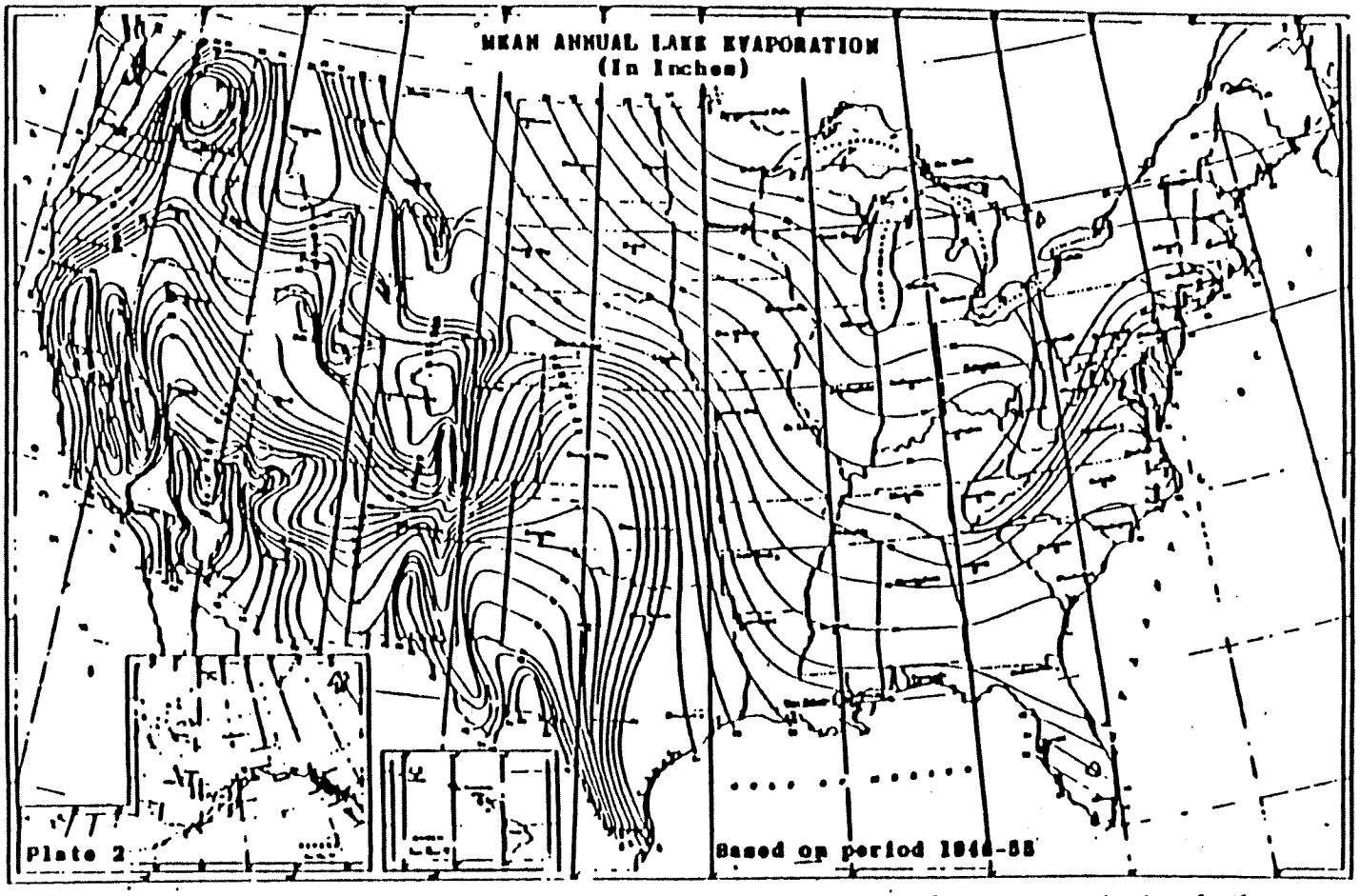
REFERENCE 7

APPENDIX C OF THIS REPORT

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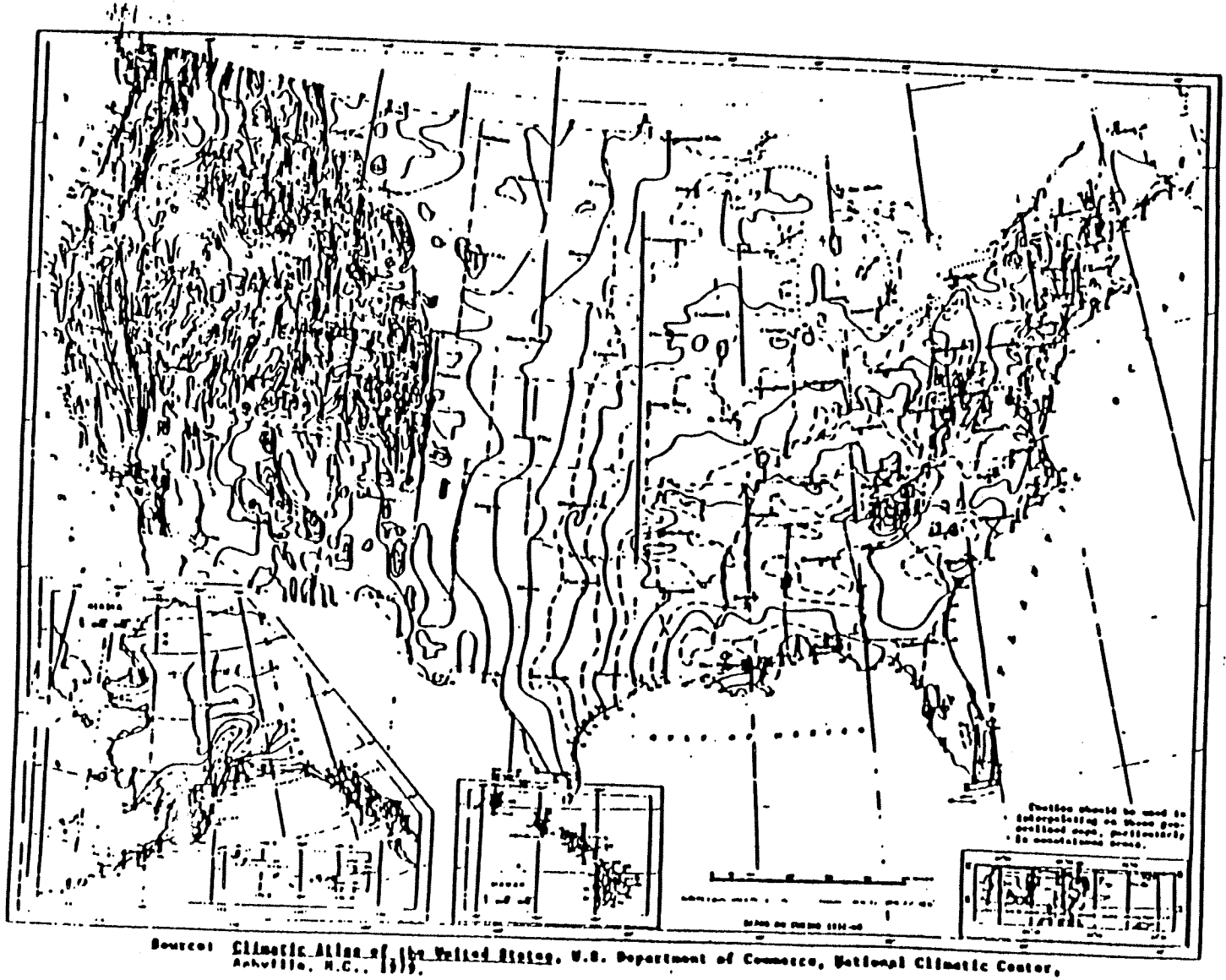
REFERENCE 8



Source: Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Ashville, N.C., 1979.

FIGURE 4
MEAN ANNUAL LAKE EVAPORATION
(IN INCHES)

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Source: Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Asheville, N.C., [illegible].

FIGURE 5
NORMAL ANNUAL TOTAL PRECIPITATION (INCHES)

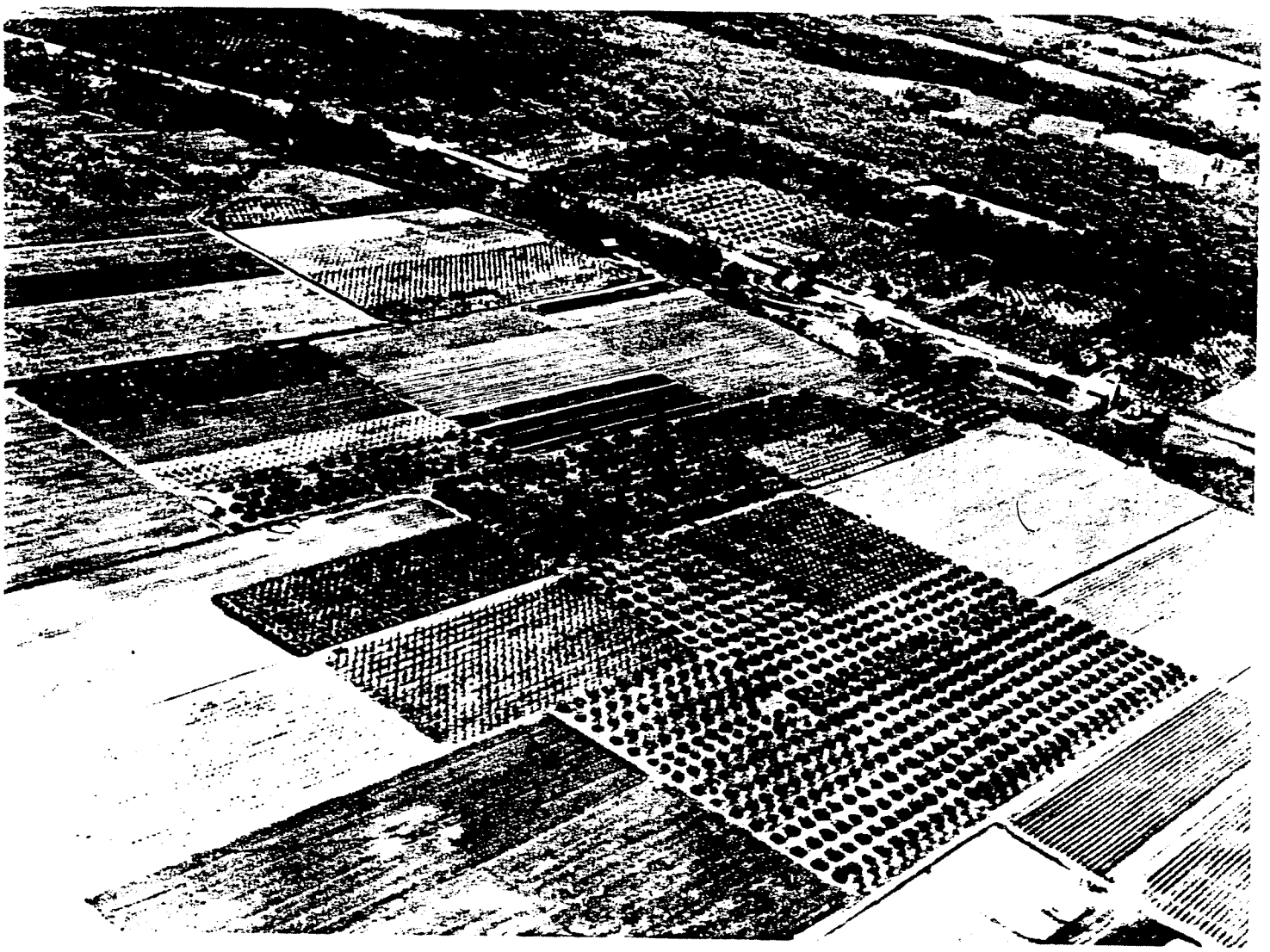
REFERENCE 9

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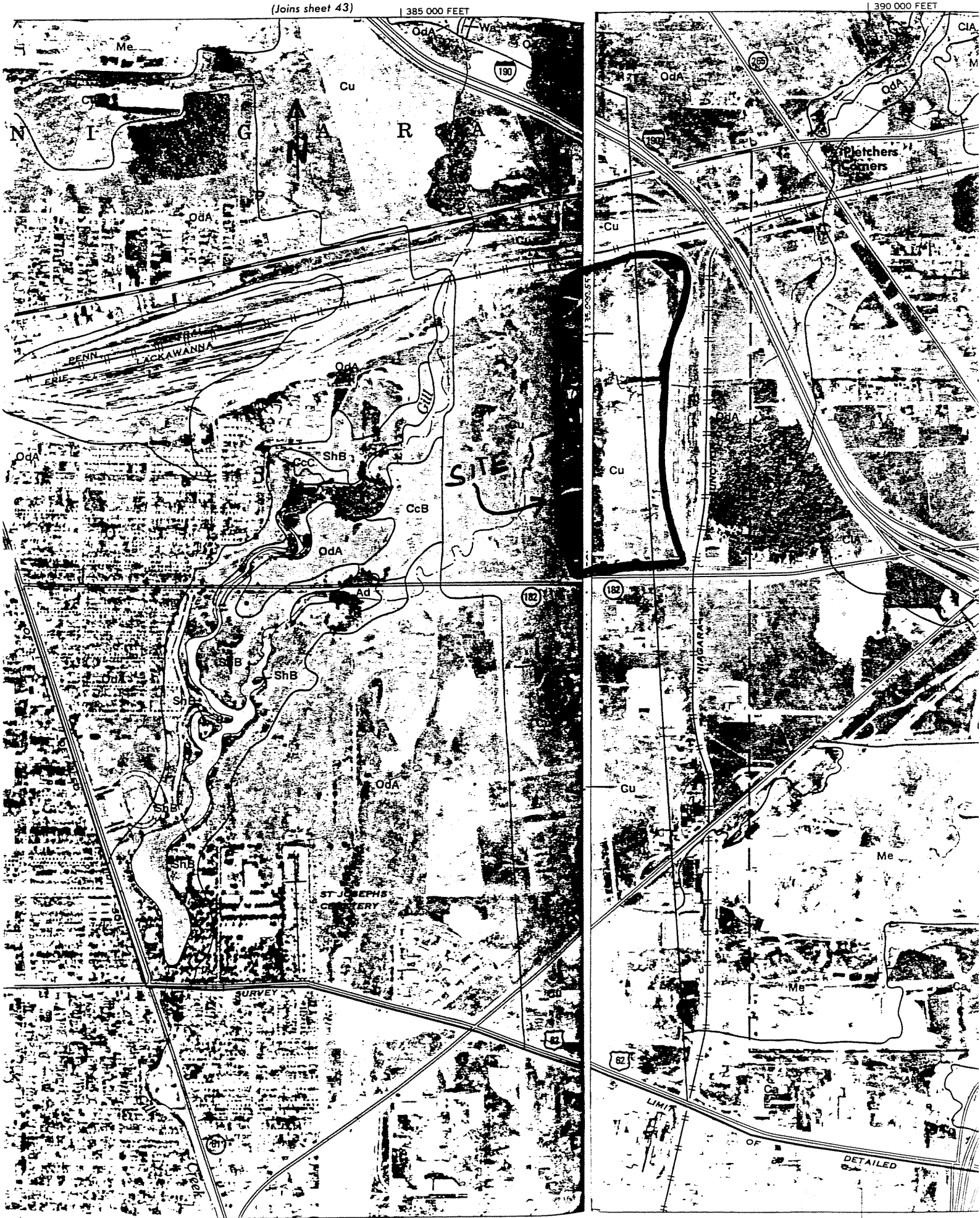
SOIL SURVEY OF

Niagara County, New York



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Cornell University Agricultural Experiment Station

Issued October 1972


(Joins sheet 43)
385 000 FEET
390 000 FEET
NIAGARA
Me
Cu
OdA
ShB
CcC
CcB
Ad
Gu
CIA
Pletchers Corners
PENN
LACKAWANNA
ERIE
Gill
SITE
NIAGARA
ST JOSEPHS CEMETERY
SURVEY
LIMIT OF DETAILED
Creek
(Joins sheet 60)

structure or single grain; very friable; plentiful fine roots; neutral; clear, wavy boundary. 3 to 8 inches thick.

B22--14 to 26 inches, brown (10YR 5/3) loamy fine sand; many, coarse, distinct strong-brown (7.5YR 5/6) stains; weak, medium, platy structure; friable; plentiful fine roots; neutral; abrupt smooth boundary. 8 to 20 inches thick.

IIC--26 to 50 inches, reddish-brown (5YR 4/3) silty clay; greenish-gray (5GY 6/1) ped coats and many yellowish-red (5YR 4/6) and strong-brown (7.5YR 5/6) mottles; weak, thick, platy structure; firm; very few fine roots; calcareous.

Depth to contrasting material ranges from 18 to 36 inches. Depth to bedrock is more than 40 inches. The average texture between a depth of 10 inches and the contrasting silty clay is loamy fine sand or coarser. The contrasting material contains more than 35 percent clay. Reaction ranges from medium acid to neutral in the B21 horizon and is slightly acid to neutral in the B22 horizon. These soils are generally free of coarse fragments.

The Ap horizon is 10YR in hue, 2 or 3 in value, and 1 or 2 in chroma. Mottles that have a chroma of 2 or less are at the base of the Ap horizon, but are not dominant above a depth of 18 inches. The Ap horizon is less than 10 inches thick, or less than one-third the thickness of the solum.

The B21 horizon ranges from 5YR to 2.5Y in hue, from 4 to 6 in value, and is 3 or 4 in chroma. Mottles are more than 4 and less than 3 in the B21 horizon. The B22 horizon ranges from 5YR to 2.5Y in hue, is 4 or 5 in value, and is 3 or 4 in chroma. Few to many mottles that have chroma of more than that of the matrix are in the B22 horizon. The B horizon ranges from loamy fine sand to fine sand.

The contrasting material in the IIC horizon ranges from heavy silty clay loam to clay. It ranges from 2.5YR to 5Y in hue, from 3 to 5 in value, and from 2 to 4 in chroma. The contrasting material is massive or layered; prismatic or blocky structure is not present.

Cosad soils formed in deposits similar to those of moderately well drained and well drained Claverack soils and poorly drained and very poorly drained Cheektowaga soils. Clayey lake sediments underlie the Cosad soils but are lacking in the Stafford and Minoa soils. Cosad soils are wetter than Elnora and Galen soils and are moderately deep to clayey lake sediments. They are better drained and have coarser textured A and B horizons than Lakemont and Madalin soils.

Cosad fine sandy loam (0 to 2 percent slopes) (Cs).--This soil normally occupies areas where runoff is slow or has accumulated. Areas range from less than 5 to 50 acres in size. The average size is about 10 acres. Shape of the areas is mostly irregular.

Commonly included with this soil in mapping are small knolls of better drained Claverack soils and depressional areas of Cheektowaga, Lakemont, or Madalin soils. Also included in some areas are sandy soils over silt. Where the sand deposit is thin, there are inclusions of Odessa or Rhinebeck soils; where thicker, inclusions of Minoa or Stafford soils occur. Some gravel is on the surface or in the profile in areas close to glacial beach or outwash deposits, such as those near U.S. Highway No. 104 (Ridge Road). Soil areas adjacent to Lockport soils generally have shale within 6 feet of the surface. Other inclusions are of sandy soils over glacial till.

This Cosad soil is not well suited to cultivated crops unless it is drained. Both planting and harvesting generally are difficult because of wetness. If adequately drained, this soil is suited to most crops grown in the area. Maintenance of fertility is essential to good crop growth. During dry periods, plants may be damaged because moisture is lacking. (Capability unit IIIw-4; woodland suitability group 4w1)

Cut and Fill Land

Cut and fill land (Cu) consists of areas that have had the original soil stripped and removed or covered with soil materials to a depth of 3 feet or more. These cut and fill areas are a result of construction operations, such as those for the New York State power project, the Robert Moses Parkway, the Barge Canal, and various quarry areas. They include borrow areas, fill areas, dikes, canal spoil, dredgings, and the like. These areas are mainly a mixture of soil materials that have had little or no profile development.

In many places, these areas are in some kind of farm or nonfarm use. Because the soil materials vary, most areas require onsite investigation if any changes in land use are contemplated. (Capability unit and woodland suitability group not assigned)

Dunkirk Series

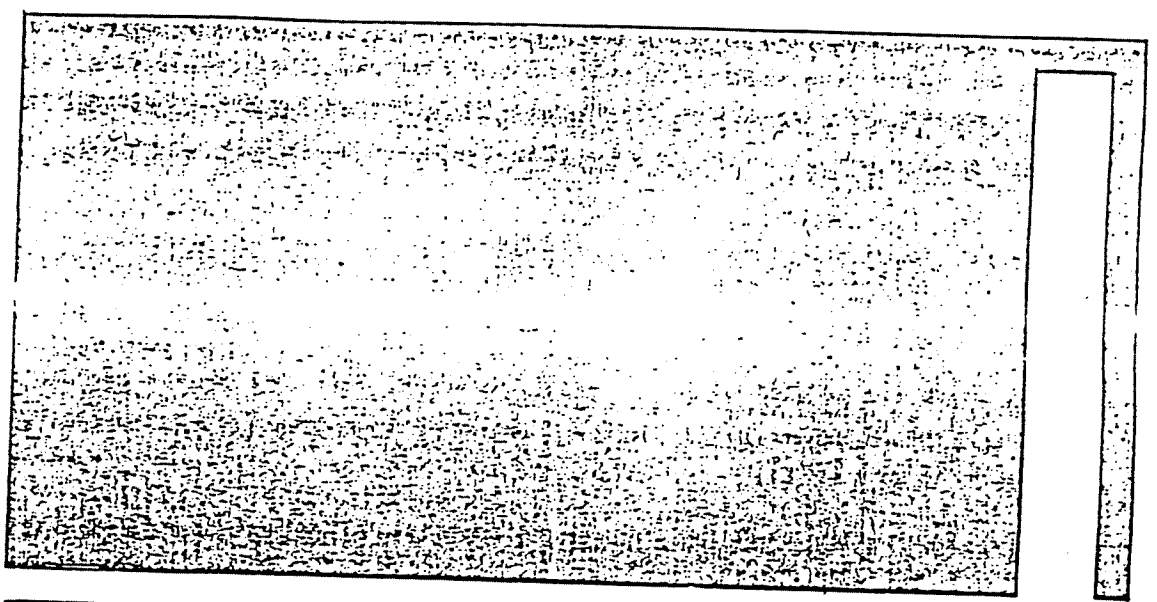
The Dunkirk series consists of deep, well-drained, medium-textured soils that formed in medium-lime to high-lime lacustrine deposits in which silt and very fine sand are dominant and the amount of clay is moderated. These soils are in areas widely scattered throughout the county on the lake plain. They are gently sloping to strongly sloping and have both simple and complex slopes. Slopes range from 2 to 20 percent.

A representative profile of a Dunkirk soil has a dark grayish-brown silt loam surface layer 9 inches thick. The surface layer is underlain by a brown, friable, slightly acid leached layer of silt loam that extends to a depth of 14 inches. The subsoil is between depths of 14 and 32 inches. It is a reddish-brown, firm, medium acid silt loam. Some intermixing with the leached layer occurs in the upper part of the subsoil. The substratum is at a depth of 32 inches. It is reddish brown,

REFERENCE 10

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R. Allan Freeze

Department of Geological Sciences
University of British Columbia
Vancouver, British Columbia

John A. Cherry

Department of Earth Sciences
University of Waterloo
Waterloo, Ontario

GROUNDWATER

Prentice-Hall, Inc.
Englewood Cliffs, New Jersey 07632

Table 2.2 Range of Values of Hydraulic Conductivity and Permeability

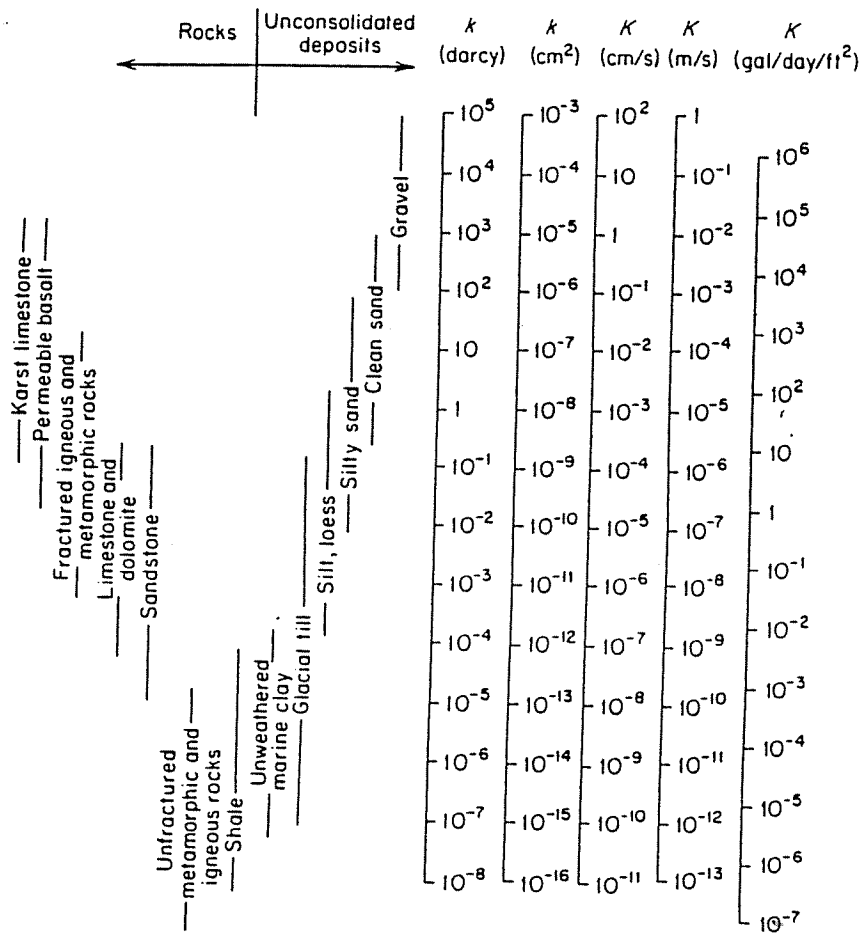


Table 2.3 Conversion Factors for Permeability and Hydraulic Conductivity Units

	Permeability, k*			Hydraulic conductivity, K		
	cm^2	ft^2	darcy	m/s	ft/s	U.S. gal/day/ft^2
cm^2	1	1.08×10^{-3}	1.01×10^{8}	9.80×10^{2}	3.22×10^{3}	1.85×10^{9}
ft^2	9.29×10^{2}	1	9.42×10^{10}	9.11×10^{5}	2.99×10^{6}	1.71×10^{12}
darcy	9.87×10^{-9}	1.06×10^{-11}	1	9.66×10^{-6}	3.17×10^{-5}	1.82×10^{1}
m/s	1.02×10^{-3}	1.10×10^{-6}	1.04×10^{5}	1	3.28	2.12×10^{6}
ft/s	3.11×10^{-4}	3.35×10^{-7}	3.15×10^{4}	3.05×10^{-1}	1	6.46×10^{5}
U.S. gal/day/ft^2	5.42×10^{-10}	5.83×10^{-13}	5.49×10^{-2}	4.72×10^{-7}	1.55×10^{-6}	1

*To obtain k in ft^2, multiply k in cm^2 by 1.08×10^{-3}.

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REFERENCE 11

(47-15-11 (10/83)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SOLID AND HAZARDOUS WASTE

INACTIVE HAZARDOUS WASTE DISPOSAL SITE REPORT

PRIORITY CODE: 2a SITE CODE: 932083

NAME OF SITE: New Road REGION: 9

STREET ADDRESS: New Road north of Porter Road

TOWN/CITY: Niagara Falls (c) COUNTY: Niagara

NAME OF CURRENT OWNER OF SITE: Power Authority of the State of New York

ADDRESS OF CURRENT OWNER OF SITE: Niagara Falls, NY

TYPE OF SITE: OPEN DUMP [X] STRUCTURE [ ] LAGOON [ ]
LANDFILL [ ] TREATMENT POND [ ]

ESTIMATED SIZE: _____ ACRES

SITE DESCRIPTION:

The site was used by the City of Niagara Falls during the 1950's as a dump for non-combustibles and incinerator refuse. A fishkill in Gill Greek in 1954 or 1955 was attributed to the leachate from this site. PASNY used this site for disposal of rock spoils and clean fill from the power project excavations from 1958 to 1962.

USGS collected water samples from each of three monitoring wells at the site. Results indicate the presence of an organic compound in the samples in low concentration. The groundwater standard for iron was exceeded in all samples.

HAZARDOUS WASTE DISPOSED: CONFIRMED [ ] SUSPECTED [X]

TYPE AND QUANTITY OF HAZARDOUS WASTES DISPOSED:

TYPE	QUANTITY (POUNDS, DRUMS, TONS, GALLONS)
None known	

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TIME PERIOD SITE WAS USED FOR HAZARDOUS WASTE DISPOSAL:

_____, 1950's TO _____, 19 62

OWNER(S) DURING PERIOD OF USE: Power Authority of the State of New York

SITE OPERATOR DURING PERIOD OF USE: City of Niagara Falls, Power Authority of NYS

ADDRESS OF SITE OPERATOR: City Bldg., 745 Main St., Niagara Falls, NY 14305

ANALYTICAL DATA AVAILABLE: AIR ☐ SURFACE WATER ☐ GROUNDWATER ☒
SOIL ☐ SEDIMENT ☐ NONE ☐

CONTRAVENTION OF STANDARDS: GROUNDWATER ☒ DRINKING WATER ☐
SURFACE WATER ☐ AIR ☐

SOIL TYPE: Top soil and fill overlying clay.

DEPTH TO GROUNDWATER TABLE: Approximately 7'

LEGAL ACTION: TYPE: None STATE ☐ FEDERAL ☐

STATUS: IN PROGRESS ☐ COMPLETED ☐

REMEDIAL ACTION: PROPOSED ☐ UNDER DESIGN ☐
IN PROGRESS ☐ COMPLETED ☐

NATURE OF ACTION: None

ASSESSMENT OF ENVIRONMENTAL PROBLEMS:

USGS analysis of water samples indicates the presence of organic parameters in the samples. More investigation is required to determine and confirm the presence of the organic compounds in the groundwater.

ASSESSMENT OF HEALTH PROBLEMS:

[illegible]

PERSON(S) COMPLETING THIS FORM:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NAME Abul Barkat
TITLE Sr. San. Engineer
NAME Peter Buechi
TITLE Associate San. Engineer
DATE: November 18, 1983

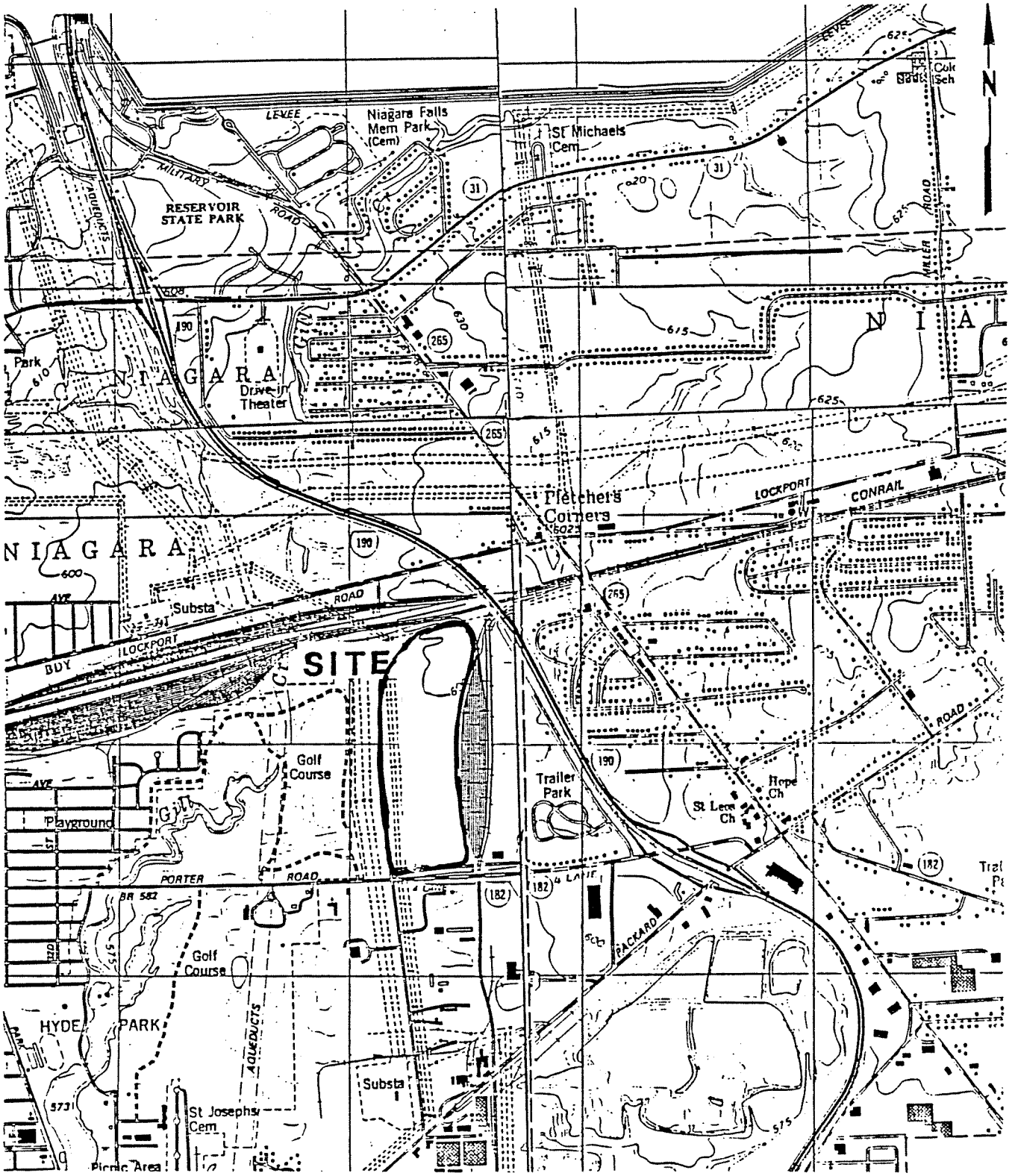
NEW YORK STATE DEPARTMENT OF HEALTH

NAME R. Tramontano
TITLE Bur. Tox. Subst. Assess.
NAME
TITLE
DATE: 12/83

REFERENCE 12

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LATITUDE: 43°06'39"
LONGITUDE: 79°00'15"

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OF ENVIRONMENTAL CONSERVATION
PHASE I REPORT

SITE LOCATION MAP

NEW ROAD

FIGURE I-1

REFERENCE: U.S.G.S. 7.5' Topographic Map
Niagara Falls, NY-ONT. (1980), Lewiston,
NY-ONT: (1980), Tonawanda West, NY (1980)
and Ransomville, NY (1980) Quadrangles

REFERENCE 13

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NYS WETLANDS MAPS

NYS Wetlands Maps were reviewed during the Phase II investigation. Individual maps for each site were not obtained and are, therefore, not included in the Phase II reports. Site specific information collected concerning the location of a wetland within 1 mile of a given site is recorded in the documentation section of each report.

REFERENCE 14

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INTERVIEW ACKNOWLEDGMENT FORM

SITE NAME:	New Road Landfill	I.D. NUMBER:	932083
PERSON CONTACTED:	Burrell Buffington	DATE:	4/10/90
AFFILIATION:	National Heritage Program	PHONE NUMBER:	518-783-3932
ADDRESS:	700 Troy-Schenectedy Road Albany, NY 12110	CONTACT PERSON(S):	Judy Vangalio Ralinda Leichner

TYPE OF CONTACT: map search

INTERVIEW SUMMARY

No significant habitats were found within 1.5 miles of the site after looking at the Significant Habitat Maps (1980) prepared by the Habitat Inventory Unit for the NYSDEC, Division of Fish and Wildlife, Bureau of Wildlife.

No endangered species, wildlife management, or wildlife refuge areas were found within 1.5 miles of the site. The Reservoir State park is within 2 miles of the site. This information was based on the Natural Heritage Maps.

ACKNOWLEDGMENT

I have read the above transcript and I agree that it is an accurate summary of the information verbally conveyed to Ecology and Environment, Inc. interviewer(s) (as revised below, if necessary).

Revisions (please write in any corrections needed to above transcript)

Signature: Burrell Buffington Date: 4/25/90

REFERENCE 15

APPENDIX G OF THIS REPORT

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REFERENCE 16

DRAFT

GRAPHICAL EXPOSURE MODELING SYSTEM

(GEMS)

USER'S GUIDE

VOLUME 1. CORE MANUAL

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES
EXPOSURE EVALUATION DIVISION
Task No. 3-2
Contract No. 68023970
Project Officer: Russell Kinerson
Task Manager: Loren Hall

Prepared by:

GENERAL SCIENCES CORPORATION
6100 Chevy Chase Drive, Suite 200
Laurel, Maryland 20707

Submitted: February, 1987

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I Y9 5040 12/06/90

NEW ROAD LANDFILL
LATITUDE 43: 6:39 LONGITUDE 79: 0:15 1980 POPULATION

MILES	0-1	1-2	2-4	SECTOR
KM	0.00-1.61	1.61-3.22	3.22-6.44	TOTALS
S 1	0	0	1218	1218
S 2	0	3560	0	3560
S 3	0	0	0	0
S 4	571	1756	57	2384
S 5	0	2333	0	2333
S 6	0	0	6756	6756
S 7	0	0	11024	11024
S 8	0	595	4858	5453
S 9	0	467	1274	1741
S10	0	1625	1055	2680
S11	0	3710	7007	10717
S12	468	7745	12285	20498
S13	623	3641	6007	10271
S14	0	1249	3568	4817
S15	0	435	1646	2081
S16	0	0	1536	1536
RING TOTALS	1662	27116	58291	87069

YQ 5040

12/05/90

NEW ROAD LANDFILL
LATITUDE 43: 6:39 LONGITUDE 79: 0:15 1980 HOUSING

MILES	0-1	1-2	2-4	SECTOR
KM	0.00-1.61	1.61-3.22	3.22-6.44	TOTALS
S 1	0	0	381	381
S 2	0	1043	0	1043
S 3	0	0	0	0
S 4	230	527	17	774
S 5	0	865	0	865
S 6	0	0	2414	2414
S 7	0	0	3865	3865
S 8	0	183	1799	1982
S 9	0	173	443	616
S10	0	596	414	1010
S11	0	1550	3092	4642
S12	163	2964	5246	8373
S13	243	1308	2146	3697
S14	0	396	1266	1662
S15	0	151	42	193
S16	0	0	504	504
RING TOTALS	636	9756	21629	32021

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REFERENCE 17

INTERVIEW ACKNOWLEDGMENT FORM

SITE NAME:	New Road Landfill	I.D. NUMBER:	932083
PERSON CONTACTED:	Ed Oliver	DATE:	4/3/90
		PHONE NUMBER:	716-434-4949
AFFILIATION:	Soil Conservation Service Cornell Cooperative Ext.		
ADDRESS:	4487 Lake Avenue Lockport, NY 14094	CONTACT PERSON(S):	Judy Vangalio Ralinda Leichner
TYPE OF CONTACT:	personal interview		

INTERVIEW SUMMARY

We were provided with a copy of the Niagara County Soil Survey and a list of prime farmland soils in the county. Aerial photos are available to be looked at in the office from the years 1951, 1958, ~~1961~~ 1966, and 1978.

ACKNOWLEDGMENT

I have read the above transcript and I agree that it is an accurate summary of the information verbally conveyed to Ecology and Environment, Inc. interviewer(s) (as revised below, if necessary).

Revisions (please write in any corrections needed to above transcript)

Signature: Edward J Oliver Date: 4/24/90

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ecology and environment

REFERENCE 18

NATIONAL REGISTER OF HISTORIC PLACES 1966-1988

NATIONAL CONFERENCE OF
STATE HISTORIC PRESERVATION OFFICERS
Washington, D.C.

NATIONAL PARK SERVICE
Washington, D.C.

AMERICAN ASSOCIATION FOR
STATE AND LOCAL HISTORY
Nashville, Tennessee

5-83

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New York County—Continued

Stuyvesant Square Historic District, Roughly bounded by Nathan D. Perleman Pl., 3rd Ave., E. 18th and E. 15th Sts., New York, 11/21/80, C, 80002723
Surrogate's Court, 31 Chambers St., New York, 1/29/72, C, NHL, 72000888
Sutton Place Historic District, 1—21 Sutton Pl. & 4—16 Sutton Sq., New York, 9/12/85, C, 85002294
Theodore Roosevelt Birthplace National Historic Site, 28 E. 20th St., New York, 10/15/66, B,c,e, 66000054
Third Judicial District Courthouse, 425 Avenue of the Americas, New York, 11/09/72, C, NHL, 72000875
Tiffany and Company Building, 401 5th Ave., New York, 6/02/78, A,C, NHL, 78001886
Tilden, Samuel J., House, 14—15 Gramercy Park South, New York, 5/11/76, B,C, NHL, 76001251
Town Hall, 113—123 W. 43rd St., New York, 4/23/80, A,C, 80002724
Trinity Chapel Complex, 15 W. 25th St., New York, 12/16/82, C,a, 82001205
Trinity Church and Graveyard, Broadway and Wall St., New York, 12/08/76, A,C,a,d, NHL, 76001252
Tudor City Historic District, Roughly bounded by Fourty-third St., First Ave., Fourty-first St., and Second Ave., New York, 9/11/86, C, 86002516
Turtle Bay Gardens Historic District, 226-246 E. 49th St. and 227-245 E. 48th St., New York, 7/21/83, A,C, 83001750
Tweed Courthouse, 52 Chambers St., New York, 9/25/74, B,C, NHL, 74001277
U.S. Customhouse, Bowling Green, New York, 1/31/72, C, NHL, 72000889
U.S. General Post Office, 8th Ave. between 31st and 33rd Sts., New York, 1/29/73, C, 73002257
US Courthouse, 40 Foley Sq., New York, 9/02/87, A,C, 87001596
USS INTREPID (aircraft carrier), Intrepid Sq., New York, 1/14/86, A,g, NHL, 86000082
Union Theological Seminary, W. 120th St. and Broadway, New York, 4/23/80, A,C,a, 80002725
United Charities Building Complex, 105 E. 22nd St,. 289 Park Ave. S. and 111-113 E. 22nd St., New York, 3/28/85, B,C, 85000661
University Club, 1 W. 54th St., New York, 4/16/80, C, 80002726
University Settlement House, 184 Eldridge St., New York, 9/11/86, A, 86002515
Upper East Side Historic District, Roughly bounded by 3rd and 5th Aves., 59th and 79th Sts., New York, 9/07/84, C, 84002803
Van Rensselar, Stephen, House, 149 Mulberry St., New York, 6/16/83, C, 83001751
Vanderbilt, Mrs. Graham Fair, House, 60 E. 93rd St., New York, 10/29/82, C, 82001206
Villard Houses, 29 1/2 50th St., 24—26 E. 51st St., and 451, 453, 455, and 457 Madison Ave., New York, 9/02/75, B,C,a, 75001210
WAVERTREE, Pier 17, foot of Fulton St., New York, 6/13/78, A,C, 78001887'
Waldo, Gertrude Rhinelander, Mansion, 867 Madison Ave., New York, 5/06/80, C, 80002727
Warburg, Felix M., Mansion, 1109 5th Ave., New York, 10/29/82, C, 82001207
Watson, James, House, 7 State St., New York, 7/24/72, C,a, 72000891
Webster Hotel, 40 W. 45th St., New York, 9/07/84, C, 84002806
West 67th Street Artists' Colony Historic District, 1—39 and 40—50 W. 67th St., New York, 7/11/85, A,C, 85001522
West 73rd-74th Street Historic District, 73rd, 74th Sts. and Columbus Ave., New York, 9/08/83, C, 83001752
West 76th Street Historic District, W. 76th St., New York, 7/24/80, C, 80002728
West End Collegiate Church and Collegiate School, W. End Ave. and W. 77th St., New York, 5/06/80, C,a, 80002729
Westchester House, 541—551 Broome St., New York, 3/20/86, A,C, 86000450
Woolworth Building, 233 Broadway, New York, 11/13/66, A,C, NHL, 66000554
Yiddish Art Theatre, 189 Second Ave., New York, 9/19/85, A,C, 85002427

Niagara County

Adams Power Plant Transformer House, Buffalo Ave. near Portage Rd., Niagara Falls, 6/11/75, A,C, NHL, 75001212
Deveaux School Historic District, 2900 Lewiston Rd., Niagara Falls, 6/05/74, A,a, 74001281
Fort Niagara Light [U.S. Coast Guard Lighthouses and Light Stations on the Great Lakes TR], Niagara River, Youngstown, 7/19/84, A,C, 84002809
Frontier House, 460 Center St., Lewiston, 7/08/74, A,C, 74001278
Herschell, Allan, Carousel Factory, 180 Thompson St., North Tonawanda, 4/18/85, A,C, 85000856
Holley-Rankine House, 525 Riverside Dr., Niagara Falls, 10/04/79, B,C, 79003793
Lewiston Mound, Address Restricted, Lewiston vicinity, 1/21/74, D, 74001279
Lewiston Portage Landing Site, Address Restricted, Lewiston vicinity, 7/18/74, A,D, 74001280
Lockport Industrial District, Bounded roughly by Erie Canal, Gooding, Clinton, and Water Sts., Lockport, 11/11/75, A,C, 75001211
Lowertown Historic District, Roughly bounded by Erie Canal and New York Central RR, Lockport, 6/04/73, A,C, 73001225
Moore, Benjamin C., Mill, Pine St. on the Erie Canal, Lockport, 6/19/73, A,C, 73001226
Niagara Falls Public Library, 1022 Main St., Niagara Falls, 6/05/74, A,C, 74001282
Niagara Reservation, Niagara Reservation, Niagara Falls, 10/15/66, A, NHL, 66000555
Old Fort Niagara, N of Youngstown on NY 18, Youngstown vicinity, 10/15/66, A,D, NHL, 66000556
Riviera Theatre, 27 Webster St., North Tonawanda, 3/20/80, A,C, 80002731
Thirty Mile Point Light [U.S. Coast Guard Lighthouses and Light Stations on the Great Lakes TR], Niagara River, Somerset, 7/19/84, A,C, 84003922
U.S. Customhouse, 2245 Whirlpool St., Niagara Falls, 7/16/73, A,C, 73001227
Union Station, 95 Union Ave., Lockport, 12/02/77, A,C, 77000966
Whitney Mansion, 335 Buffalo Ave., Niagara Falls, 1/17/74, B,C, 74001283
Williams, Johann, Farm, 10831 Cayuga Dr., Niagara Falls, 1/10/80, A,C,a, 80002730

Oneida County

Arsenal House, 514 W. Dominick St., Rome, 7/18/74, A,C, 74001284
Boonville Historic District, Schuyler, Post, W. Main and Summit Sts., Boonville, 11/16/79, A,C, 79001608
Clinton Village Historic District, North, South, East, West Park Rows, Marvin, Williams, Chestnut, Fountain, College and Utica Sts., Clinton, 6/14/82, A,C, 82003389
Conkling, Roscoe, House, 3 Rutger St., Utica, 5/15/75, B, NHL, 75001214
Erwin Library and Pratt House, 104 and 106 Schuyler St., Boonville, 8/14/73, A,B,C, 73001228
First Baptist Church of Deerfield, Herkimer Rd., Utica, 7/11/85, C,a,d, 85001497
First Congregational Free Church, 177 N. Main St., Oriskany Falls, 1/25/79, A,C,a, 79001609
First Presbyterian Church, 1605 Genesee St., Utica, 11/03/88, C,a, 88002172
Five Lock Combine and Locks 37 and 38, Black River Canal, NY 46, Boonville, 3/20/73, A,C, 73001229
Floyd, Gen. William, House, W side of Main St., Westernville, 7/17/71, B, NHL, 71000549
Fort Stanwix National Monument, Bounded by Dominick, Spring, Liberty, and James Sts., Rome, 10/15/66, A,c, NHL, 66000057
Fountain Elms, 318 Genesee St., Utica, 11/03/72, B,C, 72001599
Gansevoort-Bellamy Historic District, Roughly bounded by Liberty, Stuben, and Huntington Sts. to Bissel, Rome, 11/12/75, C,a,g, 75001213
Hamilton College Chapel, Hamilton College campus, Clinton, 11/03/72, A,C,a, 72000892
Jervis Public Library, 613 N. Washington St., Rome, 11/04/82, B,C, 82001208
Lower Genesee Street Historic District, Roughly bounded by Genesee, Liberty, Seneca, and

REFERENCE 19

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US CENSUS DATA, 1980

US Census Data used in the HRS scoring was obtained from various County Planning Offices. This data was not obtained from a report. The raw census data combined with County Planning Maps was used to estimate the population within 1, 2, 3, and 4 miles of the Phase II site being investigated. Because of the voluminous amount of data used, the data is not provided in this Appendix.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 State	02 Site Number
NY	932083

II. SITE NAME AND LOCATION

01 Site Name (Legal, common, or descriptive name of site)	02 Street, Route No., or Specific Location Identifier
New Road Landfill	Intersection of Porter and New Roads

03 City	04 State	05 Zip Code	06 County	07 County Code	08 Cong. Dist.
Niagara Falls	NY	14305	Niagara	063	36

09 Coordinates Latitude	Longitude	10 Type of Ownership (Check One)
43° 06' 44.1"	079° 00' 18.3"	[X] A. Private [ ] B. Federal [ ] C. State [ ] D. County [ ] E. Municipal [ ] F. Other _____ [ ] G. Unknown

III. INSPECTION INFORMATION

01 Date of Inspection See note in Part 11	02 Site Status	03 Years of Operation
___/___/___ Month Day Year	[ ] Active [X] Inactive	1950 | 1970 Beginning Year Ending Year [ ] Unknown

04 Agency Performing Inspection (Check all that apply)
[ ] A. EPA [ ] B. EPA Contractor _____ (Name of Firm) [ ] C. Municipal
[ ] D. Municipal Contractor _____ (Name of Firm) [ ] E. State [X] F. State Contractor Ecology and Environment Engineering, P.C. (Name of Firm)
[ ] G. Other (Specify) _____

05 Chief Inspector	06 Title	07 Organization	08 Telephone No.
Don Johnson	Geologist	E & E	(716) 684-8060
09 Other Inspectors	**10 Title**	**11 Organization**	**12 Telephone No.**
Richard Watt	Geologist	E & E	(716) 684-8060
Sybil Newchurch	Industrial Hygenist	E & E	(716) 684-8060
Chad Eich	Biologist	E & E	(716) 684-8060
Robert Meyers	Geologist	E & E	(716) 684-8060
Larry Roedl	Health & Safety Officer	E & E	(716) 684-8060

13 Site Representatives Interviewed	14 Title	15 Address	16 Telephone No.
John Malinchock	Environmental Supervisor	P.O. Box 277 Niagara Falls, NY	(716) 285-3211
Richard Banks	Assistant Supervisor	1720 New Road Niagara Falls, NY	(716) 236-2713
			( )
			( )

17 Access Gained by (Check one)	18 Time of Inspection	19 Weather Conditions
Vehicle and on foot	See note in Part 11	See note in Part 11

IV. INFORMATION AVAILABLE FROM

01 Contact	02 Agency/Organization	03 Telephone No.
Walter Demick	NYSDEC	(518) 457-9538

04 Person Responsible for Site Inspection Form	05 Agency	06 Organization	07 Telephone No.	08 Date
Jim Griffis	NA	E & E	(716) 684-8060	4 / 23 / 91 Month Day Year

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POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 2 - WASTE INFORMATION	I. IDENTIFICATION	
	01 State NY	02 Site Number 932083

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 Physical States (Check all that apply)	02 Waste Quantity at Site (Measure of waste quantities must be independent)	03 Waste Characteristics (Check all that apply)	
[X] A. Solid	Tons: Unknown	[X] A. Toxic	[ ] H. Ignitable
[X] B. Powder, Fines	Cubic Yards: Unknown	[ ] B. Corrosive	[ ] I. Highly volatile
[ ] C. Sludge	No. of Drums: Unknown	[ ] C. Radioactive	[ ] J. Explosive
[ ] D. Other _____ (Specify)		[ ] D. Persistent	[ ] K. Reactive
[ ] E. Slurry		[X] E. Soluble	[ ] L. Incompatible
[ ] F. Liquid		[ ] F. Infectious	[ ] M. Not applicable
[ ] G. Gas		[ ] G. Flammable	

III. WASTE TYPE

Category	Substance Name	01 Gross Amount	02 Unit of Measure	03 Comments
SLU	Sludge			
OLW	Oily waste	Unknown		
SOL	Solvents			
PSD	Pesticides	Unknown		
OCC	Other organic chemicals			
IOC	Inorganic chemicals			
ACD	Acids			
BAS	Bases			
MES	Heavy Metals	Unknown		

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 Category	02 Substance Name	03 CAS Number	04 Storage/Disposal Method	05 Concentration	06 Measure of Concentration
	Aroclor 1254 (PCB)		Sediments	1,100	µg/kg
	PAHs		Soil	2,000	µg/kg
	Pesticide (Beta-BHC)		Surface water	0.12	µg/L
	Mercury		Surface water	0.8	µg/L
	Lead		Groundwater	252	µg/L
	Zinc		Groundwater	2,190	µg/L

V. FEEDSTOCKS (See Appendix for CAS Numbers)

Category	01 Feedstock Name	02 CAS Number	Category	01 Feedstock Name	02 CAS Number
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Phase II investigation

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 State	02 Site Number
NY	932083

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. Groundwater Contamination
03 Population Potentially Affected 0
02 [X] Observed (Date 2/91) [ ] Potential [ ] Alleged
04 Narrative Description

Contaminants found in groundwater. However, population within 3 miles of the site obtains water from uneffected municipal water source.

01 [X] B. Surface Water Contamination
03 Population Potentially Affected 0
02 [X] Observed (Date 2/91) [ ] Potential [ ] Alleged
04 Narrative Description:

Surface water has contaminants attributed to site but population within 3 miles of the site obtains drinking water from an uneffected municipal water source.

01 [ ] C. Contamination of Air
03 Population Potentially Affected _____
02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

01 [ ] D. Fire/Explosive Conditions
03 Population Potentially Affected _____
02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

01 [X] E. Direct Contact
03 Population Potentially Affected <100
02 [ ] Observed (Date _____) [X] Potential [ ] Alleged
04 Narrative Description:

Soils and sediments contained contaminants. However, levels were low and site is generally inactive.

01 [X] F. Contamination of Soil
03 Area Potentially Affected Entire Site
02 [X] Observed (Date 2/91) [ ] Potential [ ] Alleged
04 Narrative Description:

01 [ ] G. Drinking Water Contamination
03 Population Potentially Affected _____
02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

01 [ ] H. Worker Exposure/Injury
03 Workers Potentially Affected _____
02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

01 [ ] I. Population Exposure/Injury
03 Population Potentially Affected _____
02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS (Cont.)

I. IDENTIFICATION

01 State	02 Site Number
NY	932083

II. HAZARDOUS CONDITIONS AND INCIDENTS (Cont.)

01 [ ] J. Damage to Flora — 02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

01 [ ] K. Damage to Fauna — 02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

01 [ ] L. Contamination of Food Chain — 02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

01 [ ] M. Unstable Containment of Wastes (Spills/Runoff/Standing liquids, Leaking drums) — 02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
03 [ ] Population Potentially Affected _____ 04 Narrative Description:

NA

01 [ ] N. Damage to Offsite Property — 02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

01 [ ] O. Contamination of Sewers, Storm/ Drains, WWTPs — 02 [ ] Observed (Date _____) [ ] Potential [ ] Alleged
04 Narrative Description:

NA

01 [X] P. Illegal/Unauthorized Dumping — 02 [X] Observed (Date 9-12-90) [ ] Potential [ ] Alleged
04 Narrative Description:

Solid household waste and construction and demolition debris observed during site inspection.

05 Description of Any Other Known, Potential, or Alleged Hazards

III. TOTAL POPULATION POTENTIALLY AFFECTED <100

IV. COMMENTS

Only direct contact with soil, sediment and surface water poses a health threat to the site owners and trespassers.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Phase II investigation.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 State	02 Site Number
NY	932083

II. PERMIT INFORMATION

01 Type of Permit Issued (Check all apply)	02 Permit Number	03 Date Issued	04 Expiration Date	05 Comments
[ ] A. NPDES NA	NA			
[ ] B. UIC				
[ ] C. AIR				
[ ] D. RCRA				
[ ] E. RCRA Interim Status				
[ ] F. SPCC Plan				
[ ] G. State (Specify)				
[ ] H. Local (Specify)				
[ ] I. Other (Specify)				
[ ] J. None				

III. SITE DESCRIPTION

01 Storage Disposal (Check all that apply)	02 Amount	03 Unit of Measure
[ ] A. Surface Impoundment		
[ ] B. Piles		
[ ] C. Drums, Above Ground		
[ ] D. Tank, Above Ground		
[ ] E. Tank, Below Ground		
[X] F. Landfill	Unknown	
[ ] G. Landfarm		
[X] H. Open dump	Unknown	
[ ] I. Other (Specify)		

04 Treatment (Check all that apply)

- [ ] A. Incineration
- [ ] B. Underground Injection
- [ ] C. Chemical/Physical
- [ ] D. Biological
- [ ] E. Waste Oil Processing
- [ ] F. Solvent Recovery
- [ ] G. Other Recycling Recovery
- [ ] H. Other NA (specify)

05 Other

[ ] A. Buildings On Site

NA

06 Area of Site

70 Acres

07 Comments

Unpermitted landfill/dump. Few records of materials disposed on site.

IV. CONTAINMENT

01 Containment of Wastes (Check one)

[ ] A. Adequate, Secure [ ] B. Moderate [X] C. Inadequate, Poor [ ] D. Insecure, Unsound, Dangerous

02 Description of Drums, Diking, Liners, Barriers, etc.

None

V. ACCESSIBILITY

01 Waste Easily Accessible: [X] Yes [ ] No

02 Comments:
Open access on foot from south and west.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Phase II investigation.

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 State	02 Site Number
NY	932083

II. DRINKING WATER SUPPLY

01 Type of Drinking Supply (Check as applicable)	Surface	Well
Community	A. [X]	B. [ ]
Non-community	C. [ ]	D. [ ]

02 Status		
Endangered	Affected	Monitored
A. [ ]	B. [ ]	C. [X]
D. [ ]	E. [ ]	F. [ ]

03 Distance to Site
A <3 Upstream (mi)
B _____ (mi)

III. GROUNDWATER

01 Groundwater Use in Vicinity (Check one)

[ ] A. Only Source for Drinking
[ ] B. Drinking (Other sources available) Commercial, industrial, irrigation (No other water sources available)
[X] C. Commercial, industrial, irrigation (Limited other sources available)
[ ] D. Not Used, Unusable

02 Population Served by Groundwater 0

03 Distance to Nearest Drinking Water Well >2 (mi)

04 Depth to Groundwater	05 Direction of Groundwater Flow	06 Depth to Aquifer of Concern	07 Potential Yield of Aquifer	08 Sole Source Aquifer Unknown
10 (ft)	West	14 (ft)	150,000 (gpd)	[ ] Yes [X] No

09 Description of Wells (including usage, depth, and location relative to population and buildings)

Total of 14 monitoring wells exist on site. Eight were installed in 1980 by Malcolm Pirnie and six in 1991 by Ecology and Environment Engineering, P.C. Several industrial wells reportedly exist approximately 2 miles south of the site.

10 Recharge Area		11 Discharge Area	
[ ] Yes	Comments:	[ ] Yes	Comments:
[ ] No	Unknown	[ ] No	Unknown

IV. SURFACE WATER

01 Surface Water (Check one)

[X] A. Reservoir, Recreation, Drinking Water Source
[ ] B. Irrigation, Economically Important Resources
[ ] C. Commercial, Industrial
[ ] D. Not Currently Used

02 Affected/Potentially Affected Bodies of Water

Name:	Affected	Distance to Site
East Gill Creek	[X]	0 (mi)
Gill Creek	[ ]	0.25 (mi)
Niagara River	[ ]	1.3 (mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 Total Population Within

One (1) Mile of Site	Two (2) Miles of Site	Three (3) Miles of Site
A. 3,854	B. 20,879	C. 61,894
No. of Persons	No. of Persons	No. of Persons

02 Distance to Nearest Population 0.17 (mi)

03 Number of Buildings Within Two (2) Miles of Site	04 Distance to Nearest Off-Site Home
5,490	0.17 (mi)

05 Population Within Vicinity of Site (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Trailer parks are 0.17 mile east of site, beyond which is residential housing.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA (Cont.)

I. IDENTIFICATION

01 State	02 Site Number
NY	932083

VI. ENVIRONMENTAL INFORMATION

01 Permeability of Unsaturated Zone (Check one)

[X] A. 10^{-6} - 10^{-8} cm/sec [ ] B. 10^{-4} - 10^{-6} cm/sec [ ] C. 10^{-4} - 10^{-3} cm/sec [ ] D. Greater than 10^{-3} cm/sec

02 Permeability of Bedrock (Check one)

[ ] A. Impermeable (Less than 10^{-6} cm/sec) [ ] B. Relatively Impermeable (10^{-4} - 10^{-6} cm/sec) [ ] C. Relatively Permeable (10^{-2} - 10^{-4} cm/sec) [X] D. Very Permeable (Greater than 10^{-2} cm/sec)

03 Depth to Bedrock	04 Depth of Contaminated Soil Zone	05 Soil pH
11 to 17 (ft)	<2'	8.0

06 Net Precipitation	07 One Year 24-Hour Rainfall	08 Site Slope	Direction of Site Slope	Terrain Average Slope
9 (in)	2.1 (in)	<1 %	WSW	0.3 %

09 Flood Potential

Site is in >500 Year Floodplain

10 [ ] Site is on Barrier Island, Coastal High Hazard Area, Riverine Floodway

11 Distance to Wetlands (5 acre minimum)

ESTUARINE NA OTHER

A. >2 (mi) B. >1 (mi)

12 Distance to Critical Habitat (of endangered species)

>1.5 (mi)

Endangered Species: NA

13 Land Use in Vicinity

Distance to:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREA; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS PRIME AG LAND	AGRICULTURAL LANDS AG LAND
A. 0 (mi)	B. 0.17 (mi)	C. >2 (mi)	D. >1 (mi)

14 Description of Site in Relation to Surrounding Topography

Site is generally flat as is surrounding topography.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Phase I and Phase II investigations.

02[UZ]YQ5080:D3377/5093

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 6 - SAMPLE AND FIELD INFORMATION	I. IDENTIFICATION	
	01 State NY	02 Site Number 932083

II. SAMPLES TAKEN - No samples taken during S.I.

Sample Type	01 Number of Samples Taken	02 Samples Sent to	03 Estimated Date Results Available
Groundwater	9	E & E's Analytical Services Center	March 1991
Surface Water	4	E & E's Analytical Services Center	March 1991
Waste	--		
Air	--		
Runoff	--		
Spill	--		
Soil	4	E & E's Analytical Services Center	March 1991
Vegetation	--		
Other	Sediment = 5	E & E's Analytical Services Center	March 1991

III. FIELD MEASUREMENTS TAKEN

01 Type	02 Comments
OVA	No readings in the breathing zone above background levels.
HNu	No readings in the breathing zone above background levels.
Explosimeter	No readings in the breathing zone above background levels.

IV. PHOTOGRAPHS AND MAPS

01 Type [X] Ground [ ] Aerial 33 mm photos	02 In Custody of E & E (Name of Organization or Individual)
03 Maps [X] Yes [ ] No	04 Location of Maps E & E has tax map and topographic maps

V. OTHER FIELD DATA COLLECTED (Provide narrative description of sampling activities)

A geophysical survey was performed over the well installation area using an EM31 and a magnetometer. Results of this survey are included in the Phase II report.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Phase II investigation.

02[UZ]YQ5080:D3377/5093

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 State	02 Site Number
NY	932083

II. CURRENT OWNER(S)			PARENT COMPANY (if applicable)		
01 Name Niagara Mohawk Power Corporation	02 D+B Number		08 Name	09 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.) 1720 New Road	04 SIC Code		10 Street Address (P.O. Box, RFD #, etc.)	11 SIC Code	
05 City Niagara Falls	06 State NY	07 Zip Code 14304	12 City	13 State	14 Zip Code
01 Name Power Authority of the State of New York	02 D+B Number		08 Name	09 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.) P.O. Box 277	04 SIC Code		10 Street Address (P.O. Box, RFD #, etc.)	11 SIC Code	
05 City Niagara Falls	06 State NY	07 Zip Code 14302	12 City	13 State	14 Zip Code
01 Name	02 D+B Number		08 Name	09 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code		10 Street Address (P.O. Box, RFD #, etc.)	11 SIC Code	
05 City	06 State	07 Zip Code	12 City	13 State	14 Zip Code
01 Name	02 D+B Number		08 Name	09 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code		10 Street Address (P.O. Box, RFD #, etc.)	11 SIC Code	
05 City	06 State	07 Zip Code	12 City	13 State	14 Zip Code

III. PREVIOUS OWNER(S) (List most recent first)			IV. REALTY OWNER(S) (if applicable, most recent first)		
01 Name City of Niagara Falls	02 D+B Number		01 Name	02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.) City Hall, 745 Main Street	04 SIC Code		03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code	
05 City Niagara Falls	06 State NY	07 Zip Code 14301	05 City	06 State	07 Zip Code
01 Name	02 D+B Number		01 Name	02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code		03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code	
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 8 - OPERATOR INFORMATION - NA	I. IDENTIFICATION 01 State NY / 02 Site Number 932083

II. CURRENT OPERATOR (if different from Owner)			OPERATOR'S PARENT COMPANY (if applicable)		
01 Name	02 D+B Number		10 Name	11 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code		12 Street Address (P.O. Box, RFD #, etc.)	13 SIC Code	
05 City	06 State	07 Zip Code	14 City	15 State	16 Zip Code
08 Years of Operation	09 Name of Owner				

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)			PREVIOUS OPERATORS' PARENT COMPANIES (if applicable)		
01 Name	02 D+B Number		10 Name	11 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code		12 Street Address (P.O. Box, RFD #, etc.)	13 SIC Code	
05 City	06 State	07 Zip Code	14 City	15 State	16 Zip Code
08 Years of Operation	09 Name of Owner During This Period				
01 Name	02 D+B Number		10 Name	11 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code		12 Street Address (P.O. Box, RFD #, etc.)	13 SIC Code	
05 City	06 State	07 Zip Code	14 City	15 State	16 Zip Code
08 Years of Operation	09 Name of Owner During This Period				
01 Name	02 D+B Number		10 Name	11 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code		12 Street Address (P.O. Box, RFD #, etc.)	13 SIC Code	
05 City	06 State	07 Zip Code	14 City	15 State	16 Zip Code
08 Years of Operation	09 Name of Owner During This Period				

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 9 - GENERATOR/TRANSPORTER INFORMATION	I. IDENTIFICATION	
	01 State NY	02 Site Number 932083

II. ON-SITE GENERATOR - NA

01 Name		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	
05 City	06 State	07 Zip Code	

III. OFF-SITE GENERATOR(S) - NA

01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code
01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code

IV. TRANSPORTER(S) - NA

01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code
01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

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POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 10 - PAST RESPONSE ACTIVITIES	I. IDENTIFICATION	
	01 State NY	02 Site Number 932083

II. PAST RESPONSE ACTIVITIES

01 [ ] A. Water Supply Closed 04 Description:	02 Date _____	03 Agency _____
01 [ ] B. Temporary Water Supply Provided 04 Description:	02 Date _____	03 Agency _____
01 [ ] C. Permanent Water Supply Provided 04 Description:	02 Date _____	03 Agency _____
01 [ ] D. Spilled Material Removed 04 Description:	02 Date _____	03 Agency _____
01 [ ] E. Contaminated Soil Removed 04 Description:	02 Date _____	03 Agency _____
01 [ ] F. Waste Repackaged 04 Description:	02 Date _____	03 Agency _____
01 [ ] G. Waste Disposed Elsewhere 04 Description:	02 Date _____	03 Agency _____
01 [ ] H. On-Site Burial 04 Description:	02 Date _____	03 Agency _____
01 [ ] I. In Situ Chemical Treatment 04 Description:	02 Date _____	03 Agency _____
01 [ ] J. In Situ Biological Treatment 04 Description:	02 Date _____	03 Agency _____
01 [ ] K. In Situ Physical Treament 04 Description:	02 Date _____	03 Agency _____
01 [ ] L. Encapsulation 04 Description:	02 Date _____	03 Agency _____
01 [ ] M. Emergency Waste Treatment 04 Description:	02 Date _____	03 Agency _____
01 [ ] N. Cutoff Walls 04 Description:	02 Date _____	03 Agency _____
01 [ ] O. Emergency Diking/Surface Water Diversion 04 Description:	02 Date _____	03 Agency _____
01 [ ] P. Cutoff Trenches/Sump 04 Description:	02 Date _____	03 Agency _____

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 10 - PAST RESPONSE ACTIVITIES (Cont.)	I. IDENTIFICATION	
	01 State NY	02 Site Number 932083

II. PAST RESPONSE ACTIVITIES (Cont.)

01 [ ] Q. Subsurface Cutoff Wall 04 Description:	02 Date _____	03 Agency _____
01 [ ] R. Barrier Walls Constructed 04 Description:	02 Date _____	03 Agency _____
01 [ ] S. Capping/Covering 04 Description:	02 Date _____	03 Agency _____
01 [ ] T. Bulk Tankage Repaired 04 Description:	02 Date _____	03 Agency _____
01 [ ] U. Grout Curtain Constructed 04 Description:	02 Date _____	03 Agency _____
01 [ ] V. Bottom Sealed 04 Description:	02 Date _____	03 Agency _____
01 [ ] W. Gas Control 04 Description:	02 Date _____	03 Agency _____
01 [ ] X. Fire Control 04 Description:	02 Date _____	03 Agency _____
01 [ ] Y. Leachate Treatment 04 Description:	02 Date _____	03 Agency _____
01 [ ] Z. Area Evacuated 04 Description:	02 Date _____	03 Agency _____
01 [X] 1. Access to Site Restricted 04 Description: Restricted to vehicular access	02 Date _____	03 Agency _____
01 [ ] 2. Population Relocated 04 Description:	02 Date _____	03 Agency _____
01 [ ] 3. Other Remedial Activities 04 Description:	02 Date _____	03 Agency _____

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Phase II investigation

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 11 - ENFORCEMENT INFORMATION	I. IDENTIFICATION	
	01 State NY	02 Site Number 932083

II. ENFORCEMENT INFORMATION

01 Past Regulatory/Enforcement Action [ ] Yes [X] No

02 Description of Federal, State, Local Regulatory/Enforcement Action

None

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Note: This report represents the results of several days of fieldwork and sample analysis over a period from 9-90 to 3-91. The site reconnaissance and geophysical surveys were performed from 9-12-90 to 9-13-90. The weather was generally sunny and warm, about 80°F. Drilling operations took place from 10-22-90 until 10-25-90. Generally the temperature ranged between 40-55°F with overcast skies and some drizzle or occasional rain. Additional drilling (GW-5/GW-6) took place from 1-2-91 until 1-9-91. Temperatures varied between 10° and 33°F. Sampling activities were conducted from 2-13-91 to 2-16-91. Temperatures ranged from 18 to 50°F with some drizzle.

6. REFERENCES

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_____, September 1990, Ambient Water Quality Standards and Guidance Values, Division of Water Technical and Operational Guidance Series (1.1.1).

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Tesmer, I.H., 1981, Colossal Cataract, State University of New York Press, Albany, New York.

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_____, 1985, Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Selected Waste Disposal Sites, Washington, D.C.

Appendices

APPENDIX A

SITE-SPECIFIC SAFETY PLAN

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SITE SAFETY PLAN

Version 988

A. GENERAL INFORMATION

Project Title: NYSDEC Phase II Project No.: YQ5000

TDD/Pan No.: -

Project Manager: Donald Johnson Project Dir.: James Griffis

Location(s): New Road Landfill Site, Niagara Falls, Niagara County, New York

Prepared by: R. Watt RMW Date Prepared: 5 September 1990

Approval by: Corp H/S group DMP Date Approved: 7 Sept 90

Site Safety Officer Review: [signature] Date Reviewed:

Scope/Objective of Work: Environmental investigation including the installation and sampling of groundwater monitoring wells, as well as the sampling of soil, sediment, and surface water.

Proposed Date of Field Activities: September through November 1990

Background Info: Complete: [X] Preliminary (No analytical data available) [ ]

Documentation/Summary:

Overall Chemical Hazard:	Serious [ ]	Moderate [X]
	Low [ ]	Unknown [ ]
Overall Physical Hazard	Serious [ ]	Moderate [X]
	Low [ ]	Unknown [ ]

B. SITE/WASTE CHARACTERISTICS

Waste Type(s):

Liquid [X]	Solid [X]	Sludge [X]	Gas/Vapor [ ]

Characteristic(s):

Flammable/ Ignitable [ ]	Volatile [X]	Corrosive [ ]	Acutely Toxic [X]
Explosive [ ]	Reactive [X]	Carcinogen [X]	Radioactive* [ ]

Other: _____

Physical Hazards:

Overhead [X]	Confined* Space [ ]	Below Grade [ ]	Trip/Fall [X]
Puncture [X]	Burn [ ]	Cut [X]	Splash [X]
Noise [X]	Other: Hazards associated with drill rig.		

*Requires completion of additional form and special approval from the Corporate Health/Safety group. Contact RSC or HQ.

Site History/Description and Unusual Features (see Sampling Plan for detailed description): 49 acre site formerly used for disposal of municipal refuse and ash residue, then as a burn site for trees and leaves. Now only scavenger dumping.

Locations of Chemicals/Wastes: Unknown.

Estimated Volume of Chemicals/Wastes: Unknown. However, open dumping occurred throughout the 1950's and 1960's.

Site Currently in Operation Yes: [ ] No: [X]

C. HAZARD EVALUATION

List Hazards by Task (i.e., drum sampling, drilling, etc.) and number them. (Task numbers are cross-referenced in Section D)

Physical Hazard Evaluation: 1) Site reconnaissance - Trip/Fall, dermal absorption. 2) Geophysical survey - Trip/Fall, dermal absorption. 3) Drilling & well installation - Trip/Fall, Noise, overhead, splash, etc., possible dermal & respiratory hazards. 4) Surface soil and water sampling - Trip/Fall, splash, dermal absorption.

Chemical Hazard Evaluation:

Compound	PEL/TWA	Route of Exposure	Acute Symptoms	Odor Threshold	Odor Description
Phenol	5ppm PEL	INH, ING, ABS, CON	headache, weakness, weak pulse, collapse, death	0.05 ppm	
Chromium (Cr, Cr[VI])	0.5 mg/m³	INH, ING, ABS, CON	dermatitis, mucous membrane irritation, nausea, vomiting	variable	variable
Lead	0.15 mg/kg PEL	INH, ING, ABS, CON	cumulative neurotoxin gastric distress, nausea, diarrhea.	N/A	N/A
Manganese	5 mg/m³ PEL	INH, ING, ABS, CON	nausea, vomiting, headache, coughing	N/A	N/A

Note: Complete and attach a Hazard Evaluation Sheet for major known contaminant.

INH = Inhalation
ING = Ingestion
ABS = Dermal absorption
CON = Skin/eye contact.

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D. SITE SAFETY WORK PLAN

Site Control: Attach map, use back of this page, or sketch of site showing hot zone, contamination reduction, zone, etc.

Perimeter identified? [Y] Site secured? [Y]

Work Areas Designated? [Y] Zone(s) of Contamination Identified? [N]

Personnel Protection (TLD badges required for all field personnel):

Anticipated Level of Protection (Cross-reference task numbers to Section C):

	A	B	C	D
Task 1			(X)	X
Task 2			(X)	X
Task 3			(X)	X
Task 4			(X)	X

(Expand if necessary)

Modifications: Upgrade to level C if 1 ppm above background of unknown vapors in the breathing zone

Action Levels for Evacuation of Work Zone Pending Reassessment of Conditions:

- Level D: O_2 <19.5% or >25%, explosive atmosphere >10% LEL, organic vapors above background levels, particulates >_____ mg/m^3, other _____.
- Level C: O_2 <19.5% or >25%, explosive atmosphere >25% LEL_3(California-20%), unknown organic vapor (in breathing zone) >5 ppm, particulates >_____ mg/m^3, other _____.
- Level B: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors (in breathing zone) >500 ppm, particulates >_____ mg/m^3, other _____.
- Level A: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors >500 ppm, particulates >_____ mg/m^3, other _____.

Air Monitoring (daily calibration unless otherwise noted):

Contaminant of Interest	Type of Sample (area, personal)	Monitoring Equipment	Frequency of Sampling
Phenol	Area	OVA, HNu	continuous
Chromium	Area	Miniram	continuous
Lead	Area	Miniram	continuous
Manganese	Area	Miniram	continuous

(Expand if necessary)

Decontamination Solutions and Procedures for Equipment, Sampling Gear, etc.:

All equipment used during drilling and sampling will be steam cleaned while drillers are on site. For sampling after drilling, sufficient equipment will be precleaned with 1) TSP & potable water wash 2) rinse with potable water 3) rinse w/ hexane or methanol 4) rinse w/ distilled water 5) allowed to air dry 6) wrapped in aluminum foil prior to use. (see workplan). Appropriate dermal/respiratory protection during decon w/ solvents.

Personnel Decon Protocol: Dry decon (removal of PPE) followed by hand and face wash. If applicable, remove outer gloves, Tyvek coveralls, booties, then inner gloves.

Decon Solution Monitoring Procedures, if Applicable:

Special Site Equipment, Facilities, or Procedures (Sanitary Facilities and Lighting Must Meet 29 CFR 1910.120):

E+E drilling safety protocols to be implemented including avoidance of "super exclusion zone" around auger during drilling.

Site Entry Procedures and Special Considerations: Conrail railroad yards to North and East will not be entered. No drilling within 25 ft. of overhead power lines.

Work Limitations (time of day, weather conditions, etc.) and Heat/Cold Stress Requirements:

As noted above plus heat or cold stress conditions monitored based on weather. Work during daylight hours only and not during electrical or heavy rain storms.

General Spill Control, if applicable: N/A.

Investigation-Derived Material Disposal (i.e., expendables, decon waste, cuttings):

All IDW will be rendered useless, double bagged and labeled if contaminated. Contaminated trash will be stored until proper disposal arrangements are made. Non-contaminated trash will be disposed of properly as municipal trash.

Sample Handling Procedures Including Protective Wear:

All samples to be packaged and shipped in accordance with applicable DOT regulations. Gloves will be worn during sample handling.

Team Member*	Responsibility
Donald Johnson	Team Leader
To be determined	Site Safety Officer

*All entries into exclusion zone require Buddy System use. All E & E field staff participate in medical monitoring program and have completed applicable training per 29 CFR 1910.120. Respiratory protection program meets requirements of 29 CFR 1910.134, and ANSI Z88.2 (1980).

E. EMERGENCY INFORMATION

(Use supplemental sheets, if necessary)

LOCAL RESOURCES

(Obtain a local telephone book from your hotel, if possible)

Ambulance 911

Hospital Emergency Room Niagara Falls Memorial Medical Center 716-278-4000

Poison Control Center 716-275-5151

Police (include local, county sheriff, state) 911

Fire Department 911

Airport

Agency Contact (EPA, State, Local USCG, etc.) NYSDEC - Valerie Lauzze - 518-457-9538

Local Laboratory E+E Analytical Services Center 716-631-0378

UPS/Fed. Express -

Client/EPA Contact NYSDEC - Valerie Lauzze - 518-457-9538

Site Contact

SITE RESOURCES

Site Emergency Evacuation Alarm Method Verbal

Water Supply Source To be determined (TBD)

Telephone Location, Number TBD

Cellular Phone, if available N/A

Radio N/A

Other N/A

EMERGENCY CONTACTS

1. Dr. Raymond Harbison (Univ. of Florida) ..... (501) 221-0465 or (904) 462-3277, 3281
   Alachua, Florida (501) 370-8263 (24 hours)

2. Ecology and Environment, Inc., Safety Director
   Paul Jonmaire ..... (716) 684-8060 (office)
   (716) 655-1260 (home)

3. Regional Office Contact ..... N/A (home)
   N/A (office)

4. FITOM, TATOM, or Office Manager ..... N/A (home)

MEDTOX HOTLINE

1. Twenty-four hour answering service: (501) 370-8263

   What to report:

   - State: "this is an emergency."
   - Your name, region, and site.
   - Telephone number to reach you.
   - Your location.
   - Name of person injured or exposed.
   - Nature of emergency.
   - Action taken.

2. A toxicologist, (Drs. Raymond Harbison or associate) will contact you. Repeat the information given to the answering service.

3. If a toxicologist does not return your call within 15 minutes, call the following persons in order until contact is made:

   a. **24 hour hotline - (716) 684-8940**
   b. Corporate Safety Director - Paul Jonmaire - home # (716) 655-1260
   c. Assistant Corp. Safety Officer - Steven Sherman - home # (716) 688-0084

EMERGENCY ROUTES

(NOTE: Field Team must Know Route(s) Prior to Start of Work)

Directions to hospital (include map)* Porter Ave. west. Left on Rt 161 south (Hyde Park Blvd.). Right on Rt 182A west (Pine St.). Straight to hospital on 10TH street (on left).

Emergency Egress Routes to Get Off-Site To be determined

---

* Niagara Falls Memorial Medical Center
  621 10TH Street
  Niagara Falls, NY 14301
  716-278-4000

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F. EQUIPMENT CHECKLIST

PROTECTIVE GEAR

Level A	No.
SCBA	
SPARE AIR TANKS	
ENCAPSULATING SUIT (Type _____)	
SURGICAL GLOVES	
NEOPRENE SAFETY BOOTS	
BOOTIES	
GLOVES (Type _____)	
OUTER WORK GLOVES	
HARD HAT	
CASCADE SYSTEM	
5-MINUTE ESCAPE COOLING VEST	

Level B	No.
SCBA	
SPARE AIR TANKS	
PROTECTIVE COVERALL (Type _____)	
RAIN SUIT	
BUTYL APRON	
SURGICAL GLOVES	
GLOVES (Type _____)	
OUTER WORK GLOVES	
NEOPRENE SAFETY BOOTS	
BOOTIES	
HARD HAT WITH FACE SHIELD	
CASCADE SYSTEM	
MANIFOLD SYSTEM	

Level C	
ULTRA-TWIN RESPIRATOR	X
POWER AIR PURIFYING RESPIRATOR	
CARTRIDGES (Type GMC-H)	X
5-MINUTE ESCAPE MASK	X
PROTECTIVE COVERALL (Type Saranex)	X
RAIN SUIT	
BUTYL APRON	
SURGICAL GLOVES	X
GLOVES (Type Neoprene rubber)	X
OUTER WORK GLOVES	X
NEOPRENE SAFETY BOOTS	X
HARD HAT WITH FACE SHIELD	X
BOOTIES	X
HARDHAT	X
TLD Badge	X

Level D	
ULTRA-TWIN RESPIRATOR (Available)	X
CARTRIDGES (Type GMC-H)	X
5-MINUTE ESCAPE MASK (Available)	
PROTECTIVE COVERALL (Type TYVEK)	X
RAIN SUIT	X
NEOPRENE SAFETY ~~BOOTS~~ BOOTS	X
BOOTIES	X
WORK GLOVES	X
HARD HAT WITH FACE SHIELD	X
SAFETY GLASSES	X
TLD Badge	X

INSTRUMENTATION	No.
OVA	X
THERMAL DESORBER	
O2/EXPLOSIMETER W/CAL. KIT	X
PHOTOVAC TIP	
HNu (Probe 10.2 eV)	X
MAGNETOMETER	
PIPE LOCATOR	
WEATHER STATION	
DRAEGER PUMP, TUBES _____	
BRUNTON COMPASS	X
MONITOX CYANIDE	
HEAT STRESS MONITOR	
NOISE EQUIPMENT _____	
PERSONAL SAMPLING PUMPS	
Miniram	X
RADIATION EQUIPMENT	
DOCUMENTATION FORMS	
PORTABLE RATEMETER	
SCALER/RATEMETER	
NaI Probe	
ZnS Probe	
GM Pancake Probe	
GM Side Window Probe	
MICRO R METER	
ION CHAMBER	
ALERT DOSIMETER	X
POCKET DOSIMETER	
FIRST AID EQUIPMENT	
FIRST AID KIT	X
OXYGEN ADMINISTRATOR	
STRETCHER	
PORTABLE EYE WASH	X
BLOOD PRESSURE MONITOR	
FIRE EXTINGUISHER	X

DECON EQUIPMENT	No.
WASH TUBS	X
BUCKETS	X
SCRUB BRUSHES	X
PRESSURIZED SPRAYER	X
DETERGENT (Type TSP)	X
SOLVENT (Type hexane/methanol)	X
PLASTIC SHEETING	X
TARPS AND POLES	
TRASH BAGS	X
TRASH CANS	
MASKING TAPE	
DUCT TAPE	X
PAPER TOWELS	X
FACE MASK	
FACE MASK SANITIZER	
FOLDING CHAIRS	
STEP LADDERS	
DISTILLED WATER	X
SAMPLING EQUIPMENT	
8 OZ. BOTTLES	X
HALF-GALLON BOTTLES	X
VOA BOTTLES	X
STRING	X
HAND BAILERS	X
THIEVING RODS WITH BULBS	
SPOONS	X
KNIVES	
FILTER PAPER	
PERSONAL SAMPLING PUMP SUPPLIES	

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VAN EQUIPMENT	No.
TOOL KIT	X
HYDRAULIC JACK	X
LUG WRENCH	X
TOW CHAIN	X
VAN CHECK OUT	
Gas	X
Oil	X
Antifreeze	X
Battery	X
Windshield Wash	X
Tire Pressure	X
MISCELLANEOUS	
PITCHER PUMP	
SURVEYOR'S TAPE	X
100' FIBERGLASS TAPE	X
300' NYLON ROPE	X
NYLON STRING	
SURVEYING FLAGS	X
FILM	X
WHEEL BARROW	
BUNG WRENCH	
SOIL AUGER	
PICK	
SHOVEL	X
CATALYTIC HEATER	
PROPANE GAS	
BANNER TAPE	
SURVEYING METER STICK	
CHAINING PINS & RING	
TABLES	
WEATHER RADIO	
BINOCULARS	
MAGAPHONE	

MISCELLANEOUS (Cont.)	No.
SHIPPING EQUIPMENT	
COOLERS	X
PAINT CANS WITH LIDS, 7 CLIPS EACH	X
VERMICULITE	X
SHIPPING LABELS	X
DOT LABELS: "DANGER"	
"UP"	X
"INSIDE CONTAINER COMPLIES ..."	X
"HAZARD GROUP"	X
STRAPPING TAPE	X
BOTTLE LABELS	X
BAGGIES	X
CUSTODY SEALS	X
CHAIN-OF-CUSTODY FORMS	X
FEDERAL EXPRESS FORMS	X
CLEAR PACKING TAPE	X

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Phenol Date 7 September 1990

DOT Name/U.N. No. Job No. YQ5000

CAS Number 108-95-2

References Consulted (circle):

NIOSH/OSHA Pocket Guide Verschueren Merck Index Hazardline Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other:

Rad Health Handbook NCRP 65 10 CFR 20 Handbook of Chemistry and Physics

Chemical Properties: (Synonyms: Hydroxybenzene, carbolic acid, phenic acid, phenyl hydroxide)

Chemical Formula C6H5oH Molecular Weight 94

Physical State solid; thick liquid Solubility (H2O) soluble Boiling Point 359°F

Flash Point 185°F Vapor Pressure/Density 0.36 mm Freezing Point 106°F

Specific Gravity 1.058 Odor Characteristic sweet tarry odor Flammable Limits 1.7 - 8.6%

Incompatabilities strong oxidizers, bases, calcium hypochlorite

Biological Properties:

TLV-TWA 5 ppm PEL 5 ppm Odor Threshold 0.05 ppm

IDLH 100 ppm Rat/Mouse Ld50 (dermal) 669 mg/kg; Ld50 (oral) 414 mg/kg

Route of Exposure INHalation, INGestion, skin/eye CONtact, dermal ABSorbtion

Carcinogen experimental Teratogen experimental Mutagen expeimental

Radiological Properties:

N/A

Handling Recommendations: (Personal protective measures)

Respirator: Organic vapor cartridge up to 50 ppm. >50 ppm use SCBA viton gloves and impervious clothing. Prevent skin/eye contact.

Monitoring Recommendations:

Flame ionization detector (OVA), or photoionization detector (HNu).

Disposal/Waste Treatment:

N/A

Health Hazards and First Aid:

ING: Do not induce vomiting, immediate medical attention. INH: move to fresh air, immediate medical attention. CON: rinse with large amounts of water, wash skin thoroughly with soap and water

Symptoms: Acute: CNS depression, headache, weakness, dimness of vision, ringing in ears, rapid breathing, weak pulse, collapse, possible death.

Chronic: Vomiting, diarrhea, dizziness, mental disturbance, liver and kidney damage. INGESTION OF 1 GRAM MAY BE FATAL.

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Chromium (hexavalent) Date 7 September 1990

DOT Name/U.N. No. _____ Job No. YQ5000

CAS Number 7440-47-3

References Consulted (circle):

NIOSH/OSHA Pocket Guide Verschueren Merck Index Hazardline Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: SAX, Aldrich

Rad Health Handbook NCRP 65 10 CFR 20 Handbook of Chemistry and Physics

Chemical Properties: (Synonyms: Chromic oxide, noluble chromic salts)

Chemical Formula Cr(VI) (CrO3) Molecular Weight 52

Physical State variable Solubility (H2O) insoluble (Cr) Boiling Point variable

Flash Point variable Vapor Pressure/Density variable Freezing Point variable

Specific Gravity variable Odor Characteristic variable Flammable Limits variable

Incompatabilities strong oxidizers, water

Biological Properties:

TLV-TWA 0.05 mg/m3 PEL 0.5 mg/m3 Odor/Odor Threshold variable

IDLH 250 mg/m3 Human _____ Aquatic _____ Rat/Mouse _____

Route of Exposure INHalation, INGestion, skin/eye CONtact, dermal ABSorbtion

Carcinogen possible - animal Teratogen experimental Mutagen experimental

Radiological Properties:

N/A

Handling Recommendations: (Personal protective measures)

Respirators: any detectable limit - SCBA. Wear viton or neoprene gloves, boots, etc. Prevent skin/eye contact.

Monitoring Recommendations:

N/A - sediment bound material.

Disposal/Waste Treatment:

N/A

Health Hazards and First Aid:

Ingestion: give large amounts of water, induce vomiting, immediate medical attention. Inhalation: Move to fresh air, CPR if necessary, immediate medical attention. Contact: Rinse with large amounts of water; wash skin thoroughly with soap and water.

Symptoms: Acute: Contact dermatitis; irritation on mucous membranes and upper respiratory tract, coughing, wheezing, headache, fever, nausea, vomiting.

Chronic: Carcinogen, liver and kidney damage, bronchitis, ulceration of skin, lung cancer.

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Chromium (metal) Date 7 September 1990

DOT Name/U.N. No. _____ Job No. YQ5000

CAS Number 7440-47-3

References Consulted (circle):

NIOSH/OSHA Pocket Guide Verschueren Merck Index Hazardline Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: SAX, Aldrich

Rad Health Handbook NCRP 65 10 CFR 20 Handbook of Chemistry and Physics

Chemical Properties: (Synonyms: Chromium (Cr) metals and insoluble salts)

Chemical Formula Cr Molecular Weight 52

Physical State variable Solubility (H2O) insoluble Boiling Point 4842 °F

Flash Point variable Vapor Pressure/Density variable Freezing Point 3339 °F

Specific Gravity 7.2 @ 82 °F Odor Characteristic none Flammable Limits 23% LEL

Incompatabilities strong oxidizers; powdered Cr metal is explosive

Biological Properties:

TLV-TWA 0.05 mg/m3 PEL 1.0 mg/m3 Odor/Odor Threshold N/A

IDLH 500 mg/m3 Human _____ Aquatic _____ Rat/Mouse _____

Route of Exposure INHalation, INGestion, skin/eye CONtact.

Carcinogen N/A Teratogen N/A Mutagen N/A

Radiological Properties:

N/A

Handling Recommendations: (Personal protective measures)

Respirators: >5 mg/m3, use SCBA

Prevent skin/eye contact - wear impervious clothing

Monitoring Recommendations:

N/A - sediment bound material.

Disposal/Waste Treatment:

N/A

Health Hazards and First Aid:

Ingestion: give large amounts of water, induce vomiting, immediate medical attention. Inhalation: move to fresh air, CPR if necessary, immediate medical attention. Eye/Skin Contact: Rinse w/large amounts of water. Wash skin with soap and water.

Symptoms: Acute: Contact dermatitis; ulceration of skin and nasal mucosa; irritation of eyes and mucous membranes.

Chronic: Not often encountered in trivalent (3+) state since Cr compounds in this state are of a lower order toxicity.

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Manganese Date 7 September 1990

DOT Name/U.N. No. _____ Job No. YQ5000

CAS Number _____

References Consulted (circle):

NIOSH/OSHA Pocket Guide Verschueren Merck Index Hazardline Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: SAX, Aldrich

Rad Health Handbook NCRP 65 10 CFR 20 Handbook of Chemistry and Physics

Chemical Properties: (Synonyms: Colloidal manganese)

Chemical formula Mn Molecular Weight 55

Physical state solid Solubility (H2O) decomposes Boiling Point 3564 °F

Flash point flammable Vapor Pressure/Density 1 mm Freezing Point 2266 °F

Specific gravity 7.20 Odor Characteristic N/A Flammable Limits N/A

Incompatabilities strong acids, strong oxidizers

Biological Properties:

TLV-TWA 2300 ug/m3 PEL 5000 ug/m3 Odor/Odor Threshold N/A

IDLH 10,000 ppm Human _____ Aquatic _____ Rat/Mouse _____

Route of Exposure INHalation, INGestion, eye/skin CONtact.

Carcinogen human-suspected Teratogen human-suspected Mutagen experimental

Radiological Properties:

N/A

Handling Recommendations: (Personal protective measures)

Prevent skin exposure or eye contact. Wear impervious clothing (viton gloves).

Monitoring Recommendations:

Miniram aerosol monitor - sediment bound material.

Disposal/Waste Treatment:

N/A

Health Hazards and First Aid:

Inhalation: move to fresh air; keep quiet/warm. CPR if necessary. Immediate medical attention.

Ingestion: do not induce vomiting. Immediate medical attention to remove by gastric lavage. Eye/Skin Contact: rinse immediately. Wash skin thoroughly with soap and water.

Symptoms: Acute: Irritation of skin, eyes, mucous membranes of upper repiratory tract; nausea; vomiting; giddiness; headache; cramps.

Chronic: Unknown - causes fetoxicity and mutagenic effects in rats.

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HAZARD EVALUATION OF CHEMICALS

Chemical Name Lead Date 7 September 1990

DOT Name/U.N. No. _____ Job No. YQ5000

CAS Number 7439-92-1

References Consulted (circle):

NIOSH/OSHA Pocket Guide Verschueren Merck Index Hazardline Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other: _____

Rad Health Handbook NCRP 65 10 CFR 20 Handbook of Chemistry and Physics

Chemical Properties: (Synonyms: White lead, plumbum)

Chemical Formula Pb Molecular Weight 207

Physical State variable Solubility (H2O) insoluble Boiling Point 3164°F

Flash Point incombustible Vapor Pressure/Density variable Freezing Point °F

Specific Gravity 11.3 Odor Characteristic N/A Flammable Limits N/A

Incompatabilities Strong oxidizers, peroxides, active metals

Biological Properties:

TLV-TWA 0.15 mg/m3 PEL 50 ug/m3 Odor/Odor Threshold N/A

IDLH variable Human Td10 (oral) 450 mg/kg/6Y Other toxicity varies with Pb compound

Route of Exposure INHalation, INGestion, skin/eye CONtact, dermal ABSorbtion

Carcinogen indefinite Teratogen indefinite Mutagen experimental

Radiological Properties:

N/A

Handling Recommendations: (Personal protective measures)

Respirator: high efficiency particulate respirator to 5 mg/m3. SCBA for other concentrations.

Avoid skin and eye contact.

Monitoring Recommendations:

Miniram aerosol monitor for sediment bound material.

Disposal/Waste Treatment:

N/A

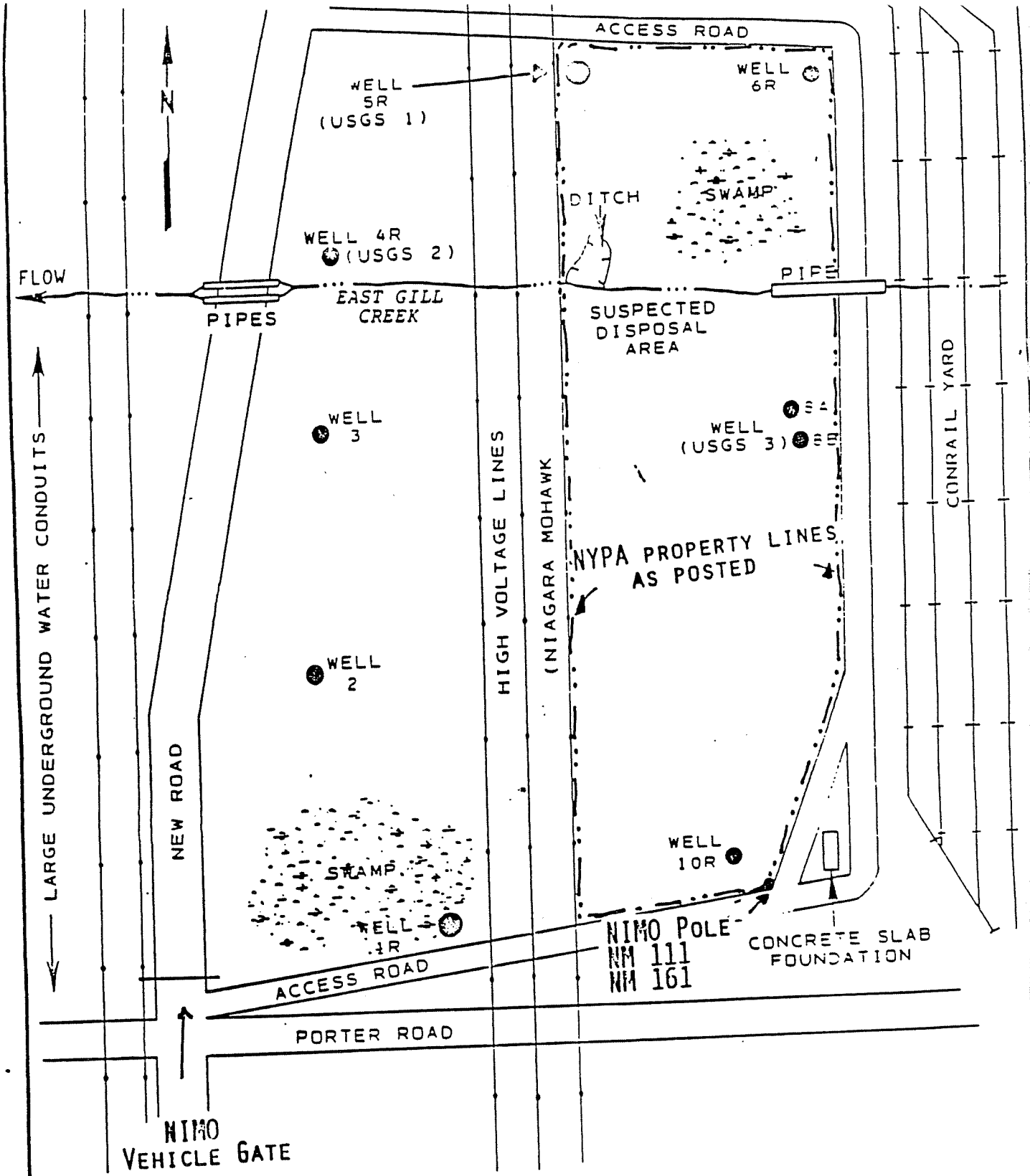
Health Hazards and First Aid:

ING: immediate medical attention, give water or milk, induce vomiting. INH: move to fresh air, CPR if necessary, immediate medical attention. CON: rinse with water, wash skin thoroughly with soap & water

Symptoms: Acute: Stomach distress, vomiting, diarrhea, anemia, nervous system effects.

Chronic: Abdominal effects, neuromuscular effects, encephalic (brain) effects.

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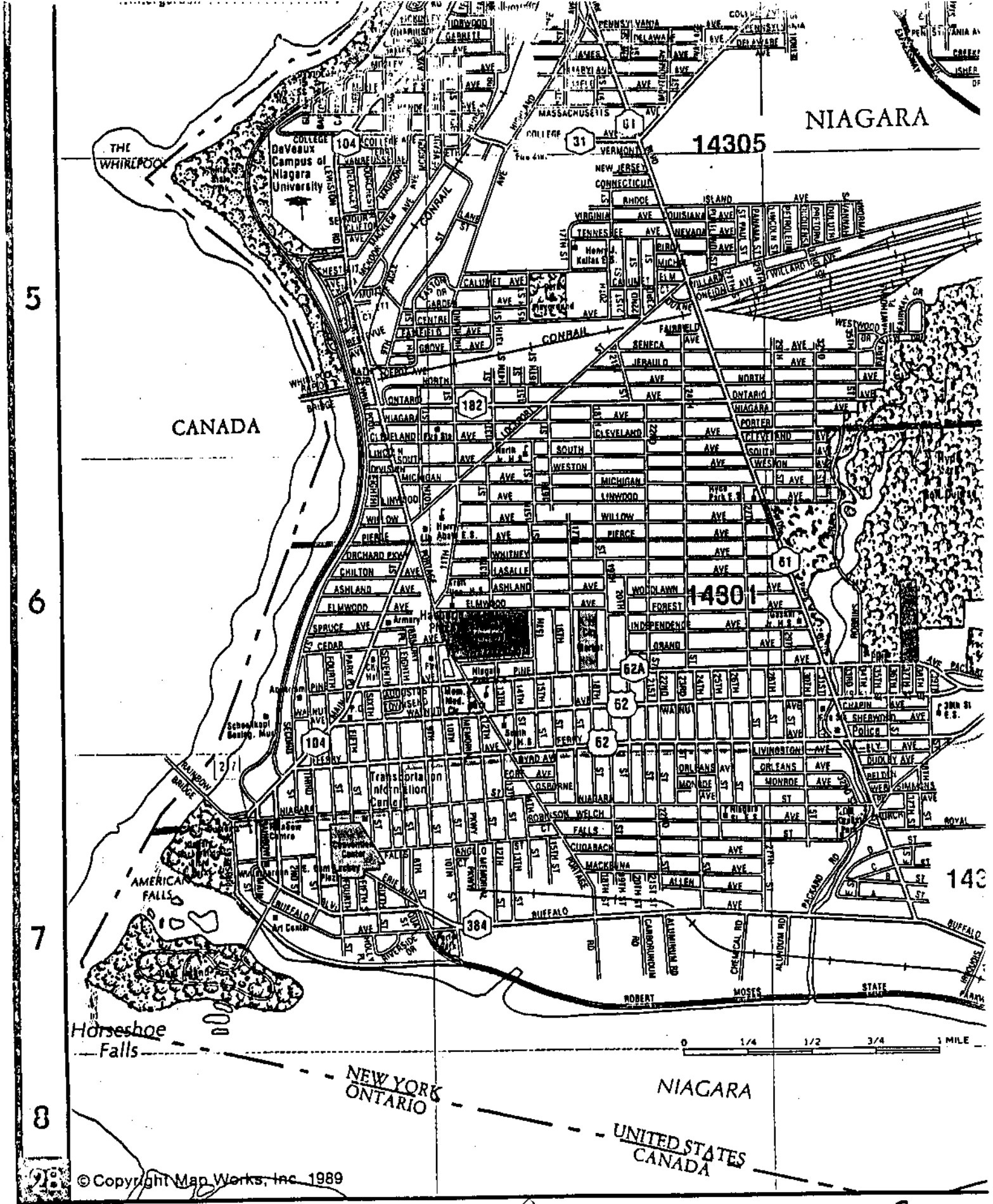


NOT TO SCALE

FIGURE 2.
Plot Plan

New Road Landfill
NYSDEC ID No.: 93208

● Well designations by Malcolm Pirnie


NIAGARA
14305
CANADA
14301
143
THE WHIRLPOOL
College DeVeaux Campus of Niagara University
Transportation Information Center
Schoellkopf Geolog. Mus.
AMERICAN FALLS
Horseshoe Falls
NEW YORK
ONTARIO
UNITED STATES
CANADA
NIAGARA
0 1/4 1/2 3/4 1 MILE
5
6
7
8
A
B
C
78
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DRILLING SITE SAFETY CHECKLIST

- All E & E drilling personnel will have read and understood the terms of E & E drilling SOP.

- Daily inspection of rig and components: obvious or questionable safety conditions will be cause for work interruption.

- Only approved drillers will remain in proximity to borehole during drilling, and, in any event, an approximate 4' x 8' super exclusion area will be in place around moving auger. No personnel will enter this zone while drilling is ongoing.

- Continuous O_2/explosimeter monitoring at borehole using remote sampling hose.

- All field team members will be briefed on planned drilling operations and possible problems before work commences on day one. All will be shown location and operation of "kill switches." These switches will be operationally checked each morning.

- Fire extinguisher(s) will be staged next to rig before drilling/refueling operations.

- Welding/cutting activities will only be performed at a distance from ignition sources and the activity site will be approved as safe by the Site Safety Officer (SSO), Team Leader.

- Appropriate personnel protective equipment (based on hazards associated with assumed well contaminants) will be worn as directed by the SSO and terms of the site safety plan. As a minimum, steel-toed boots, hard-hats, and face shields will be worn during any active drilling.

- Outrigger stabilizers must be in place before drilling commences. The rig must also be leveled.

DRILLING SITE SAFETY CHECKLIST (Continued)

- Drill rig boom must be horizontal during movement of rig. It will not be erected within 25 feet of overhead lines.
- Electrical storms within earshot of the job site will be cause for work termination until deemed safe by the SSO and Team Leader.
- Where underground utilities are suspected in the vicinity of operations, the local utilities shall be contacted. Where utilities are identified, they shall be marked using flags.
- Where buried drums, etc., are suspected, a full survey of the drilling zone is required using appropriate instrumentation prior to ground breaking.
- Only trained, experienced staff will operate the cathead. Personnel must be knowledgeable in safe practice procedures for cathead use.
- Only properly licensed staff will drive the drill rig. A daily safety check of the vehicle will be carried out by the driver, per E & E protocol.
- Climbing on the vertical boom is not permitted by E & E staff.

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APPENDIX B

GEOPHYSICAL SURVEY

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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PHASE II INVESTIGATIONS
GEOPHYSICAL SURVEY

New Road Landfill Site
Site Number 932083
City of Niagara Falls, Niagara County

June 1991

Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233

Thomas C. Jorling, Commissioner

Division of Hazardous Waste Remediation

Michael J. O'Toole, Jr., P.E., Director

Prepared by:

Ecology and Environment Engineering, P.C.

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

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1. INTRODUCTION

This geophysical investigation report for the New Road Landfill site (I.D. No. 932083) directly north of Porter Road between the Conrail tracks and 48th Street (New Road extension) in the City of Niagara Falls, Niagara County, New York, was prepared by Ecology and Environment Engineering, P.C. (E & E), under contract to the New York State Department of Environmental Conservation (NYSDEC). The geophysical investigation consisted of an EM31 (electromagnetic terrain conductivity) survey and a portable proton magnetometer (total earth field magnetics) survey. This report includes field data (Appendix A) and contour maps (Appendix B) for the geophysical survey performed at this site on September 12 and 13, 1990 as part of the Phase II Investigation. Additionally, interpretations of the data generated, along with conclusions, are provided in this report.

2. OBJECTIVES

The geophysical survey program at the New Road Landfill site was designed to achieve several general goals. The main objectives of the geophysical methods used were to optimize the locations of the six proposed groundwater monitoring wells; reduce the risks associated with drilling into unknown terrain and wastes; reduce overall project time and cost; improve the accuracy and confidence of the investigation; identify the existence and boundaries of buried waste or groundwater contamination plumes; and determine vertical and horizontal anomalies.

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3. METHODS

For the purpose of performing ground conductivity (EM31) and geomagnetic (magnetometer) surveys, grid coordinates were established in locations which correspond to the five proposed, groundwater monitoring wells.

Survey grids 1 through 6 included the proposed locations of monitoring wells GW-1 through GW-6 as follows:

Geophysical Survey Grid No.	Proposed Monitoring Well Included
1	GW-1
2	GW-2
3	GW-3
4	GW-4
5	GW-5
6	GW-6

All geophysical survey grids were 1,600 square feet in area with 10-foot data station interval spacing. The X and Y axes of each survey grid were oriented east-west and north-south, respectively. Precise compass orientations were obtained for each of the survey grid axes, allowing for a local magnetic declination of approximately 7.5° west of true north. These orientations are indicated on the geophysical contour maps (see Appendix B). Survey grid coordinate 0,0 is located in the

southwest corner of each contour map. Semi-permanent wooden stakes mark the proposed monitoring well locations for reference during drilling. Any subsequent adjustment of monitoring well locations will be referenced to the remaining wood stake.

Horizontal and vertical dipole readings in north-south and east-west orientations were recorded at each mode while performing the electromagnetic ground conductivity survey with a Geonics, Ltd., EM31 instrument. The effective depths of penetration provided by the EM31 in the vertical and horizontal dipole modes are $\leq$18 feet and $\leq$9 feet, respectively. Geomagnetic readings were recorded at each mode in both north-south and east-west orientations using an EG+G Geometrics (Model G-856) Portable Proton Magnetometer. The response of the magnetometer is proportional to the mass of the ferrous target. The effective depths of the EM31 and magnetometer were considered adequate to delineate any buried materials that may be encountered while drilling.

All geophysical field data were initially recorded in two logbooks dedicated to this site investigation. Magnetometer data were collected at a north-south orientation at each grid station. All magnetometer readings averaging station readings for north-south and east-west orientations were corrected for diurnal variation based on background station readings. EM31 ground conductivity data were averaged for north-south and east-west orientations for the vertical and horizontal dipole positions. The reduced geophysical data were then plotted and contoured for each magnetometer and EM31 survey (see appendices A and B).

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4. DATA INTERPRETATION

EM31 and Magnetometer Interpretations

The purpose of interpreting the results of the EM31 and magnetometer surveys at the New Road Landfill site is to provide a probable explanation for anomalous geophysical data contours. The presence of buried waste, metal objects, and utilities are often manifest as relatively increased or decreased nodal readings and gradient values.

The following interpretations are based on the geophysical contour maps (see Appendix B) generated from the electromagnetic ground conductivity and geomagnetic field measurements listed in Appendix A. These six geophysical survey grids encompass the six proposed groundwater monitoring well locations as proposed by NYSDEC in the Phase II Investigation Work Plan for the site (see Figure 4-1).

The following discussion provides details of each of the six geophysical survey grids.

Survey Grid Area No. 1. A review of magnetometer data obtained at this survey location indicates that geomagnetic field intensities, as corrected, range from 55,899 to 58,311 gammas. The steepest geomagnetic gradient was observed across the western half and southwest quadrant of the survey grid. The geomagnetic gradient is relatively gentle across the northeast quadrant of survey grid no. 1.

Electromagnetic ground conductivity measurements obtained in survey grid no. 1 range from 21 (horizontal dipole) to 46 millimhos/meter (vertical dipole). A relatively steep increase in the ground conductivity gradient is observed across the western half of the survey grid. The overall ground conductivity gradient is gentler in the vertical dipole survey mode, with the highest readings recorded at the

data stations with coordinates 10,10 and 10,20. The coincident geophysical anomalies observed on the western half of the survey grid are the result of either small ferrous metal objects located beneath or in proximity to the respective data stations or the group of high-voltage electrical transmission lines directly to the west.

The installation of proposed groundwater monitoring well GW-1 at the location designated on the geophysical contour maps is not acceptable. The well location should be adjusted to the data station with grid coordinates 30,30 or 40,30. The west and southwest quadrants of grid no. 1 should be avoided due to the geomagnetic field and ground conductivity anomalies identified.

Survey Grid Area No. 2. A review of magnetometer data obtained at this survey location indicates that geomagnetic field intensities, as corrected, range from 56,444 to 58,853 gammas. Steep geomagnetic gradients are observed in the south and northeast portions of the grid. These increases in gradient are attributed to ferrous metal objects which are located in proximity to data stations with coordinates 10,0; 10,10; 20,0; 30,0; and 40,40. The geomagnetic gradient is gentler across the central and northwest portions of survey grid no. 2.

Electromagnetic ground conductivity measurements obtained in survey grid no. 2 range from 23.5 (horizontal dipole) to 38 millimhos/meter (vertical dipole). The flat ground conductivity gradient indicates that shallow (<18 feet) conductive materials are not located within the boundaries of survey grid no. 2.

The installation of proposed groundwater monitoring well GW-2 at the location designated on the geophysical survey map is acceptable. If adjustment or offset of the monitoring well location are necessary, the south boundary and northeast corner of the survey grid should be avoided.

Survey Grid Area No. 3. A review of magnetometer data obtained at this survey location indicates that geomagnetic field intensities, as corrected, range from 56,384 to 58,574 gammas. The geomagnetic gradient is erratic over the majority of this survey grid. A 4-foot by 8-foot slab of concrete with a 1/2-inch steel reinforcement bar was

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observed directly northeast of grid node 20,40. It is probable that this and similar ferrous metal objects in proximity to survey grid no. 3 are the cause of this substantial interference in the geomagnetic gradient.

Electromagnetic ground conductivity measurements obtained in survey grid no. 3 range from 22 (horizontal dipole) to 55 millimhos/meter (vertical dipole). Readings in both dipoles indicate that ground conductivity steadily increases from south to north across the survey grid. The apparent cause for this relatively subtle ground conductivity gradient is the steel reinforcement bars previously noted.

The installation of proposed monitoring well GW-3 at the location designated on the geophysical contour maps (10,10) is acceptable. The geomagnetic and ground conductivity anomalies identified indicate the presence of conductive material north of the survey grid; however, the respective geophysical gradients are relatively flat at the central and southwest quadrant areas. Caution is to be exercised when drilling in survey grid no. 3 in the event that isolated fragments of concrete may be present that will not manifest as a geomagnetic or ground conductivity anomaly if steel reinforcement is not also present.

Survey Grid Area No. 4. A review of the magnetometer data obtained at this survey location indicates that geomagnetic field intensities, as corrected, range from 56,446 to 58,404 gammas. The geomagnetic gradient is relatively flat across the northwest and the southern quadrants of this grid. Significant isolated geomagnetic anomalies are exhibited at survey node coordinates 20,40 and 30,30. These anomalies are depicted by contour intervals of relatively narrow width located concentrically about the 20,40 and 30,30 locations. The probable cause of the alterations in the geomagnetic field are isolated ferrous metal objects of unknown mass and depth.

Due to the presence of high voltage power transmission lines in proximity to survey grid no. 4, it was impossible to conduct an electromagnetic ground conductivity survey. The EM-31 readings in both the horizontal and vertical dipole positions were completely unstable throughout the data stations within this survey grid and, as such, are unreliable.

The installation of the proposed monitoring well GW-4 at the location designated on the geomagnetic contour map is acceptable. Particular caution should be exercised during drilling to avoid subsurface objects (non-ferrous) which will not be detected by the magnetometer survey.

Survey Grid Area No. 5. A review of the magnetometer data obtained at this survey location indicates that the geomagnetic field intensities, as corrected, range from 56,370 to 58,387 gammas. Significant isolated geomagnetic anomalies are exhibited at survey node coordinates 0,30 and 30,0. The probable cause of these anomalies are ferrous metal objects located outside of the survey grid, but in proximity to the 0,30 and 30,0 locations. The geomagnetic gradient is relatively flat across the remainder of this survey grid.

Electromagnetic ground conductivity measurements obtained in survey grid no. 5 range from 15 (horizontal dipole) to 31 milllimhos/meter (vertical dipole). The ground conductivity gradient is gentle across the survey grid, indicating that conductive material is not present at a depth of <18 feet beneath this survey grid.

The installation of monitoring well GW-5 at the location designated on the geophysical contour maps is acceptable. The geomagnetic anomalies identified are on the south and west borders of this survey grid; therefore, if any adjustments or offsets are necessary, these areas should be avoided.

Survey Grid Area No. 6. A review of the magnetometer data obtained at this survey location indicates that geomagnetic field intensities, as corrected, range from 56,361 to 58,524 gammas. The geomagnetic gradient is steep and erratic throughout this survey grid with the exception of station nodes 10,20; 10,30; 20,20; 20,30; and 30,30. It is probable that high voltage power transmission lines located directly east and west of this survey grid have caused geomagnetic field interference. It is also possible that an abundance of ferrous metal objects are present beneath the anomalous majority of survey grid.

Due to the proximity of the aforementioned power lines to survey grid no. 6, it was impossible to conduct an electromagnetic ground

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conductivity survey. The EM-31 readings in both the horizontal and vertical dipole were completely unstable throughout the data stations within this survey grid and, as such, are unreliable.

The installation of the proposed monitoring well GW-6 at the location designated on the geomagnetic contour map is acceptable. If any adjustments or offsets are necessary, station nodes 10,20; 10,30; 20,30; or 30,30 will be acceptable. Particular caution should be exercised during drilling to avoid subsurface objects (non-ferrous) which will not be detected by the magnetometer survey.

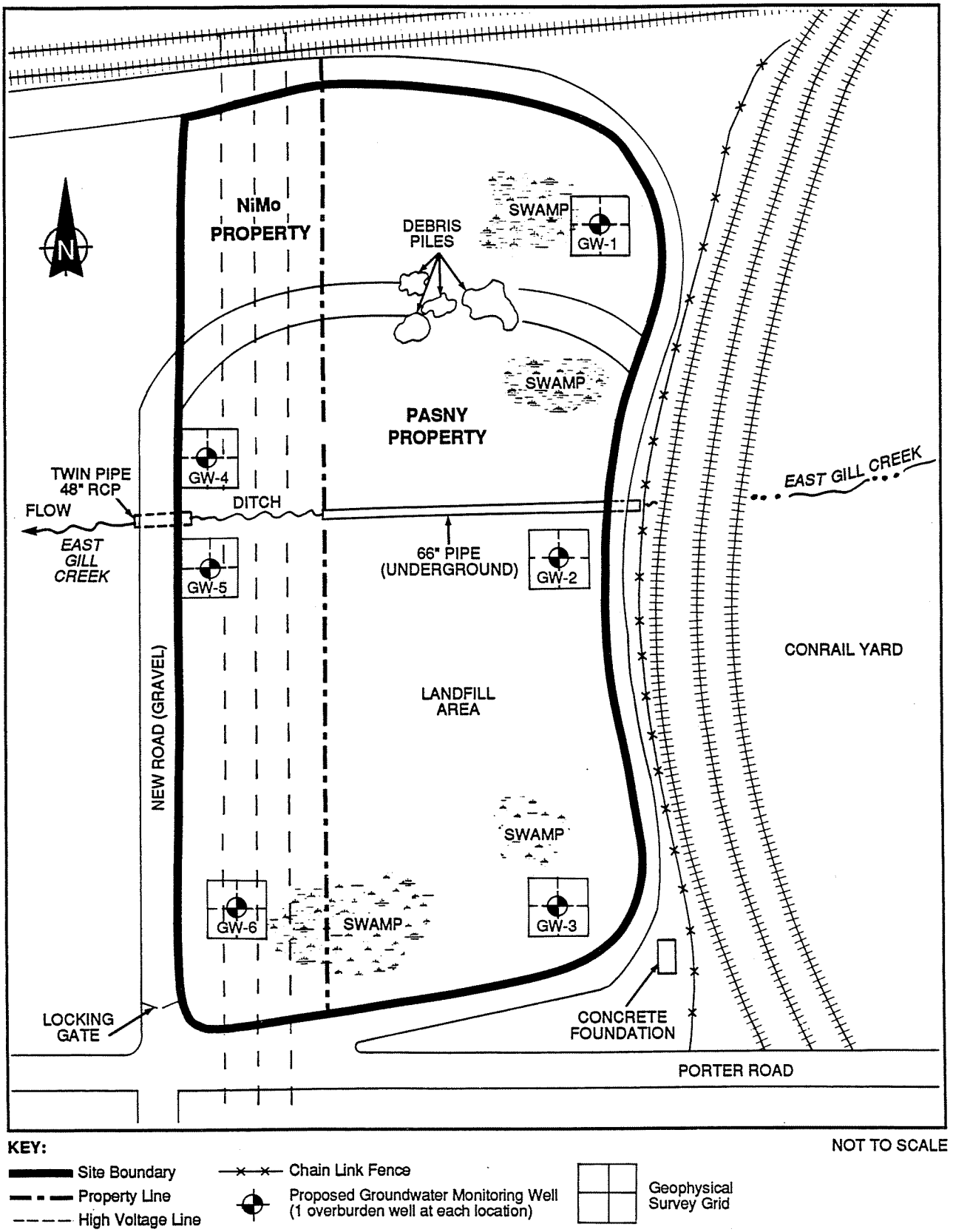


Figure 4-1
GEOPHYSICAL SURVEY GRIDS AND PROPOSED GROUNDWATER MONITORING WELL LOCATIONS, NEW ROAD LANDFILL SITE, NIAGARA FALLS, NEW YORK

5. CONCLUSIONS AND RECOMMENDATIONS

Based upon the interpretation of the geophysical survey results discussed in Section 4, particular care was taken when selecting the placement of 4 of the 6 monitoring wells at the New Road Landfill site.

Although the proposed locations for the installation of wells GW-2 through GW-6 were acceptable as indicated on the respective geophysical contour maps (see Appendix B), caution was exercised at the proposed locations for GW-3, GW-4, and GW-6. Concrete fragments (without steel reinforcement) appeared to be present beneath survey grid no. 3. Non-ferrous subsurface objects which were not detected by the magnetometer survey were potentially present beneath survey grid nos. 4 and 6. It was impossible to conduct an electromagnetic ground conductivity survey at these locations due to the proximity of high voltage power transmission lines. The location of monitoring well GW-1 was adjusted to a data station with grid coordinates 30,30. The west and southeast quadrants of grid no. 1 were avoided entirely due to the geomagnetic field and ground conductivity anomalies identified in Section 4.

The Underground Utilities Locating Service (UULS) was contacted (716/893-1133) to identify the location of buried service lines in the vicinity of the proposed drill sites. The file number associated with this search is J1315. Utility companies contacted include New York Telephone Company, Niagara Mohawk Power Corporation, National Fuel Corporation, Adelphia Cable Company, and the Niagara Falls Water Authority.

All proposed well locations were confirmed with a NYSDEC representative prior to the commencement of drilling.

APPENDIX A

MAGNETOMETER AND EM31 SURVEY DATA

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Table A-1

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

NEW ROAD LANDFILL SITE

Survey Grid No. 1

Station No.	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	41.5	33.0
0,10	43.5	29.0
0,20	30.0	37.5
0,30	34.5	31.0
0,40	31.5	25.0
10,0	43.0	28.5
10,10	45.5	24.5
10,20	46.0	23.5
10,30	26.5	35.5
10,40	35.5	30.0
20,0	38.5	26.0
20,10	40.5	22.5
20,20	44.0	21.0
20,30	42.0	23.0
20,40	23.0	38.0
30,0	36.0	23.5
30,10	36.0	23.0
30,20	39.5	23.0
30,30	42.0	22.5
30,40	41.5	26.0
40,0	32.5	22.5
40,10	32.5	21.5
40,20	37.0	22.5
40,30	39.0	24.0
40,40	43.5	23.5

02[UZ]YQ5030:D3131/3683/30

Table A-1 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

NEW ROAD LANDFILL SITE

Survey Grid No. 2

Station No.	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	36.0	25.0
0,10	34.5	24.5
0,20	35.0	25.0
0,30	37.5	25.5
0,40	34.0	28.5
10,0	35.5	25.5
10,10	34.0	26.0
10,20	35.5	25.5
10,30	38.0	31.0
10,40	34.0	29.0
20,0	35.5	25.5
20,10	34.0	27.5
20,20	38.0	25.5
20,30	37.0	26.0
20,40	35.0	27.0
30,0	34.5	25.0
30,10	34.0	26.5
30,20	37.5	26.6
30,30	35.5	30.0
30,40	37.0	24.5
40,0	36.0	23.5
40,10	35.0	27.0
40,20	38.0	28.5
40,30	36.0	29.0
40,40	35.0	26.0

02[UZ]YQ5030:D3131/3683/30

Table A-1 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

NEW ROAD LANDFILL SITE

Survey Grid No. 3

Station No.	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	41.0	28.0
0,10	40.5	28.5
0,20	39.0	31.0
0,30	44.0	32.5
0,40	49.0	41.0
10,0	40.5	27.0
10,10	42.5	29.0
10,20	43.5	27.5
10,30	50.0	32.5
10,40	55.0	43.0
20,0	38.5	30.0
20,10	40.5	33.5
20,20	44.5	32.0
20,30	49.0	33.0
20,40	53.5	38.0
30,0	35.0	29.5
30,10	33.0	35.0
30,20	41.5	32.0
30,30	49.0	32.0
30,40	55.0	35.5
40,0	39.0	22.0
40,10	42.5	25.5
40,20	38.5	28.5
40,30	41.5	29.5
40,40	51.0	33.0

02[UZ]YQ5030:D3131/3683/30

Table A-1 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST
GROUND CONDUCTIVITY READINGS
WITH EM31

NEW ROAD LANDFILL SITE

Survey Grid No. 4

Station No.	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	*	*
0,10	*	*
0,20	*	*
0,30	*	*
0,40	*	*
10,0	*	*
10,10	*	*
10,20	*	*
10,30	*	*
10,40	*	*
20,0	*	*
20,10	*	*
20,20	*	*
20,30	*	*
20,40	*	*
30,0	*	*
30,10	*	*
30,20	*	*
30,30	*	*
30,40	*	*
40,0	*	*
40,10	*	*
40,20	*	*
40,30	*	*
40,40	*	*

02[UZ]YQ5030:D3131/3683/30

*Reading unobtainable due to excessive eletromagnetic interference caused by high tension power transmission lines located east and west of this survey grid.

Table A-1 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST
GROUND CONDUCTIVITY READINGS
WITH EM31

NEW ROAD LANDFILL SITE

Survey Grid No. 5

Station No.	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	25.0	17.5
0,10	27.0	19.5
0,20	24.5	22.5
0,30	28.0	20.5
0,40	26.5	17.5
10,0	25.5	18.5
10,10	29.0	23.0
10,20	28.0	21.5
10,30	28.0	21.5
10,40	27.0	19.0
20,0	27.5	20.0
20,10	31.0	18.0
20,20	28.0	19.5
20,30	26.0	18.5
20,40	24.0	16.5
30,0	28.5	20.0
30,10	30.0	19.0
30,20	29.5	17.0
30,30	25.0	16.5
30,40	28.5	15.0
40,0	28.5	18.0
40,10	28.5	15.0
40,20	26.5	17.0
40,30	26.0	16.5
40,40	29.0	17.0

02[UZ]YQ5030:D3131/3683/30

Table A-1 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

NEW ROAD LANDFILL SITE

Survey Grid No. 6

Station No.	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	*	*
0,10	*	*
0,20	*	*
0,30	*	*
0,40	*	*
10,0	*	*
10,10	*	*
10,20	*	*
10,30	*	*
10,40	*	*
20,0	*	*
20,10	*	*
20,20	*	*
20,30	*	*
20,40	*	*
30,0	*	*
30,10	*	*
30,20	*	*
30,30	*	*
30,40	*	*
40,0	*	*
40,10	*	*
40,20	*	*
40,30	*	*
40,40	*	*

02[UZ]YQ5030:D3131/3683/30

*Reading unobtainable due to excessive eletromagnetic interference caused by high tension power transmission lines located east and west of this survey grid.

Table A-2

AVERAGE NORTH-SOUTH/EAST-WEST MAGNETOMETER READINGS

NEW ROAD LANDFILL SITE

Grid No. 1

Station No.	Average N-S/E-W (gammas)	Corrected Data* (gammas)
0,0	56,747	56,715
0,10	58,376	58,311
0,20	56,793	56,696
0,30	58,396	58,266
0,40	58,405	58,243
10,0	56,772	56,448
10,10	58,410	58,118
10,20	57,108	56,848
10,30	58,429	58,202
10,40	56,852	56,657
20,0	56,620	56,263
20,10	58,413	58,024
20,20	56,946	56,524
20,30	56,771	56,317
20,40	56,986	56,499
30,0	56,548	55,899
30,10	57,354	56,738
30,20	57,290	56,706
30,30	56,718	56,167
30,40	58,351	57,832
40,0	57,417	56,736
40,10	58,392	57,678
40,20	57,518	56,772
40,30	56,797	56,018
40,40	56,818	56,007

02[UZ]YQ5030:D3131/3686/35

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at a base station located outside of the survey grid.

Table A-2 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST MAGNETOMETER READINGS

NEW ROAD LANDFILL SITE

Grid No. 2

Station No.	Average N-S/E-W (gammas)	Corrected Data* (gammas)
0,0	56,805	56,802
0,10	56,627	56,621
0,20	56,567	56,558
0,30	56,813	56,802
0,40	56,472	56,458
10,0	56,769	56,741
10,10	57,825	57,799
10,20	56,681	56,658
10,30	56,842	56,822
10,40	56,602	56,585
20,0	58,457	58,426
20,10	56,801	56,767
20,20	56,740	56,703
20,30	56,874	56,834
20,40	56,810	56,767
30,0	56,910	58,853
30,10	56,802	56,746
30,20	56,893	56,842
30,30	56,710	56,662
30,40	56,709	56,664
40,0	56,504	56,444
40,10	56,584	56,522
40,20	56,783	56,718
40,30	57,004	56,936
40,40	58,550	58,479

02[UZ]YQ5030:D3131/3686/35

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at a base station located outside of the survey grid.

Table A-2 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST MAGNETOMETER READINGS

NEW ROAD LANDFILL SITE

Grid No. 3

Station No.	Average N-S/E-W (gammas)	Corrected Data* (gammas)
0,0	56,488	56,489
0,10	58,449	58,450
0,20	56,435	56,437
0,30	56,381	56,384
0,40	58,456	58,459
10,0	58,418	58,425
10,10	58,125	58,131
10,20	58,418	58,423
10,30	56,546	56,551
10,40	58,418	58,422
20,0	56,490	56,497
20,10	58,095	58,103
20,20	58,382	58,391
20,30	56,644	56,654
20,40	57,440	57,450
30,0	58,560	58,574
30,10	56,550	56,563
30,20	56,572	56,583
30,30	58,142	58,154
30,40	56,644	56,655
40,0	58,368	58,382
40,10	56,506	56,521
40,20	58,422	58,438
40,30	56,588	56,604
40,40	58,408	58,425

02[UZ]YQ5030:D3131/3686/35

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at a base station located outside of the survey grid.

Table A-2 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST MAGNETOMETER READINGS

NEW ROAD LANDFILL SITE

Grid No. 4

Station No.	Average N-S/E-W (gammas)	Corrected Data* (gammas)
0,0	56,775	56,776
0,10	56,508	56,511
0,20	56,843	56,847
0,30	56,647	56,653
0,40	56,494	56,501
10,0	56,516	56,530
10,10	56,456	56,469
10,20	56,809	56,821
10,30	56,488	56,498
10,40	56,717	56,726
20,0	56,693	56,709
20,10	56,806	56,823
20,20	56,629	56,645
20,30	56,426	56,446
20,40	58,323	58,345
30,0	56,561	56,590
30,10	56,743	56,770
30,20	56,542	56,568
30,30	58,380	58,404
30,40	56,594	56,617
40,0	56,775	56,805
40,10	56,684	56,716
40,20	56,462	56,495
40,30	56,472	56,507
40,40	56,602	56,638

02[UZ]YQ5030:D3131/3686/35

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at a base station located outside of the survey grid.

Table A-2 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST MAGNETOMETER READINGS

NEW ROAD LANDFILL SITE

Grid No. 5

Station No.	Average N-S/E-W (gammas)	Corrected Data* (gammas)
0,0	56,371	56,370
0,10	56,966	56,964
0,20	57,036	57,033
0,30	58,391	58,387
0,40	56,510	56,504
10,0	56,764	56,753
10,10	56,607	56,597
10,20	56,773	56,764
10,30	56,550	56,551
10,40	56,801	56,794
20,0	56,927	56,915
20,10	56,533	56,520
20,20	56,634	56,619
20,30	56,950	56,934
20,40	56,865	56,848
30,0	58,323	58,301
30,10	58,892	56,871
30,20	56,539	56,519
30,30	56,658	56,639
30,40	56,599	56,581
40,0	56,904	56,880
40,10	56,872	56,847
40,20	56,544	56,518
40,30	56,586	56,559
40,40	56,676	56,648

02[UZ]YQ5030:D3131/3686/35

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at a base station located outside of the survey grid.

Table A-2 (Cont.)

AVERAGE NORTH-SOUTH/EAST-WEST
MAGNETOMETER READINGS

NEW ROAD LANDFILL SITE

Grid No. 6

Station No.	Average N-S/E-W (gammas)	Corrected Data* (gammas)
0,0	58,466	58,465
0,10	56,492	56,490
0,20	58,485	58,482
0,30	57,132	57,127
0,40	56,367	56,361
10,0	56,506	56,494
10,10	58,532	58,522
10,20	56,414	56,405
10,30	56,834	56,826
10,40	58,440	58,433
20,0	57,802	57,789
20,10	56,485	56,471
20,20	56,645	56,630
20,30	56,466	56,450
20,40	56,818	56,801
30,0	56,527	56,504
30,10	58,546	58,524
30,20	58,530	58,509
30,30	56,413	56,393
30,40	58,444	58,425
40,0	57,376	57,352
40,10	56,433	56,407
40,20	58,464	58,437
40,30	58,346	58,318
40,40	57,717	57,688

02[UZ]YQ5030:D3131/3686/35

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at a base station located outside of the survey grid.

recycled paper

APPENDIX B

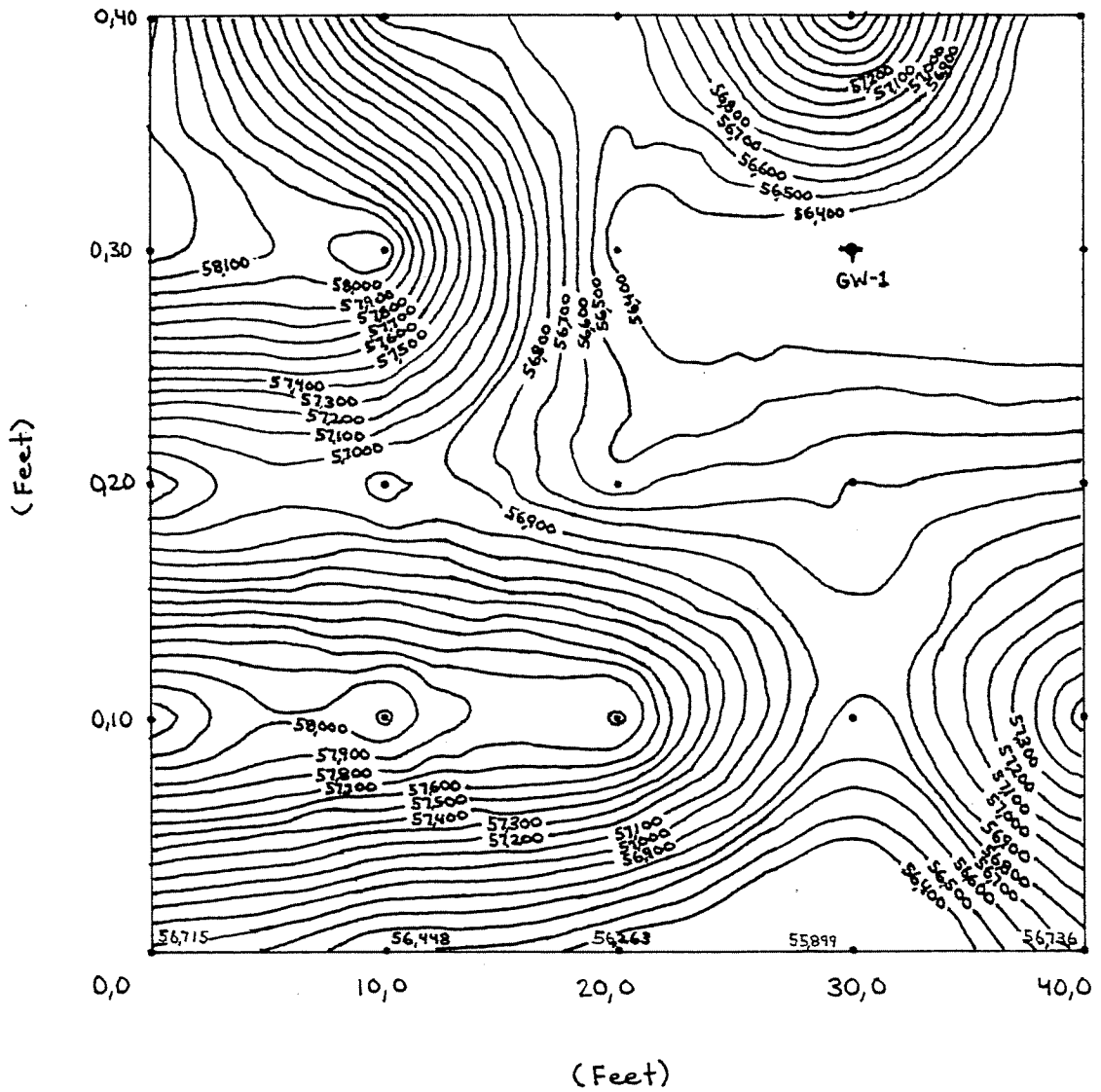
MAGNETOMETER AND
EM31 SURVEY CONTOUR MAPS

NEW ROAD LANDFILL

GRID NO. 1

MAGNETIC FIELD INTENSITY

(GAMMAS)



Contour Interval = 100 Gammas

▼ Proposed Well Location

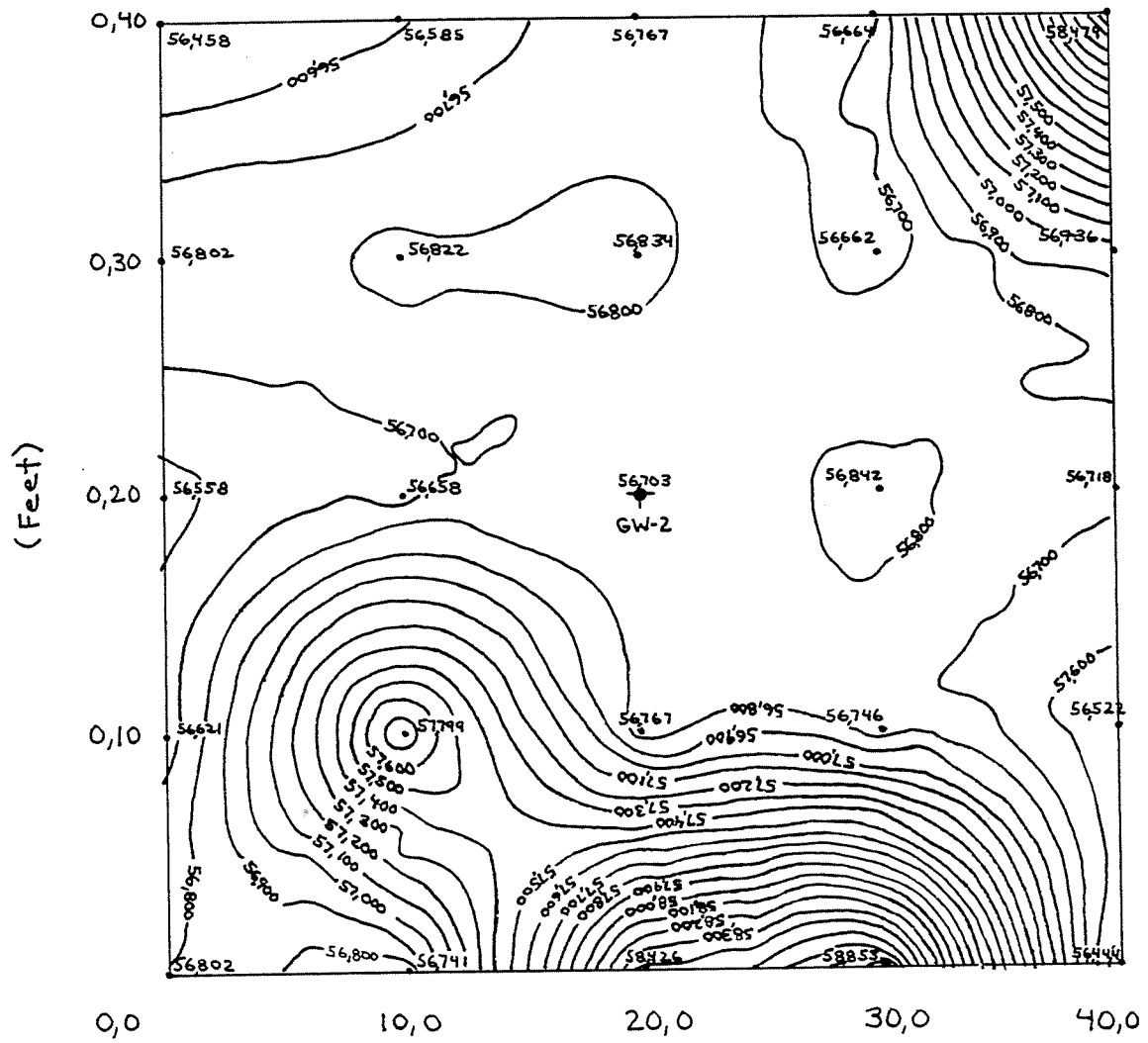
recycled paper ecology and environment

NEW ROAD LANDFILL

GRID NO. 2

MAGNETIC FIELD INTENSITY

(GAMMAS)



Contour Interval = 100 Gammas

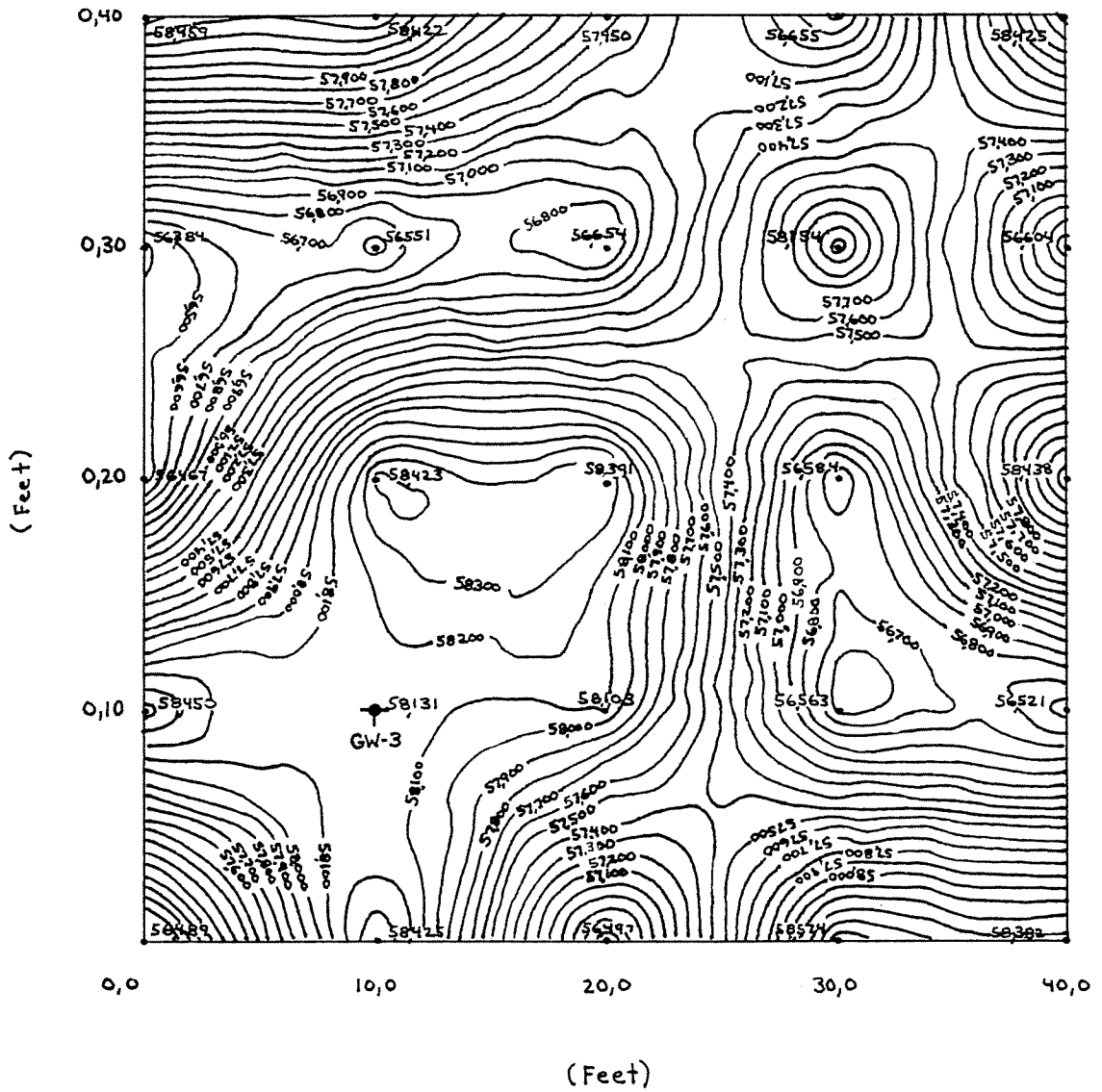
✦ Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 3

MAGNETIC FIELD INTENSITY

(GAMMAS)



Contour Interval = 100 Gammas

✦ Proposed Well Location

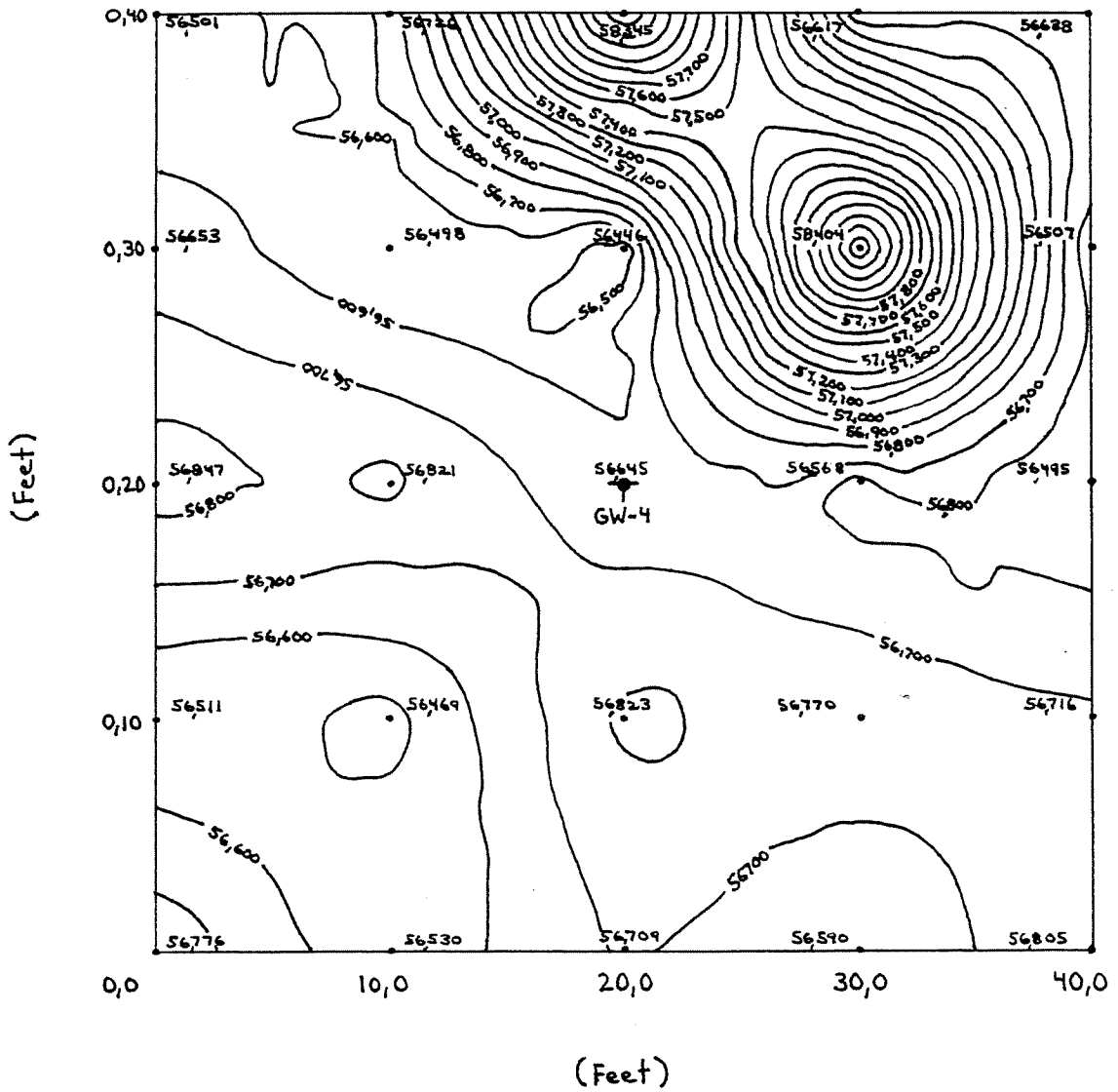
recycled paper
ecology and environment

NEW ROAD LANDFILL

GRID NO. 4

MAGNETIC FIELD INTENSITY

(GAMMAS)



Contour Interval = 100 Gammas

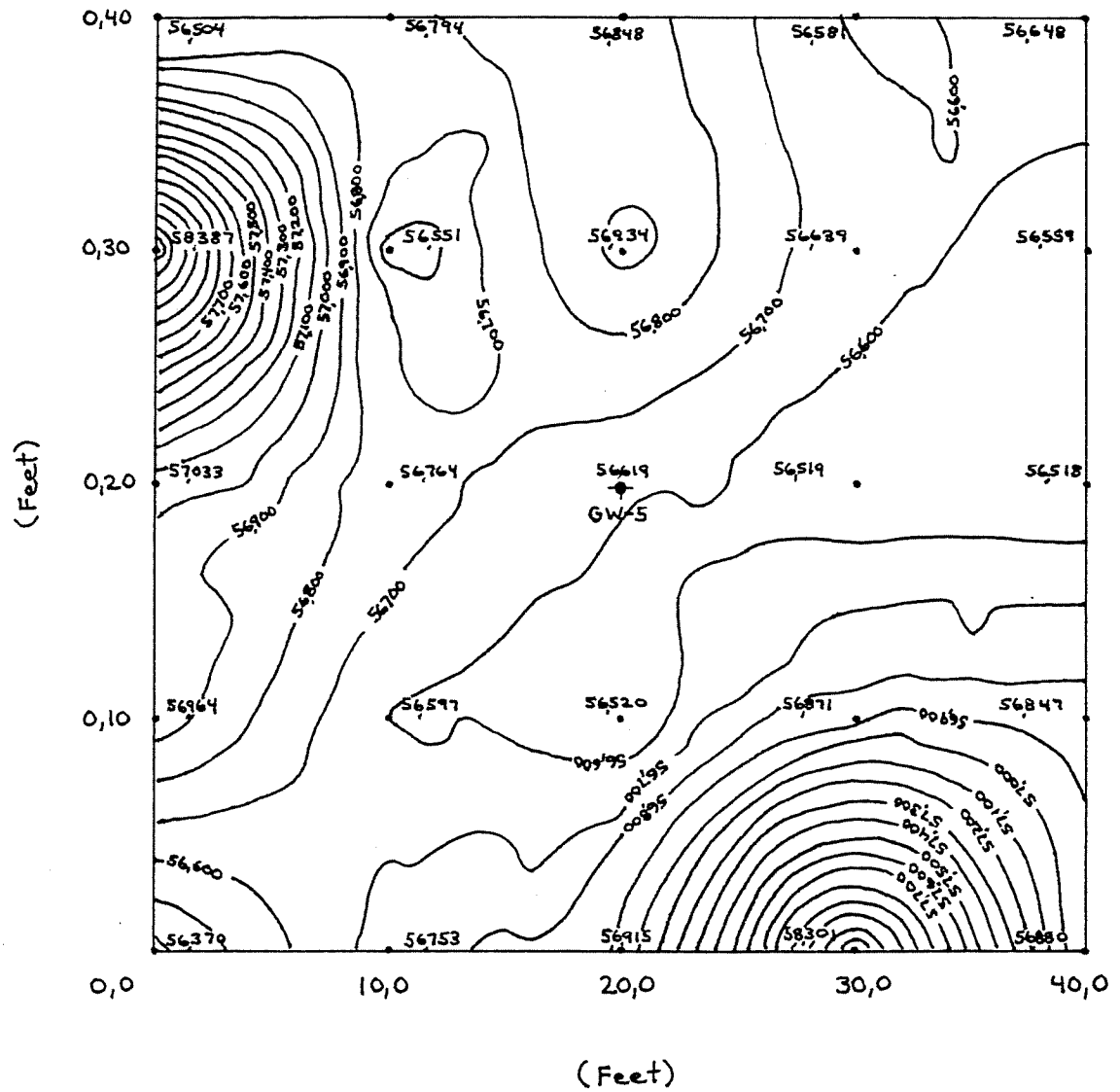
✝ Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 5

MAGNETIC FIELD INTENSITY

(GAMMAS)



Contour Interval = 100 Gammas

Proposed Well Location

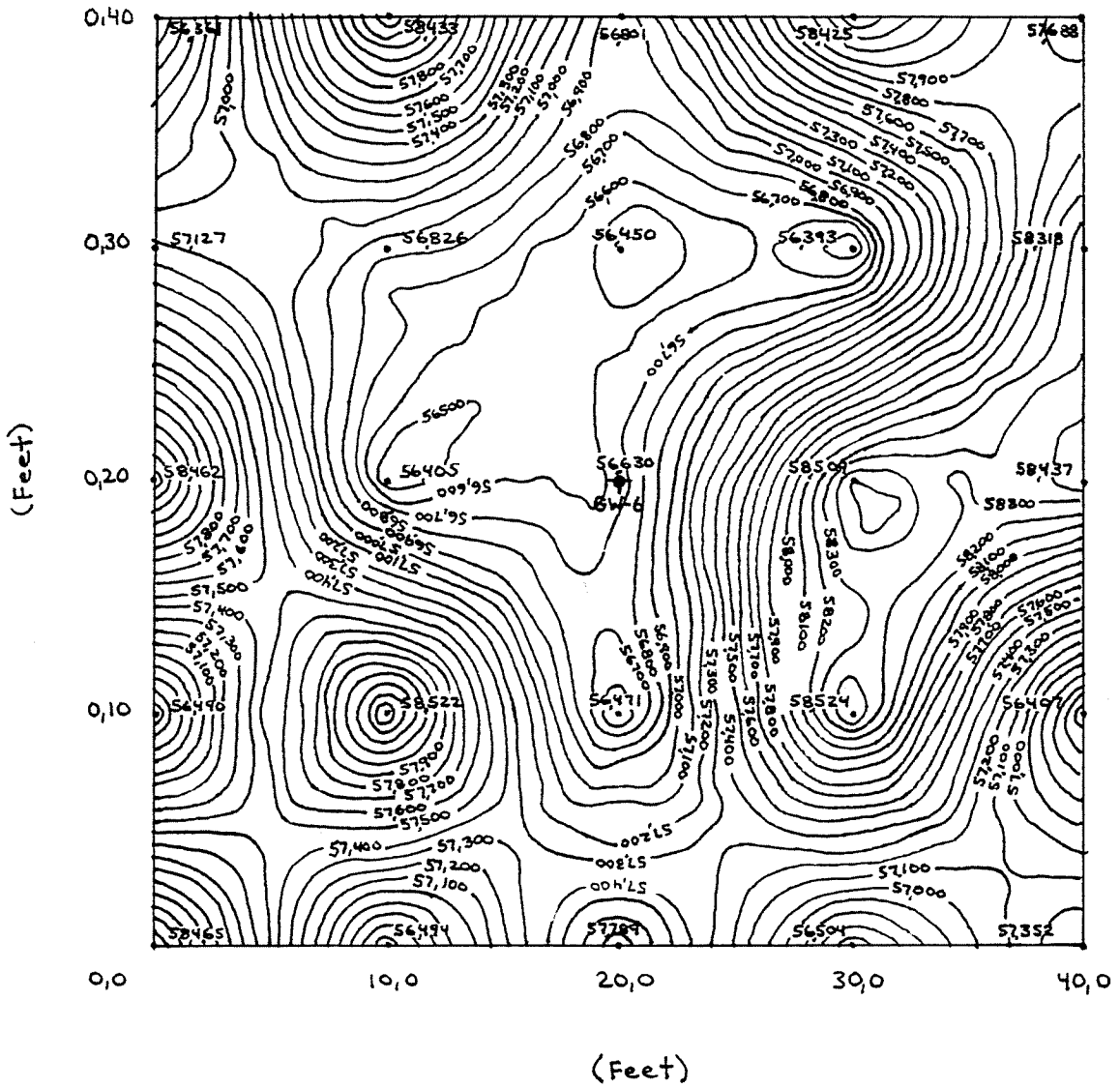
recycled paper ecology and environment

NEW ROAD LANDFILL

GRID NO. 6

MAGNETIC FIELD INTENSITY

(GAMMAS)



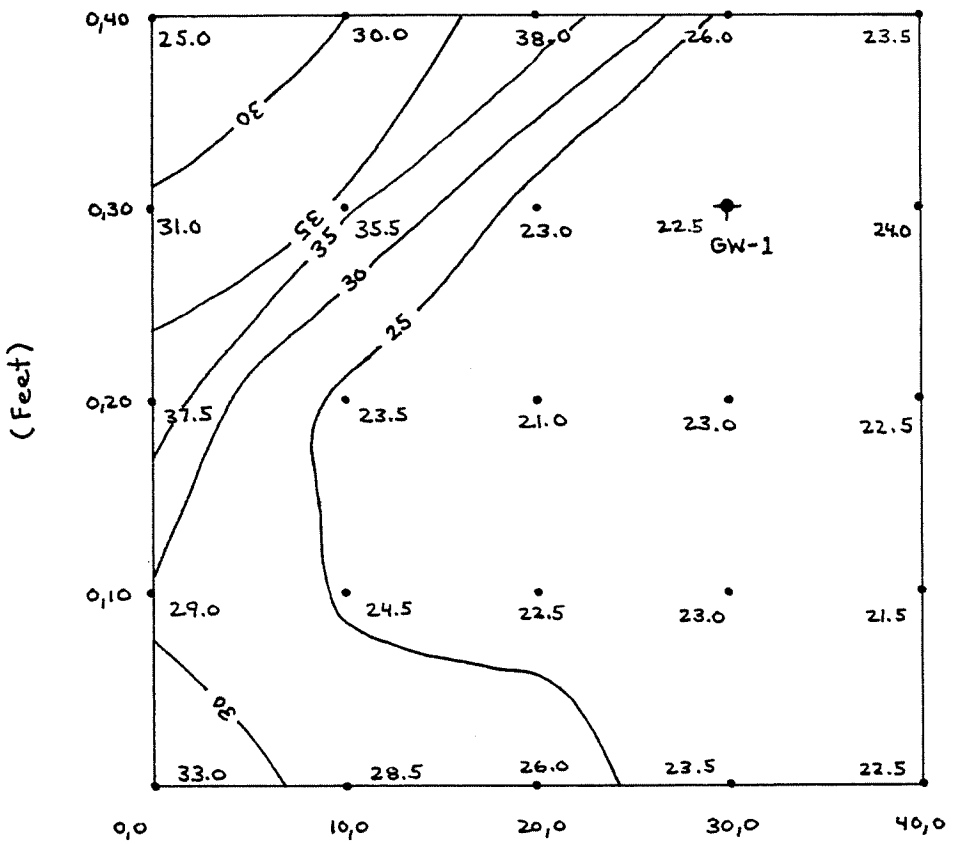
Contour Interval = 100 Gammas

✝ Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 1

HORIZONTAL DIPOLE
(millimhos/meter)



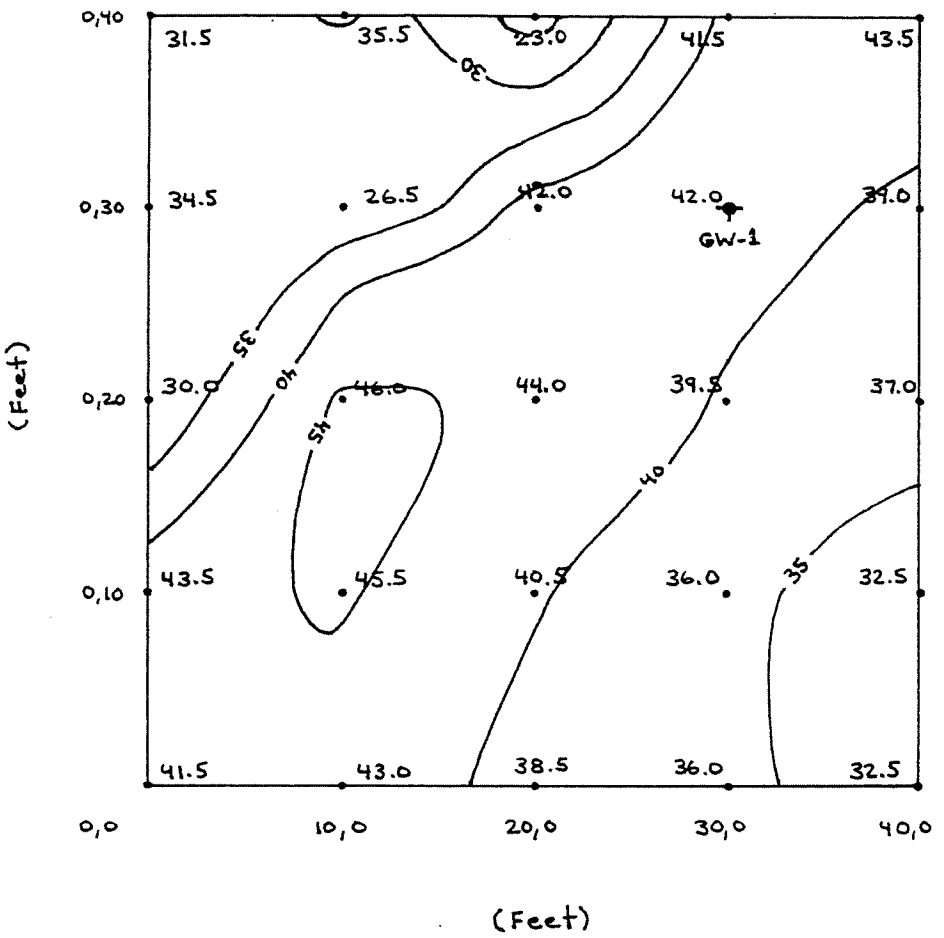
C.I. 5.0 millimhos/meter

Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 1

VERTICAL DIPOLE
(millimhos/meter)



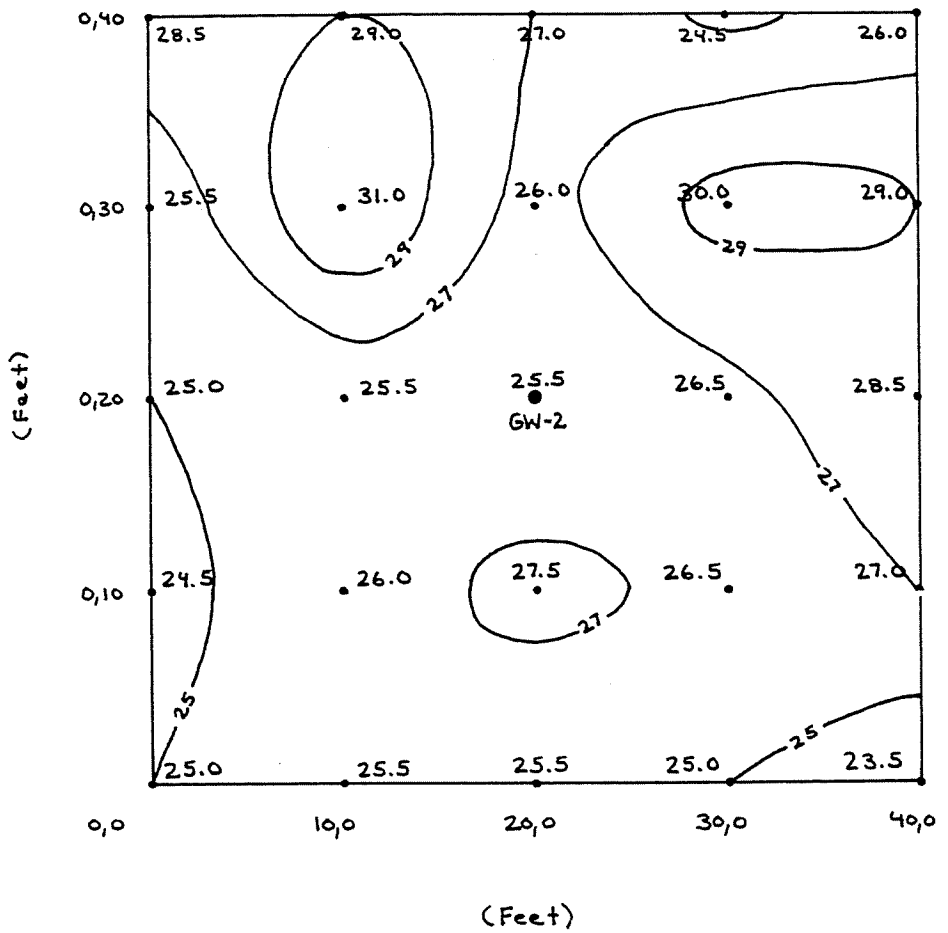
C.I. = 5.0 millimhos/meter

✦ Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 2

HORIZONTAL DIPOLE
(millimhos/meter)



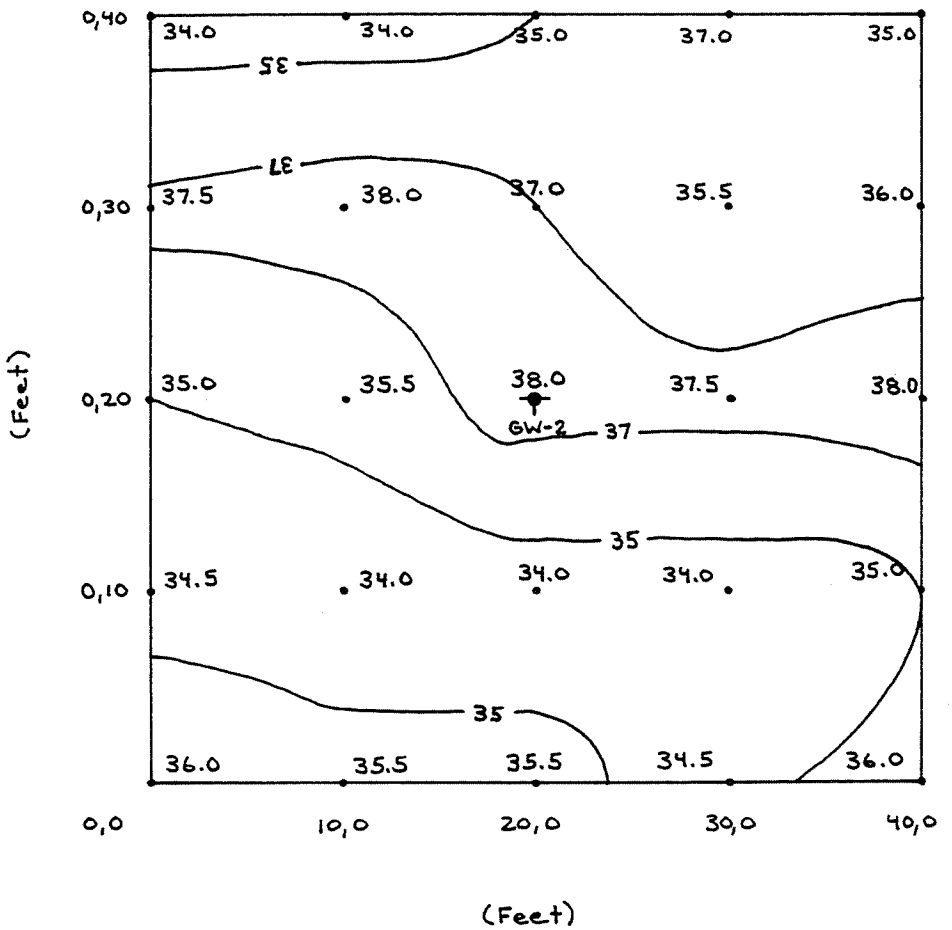
C.I. 2.0 millimhos/meter

✦ Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 2

VERTICAL DIPOLE
(millimhos/meter



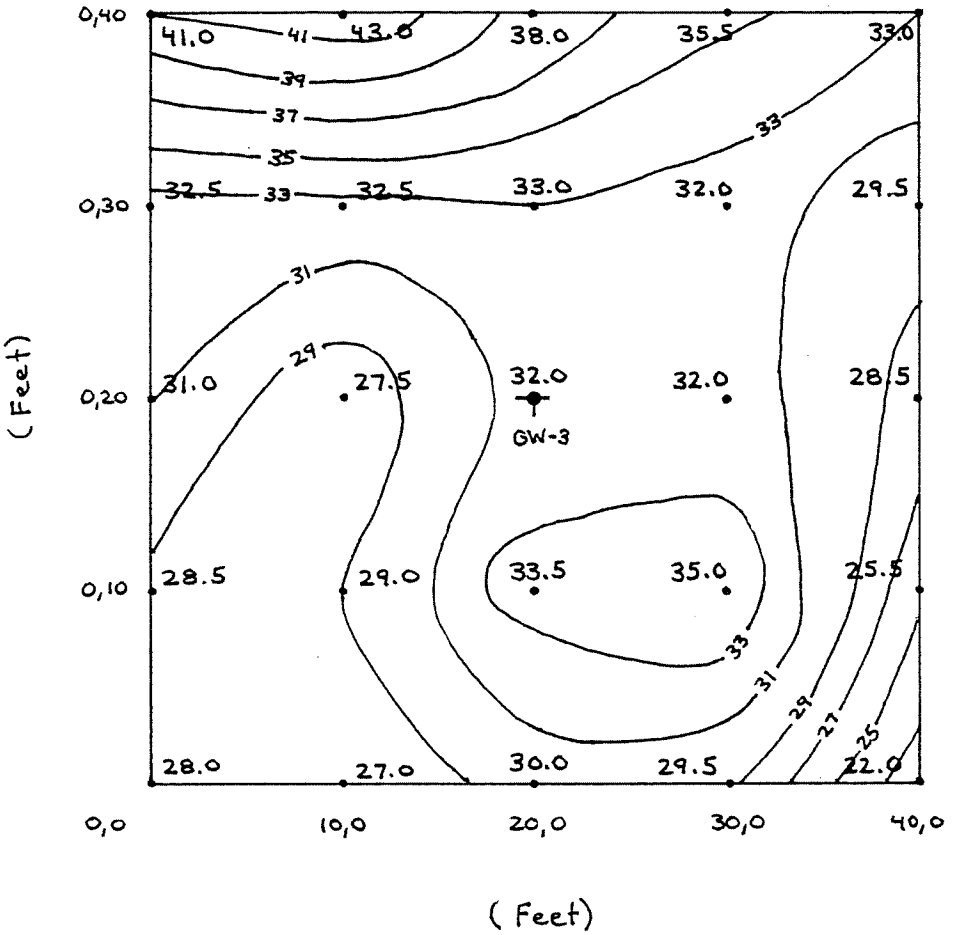
C.I. = 2.0 millimhos/meter

✦ Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 3

HORIZONTAL DIPOLE
(millimhos/meter)



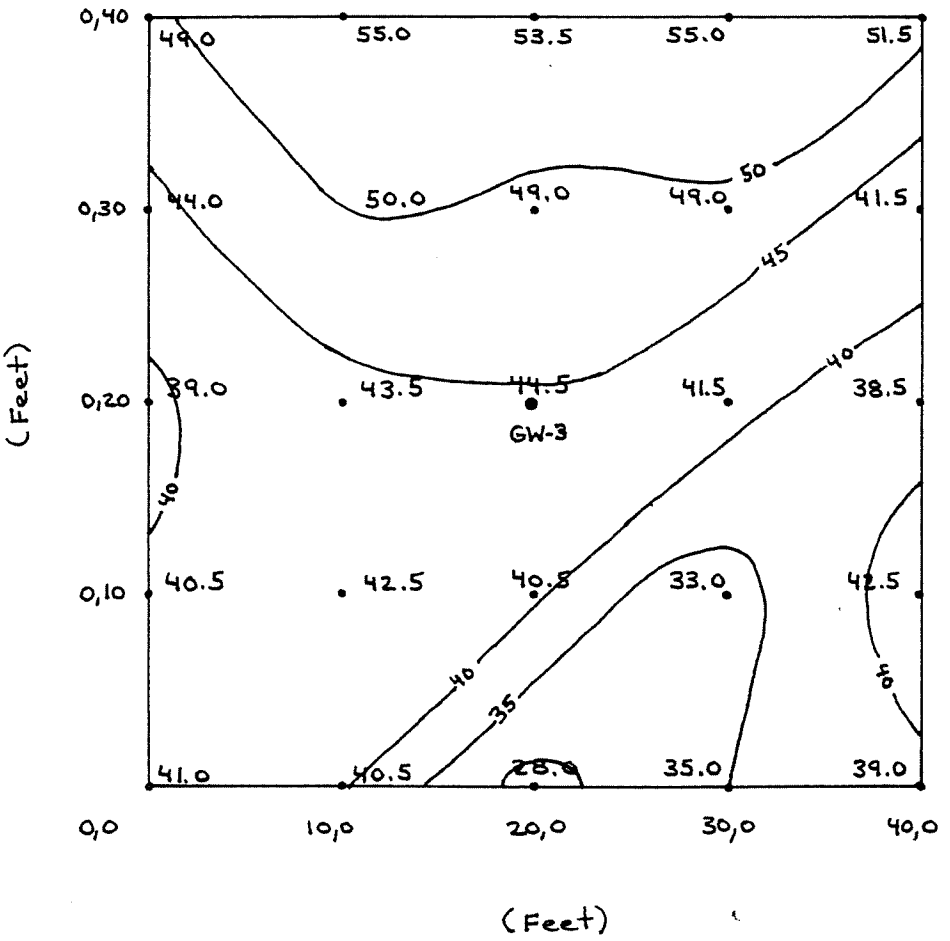
C.I. = 2.0 millimhos/meter

✦ Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 3

VERTICAL DIPOLE
(millimhos/meter)



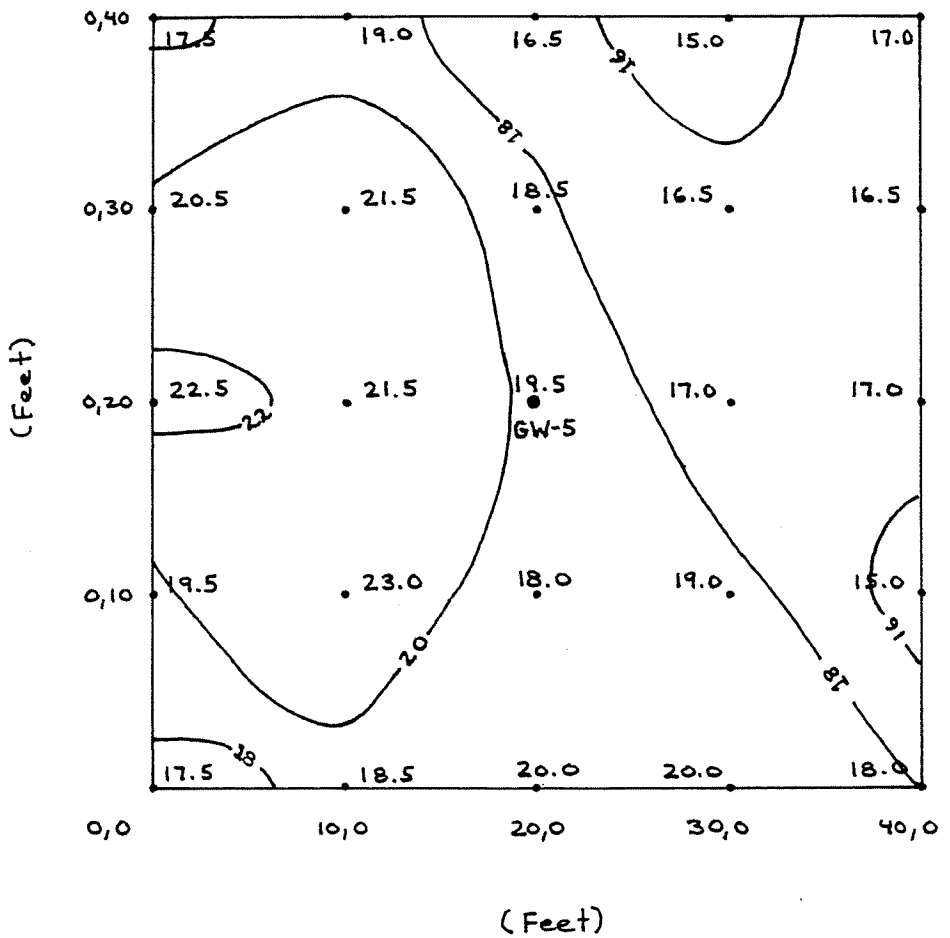
C.I. = 5.0 millimhos/meter

✝ Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 5

HORIZONTAL DIPOLE
(millimhos/meter)



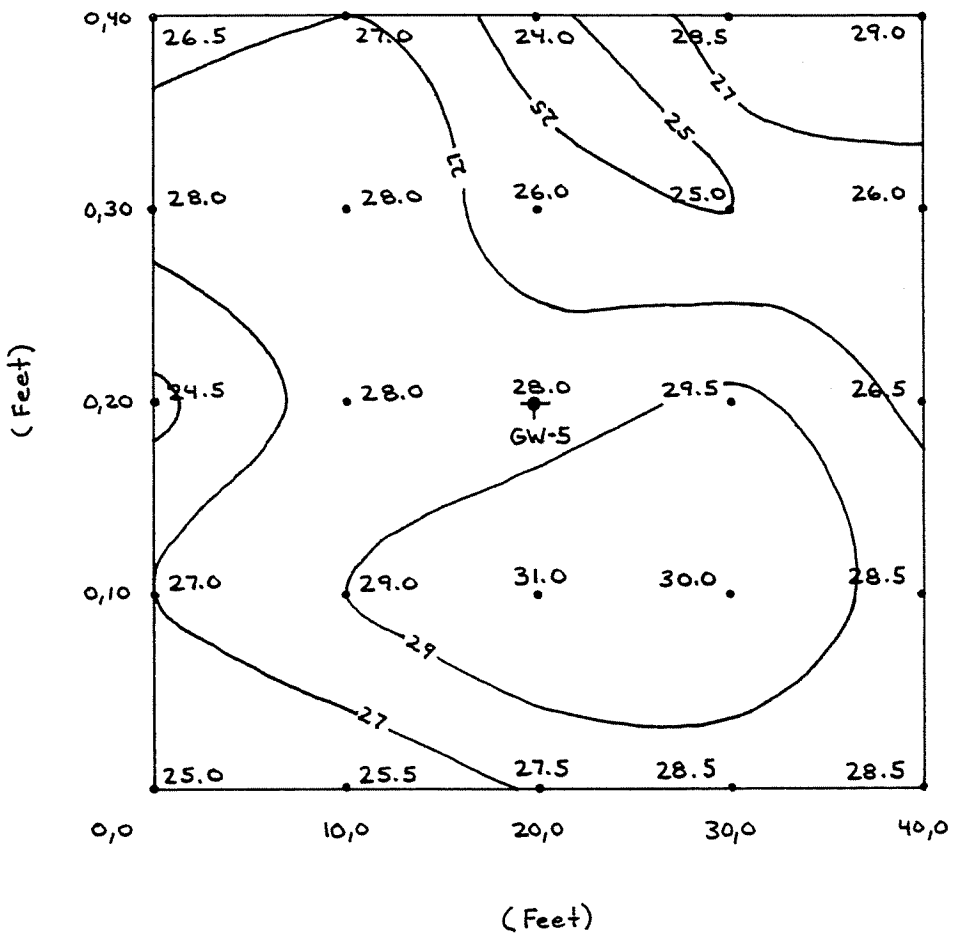
C.I. = 2.0 millimhos/meter

✦ Proposed Well Location

NEW ROAD LANDFILL

GRID NO. 5

VERTICAL DIPOLE
(millimhos/meter)



C.I. = 2.0 millimhos/meter

Proposed Well Location

APPENDIX C

DRILLING LOGS

recycled paper

ecology and environment

DATE
STARTED 10-22-90
FINISHED 10-23-90
SHEET 1 OF 2

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-1
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT New Road Landfill
NYSDEC Phase II

LOCATION NE corner of site
PASNY Property

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
5		SS	1	7 4 / 8 10		SS #1 0-2' 1.4' Recovery 0-0.4' Grey Gravelly (~10%), silty, sand Fill w/ organic matter (roots) + 1 small coal fragment. 0.4-1.4' Light brown clayey silt w/ organics (rootlets) + ½" gravel seam @ 1.1'.	Damp from surface infiltration HNu = 1-4 ppm but questionable
		SS	2	4 6 / 9 13	GW1-01 (5-6') ATTERBERGS		
10		SS	3	5 5 / 7 15		SS #2 4-6' 1.7' Recovery. 4-4.4' Light brown clayey silt low plasticity + moderate cohesiveness	DAMP HNu = 1 ppm but questionable
		SS	4	3 3 / 5 7		4.4-5.0' Grey silty clay mottled w/ yellow, red + greenish-grey. Some coarse sand grains (~5%)	
		SS	5	10 9 / 18 23	GW1-02 (12-13') (GRAIN SIZE)	5-5.7' Reddish brown silty clay, moderate plasticity, high cohesiveness, horizontally layered.	
15		SS	6	50 3"	GW1-03 (14-15')	SS #3 9-11' 2.0' Recovery 9-10.0' Reddish brown silty clay w/ coarse sand (~10%) + gravel (~10%) (DAMP)	DAMP/WET ▼ @ 10.0' HNu = 2 ppm.
20						10-11.0' Sandy, silty clay grading downward to a clayey sand. All reddish brown + wet. Sand near base (~50%) is fine to coarse.	
25						SS #4 11-13' 2.0' Recovery All wet, reddish brown sandy, silty clay. About 50% fine + 50% coarse. Clay is highly cohesive + moderately plastic. Sand is fine to coarse + subangular (appears to be chert). About 10% gravel (subangular to subround chert.	WET HNu = 0
30						SS #5 13-15' 1.8' Recovery 13-13.5' Same as SS #4 13.5-14.8' weathered bedrock Saturated angular fragments of grey dolostone (Lockport) from medium sand to coarse gravel in size. Some clay mixed in.	wet HNu = 0

WELL DIAGRAM: Cap; T.D. = 15.2'; screen: 5.0-15.0'; sand: 4.5-15.2'; seal: 3.5-4.5'; grout: 0-3.5'; 2" ID PVC screen + riser

640088

CLASSIFICATION/BY R. Watt

DATE
STARTED 10-22-90
FINISHED 10-23-90
SHEET 2 OF 2

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-1
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT New Road Landfill
NYSDEC Phase II

LOCATION NE corner of site

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						SS#16 15-15.3' 0.3' Recovery. Refusal after 0.3'. All weathered angular dolostone mixed in a clay (~20%) matrix.	WET HNu=0
						Augered to refusal @ 15.5'	
						From 15 to 15.2' is sandy clay backfill cleaned out of the bit.	

640088

CLASSIFICATION/BY R. Watts

DATE
STARTED 10-23-90
FINISHED 10-23-90
SHEET 1 OF 2

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-2
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT New Road Landfill NYSDEC Phase II

LOCATION East central side of site PASNY property.

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	PROFILE (Cl Si Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
		SS	1	9 / 10 / 18 / 8		SS #1 0-2' 0.4' Recovery. Sandy gravel w/ clay + silt. ~60% subangular dolomite gravel, 25% sand + remainder is clay/silt matrix	WET from surface infiltration. OVA = 0
5		SS	2	3 / 6 / 6 / 6		SS #2 4-6' 0.5' Recovery. Must have pushed a stone. All reddish brown highly plastic + cohesive clay w/ minor silt	OVA = 0 outside of sample + sampler is wet but fresh clay surface is moist.
		SS	3	23 / 50	↕ move all these up 2'		
10		SS	4	50 / 15 / 10 / 26*	* Bouncing refusal	SS #3 ~~9-11~~ 6-8' 1.0' Recovery Refusal @ 7.0' All same as SS #2 but coarse sand @ 6.5' + a 1.5" subangular dolomite fragment @ 7.0' Auger refusal @ 7.0' ∴ will move 6' back + try again – maybe on a boulder.	OVA = 0 SAME NOTE AS #2
		SS	5	3 / 6 / 5 / 5			
15		SS	6	6 / 4 / 1 / 4		SS #4 8-10' 0.8' Recovery Refusal @ 9.5' 8-8.4' Dry, weathered dolostone f. sand to gravel. 8.4-8.8' Dry, compact, highly plastic, red, lacustrine clay with silt. Horiz. layers.	OVA = 0 DRY. No water in this hole like in previous try 5' away.
	BEDROCK	SS	7	3 / 6 / 6 / 18			
	T.D. = 16.5'	SS	8	23*			
20	Bentonite seal from 16.5-15.75'						
	~~Bottom of Plug @ 15.5'~~						
	Screen: 5.5-15.5'						
25	Sand: 5.0-15.75'						
	Seal: 3.5-5.0'						
	Grout: 0-3.5'					SS #5 10-12' 1.0' Recovery 10-10.3' Grey clay, moist, moderate cohesiveness, highly plastic 10.3-10.6' Same grey clay mixed with 50-60% weathered dolomite (sand → gravel). 10.6-11.0' Similar red clay to SS #4 but mixed w/ coarse sand + fine gravel of subangular to subround dolomite. Fines are ~80-85%	OVA = 1 to 4 in weathered dolo. OVA = 0 in clay DRY
						SS #6 12-14' 0.4' Recovery. Pushed a cobble through presumably clay. Sample retrieved is from auger bit.	outside of spoon is very wet.

640088

CLASSIFICATION/BY R. Watt

DATE
STARTED 10-23-90
FINISHED 10-23-90
SHEET 2 OF 2

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-2
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT New Road Landfill
NYSDEC Phase II

LOCATION E central portion of site.
S of E. Gill Creek.

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						SS#7 14-16' 1.7' Recovery 14-15.1' Grey, wet clay mixed with ~20% subangular dolomite of cs sand to gravel size 15.1-15.7' Red clay as above with ~50% fine sand to gravel. Similar material to GW-1 (12-13') SS #8 16-16.2' 0.2' Recovery. Refusal on bedrock. Recovery is ~75% dolomite (sand to gravel) in a clay matrix (25%).	OVA = 0 OUTSIDE OF SPOON (4 IN) are very wet, but again, fresh sample surface (clay) is only moist.

340088

CLASSIFICATION/BY R. Watt

DATE
STARTED 10-24-90
FINISHED 10-24-90
SHEET 1 OF 1

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-3
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT New Road Landfill
NYSDEC Phase II

LOCATION SE corner of site
PASNY Property.

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
		SS	1	5 7 / 6 9		SS #1 0-2' 1.7' Recovery 0-1.7' Medium brown silty clay with gravel. Gravel is angular to subangular dolomite w/ some freshly broken surfaces.	DAMP OVA/HNu = 0
5		SS	2	4 6 / 8 17		SS #2 4-6' 1.8' Recovery 4-5.8' Red lacustrine clay w/ grey + yellow-grey silt partings. Clay is tight, compact, dry, highly plastic + moderately cohesive.	DRY OVA/HNu = 0
		SS	3	5 3 / 4 5			
10		SS	4	2 3 / 4 11			
		SS	5	18 50*	*4"	SS #3 9-11' 2.0' Recovery 9-11' Same as SS #2 but clay is now moist, particularly near the bottom.	MOIST OVA/HNu = 0
15		SS	6	50*	*1".	SS #4 11-13' 0.4' Recovery. Very moist to wet silty clay w/ ~25-30% coarse sand + gravel. Coarse portion is subangular to subround dolomite (to 1").	VERY MOIST OVA/HNu = 0
20	T.D. = 14.5' Ben. seal between rock + screen 12.8 – 14.5' Cap 12.7-12.8' Screen: 7.7-12.7' Sand: 7.0 – 12.8' Seal: 5.0-7.0' Grout: 0-5.0' 2" ID PVC screen + riser.					SS #5 13-15' 0.6' Recovery Refusal @ 13'10" All moist, weathered dolomite. Fine sand from angular gravel. Auger refusal @ 14.5' SS #6 14.5-14.5' 1" Recovery Recovered 6" of material from auger bit which is saturated sandy clay as in previous wells. There is water running on top of bedrock.	MOIST OVA = see log HNu = 0 Tar-like odor
25							

640088

CLASSIFICATION/BY R. Watt

DATE
STARTED 1-7-91
FINISHED 1-9-91
SHEET 1 OF 2

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-4
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT New Road Landfill
NYSDEC Phase II

LOCATION NW Corner Of NiMo
Property, Niagara Falls, NY

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER (0/6 6/12 12/18 18/24)	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
5	3" PVC; HQ CORE HOLE; NX CORE HOLE; TD = 31.59'; NX Corehole: 16.84'-31.59'; HQ Corehole (rock socket): 12.0'-16.84'; 3" PVC: 0'-16.5'	SS	1	4 5 / 8 7		0'-1.2': Moist, medium brown Clay with minor silt and angular dolostone fragments throughout (Ø ≈ 0.75 cm). Sample exhibits moderate plasticity. Grass and rootlets are observed 0-0.3'.	4¼" ID HSAs advanced with ATV mounted Mobile B-57 drill rig. Split-spoons (2" ID x 2') driven with 140 pound hammer falling 30".
		SS	2	4 7 / 15 17		4'-5.85': Very moist (4'-4.25'), medium brown clay with narrow (<1mm) silt seams, dolostone fragments as above. 4.25'-5.85': moisture content is lower (moist).	SS-1: 2.0' Drive 1.2' Recovery
10		SS	3	4 3 / 3 4		9'-11.0': Moist (9-9.92), medium brown clay with minor silt present as above. 9.92'-11.0': Very moist, medium brown Clay with very fine sand and silt, non-plastic.	SS-2: 2.0' Drive 1.85' Recovery
15							SS-3: 2.0' Drive 2.0' Recovery
20						* Bedrock auger refusal at 12.0' below ground surface.	Instrumentation: SS-1: no HNU response SS-2: no HNU response SS-3: no HNU response
25						(HQ) rock core recovery: Run No. 1 from 12.0'-16.84' Rate of advancement ~ 0.35'/min. Rec. = 4.10'/4.84' run = 85% RQD = 3.85'/4.10' rec = 94% Medium grey, non-fossiliferous, tight, non-vugged, fine grained, massive dolostone - Lockport Form.	No CGI response during boring.
30							
35							

640088

CLASSIFICATION/BY D. Johnson

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DATE
STARTED 1.7.91
FINISHED 1.9.91
SHEET 2 OF 2

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-4
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT New Road Landfill NYSDEC Phase II

LOCATION NW Corner of Ni Mo Property, Niagara Falls, NY

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						(NX) rock core recoveries:	
						Run No. 2 from 16.5'-21.84'	
						16.5'-16.84' - Grout from installation of rock-socket 1-7-91.	
						Rec. = 100% (5.0'/5.0')	
						RQD = 100% (5.0'/5.0')	
						Medium grey, massive, lockport dolostone, unweathered, tight-fine grained. Narrow weathered (moderately) horizontal fracture at 17.14' ≈ 0.5" width.	
						Run No. 3 from 21.84'-26.84'	
						Rec. = 4.75'/5.0' = 95%	
						RQD = 4.75'/4.75' = 100%	
						Medium grey, massive, dolostone, as above. Narrow (<0.25" width) horizontal, moderately weathered fracturures at 22.14', 22.54', and 26.14'.	
						Run No. 4 from 26.59'-31.59'	
						Rec. = 5.0'/5.0' = 100%	
						RQD = (* refer to core box upon return to ASC)	
						Medium grey, massive dolostone, as above, weathered fractures (narrow) at *, Vuggy zone observed at *, sphalerite XLS fill vugs.	

640088

CLASSIFICATION/BY D. Johnson

DATE
STARTED 1.3.91
FINISHED 1.4.91
SHEET 1 OF 1

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-5
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT New Road Landfill NYSDEC Phase II

LOCATION West Side of Ni Mo Property, Niagara Falls, NY

DEPTH - FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
5	2" PVC; LCAP; TD=11.03'; *Screen: 6.03'-11.03'; sand: 5.0'-11.03'; seal: 3.0'-5.0'; grout: 0'-3.0'; * screen is 0.010" slot	SS	1	2/4, 3/2		0'-0.18': Grass and rootlets 0.18'-1.8': Moist, red-brown Clay with minor silt, medium-high plasticity. 4.0'-5.6': Moist, red-brown Clay with minor silt, medium plasticity, compact. * Driller encounters rock or gravel material at 8.5'-9.0'. 9.0'-9.65': Wet, medium brown Clay with minor sand (medium) and dolostone fragments ≤0.5" Ø - angular. Reattempt 11.0'-11.03': Bedrock refusal encountered. Wet, medium brown clay with minor sand (medium) in bottom of split spoon.	4¼" ID HSAs advanced with ATV mounted Mobile B-57 drill rig. Split-spoons (2" ID x 2') driven with 140 lb. hammer falling 30". SS-1: 2.0' Drive 1.8' Recovery SS-2: 2.0' Drive 1.6' Recovery SS-3: 2.0' Drive 0.65' Recovery SS-4 0.3' Drive 0.3' Recovery * No HNU response above background obtained from any sample.
		SS	2	4/8, 6/11			
10		SS	3	9/4, 5/4			
15		SS	4	—/—, —/—			
20							

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DATE
STARTED 1.2.91
FINISHED 1.8.91
SHEET 1 OF 2

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-6
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT New Road Landfill NYSDEC Phase II

LOCATION SW Corner of Ni Mo Property, Niagara Falls, NY

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER (0/6 6/12 12/18 18/24)	PROFILE (Cl Si Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
0	3" PVC	SS	1	2 2 / 4 5		0'-0.35': Very moist, medium brown silty Clay with grass and rootlets.	4¼" ID HSAs advanced with ATV mounted Mobile B-57 drill rig.
						0.35'-2.0': Very moist, medium brown Clay with minor silt.	Split-spoons (2"ID×2') driven with 140 lb. hammer falling 30".
5		SS	2	3 6 / 9 13		4'-6.0': Moist, medium brown-red Clay with minor silt (lenses <1mm in thickness), plastic, cohesive.	SS-1: 2.0' Drive 2.0' Recovery
							SS-2: 2.0' Drive 2.0' Recovery
10		SS	3	3 3 / 4 4		9'-11.0': Moist, red-brown Clay with minor silt, as above.	SS-3: 2.0' Drive 2.0' Recovery
						* 10.6' – Moisture increases slightly, less plastic than surrounding depths.	SS-4: 2.0' Drive 0.6' Recovery
		SS	4	4 5 / 9 21		13'-13.6': Moist, red-brown sandy Clay, low plasticity	SS-5: 2.0' Drive 1.45' Recovery
15		SS	5	18 12 / 17 20		15'-16.45': Moist, red-brown silty Clay with subangular dolostone fragments (≤2"Ø).	* No HNU or OVA response obtained above back ground from any sample.
	HQ COREHOLE					* Complete bedrock auger refusal at 17.5'.	
20						(HQ) rock core recovery:	
						Run No. 1 from 17.5'-22.5'	
25	NX COREHOLE					Rec = 5.0'/5.0' = 100%	
						RQD = 5.0'/5.0' = 100%	
30							
35							
	TD = 36.4' NX corehole: 22.5-36.4' HQ Corehole (rock socket): 17.5'-22.5' 3" PVC 0'-21.66'						
40							

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CLASSIFICATION/BY D. Johnson

DATE
STARTED 1-2-91
FINISHED 1-8-91
SHEET 2 OF 2

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-6
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT New Road Landfill
NYSDEC Phase II

LOCATION SW Corner Of Ni Mo Property, Niagara Falls, NY

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES

(HQ) rock core run No. 1 17.5'-22.5' cont.:

Medium grey dolostone (Lockport Formation), no calcite observed. Moderate solutioning from 19.5'-21.0', any horizontal fractures are "core-breaks". Significant weathering is not observed, section is competent. Rock socket completed in this interval.

(NX) rock core recoveries:

Run No. 2 from 19.0'-26.3'
(3.5' of grout inside rock socket)
Rec = 3.8'/3.8' = 100%
RQD = 3.8'/3.8' = 100%
Medium grey, unweathered lockport Dolostone, fine grained, massive.

Run No. 3 from 26.3'-31.4':
Rate of advancement ≈ 0.55'/min
Rec = 5.1'/5.1' = 100%
RQD = 4.2'/5.1' = 82%
Medium grey, massive, lockport Dolostone, as above.

Run No. 4 from 31.4'-36.4'
Rec = 5.0'/5.0' = 100%
RQD = 5.0'/5.0' = 100%
Medium grey, massive Lockport Dolostone, narrow (< 1") weathered horizontal fracture at 32.0'

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APPENDIX D

ANALYTICAL DATA SUMMARY SHEETS FROM WATER, SOIL, AND SEDIMENT SAMPLING

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm results.

CODES RELATING TO QUANTITATION

J = Analyte present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value expected to be higher.

[]= Inorganic analyte present. As values approach the IDL the quantitation may not be accurate.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

DATA SUMMARY FORM: VOLATILES 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	DW-1		FB-1		1-R		1-RRE		5-R		10-R		GW-1		GW-2		GW-3	
	Dilution Factor	1.0		50		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	Location					more acceptable													
CRQL	COMPOUND																		
10	Chloromethane																		
10	Bromomethane																		
10	*Vinyl Chloride																		
10	Chloroethane																		
5	*Methylene Chloride	6	B	9300		6	B	7	B	4	B	6	B	5	B	5	B	5	B
10	Acetone	22	B					34	B	17	B								
5	Carbon Disulfide																		
5	*1,1-Dichloroethene																		
5	1,1-Dichloroethane																		
5	*Total-1,2-Dichloroethene																		
5	Chloroform	12																	
5	*1,2-Dichloroethane																		
10	*2-Butanone																		
5	*1,1,1-Trichloroethane																		
5	*Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane	7																	

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: V O L A T I L E S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	DW-1		FB-1		1-R		1-R RE		5-R		10-R		GW-1		GW-2		GW-3	
	Dilution Factor	1.0		50		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	Location																		
CRQL	COMPOUND																		
5	*1,2-Dichloropropane																		
5	Cis-1,3 Dichloropropene																		
5	Trichloroethene																		
5	Dibromochloromethane	1	J																
5	1,1,2 Trichloroethane																		
5	*Benzene																		
5	Trans-1,3 Dichloropropene																		
5	Bromoform																		
10	4-Methyl-2-pentanone																		
10	2-Hexanone																		
5	*Tetrachloroethene																		
5	1,1,2,2-Tetrachloroethane																		
5	*Toluene																		
5	*Chlorobenzene																		
5	*Ethylbenzene																		
5	*Styrene																		
5	*Total Xylenes																		

CRQL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: V O L A T I L E S 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND	GW-4		GW-4RE		GW-5		GW-6		SW-1		SW-2		SW-2 DL		SW-3		SW-4	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		10		20		5.0		1.0	
	Location	more acceptable																	
10	Chloromethane																		
10	Bromomethane																		
10	*Vinyl Chloride																		
10	Chloroethane																		
5	*Methylene Chloride	6	B	7	B	4	B	8	B	8	B	2500	J	2400		550		8	B
10	Acetone			25				18	B			140	B					9	B
5	Carbon Disulfide																		
5	*1,1-Dichloroethene																		
5	1,1 Dichloroethane																		
5	*Total-1,2-Dichloroethene																		
5	Chloroform																		
5	*1,2-Dichloroethane																		
10	*2-Butanone																		
5	*1,1,1-Trichloroethane																		
5	*Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane																		

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: V O L A T I L E S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-4	GW-4RE	GW-5	GW-6	SW-1	SW-2	SW-2 DL	SW-3	SW-4
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	10	10	5.0	1.0
	Location									
CRQL	COMPOUND									
5	*1,2-Dichloropropane									
5	Cis-1,3 Dichloropropene									
5	Trichloroethene									
5	Dibromochloromethane									
5	1,1,2 Trichloroethane									
5	*Benzene					U			U	
5	Trans-1,3 Dichloropropene									
5	Bromoform									
10	4 Methyl 2 pentanone									
10	2 Hexanone									
5	*Tetrachloroethene					4 J				
5	1,1,2,2 Tetrachloroethane									
5	*Toluene					U			U	
5	*Chlorobenzene					↓			↓	
5	*Ethylbenzene									
5	*Styrene									
5	*Total Xylenes									

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: V O L A T I L E S 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND	Sample No. / Dilution Factor / Location																	
		VBLKW1 1.0		VBLKW2 1.0		VBLKW3 1.0		VBLKW4 1.0		VBLKW5 1.0		VBLKW6 1.0		VBLKW7 1.0		10R-MS 1.0		10R-MSD 1.0	
10	Chloromethane																		
10	Bromomethane																		
10	*Vinyl Chloride																		
10	Chloroethane																		
5	*Methylene Chloride	7		14		9		5		10		12		6		7	B	7	B
10	Acetone					3	J			16		9	J	16					
5	Carbon Disulfide																		
5	*1,1-Dichloroethene																		
5	1,1 Dichloroethane																		
5	*Total-1,2-Dichloroethene																		
5	Chloroform																		
5	*1,2-Dichloroethane																		
10	*2-Butanone																		
5	*1,1,1-Trichloroethane																		
5	*Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane																		

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: V O L A T I L E S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND	Sample No. / Dilution Factor / Location																	
		VBLKW1		VBLKW2		VBLKW3		VBLKW4		VBLKW5		VBLKW6		VBLKW7		10R-MS		10R-MSD	
		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
5	*1,2-Dichloropropane																		
5	Cis-1,3 Dichloropropene																		
5	Trichloroethene																		
5	Dibromochloromethane																		
5	1,1,2 Trichloroethane																		
5	*Benzene																		
5	Trans-1,3 Dichloropropene																		
5	Bromoform																		
10	4 Methyl 2 pentanone																		
10	2 Hexanone																		
5	*Tetrachloroethene																		
5	1,1,2,2 Tetrachloroethane																		
5	*Toluene																		
5	*Chlorobenzene																		
5	*Ethylbenzene																		
5	*Styrene																		
5	*Total Xylenes																		

CRDL = Contract Required Detection Limit

*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: VOLATILES 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES (ug/L)

To calculate sample quantitation limit: (CRQL * Dilution Factor)

CRQL	COMPOUND	GW-5MS		GW-5MSD		SW-4MS		SW-4MSD											
	Sample No.	GW-5MS		GW-5MSD		SW-4MS		SW-4MSD											
	Dilution Factor	1.0		1.0		1.0		1.0											
	Location																		
10	Chloromethane																		
10	Bromomethane																		
10	*Vinyl Chloride																		
10	Chloroethane																		
5	*Methylene Chloride	5	B	5	B	9	B	9	B										
10	Acetone					9	B												
5	Carbon Disulfide																		
5	*1,1-Dichloroethene																		
5	1,1 Dichloroethane																		
5	*Total-1,2-Dichloroethene																		
5	Chloroform																		
5	*1,2-Dichloroethane																		
10	*2-Butanone																		
5	*1,1,1-Trichloroethane																		
5	*Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane																		

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: VOLATILES 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-5MS	GW-5MSD	SW-4MS	SW-4MSD														
	Dilution Factor	1.0	1.0	1.0	1.0														
	Location																		
CRQL	COMPOUND																		
5	*1,2-Dichloropropane																		
5	Cis-1,3 Dichloropropene																		
5	Trichloroethene																		
5	Dibromochloromethane																		
5	1,1,2 Trichloroethane																		
5	*Benzene																		
5	Trans-1,3 Dichloropropene																		
5	Bromoform																		
10	4-Methyl-2 pentanone																		
10	2-Hexanone																		
5	*Tetrachloroethene																		
5	1,1,2,2-Tetrachloroethane																		
5	*Toluene																		
5	*Chlorobenzene																		
5	*Ethylbenzene																		
5	*Styrene																		
5	*Total Xylenes																		

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: V O L A T I L E S 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	S-1		S-2		S-3		S-4		SED-1		SED-2		SED-3		SED-4		SED-5	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	% Moisture	42		8		23		8		28		42		23		40		17	
	Location																		
CRQL	COMPOUND																		
10	Chloromethane																		
10	Bromomethane																		
10	Vinyl Chloride																		
10	Chloroethane																		
5	Methylene Chloride	33	B	6	B	9	B	7	B	8	B	11	B	8	B	25	B	7	B
10	Acetone	35	B	4	B	4	B			23	B	6	B	15	B	12	B	9	B
5	Carbon Disulfide																		
5	1,1 Dichloroethene																		
5	1,1 Dichloroethane																		
5	Total 1,2 Dichloroethene																		
5	Chloroform																		
5	1,2 Dichloroethane																		
10	2 Butanone																		
5	1,1,1 Trichloroethane																		
5	Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane																		

CRDL = Contract Required Detection Limit

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DATA SUMMARY FORM: V O L A T I L E S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	S-1	S-2	S-3	S-4	SED-1	SED-2	SED-3	SED-4	SED-5
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	% Moisture	42	8	23	8	28	42	23	40	17
	Location									
CRQL	COMPOUND									
5	1,2-Dichloropropane									
5	Cis-1,3-Dichloropropene									
5	Trichloroethene					2 J				
5	Dibromochloromethane									
5	1,1,2-Trichloroethane									
5	Benzene									
5	Trans-1,3-Dichloropropene									
5	Bromoform									
10	4-Methyl-2-pentanone									
10	2-Hexanone									
5	Tetrachloroethene					5 J				
5	1,1,2,2-Tetrachloroethane									
5	Toluene									
5	Chlorobenzene									
5	Ethylbenzene									
5	Styrene									
5	Total Xylenes									

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: V O L A T I L E S 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	VBLKS1		VBLKS2		VBLKS3		S-4 MS		S-4MSD		SED-2MS		SED-2MSD		SED-4MS		SED-4MSD	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	% Moisture	-		-		-		8		8		42		42		40		40	
	Location																		
CRQL	COMPOUND																		
10	Chloromethane																		
10	Bromomethane																		
10	Vinyl Chloride																		
10	Chloroethane																		
5	Methylene Chloride	7		8		10		8	B	8	B	14	B	13	B	11	B	11	B
10	Acetone	7	J	10		4	J			4	B	2	B	2	B	4	B	7	B
5	Carbon Disulfide																		
5	1,1 Dichloroethene																		
5	1,1 Dichloroethane																		
5	Total-1,2 Dichloroethene																		
5	Chloroform																		
5	1,2 Dichloroethane																		
10	2 Butanone																		
5	1,1,1 Trichloroethane																		
5	Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane																		

CRDL = Contract Required Detection Limit

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DATA SUMMARY FORM: V O L A T I L E S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	VBLK51		VBLK52		VBLK53		S-4 MS		S-4 MSD		SED-2MS		SED-2MSD		SED-4MS		SED-4MSD	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	% Moisture	—		—		—		8		8		42		42		40		40	
	Location																		
CRQL	COMPOUND																		
5	1,2-Dichloropropane																		
5	Cis-1,3 Dichloropropene																		
5	Trichloroethene																		
5	Dibromochloromethane																		
5	1,1,2 Trichloroethane																		
5	Benzene																		
5	Trans-1,3 Dichloropropene																		
5	Bromoform																		
10	4 Methyl-2-pentanone																		
10	2 Hexanone																		
5	Tetrachloroethene																		
5	1,1,2,2 Tetrachloroethane																		
5	Toluene																		
5	Chlorobenzene																		
5	Ethylbenzene																		
5	Styrene																		
5	Total Xylenes																		

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	DW-1	FB-1	1-R	5-R	10-R	GW-1	GW-2	GW-3	GW-4
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Location									
CRQL	COMPOUND									
10	Phenol									
10	bis(2-Chloroethyl)ether									
10	2 Chlorophenol									
10	*1,3-Dichlorobenzene									
10	*1,4-Dichlorobenzene									
10	Benzyl Alcohol									
10	1,2-Dichlorobenzene									
10	2 Methylphenol									
10	bis(2-Chloroisopropyl)ether									
10	4 Methylphenol									
10	N Nitroso di n propylamine									
10	Hexachloroethane									
10	Nitrobenzene									
10	Isophorone									
10	2 Nitrophenol									
10	2,4 Dimethylphenol									
50	Benzoic Acid									
10	bis(2-Chloroethoxy)methane									
10	2,4 Dichlorophenol									
10	1,2,4-Trichlorobenzene									
10	Naphthalene									
10	4-Chloroaniline									

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND	Sample No.	DW-1		FB-1		1-R		5-R		10-R		GW-1		GW-2		GW-3		GW-4	
		Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
		Location																		
10	Hexachlorobutadiene																			
10	4-Chloro-3-methylphenol																			
10	2-Methylnaphthalene																			
10	Hexachlorocyclopentadiene																			
10	2,4,6-Trichlorophenol																			
50	2,4,5-Trichlorophenol																			
10	2-Chloronaphthalene																			
50	2-Nitroaniline																			
10	Dimethylphthalate																			
10	Acenaphthylene																			
10	2 6 Dinitrotoluene																			
50	3-Nitroaniline																			
10	Acenaphthene																			
50	2,4 Dinitrophenol																			
50	4-Nitrophenol																			
10	Dibenzofuran																			
10	2,4-Dinitrotoluene																			
10	Diethylphthalate																			
10	4-Chlorophenyl-phenylether																			
10	Fluorene																			
50	4-Nitroaniline																			
50	4 6 Dinitro 2 methylphenol																			

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 3

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES (ug/L)

To calculate sample quantitation limit: (CRQL * Dilution Factor)

	Sample No.	DW-1		FB-1		1-R		5-R		10-R		GW-1		GW-2		GW-3		GW-4	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	Location																		
CRDL	COMPOUND																		
10	N Nitrosodiphenylamine																		
10	4 Bromophenyl phenylether																		
10	*Hexachlorobenzene																		
50	*Pentachlorophenol																		
10	Phenanthrene																		
10	Anthracene																		
10	Di-n-butylphthalate																		
10	Fluoranthene																		
10	Pyrene																		
10	Butylbenzylphthalate																		
20	3,3 Dichlorobenzidine																		
10	Benzo(a)anthracene																		
10	Chrysene																		
10	bis(2 Ethylhexyl)phthalate	5	B	7	B	6	B	7	B	7	B	3	B	4	B	4	B	4	B
10	Di-n-octylphthalate																		
10	Benzo(b)fluoranthene																		
10	Benzo(k)fluoranthene																		
10	Benzo(a)pyrene																		
10	Indeno(1,2,3-cd)pyrene																		
10	Dibenz(a,h)anthracene																		
10	Benzo(g,h,i)perylene																		

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND	Sample No.	GW-5	GW-6	SW-1	SW-2	SW-3	SW-4	SBLKW1	SBLKW2	SBLKW3
		Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		Location									
10	Phenol										
10	bis(2-Chloroethyl)ether										
10	2 Chlorophenol										
10	*1,3 Dichlorobenzene										
10	*1,4 Dichlorobenzene										
10	Benzyl Alcohol										
10	1,2 Dichlorobenzene										
10	2 Methylphenol										
10	bis(2 Chloroisopropyl)ether										
10	4 Methylphenol										
10	N Nitroso di n propylamine										
10	Hexachloroethane										
10	Nitrobenzene										
10	Isophorone										
10	2 Nitrophenol										
10	2,4 Dimethylphenol										
50	Benzoic Acid										
10	bis(2 Chloroethoxy)methane										
10	2,4 Dichlorophenol										
10	1,2,4-Trichlorobenzene										
10	Naphthalene										
10	4-Chloroaniline										

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND	Sample No.	GW-5		GW-6		SW-1		SW-2		SW-3		SW-4		SBLKW1		SBLKW2		SBLKW3	
		Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0			
		Location																		
10	Hexachlorobutadiene																			
10	4-Chloro-3-methylphenol																			
10	2-Methylnaphthalene																			
10	Hexachlorocyclopentadiene																			
10	2,4,6-Trichlorophenol																			
50	2,4,5-Trichlorophenol																			
10	2-Chloronaphthalene																			
50	2-Nitroaniline																			
10	Dimethylphthalate																			
10	Acenaphthylene																			
10	2,6 Dinitrotoluene																			
50	3-Nitroaniline																			
10	Acenaphthene																			
50	2,4-Dinitrophenol																			
50	4-Nitrophenol																			
10	Dibenzofuran																			
10	2,4 Dinitrotoluene																			
10	Diethylphthalate																			
10	4-Chlorophenyl-phenylether																			
10	Fluorene																			
50	4-Nitroaniline																			
50	4,6 Dinitro 2-methylphenol																			

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 3

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	GW-5		GW-6		SW-1		SW-2		SW-3		SW-4		SBLKW1		SBLKW2		SBLKW3	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	Location																		
CRDL	COMPOUND																		
10	N Nitrosodiphenylamine																		
10	4 Bromophenyl phenylether																		
10	*Hexachlorobenzene																		
50	*Pentachlorophenol																		
10	Phenanthrene											1	J						
10	Anthracene																		
10	Di n butylphthalate																		
10	Fluoranthene							1	J			2	J						
10	Pyrene											2	J						
10	Butylbenzylphthalate																		
20	3,3 Dichlorobenzidine																		
10	Benzo(a)anthracene																		
10	Chrysene																		
10	bis(2 Ethylhexyl)phthalate	7	B	6	B	6	B	7	B	3	B	12	B	4	J	5	J	10	
10	Di n octylphthalate											2	J						
10	Benzo(b)fluoranthene																		
10	Benzo(k)fluoranthene											1	J						
10	Benzo(a)pyrene																		
10	Indeno(1,2,3-cd)pyrene																		
10	Dibenz(a,h)anthracene																		
10	Benzo(g,h,i)perylene																		

CRDL = Contract Required Detection Limit

*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND	Sample No.	SW-1MS		SW-1MSD		SW-4MS		SW-4MSD											
		Dilution Factor	1.0		1.0		1.0		1.0											
		Location																		
10	Phenol																			
10	bis(2-Chloroethyl)ether																			
10	2 Chlorophenol																			
10	*1,3 Dichlorobenzene																			
10	*1,4 Dichlorobenzene																			
10	Benzyl Alcohol																			
10	1,2 Dichlorobenzene																			
10	2 Methylphenol																			
10	bis(2-Chloroisopropyl)ether																			
10	4 Methylphenol																			
10	N Nitroso di n propylamine																			
10	Hexachloroethane																			
10	Nitrobenzene																			
10	Isophorone																			
10	2 Nitrophenol																			
10	2,4 Dimethylphenol																			
50	Benzoic Acid																			
10	bis(2 Chloroethoxy)methane																			
10	2,4 Dichlorophenol																			
10	1,2,4-Trichlorobenzene																			
10	Naphthalene																			
10	4-Chloroaniline																			

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND	SW-1MS		SW-1MSD		SW-4MS		SW-4MSD											
Sample No.		SW-1MS		SW-1MSD		SW-4MS		SW-4MSD											
Dilution Factor		1.0		1.0		1.0		1.0											
Location																			
10	Hexachlorobutadiene																		
10	4-Chloro-3-methylphenol																		
10	2-Methylnaphthalene																		
10	Hexachlorocyclopentadiene																		
10	2,4,6-Trichlorophenol																		
50	2,4,5-Trichlorophenol																		
10	2-Chloronaphthalene																		
50	2-Nitroaniline																		
10	Dimethylphthalate																		
10	Acenaphthylene																		
10	2,6 Dinitrotoluene																		
50	3-Nitroaniline																		
10	Acenaphthene																		
50	2,4-Dinitrophenol																		
50	4-Nitrophenol																		
10	Dibenzofuran																		
10	2,4 Dinitrotoluene																		
10	Diethylphthalate																		
10	4-Chlorophenyl-phenylether																		
10	Fluorene																		
50	4-Nitroaniline																		
50	4,6 Dinitro 2-methylphenol																		

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 3

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	SW-1MS		SW-1MSD		SW-4MS		SW-4MSD									
	Dilution Factor	1.0		1.0		1.0		1.0									
	Location																
CRDL	COMPOUND																
10	N Nitrosodiphenylamine																
10	4 Bromophenyl phenylether																
10	*Hexachlorobenzene																
50	*Pentachlorophenol																
10	Phenanthrene																
10	Anthracene																
10	Di n butylphthalate																
10	Fluoranthene																
10	Pyrene																
10	Butylbenzylphthalate																
20	3,3 Dichlorobenzidine																
10	Benzo(a)anthracene																
10	Chrysene																
10	bis(2 Ethylhexyl)phthalate	4	B	4	B	7	B	8	B								
10	Di n octylphthalate																
10	Benzo(b)fluoranthene																
10	Benzo(k)fluoranthene																
10	Benzo(a)pyrene																
10	Indeno(1,2,3-cd)pyrene																
10	Dibenz(a,h)anthracene																
10	Benzo(g,h,i)perylene																

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	S-1		S-2		S-3		S-4		SED-1		SED-2		SED-3		SED-4		SED-5	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	% Moisture	42		8		23		8		28		42		23		42		17	
	Location																		
CRQL	COMPOUND																		
330	Phenol												UJ						
330	bis(2-Chloroethyl)ether																		
330	2-Chlorophenol																		
330	1,3-Dichlorobenzene																		
330	1,4-Dichlorobenzene																		
330	Benzyl Alcohol																		
330	1,2-Dichlorobenzene																		
330	2-Methylphenol																		
330	bis(2-Chloroisopropyl)ether																		
330	4-Methylphenol																		
330	N-Nitroso-di-n-propylamine																		
330	Hexachloroethane																		
330	Nitrobenzene																		
330	Isophorone																		
330	2-Nitrophenol																		
330	2,4-Dimethylphenol																		
1600	Benzoic Acid																		
330	bis(2-Chloroethoxy)methane																		
330	2,4-Dichlorophenol																		
330	1,2,4-Trichlorobenzene																		
330	Naphthalene																		
330	4-Chloroaniline																		

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	S-1		S-2		S-3		S-4		SED-1		SED-2		SED-3		SED-4		SED-5	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	% Moisture	42		8		23		8		28		42		23		42		17	
	Location																		
CRQL	COMPOUND																		
330	Hexachlorobutadiene												UL						
330	4 Chloro 3 methylphenol																		
330	2 Methylnaphthalene																		
330	Hexachlorocyclopentadiene																		
330	2,4,6 Trichlorophenol																		
1600	2,4,5 Trichlorophenol																		
330	2 Chloronaphthalene																		
1600	2 Nitroaniline																		
330	Dimethylphthalate																		
330	Acenaphthylene																		
330	2,6 Dinitrotoluene																		
1600	3 Nitroaniline																		
330	Acenaphthene																		
1600	2,4 Dinitrophenol																		
1600	4 Nitrophenol																		
330	Dibenzofuran																		
330	2,4 Dinitrotoluene																		
330	Diethylphthalate																		
330	4 Chlorophenyl phenylether																		
330	Fluorene									49 J									
1600	4 Nitroaniline																		
1600	4,6 Dinitro 2 methylphenol																		

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 3

Site Name: New Road

SOIL SAMPLES (ug/Kg)

Case #: 9100.334 Sampling Date(s): _____

To calculate sample quantitation limit: (CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	S-1		S-2		S-3		S-4		SED-1		SED-2		SED-3		SED-4		SED-5	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	% Moisture	42		8		23		8		28		42		23		42		17	
	Location																		
CRQL	COMPOUND																		
330	N Nitrosodiphenylamine												UL						
330	4-Bromophenyl phenylether																		
330	Hexachlorobenzene																		
1600	Pentachlorophenol																		
330	Phenanthrene	59	J	170	J	47	J			410	J	250	L	90	J	110	J		
330	Anthracene									160	J		UL						
330	Di-n-butylphthalate											110	B	58	B				
330	Fluoranthene	91	J	250	J	67	J			590		430	L	190	J	160	J	63	J
330	Pyrene	90	J	260	J	67	J			420	J	410	L	130	J	180	J	68	J
330	Butylbenzylphthalate												UL						
1600	3,3 Dichlorobenzidine												UL						
330	Benzo(a)anthracene			140	J					230	J	210	L	77	J	110	J	42	J
330	Chrysene	64	J	230	J	64	J			270	J	270	L	110	J	120	J	59	J
330	bis(2 Ethylhexyl)phthalate	150	B	55	B	55	B	52	B	410	B	1800	B	110	B	170	B	180	B
330	Di-n-octylphthalate												UL						
330	Benzo(b)fluoranthene	94	J	420		130	J	43	J	600		390	L	250	J	180	J	120	J
330	Benzo(k)fluoranthene											190	L						
330	Benzo(a)pyrene	68	J	230	J	58	J			310	J	300	L	130	J	100	J	70	J
330	Indeno(1,2,3-cd)pyrene			150	J	52	J			210	J	250	L	98	J	100	J	57	J
330	Dibenz(a,h)anthracene			36	J					53	J		UL						
330	Benzo(g,h,i)perylene			140	J	45	J			170	J	230	L	100	J	90	J	48	J

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 1

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

CRQL	COMPOUND	SBLK51		SBLK52		SBLK53		S-2 MS		S-2 MSD		SED-2MS		SED-2MSD					
	Sample No.	SBLK51		SBLK52		SBLK53		S-2 MS		S-2 MSD		SED-2MS		SED-2MSD					
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0					
	% Moisture	—		—		—		8		8		42		42					
	Location																		
330	Phenol																		
330	bis(2-Chloroethyl)ether																		
330	2-Chlorophenol																		
330	1,3-Dichlorobenzene																		
330	1,4-Dichlorobenzene																		
330	Benzyl Alcohol																		
330	1,2 Dichlorobenzene																		
330	2-Methylphenol																		
330	bis(2-Chloroisopropyl)ether																		
330	4-Methylphenol																		
330	N-Nitroso di n propylamine																		
330	Hexachloroethane																		
330	Nitrobenzene																		
330	Isophorone																		
330	2 Nitrophenol																		
330	2,4 Dimethylphenol																		
1600	Benzoic Acid																		
330	bis(2 Chloroethoxy)methane																		
330	2,4 Dichlorophenol																		
330	1,2,4-Trichlorobenzene																		
330	Naphthalene																		
330	4-Chloroaniline																		

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 2

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

CRQL	COMPOUND	SBLKS1		SBLKS2		SBLKS3		S-2MS		S-2MSD		SED-2MS		SED-2MSD					
Sample No.		SBLKS1		SBLKS2		SBLKS3		S-2MS		S-2MSD		SED-2MS		SED-2MSD					
Dilution Factor		1.0		1.0		1.0		1.0		1.0		1.0		1.0					
% Moisture		—		—		—		8		8		42		42					
Location																			
330	Hexachlorobutadiene																		
330	4-Chloro-3-methylphenol																		
330	2-Methylnaphthalene																		
330	Hexachlorocyclopentadiene																		
330	2,4,6-Trichlorophenol																		
1600	2,4,5-Trichlorophenol																		
330	2-Chloronaphthalene																		
1600	2-Nitroaniline																		
330	Dimethylphthalate																		
330	Acenaphthylene																		
330	2,6-Dinitrotoluene																		
1600	3-Nitroaniline																		
330	Acenaphthene																		
1600	2,4-Dinitrophenol																		
1600	4-Nitrophenol																		
330	Dibenzofuran																		
330	2,4-Dinitrotoluene																		
330	Diethylphthalate																		
330	4-Chlorophenyl-phenylether																		
330	Fluorene																		
1600	4-Nitroaniline																		
1600	4,6-Dinitro-2-methylphenol																		

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 3

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	SBLKS1		SBLKS2		SBLKS3		S-2 MS		S-2 MSD		SED-2MS		SED-2MSD					
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0					
	% Moisture	—		—		—		8		8		42		42					
	Location																		
CRQL	COMPOUND																		
330	N-Nitrosodiphenylamine																		
330	4-Bromophenyl phenylether																		
330	Hexachlorobenzene																		
1600	Pentachlorophenol																		
330	Phenanthrene							170	J	170	J	340	J	350	J				
330	Anthracene											67	J	68	J				
330	Di-n-butylphthalate					61	J												
330	Fluoranthene							240	J	280	J	690		570					
330	Pyrene																		
330	Butylbenzylphthalate																		
1600	3,3 Dichlorobenzidine																		
330	Benzo(a)anthracene							140	J	140	J	370	J	360	J				
330	Chrysene							200	J	220	J	420	J	380	J				
330	bis(2-Ethylhexyl)phthalate	63	J	86	J	1000		60	B	72	B	320	B	290	B				
330	Di-n-octylphthalate																		
330	Benzo(b)fluoranthene							330	J	480		670		640					
330	Benzo(k)fluoranthene																		
330	Benzo(a)pyrene							230	J	260	J	380	J	380	J				
330	Indeno(1,2,3-cd)pyrene							170	J	200	J	390	J	390	J				
330	Dibenz(a,h)anthracene							37	J	38	J	61	J	68	J				
330	Benzo(g,h,i)perylene							160	J	180	J	340	J	300	J				

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: T E N T A T I V E L Y I D E N T I F I E D C O M P O U N D S

Site Name: New Road

Case #: 9100.334 Sampling Date: _____

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((1 - % moisture/100)

CRQL	COMPOUND	Sample No.		Sample No.																	
	Dilution Factor	5-3		SED-5																	
	% Moisture	1.0		1.0																	
	Location	23		17																	
	2,2'-oxybisethanol CAS # 111466	2100	J																		
	Limonene CAS # 138863			360	J																

CRQL = Contract Required Quantitation Limit

DATA SUMMARY FORM: PESTICIDES AND PCBS

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES (ug/L)

To calculate sample quantitation limit: (CROL * Dilution Factor)

CROL	COMPOUND	Sample No.	DW-1		FB-1		1-R		5-R		10-R		GW-1		GW-2		GW-3		GW-4	
		Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
		Location																		
0.05	alpha-BHC																			
0.05	beta BHC																			
0.05	delta BHC																			
0.05	*Gamma-BHC (Lindane)																			
0.05	*Heptachlor																			
0.05	Aldrin																			
0.05	Heptachlor Epoxide																			
0.05	Endosulfan I																			
0.10	Dieldrin																			
0.10	4,4'-DDE																			
0.10	*Endrin																			
0.10	Endosulfan II																			
0.10	4,4'-DDD																			
0.10	Endosulfan Sulfate																			
0.10	4,4'-DDT																			
0.5	*Methoxychlor																			
0.10	Endrin ketone																			
0.5	*Alpha-Chlordane																			
0.5	*Gamma-Chlordane																			
1.0	*Toxaphene																			
0.5	*Aroclor-1016																			
0.5	*Aroclor-1221																			
0.5	*Aroclor-1232																			
0.5	*Aroclor-1242																			
0.5	*Aroclor-1248																			
1.0	*Aroclor-1254																0.78	J		
1.0	*Aroclor-1260																			

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: P E S T I C I D E S A N D P C B S

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CROL * Dilution Factor)

	Sample No.	GW-5		GW-6		SW-1		SW-2		SW-3		SW-4		PBLKW1		PBLKW2		PBLKW3	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	Location																		
CROL	COMPOUND																		
0.05	alpha BHC							0.017	J										
0.05	beta BHC					0.077		0.12											
0.05	delta BHC																		
0.05	*Gamma-BHC (Lindane)																		
0.05	*Heptachlor																		
0.05	Aldrin																		
0.05	Heptachlor Epoxide																		
0.05	Endosulfan I																		
0.10	Dieldrin																		
0.10	4,4'-DDE																		
0.10	*Endrin																		
0.10	Endosulfan II																		
0.10	4,4'-DDD																		
0.10	Endosulfan Sulfate																		
0.10	4,4'-DDT																		
0.5	*Methoxychlor																		
0.10	Endrin ketone																		
0.5	*Alpha-Chlordane																		
0.5	*Gamma-Chlordane																		
1.0	*Toxaphene																		
0.5	*Aroclor-1016																		
0.5	*Aroclor-1221																		
0.5	*Aroclor-1232																		
0.5	*Aroclor-1242																		
0.5	*Aroclor-1248									1.2									
1.0	*Aroclor-1254																		
1.0	*Aroclor-1260																		

CRDL = Contract Required Detection Limit

*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: P E S T I C I D E S A N D P C B S

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	SW-1MS		SW-1MSD		SW-4MS		SW-4MSD											
	Dilution Factor	1.0		1.0		1.0		1.0											
	Location																		
CRQL	COMPOUND																		
0.05	alpha-BHC																		
0.05	beta BHC																		
0.05	delta BHC																		
0.05	*Gamma-BHC (Lindane)																		
0.05	*Heptachlor																		
0.05	Aldrin																		
0.05	Heptachlor Epoxide																		
0.05	Endosulfan I																		
0.10	Dieldrin																		
0.10	4,4'-DDE																		
0.10	*Endrin																		
0.10	Endosulfan II																		
0.10	4,4'-DDD																		
0.10	Endosulfan Sulfate																		
0.10	4,4'-DDT																		
0.5	*Methoxychlor																		
0.10	Endrin ketone																		
0.5	*Alpha-Chlordane																		
0.5	*Gamma-Chlordane																		
1.0	*Toxaphene																		
0.5	*Aroclor-1016																		
0.5	*Aroclor-1221																		
0.5	*Aroclor-1232																		
0.5	*Aroclor-1242																		
0.5	*Aroclor-1248																		
1.0	*Aroclor-1254																		
1.0	*Aroclor-1260																		

CRDL = Contract Required Detection Limit

*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: P E S T I C I D E S A N D P C B S

Site Name: New Road

SOIL SAMPLES (ug/Kg)

Case #: 9100.334 Sampling Date(s): _____

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

CRQL	COMPOUND	S-1		S-2		S-3		S-4		SED-1		SED-2		SED-3		SED-4		SED-5	
	Sample No.	S-1		S-2		S-3		S-4		SED-1		SED-2		SED-3		SED-4		SED-5	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		2.0		5.0		1.0		1.0	
	% Moisture	42		8		23		8		28		42		23		42		81	
	Location																		
8	alpha-BHC																		
8	beta-BHC																		
8	delta-BHC																		
8	Gamma-BHC (Lindane)																		
8	Heptachlor																		
8	Aldrin																		
8	Heptachlor Epoxide																		
8	Endosulfan I																		
16	Dieldrin																		
16	4,4'-DDE																		
16	Endrin																		
16	Endosulfan II																		
16	4,4'-DDD																		
16	Endosulfan Sulfate																		
16	4,4'-DDT		UL		UL				UL		UL		UL		UL				UL
80	Methoxychlor																		
16	Endrin ketone																		
80	Alpha-Chlordane																		
80	Gamma-Chlordane																		
160	Toxaphene																		
80	Aroclor-1016																		
80	Aroclor-1221																		
80	Aroclor-1232																		
80	Aroclor-1242																		
80	Aroclor-1248																		
160	Aroclor-1254													1100					
160	Aroclor-1260																		

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: P E S T I C I D E S A N D P C B S

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

CRQL	COMPOUND																			
	Sample No.	S-2MS		S-2MSD		SED-2MS		SED-2MSD												
	Dilution Factor	1.0		1.0		2.0		2.0												
	% Moisture	8		8		42		42												
	Location																			
8	alpha-BHC																			
8	beta-BHC																			
8	delta-BHC																			
8	Gamma-BHC (Lindane)																			
8	Heptachlor																			
8	Aldrin																			
8	Heptachlor Epoxide																			
8	Endosulfan I																			
16	Dieldrin																			
16	4,4'-DDE																			
16	Endrin																			
16	Endosulfan II																			
16	4,4'-DDD																			
16	Endosulfan Sulfate																			
16	4,4' DDT																			
80	Methoxychlor																			
16	Endrin ketone																			
80	Alpha-Chlordane																			
80	Gamma-Chlordane																			
160	Toxaphene																			
80	Aroclor-1016																			
80	Aroclor-1221																			
80	Aroclor-1232																			
80	Aroclor-1242																			
80	Aroclor-1248																			
160	Aroclor-1254																			
160	Aroclor-1260																			

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: I N O R G A N I C S

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

*Due to dilution, sample quantitation limit is affected. See dilution table for specifics.

CRDL	ANALYTE	DW-1		FB-1		1-R	5-R	10-R	GW-1	GW-2	GW-3	GW-4	GW-5
	Dilution Factor	1.0		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Location												
200	Aluminum	[63.8]				14000	2830	8040	2760	40100	1140		16700
60	Antimony												
10	*Arsenic					14.9		[3.3]		[8.4]			[4.9]
200	Barium	[23.2]				303	[46.2]	[125]	[108]	349	[120]	[143]	[146]
5	Beryllium												
5	*Cadmium					6.7				7.7			
5000	Calcium	30900				47000	219000	183000	149000	352000	132000	128000	199000
10	*Chromium					24.9		11.1		48.8			21.4
50	Cobalt					[47.0]				[21.0]			[12.1]
25	Copper					60	[11.7]	31.5		75.9			30.5
100	Iron	635				50300	6610	14100	4420	56800	1880	5440	25200
5	*Lead	5.1	B	[2.1]	B	252	33.5	55.0	103	165	47.0 J		41.5
5000	Magnesium	8260				25400	29000	13000	12500	167000	7850	6510	12300
15	Manganese	[14.9]				7210	435	1260	725	2150	214	2220	826
0.2	Mercury									0.24			
40	*Nickel					[26.8]	[10.4]			57.6			[23.1]
5000	Potassium	[1140]				[4570]	[2850]	[3270]	[1940]	8860	[790]	[2330]	6090
5	Selenium	[4.1]											
10	Silver												
5000	Sodium	8490				14800	72700	20100	33200	42400	35500	12100	12600
10	Thallium												
50	Vanadium					[39.6]		[11.2]		63.8			31.4
20	Zinc			26.0	B	1750	120	816	217	2190	61.4	[7.0]	233
10	*Cyanide												

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: I N O R G A N I C S

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

•Due to dilution, sample quantitation limit is affected.
See dilution table for specifics.

CRDL	ANALYTE	GW-6		SW-1		SW-2		SW-3		SW-4													
	Sample No.	GW-6		SW-1		SW-2		SW-3		SW-4													
	Dilution Factor	1.0		1.0		1.0		1.0		1.0													
	Location																						
200	Aluminum	6810		475		1810		30800		545													
60	Antimony																						
10	*Arsenic	[4.5]						[5.5]															
200	Barium	[110]		[58.3]		[62.5]		538		[46.4]													
5	Beryllium																						
5	*Cadmium							12.4															
5000	Calcium	207000		105000		68100		163000		51200													
10	*Chromium			64.8				54.4															
50	Cobalt							[29.3]															
25	Copper	[17.6]						147															
100	Iron	11300		667		2580		64800		874													
5	*Lead	10.0		[2.8]	B	16.1	J	38		16.6													
5000	Magnesium	139000		36500		19200		55100		17000													
15	Manganese	497		47.6		80.4		1560		172													
0.2	Mercury							0.80															
40	*Nickel							70.1															
5000	Potassium	[3900]		[2060]		[2630]		11000		[2670]													
5	Selenium	[2.0]																					
10	Silver																						
5000	Sodium	34100		96600		204000		13500		5710													
10	Thallium																						
50	Vanadium	[10.3]						58.1															
20	Zinc	293		41.7		123		1530		460													
10	*Cyanide																						

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: I N O R G A N I C S

Site Name: New Road

Case #: 9100.334 Sampling Date(s): _____

SOIL SAMPLES (mg/Kg)

*Due to dilution, sample quantitation limit is affected. See dilution table for specifics.

CRDL	ANALYTE	Sample No.		S-1		S-2		S-3		S-4		SED-1		SED-2		SED-3		SED-4		SED-5	
		Dilution Factor		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
		% Solids		57.6		91.8		77.1		92.0		71.5		58.5		77.5		57.9		82.6	
		Location																			
40	Aluminum		17800		2180		13500		749		9030		13700		7990		14100		17300		
12	Antimony			UL		R		R		R		R		UL		R		UL		R	
2	Arsenic		5.5		3.4		6.9		3.0		4.2		4.2		5.2		5.5		4.6		
40	Barium		139		[29.0]		91.4		[10.8]		129		139		173		98.4		132		
1	Beryllium																		[0.76]		
1	Cadmium		3.4		8.2	J	4.7	J	1.1	J	3.6	J	2.4		3.7	J			2.3	J	
1000	Calcium		2900		158000		41200		17700		95200		42700		56700		11000		59600		
2	Chromium		11.7	J	9.1	L	29.6	L	7.6	L	19.3	L	75.5	J	16.1	L	30.6	J	26.4	L	
10	Cobalt		[14.5]				[11.3]				20.0		[10.1]		[8.0]		[8.4]		[9.8]		
5	Copper		23.3		10.5		76.5		[3.6]		17.7		31.1		58.3		34.3		32.9		
20	Iron		30300		4870	J	26300	J	4380	J	22500	J	23400		42600	J	20400		25900	J	
1	*Lead		28.5	L	113	L	36.8	L	88.6		21.0	L	83.6	L	116	L	61.8	L	25.2	L	
1000	Magnesium		11600		92900		22500		107000		26300		108000		21800		7400		11300		
3	Manganese		817		580	J	870	J	532	J	1560	J	695		506	J	243		540	J	
0.2	Mercury						0.13						0.34		0.14		0.28				
8	Nickel		31.1		[6.7]	L	17.5	L	[2.1]	L	18.3	L	26.8		24.5	L	20.4		28.9	L	
1000	Potassium		2280		[469]		[1160]		[516]		[906]		1890		[970]		[500]		2410		
1	Selenium			UL		R		R		R		R		UL		R		UL		R	
2	Silver					UL		UL		UL		UL				UL				UL	
1000	Sodium		[105]		[183]		[117]		[214]		[240]		[188]		[174]				[148]		
2	Thallium					UL	[0.66]	L	[0.53]	L	[0.98]	L				UL				UL	
10	Vanadium		37.3		[89]		31.9		[3.7]		22.5		26.8		16.4		28.5		34.4		
4	Zinc		132	L	1760	K	101	K	.371	K	196	K	348	L	300	K	168	L	108	K	
2	Cyanide																				

CRDL = Contract Required Detection Limit

*Action Level Exists

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Results of Analysis of EP Toxicity Extracts Job Number :9100.368

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : YQ-5000 NEW ROAD LANDFILL
SAMPLE ID LAB :EE-91-03154 MATRIX: SOLID
SAMPLE ID CLIENT: S-1 UNITS : MG/L

PARAMETER		RESULTS	Q	DETECTION LIMIT	REGULATORY LEVEL
Mercury		ND		0.00080	0.20
Arsenic	(ICP)	ND		0.50	5.0
Barium	(ICP)	ND		5.0	100
Cadmium	(ICP)	ND		0.10	1.0
Chromium	(ICP)	ND		0.50	5.0
Lead	(ICP)	ND		0.50	5.0
Selenium	(ICP)	ND		0.50	1.0
Silver	(ICP)	ND		0.50	5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

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Results of Analysis of EP Toxicity Extracts Job Number :9100.334

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : YQ-5000 NEW ROAD LANDFILL
SAMPLE ID LAB :EE-91-02892 MATRIX: SOLID
SAMPLE ID CLIENT: S-2 UNITS : MG/L

PARAMETER		RESULTS	Q	DETECTION LIMIT	REGULATORY LEVEL
Mercury		ND		0.00080	0.20
Arsenic	(ICP)	ND		0.50	5.0
Barium	(ICP)	ND		5.0	100
Cadmium	(ICP)	ND		0.10	1.0
Chromium	(ICP)	ND		0.50	5.0
Lead	(ICP)	ND		0.50	5.0
Selenium	(ICP)	ND		0.50	1.0
Silver	(ICP)	ND		0.50	5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

Results of Analysis of EP Toxicity Extracts Job Number :9100.334

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : YQ-5000 NEW ROAD LANDFILL
SAMPLE ID LAB :EE-91-02893 MATRIX: SOLID
SAMPLE ID CLIENT: S-3 UNITS : MG/L

PARAMETER		RESULTS	Q	DETECTION LIMIT	REGULATORY LEVEL
Mercury		ND		0.00080	0.20
Arsenic	(ICP)	ND		0.50	5.0
Barium	(ICP)	ND		5.0	100
Cadmium	(ICP)	ND		0.10	1.0
Chromium	(ICP)	ND		0.50	5.0
Lead	(ICP)	ND		0.50	5.0
Selenium	(ICP)	ND		0.50	1.0
Silver	(ICP)	ND		0.50	5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

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Results of Analysis of EP Toxicity Extracts Job Number :9100.334

Ecology and Environment, Inc.
Analytical Services Center

CLIENT : YQ-5000 NEW ROAD LANDFILL
SAMPLE ID LAB :EE-91-02894 MATRIX: SOLID
SAMPLE ID CLIENT: S-4 UNITS : MG/L

PARAMETER		RESULTS	Q	DETECTION LIMIT	REGULATORY LEVEL
Mercury		ND		0.00080	0.20
Arsenic	(ICP)	ND		0.50	5.0
Barium	(ICP)	ND		5.0	100
Cadmium	(ICP)	ND		0.10	1.0
Chromium	(ICP)	ND		0.50	5.0
Lead	(ICP)	ND		0.50	5.0
Selenium	(ICP)	ND		0.50	1.0
Silver	(ICP)	ND		0.50	5.0

QUALIFIERS: C = COMMENT ND = NOT DETECTED
J = ESTIMATED VALUE B = ALSO PRESENT IN BLANK
L = PRESENT BELOW STATED DETECTION LIMIT

DATA SUMMARY FORM: V O L A T I L E S 1

Site Name: Macedon Landfill

Case #: 9002-536 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND	Sample No.																			
		Dilution Factor	DW-1 1.0																		
		Location																			
10	Chloromethane																				
10	Bromomethane																				
10	*Vinyl Chloride																				
10	Chloroethane																				
5	*Methylene Chloride		13																		
10	Acetone		11																		
5	Carbon Disulfide																				
5	*1,1-Dichloroethene																				
5	1,1 Dichloroethane																				
5	*Total-1,2-Dichloroethene																				
5	Chloroform		35																		
5	*1,2-Dichloroethane																				
10	*2-Butanone																				
5	*1,1,1-Trichloroethane																				
5	*Carbon Tetrachloride																				
10	Vinyl Acetate																				
5	Bromodichloromethane		16																		

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: V O L A T I L E S 2

Site Name: Macedon Landfill

Case #: 9002-536 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	COMPOUND																							
	Sample No.	GW-1																						
	Dilution Factor	1.0																						
	Location																							
5	*1,2-Dichloropropane																							
5	Cis-1,3 Dichloropropene																							
5	Trichloroethene																							
5	Dibromochloromethane	6																						
5	1,1,2 Trichloroethane																							
5	*Benzene																							
5	Trans-1,3 Dichloropropene																							
5	Bromoform																							
10	4 Methyl 2 pentanone																							
10	2 Hexanone																							
5	*Tetrachloroethene																							
5	1,1,2,2 Tetrachloroethane																							
5	*Toluene																							
5	*Chlorobenzene																							
5	*Ethylbenzene																							
5	*Styrene																							
5	*Total Xylenes																							

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 1

Site Name: Macedon Landfill

Case #: 9002-536 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CROL * Dilution Factor)

CROL	COMPOUND	Sample No.																			
		Dilution Factor	DW-1																		
		Location	1.0																		
10	Phenol																				
10	bis(2-Chloroethyl)ether																				
10	2 Chlorophenol																				
10	*1,3-Dichlorobenzene																				
10	*1,4-Dichlorobenzene																				
10	Benzyl Alcohol																				
10	1,2 Dichlorobenzene																				
10	2 Methylphenol																				
10	bis(2 Chloroisopropyl)ether																				
10	4 Methylphenol																				
10	N Nitroso di n propylamine																				
10	Hexachloroethane																				
10	Nitrobenzene																				
10	Isophorone																				
10	2 Nitrophenol																				
10	2,4 Dimethylphenol																				
50	Benzoic Acid																				
10	bis(2 Chloroethoxy)methane																				
10	2,4 Dichlorophenol																				
10	1,2,4-Trichlorobenzene																				
10	Naphthalene																				
10	4 Chloroaniline																				

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 2

Site Name: Macedon Landfill

Case #: 9022-536 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

	Sample No.	DW-1																	
	Dilution Factor	1.0																	
	Location																		
CRQL	COMPOUND																		
10	Hexachlorobutadiene																		
10	4-Chloro-3-methylphenol																		
10	2-Methylnaphthalene																		
10	Hexachlorocyclopentadiene																		
10	2,4,6-Trichlorophenol																		
50	2,4,5-Trichlorophenol																		
10	2 Chloronaphthalene																		
50	2 Nitroaniline																		
10	Dimethylphthalate																		
10	Acenaphthylene																		
10	2,6 Dinitrotoluene																		
50	3-Nitroaniline																		
10	Acenaphthene																		
50	2,4-Dinitrophenol																		
50	4-Nitrophenol																		
10	Dibenzofuran																		
10	2,4-Dinitrotoluene																		
10	Diethylphthalate																		
10	4-Chlorophenyl phenylether																		
10	Fluorene																		
50	4-Nitroaniline																		
50	4 6 Dinitro 2-methylphenol																		

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: B N A S 3

Site Name: Macedon Landfill

Case #: 9002-536 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRDL	COMPOUND	Sample No.																			
		Dilution Factor	DW-1																		
		Location	1.0																		
10	N Nitrosodiphenylamine																				
10	4 Bromophenyl phenylether																				
10	*Hexachlorobenzene																				
50	*Pentachlorophenol																				
10	Phenanthrene																				
10	Anthracene																				
10	Di-n-butylphthalate		1	J																	
10	Fluoranthene																				
10	Pyrene																				
10	Butylbenzylphthalate																				
20	3,3 Dichlorobenzidine																				
10	Benzo(a)anthracene																				
10	Chrysene																				
10	bis(2 Ethylhexyl)phthalate		7	B																	
10	Di-n-octylphthalate																				
10	Benzo(b)fluoranthene																				
10	Benzo(k)fluoranthene																				
10	Benzo(a)pyrene																				
10	Indeno(1,2,3-cd)pyrene																				
10	Dibenz(a,h)anthracene																				
10	Benzo(g,h,i)perylene																				

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: P E S T I C I D E S A N D P C B S

Site Name: Macedon Landfill

Case #: 9002-536 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CROL * Dilution Factor)

CROL	COMPOUND	Sample No.																			
		Dilution Factor	DW-1																		
		Location	1.0																		
0.05	alpha-BHC																				
0.05	beta-BHC																				
0.05	delta-BHC																				
0.05	*Gamma-BHC (Lindane)																				
0.05	*Heptachlor																				
0.05	Aldrin																				
0.05	Heptachlor Epoxide																				
0.05	Endosulfan I																				
0.10	Dieldrin																				
0.10	4,4'-DDE																				
0.10	*Endrin																				
0.10	Endosulfan II																				
0.10	4,4'-DDD																				
0.10	Endosulfan Sulfate																				
0.10	4,4'-DDT																				
0.5	*Methoxychlor																				
0.10	Endrin ketone																				
0.5	*Alpha-Chlordane																				
0.5	*Gamma-Chlordane																				
1.0	*Toxaphene																				
0.5	*Aroclor-1016																				
0.5	*Aroclor-1221																				
0.5	*Aroclor-1232																				
0.5	*Aroclor-1242																				
0.5	*Aroclor-1248																				
1.0	*Aroclor-1254																				
1.0	*Aroclor-1260																				

CRDL = Contract Required Detection Limit

*Action Level Exists

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DATA SUMMARY FORM: I N O R G A N I C S

Site Name: Macedon Landfill

Case #: 9002.536 Sampling Date(s): _____

WATER SAMPLES
(ug/L)

•Due to dilution, sample quantitation limit is affected. See dilution table for specifics.

	Sample No.	DW-1	
	Dilution Factor	1.0	
	Location		
CRDL	ANALYTE		
200	Aluminum	556	B
60	Antimony		
10	*Arsenic		
200	Barium	[30.1]	
5	Beryllium		
5	*Cadmium		
5000	Calcium	42800	
10	*Chromium		
50	Cobalt		
25	Copper	[14.7]	
100	Iron	3280	
5	*Lead	[2.7]	
5000	Magnesium	6810	
15	Manganese	107	
0.2	Mercury		
40	*Nickel		
5000	Potassium	[1340]	
5	Selenium		
10	Silver		
5000	Sodium	12900	
10	Thallium		
50	Vanadium		
20	Zinc	[8.0]	
10	*Cyanide		

CRDL = Contract Required Detection Limit

*Action Level Exists

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APPENDIX E

SITE PHOTOGRAPHIC LOG

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PHOTOGRAPHIC RECORD

Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-12-90/1402

Lens: Type NA SN: NA Frame No.: 1

Comments: View west from concrete slab located along Conrail access road at the southeast corner of the site.



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PHOTOGRAPHIC RECORD

Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-12-90/1402

Lens: Type NA SN: NA Frame No.: 2

Comments: View northwest from concrete slab along Conrail access road at the southeast corner of the site.



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02[UZ]YQ5080:D3377/5141

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PHOTOGRAPHIC RECORD

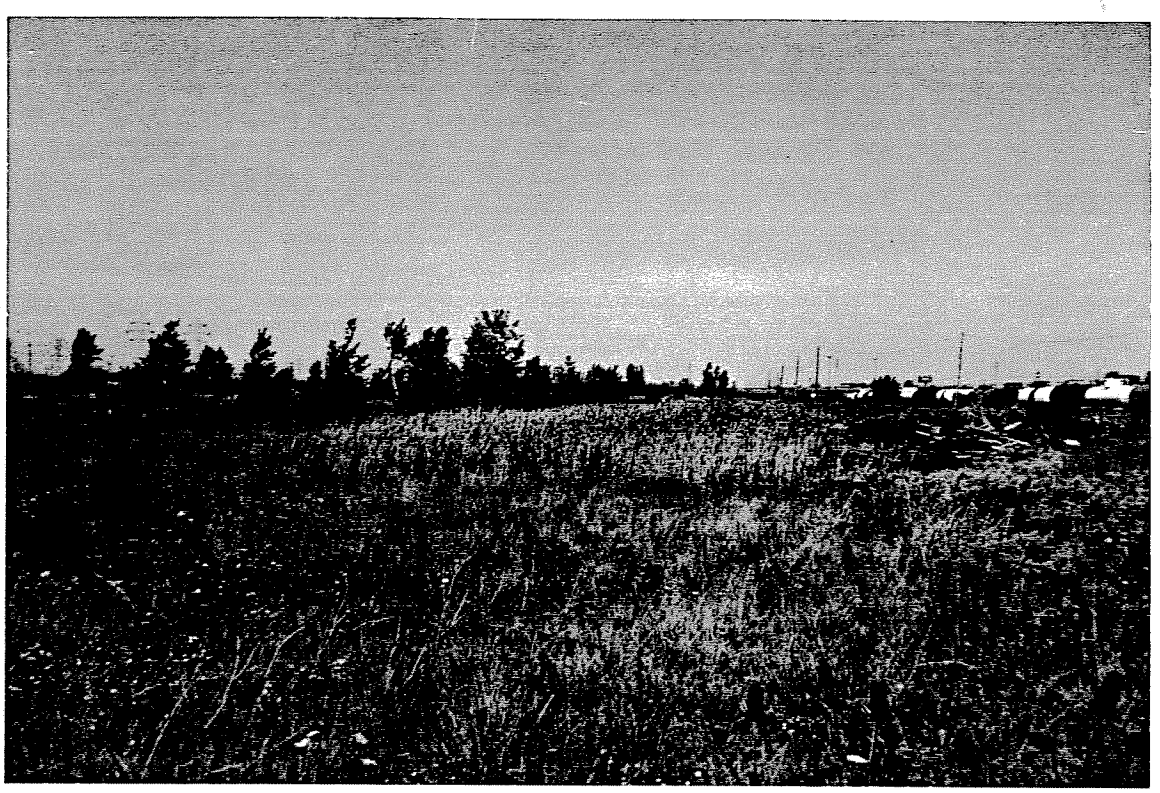
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-12-90/1404

Lens: Type NA SN: NA Frame No.: 3

Comments: View north of proposed GW-3 location from 55 feet south of staked GW-3 location.



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PHOTOGRAPHIC RECORD

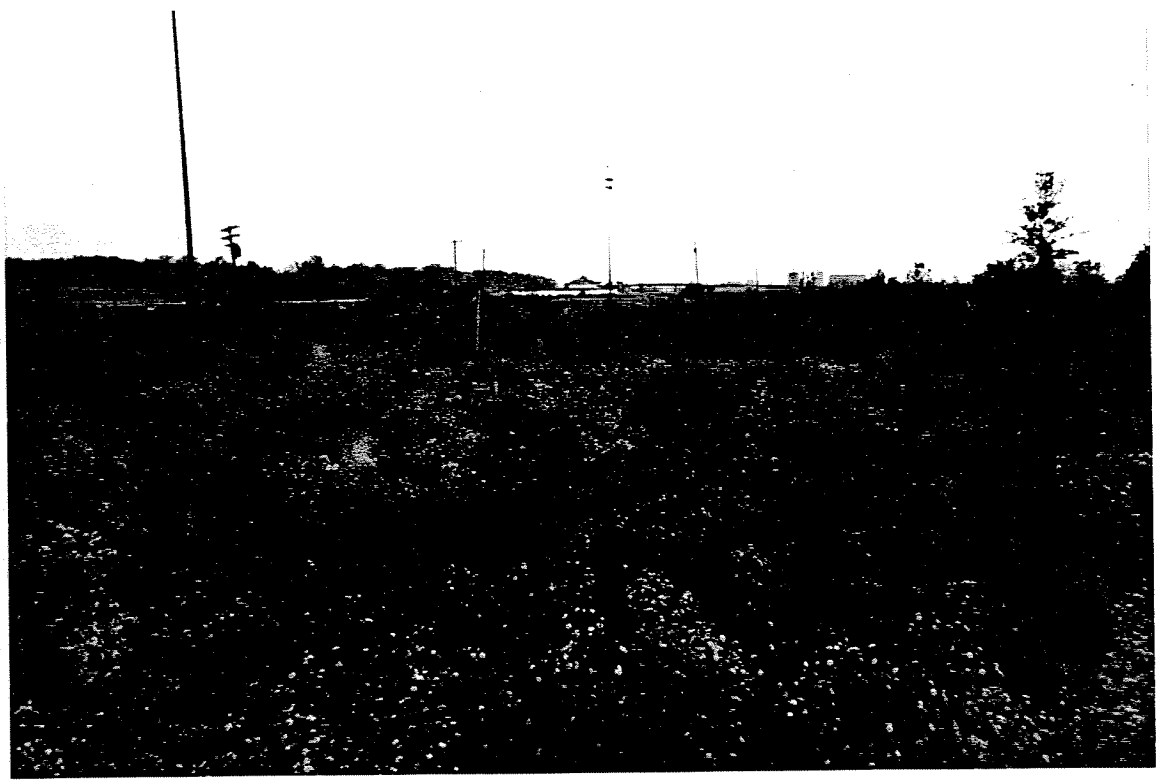
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-12-90/1519

Lens: Type NA SN: NA Frame No.: 5

Comments: View south of proposed GW-1 location from 20 feet north of staked GW-1 location.



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02[UZ]YQ5080:D3377/5141

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PHOTOGRAPHIC RECORD

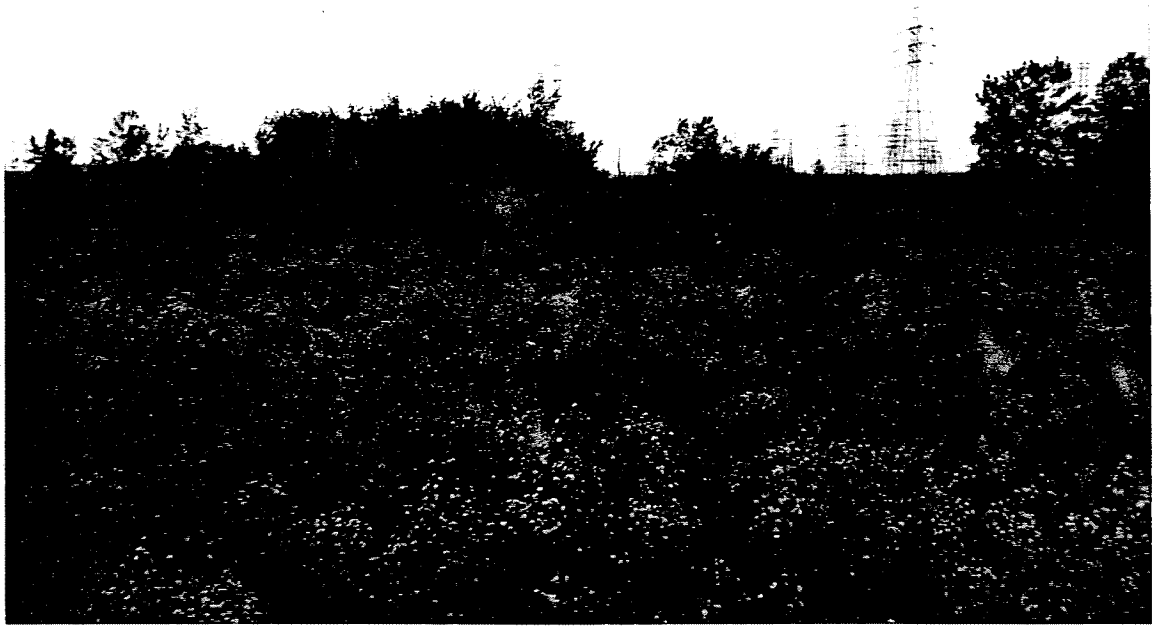
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-12-90/1520

Lens: Type NA SN: NA Frame No.: 6

Comments: View west of proposed GW-1 location from 50 feet east of GW-1 stake. Note reeds in background indicative of marshy area west of GW-1.



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PHOTOGRAPHIC RECORD

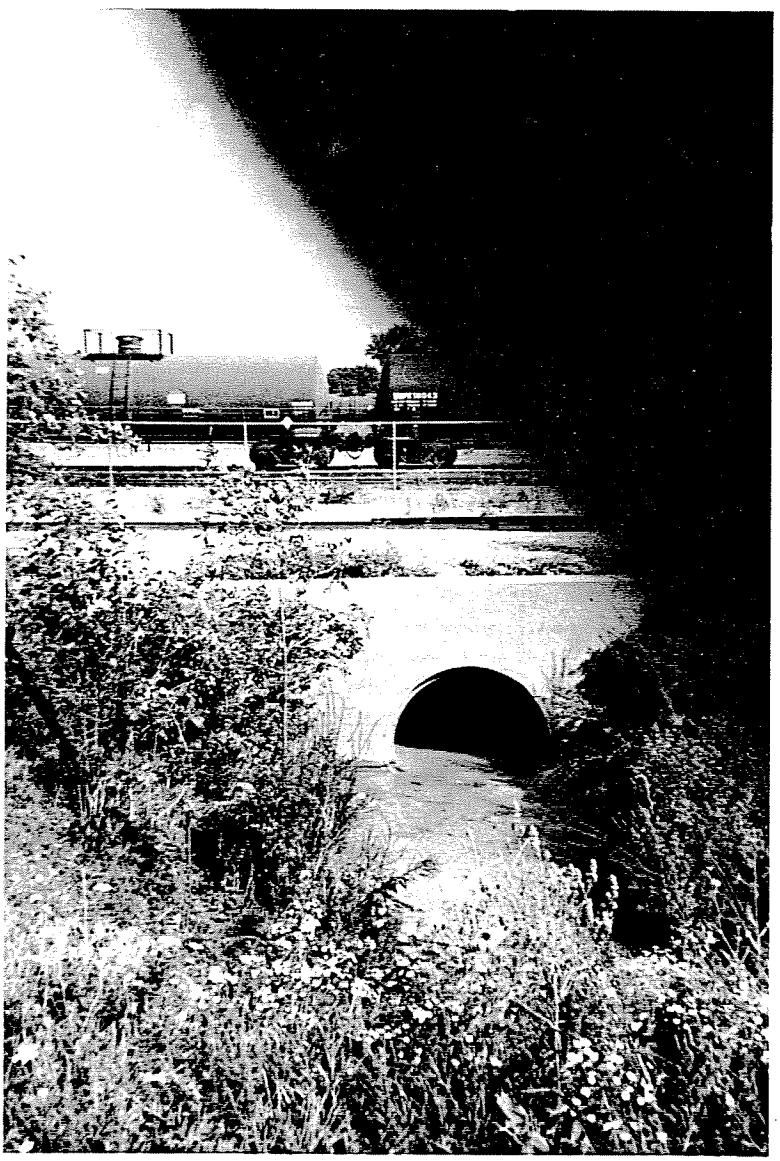
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-12-90/1529

Lens: Type NA SN: NA Frame No.: 7

Comments: View east of Gill Creek from Conrail access road. Note the green hue of the water.



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02[UZ]YQ5080:D3377/5141

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PHOTOGRAPHIC RECORD

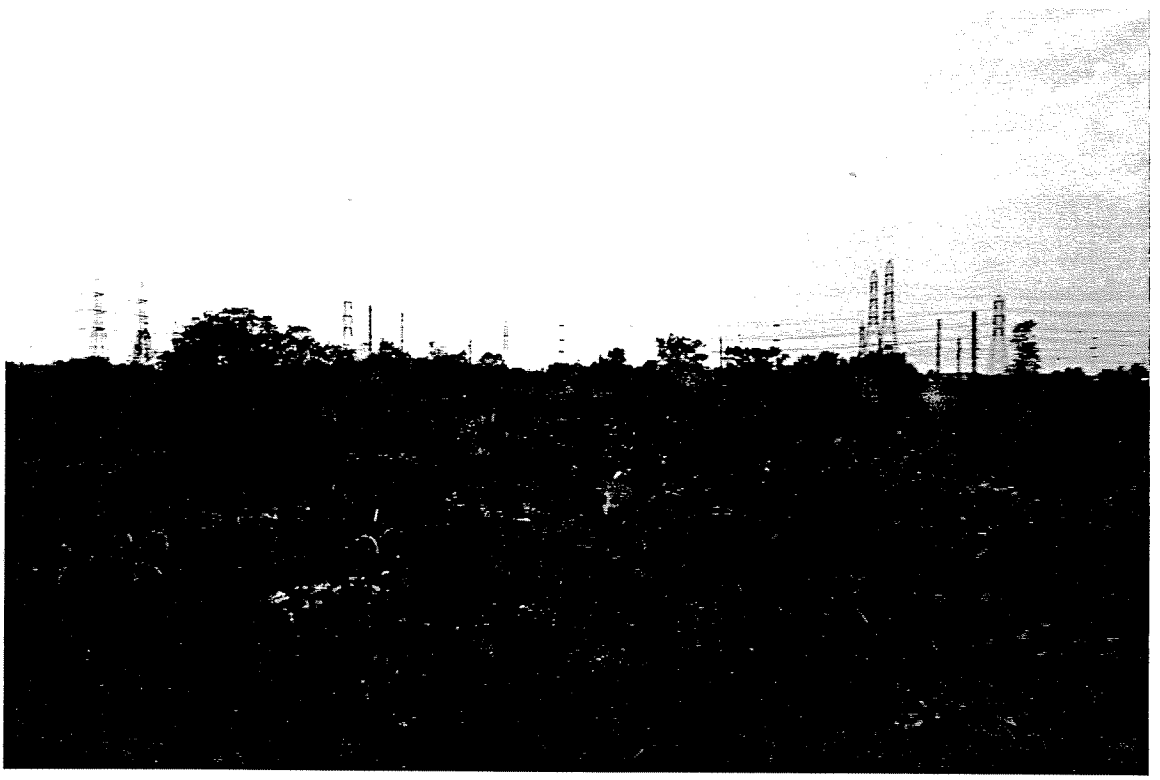
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-12-90/1529

Lens: Type NA SN: NA Frame No.: 8

Comments: View west of Gill Creek from Conrail access road. Note that creek is not exposed at the surface.



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PHOTOGRAPHIC RECORD

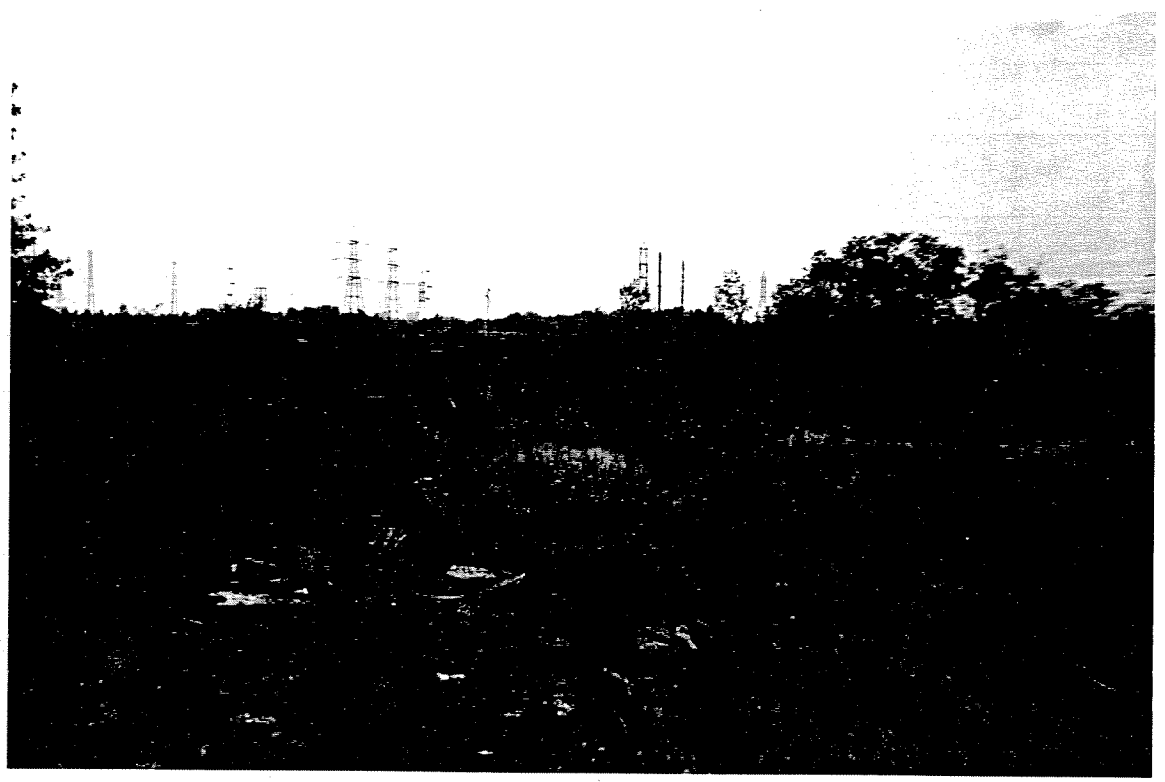
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-12-90/1530

Lens: Type NA SN: NA Frame No.: 9

Comments: View west of proposed GW-2 location from 40 feet east of GW-2 stake.



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02[UZ]YQ5080:D3377/5141

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PHOTOGRAPHIC RECORD

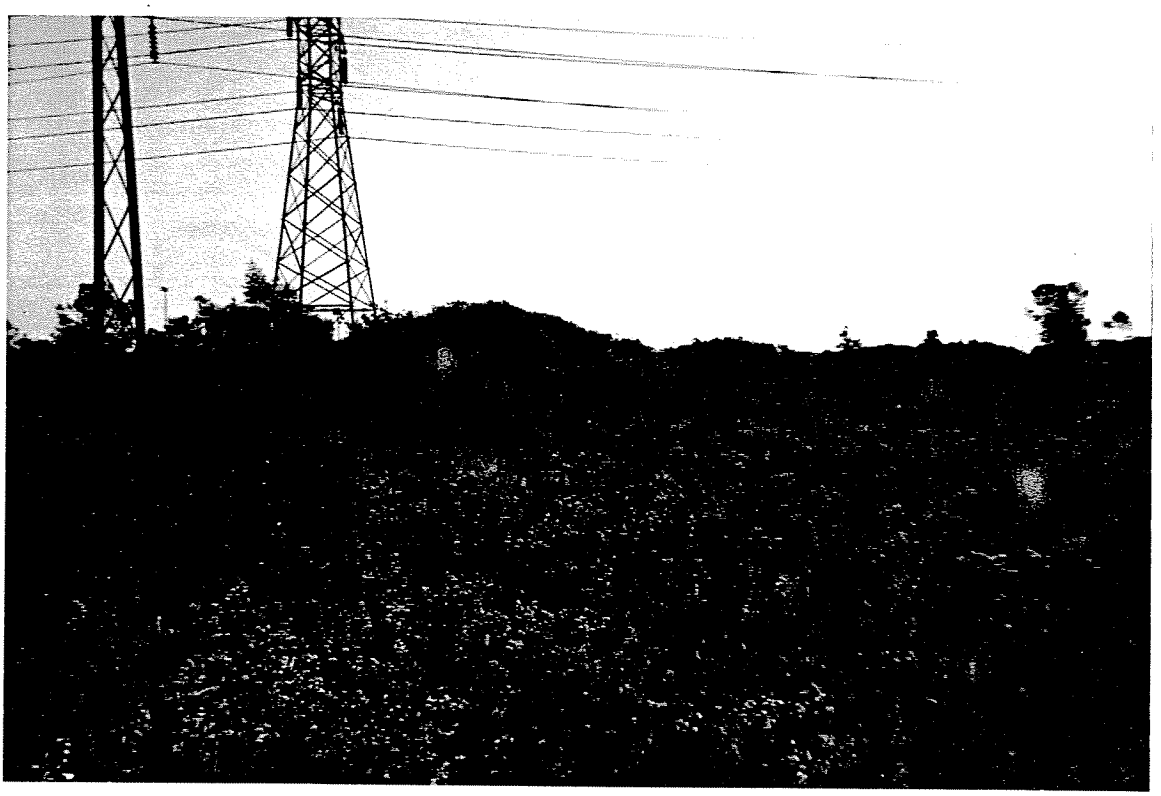
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-13-90/0955

Lens: Type NA SN: NA Frame No.: 10

Comments: View east of proposed GW-4 location from 50 feet west of GW-4 stake.



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PHOTOGRAPHIC RECORD

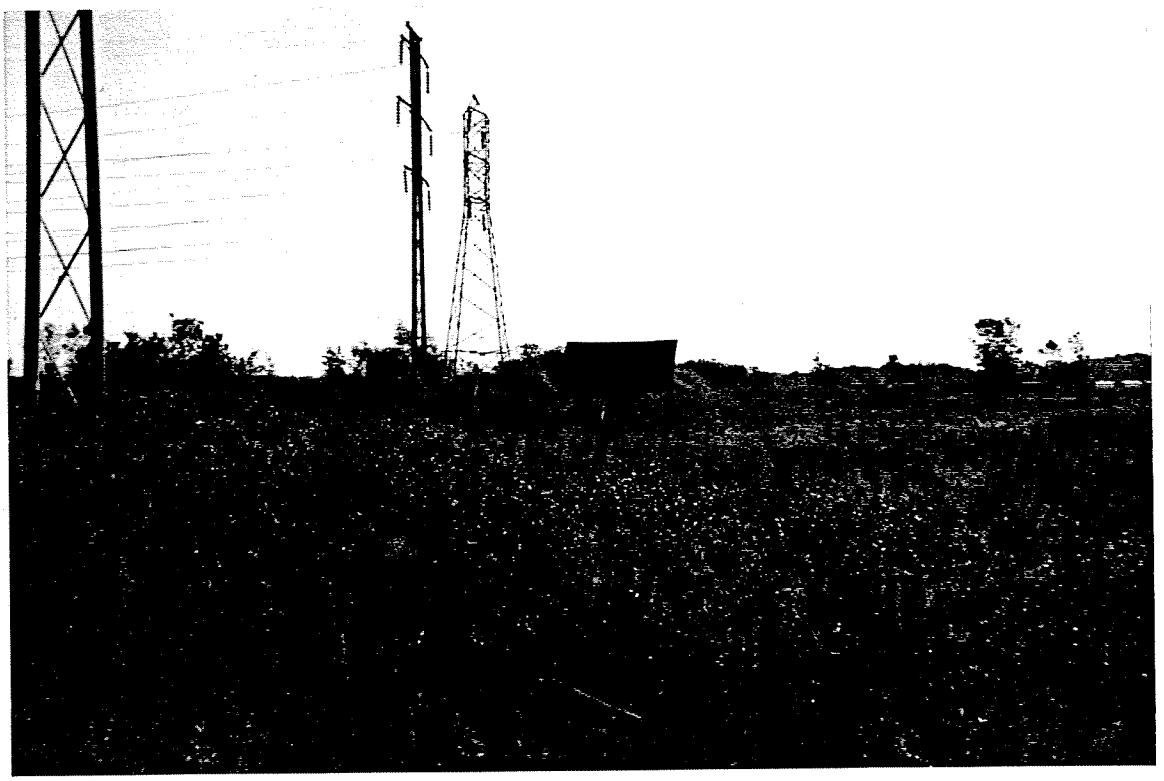
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-13-90/0956

Lens: Type NA SN: NA Frame No.: 11

Comments: View east from western access road (48th Street) from a point due west of proposed GW-4 location. Note that GW-4 stake cannot be seen due to vegetation.



48

02[UZ]YQ5080:D3377/5141

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ecology and environment, inc.

PHOTOGRAPHIC RECORD

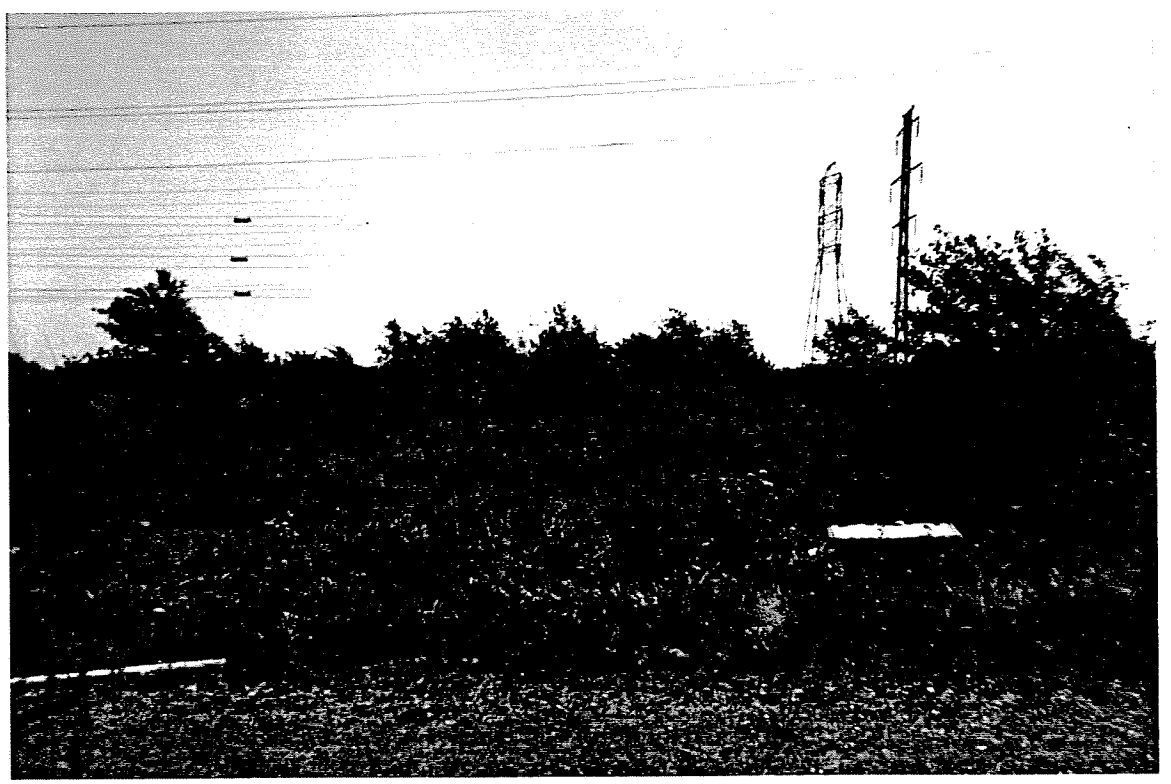
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-13-90/1113

Lens: Type NA SN: NA Frame No.: 12

Comments: View east of proposed GW-5 location from western access road (48th Street).



48

02[UZ]YQ5080:D3377/5141

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-13-90/1114

Lens: Type NA SN: NA Frame No.: 13

Comments: View of East Gill Creek from western access road (48th Street).



48

02[UZ]YQ5080:D3377/5141

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-13-90/1114

Lens: Type NA SN: NA Frame No.: 14

Comments: View of East Gill Creek from western access road (48th Street). Note that surface water cannot be seen from this distance due to vegetation.



48

02[UZ]YQ5080:D3377/5141

ecology and environment, inc.

PHOTOGRAPHIC RECORD

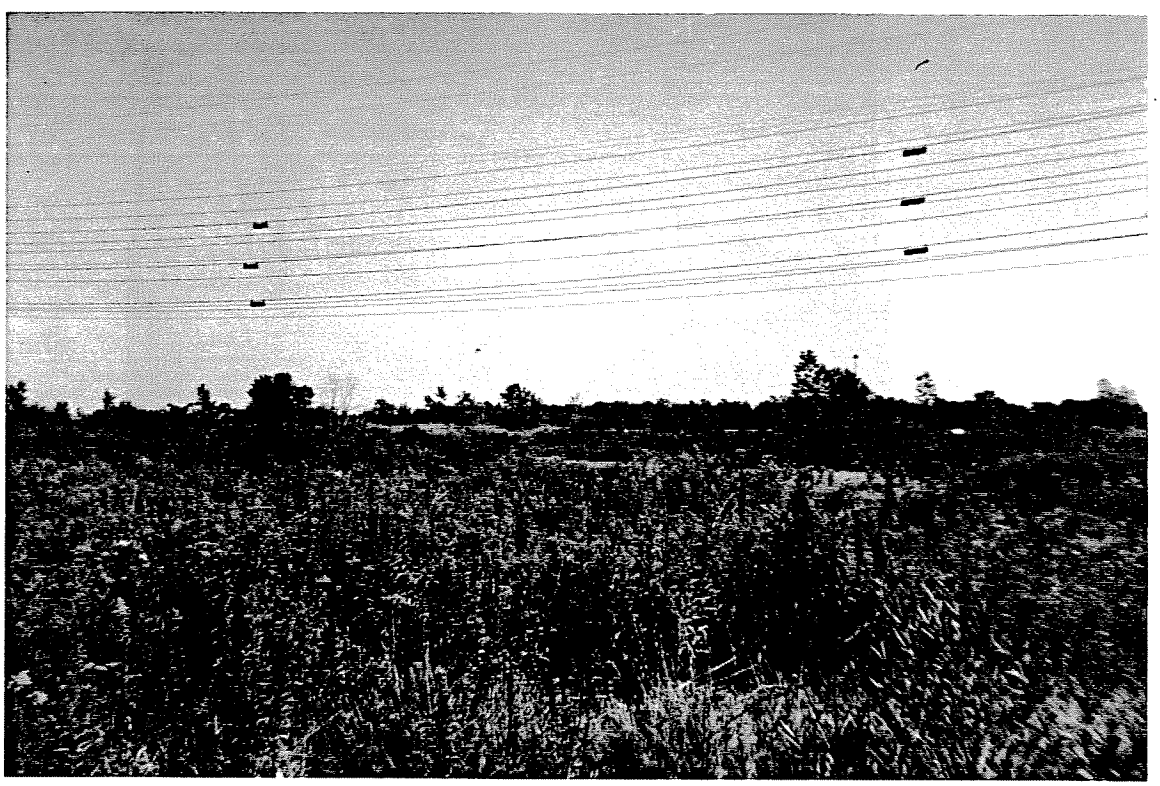
Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-13-90/1237

Lens: Type NA SN: NA Frame No.: 15

Comments: View east of proposed GW-6 location from western access road (48th Street). Note that GW-6 stake cannot be seen due to vegetation.



48

02[UZ]YQ5080:D3377/5141

recycled paper ecology and environment

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: New York State Department of Environmental Conservation E & E Job No.: YQ5010/5030

Camera: Make Kodak 35-mm Fling - Disposable SN: NA

Photographer: R. Watt Date/Time: 9-13-90/1238

Lens: Type NA SN: NA Frame No.: 16

Comments: View southeast of proposed GW-6 location from western access road (48th Street). Note that GW-6 stake cannot be seen due to vegetation.



48

APPENDIX F

GEOTECHNICAL ANALYSES

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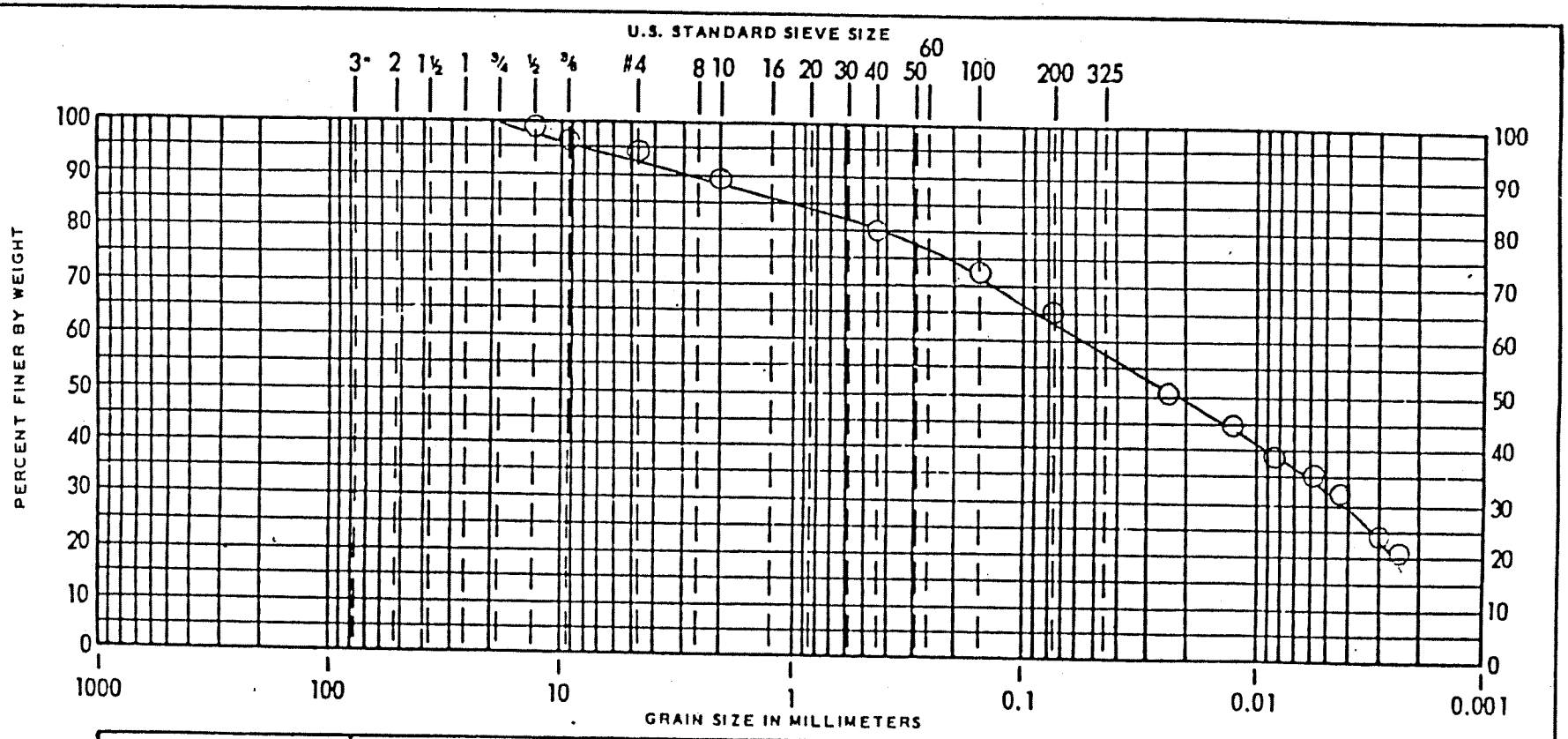
Project No. 11420	TOLEDO TESTING LABORATORY	Sheet 1 Of 1

TABULATION OF TEST DATA

Test Boring or Test Pit Number	Sample Number	Depth of Sample Tip	Elevation of Sample Tip	Standard Penetration (Number of Blows/Foot Unless Otherwise Stated)	Natural Water Content (Percent of Dry Weight)	In-Place Dry Density (Pounds per Cubic Foot)	Unconfined Compressive Strength (PSF)		Particle Size Distribution							Atterberg Limits			Group Designation and Index (AASHTO)
									Gravel (Percent)	Coarse Sand (Percent)	Medium Sand (Percent)	Fine Sand (Percent)	Silt (Percent)	Clay (Percent)	Colloids (Percent)	Liquid Limit (Percent)	Plastic Limit (Percent)	Plasticity Index (Percent)	
F-2	GW-04	4'-6'							15	1	2	4	11	67		45	20	25	A-7-6 (15)
	GW-05	9'-11.5'							6	5	9	15	32	33		22	13	9	A-4a (6)
	GW-06	13'-15'							10	7	11	14	32	26		17	13	4	A-4a (5)

Figure Number 1

SOIL CLASSIFICATION SHEET



PROJECT Ecology & Environment, Inc.
YQ-5040

BORING NO:

SAMPLE NO. GW-05

DEPTH 9'-11.6'

CLASSIFICATION
Sandy clayey silt
A-4a (6)
USCS: sandy lean clay (CL)

NATURAL % MOISTURE

LIQUID LIMIT 22

PLASTIC LIMIT 13

PLASTICITY INDEX 9

COLOR

REMARKS

Toledo Testing Laboratory, Inc.

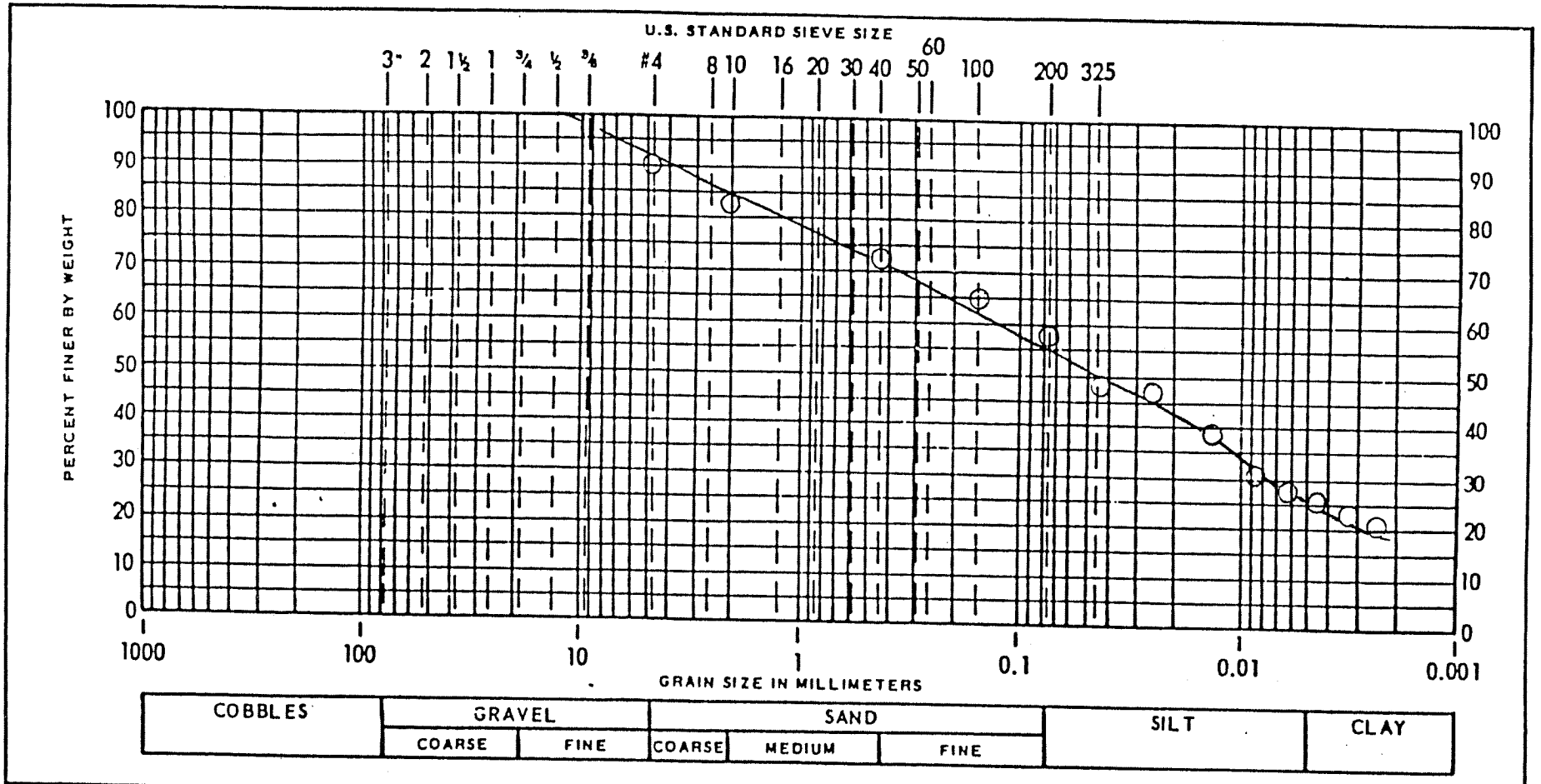
T.T.L. Job No. 11420

Figure Number 2

F-3

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SOIL CLASSIFICATION SHEET



PROJECT Ecology & Environment, Inc.
YQ-5040

BORING NO.

SAMPLE NO. MW-06

DEPTH 13'-15'

CLASSIFICATION
Clayey sandy silt
A-4a (5)

USCS: Sandy silty clay (CL-ML)

NATURAL % MOISTURE

LIQUID LIMIT 17

PLASTIC LIMIT 13

PLASTICITY INDEX 4

COLOR

REMARKS

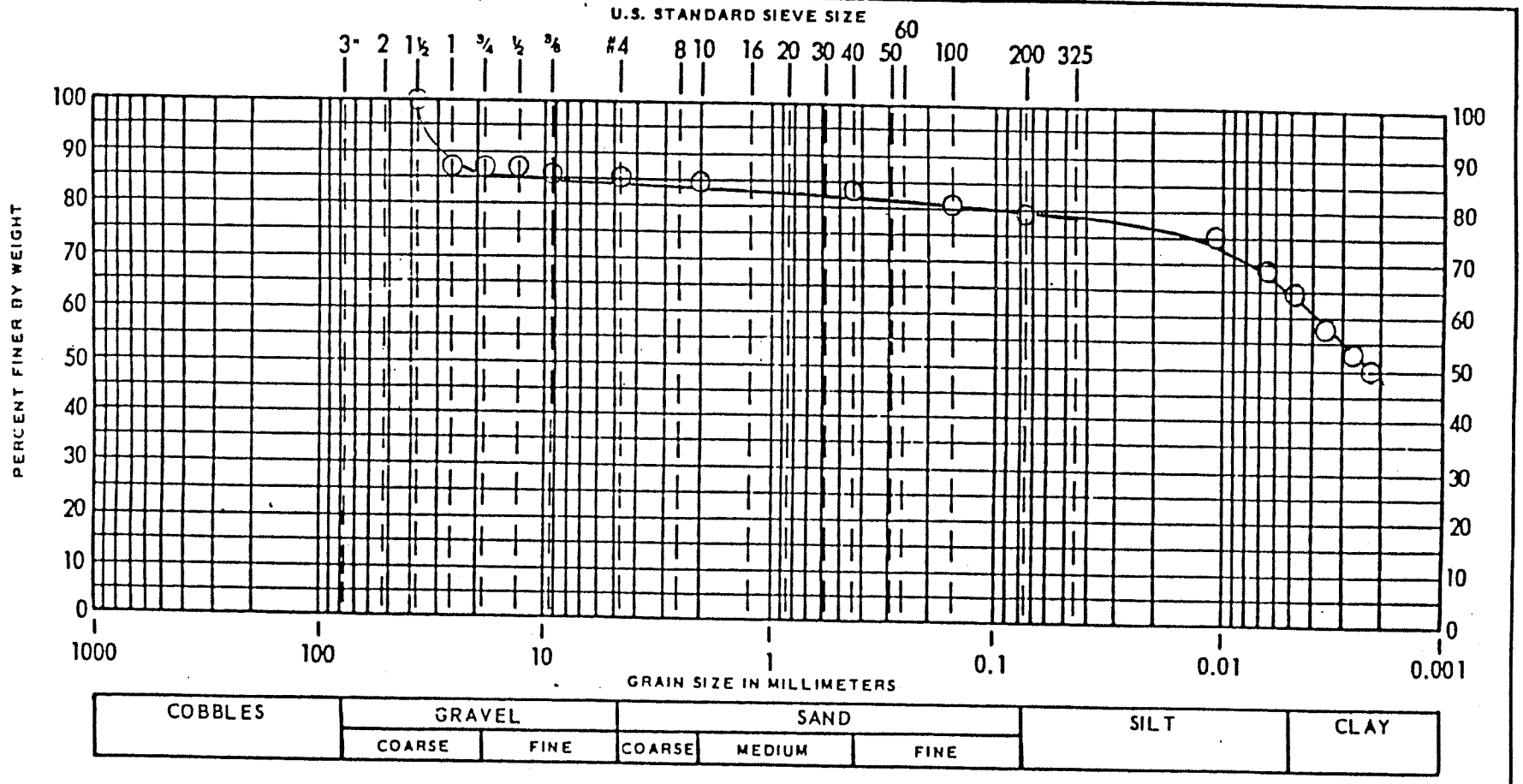
Toledo Testing Laboratory, Inc.

T.T.L. Job No. 11420

F-4

Figure Number 3

SOIL CLASSIFICATION SHEET



PROJECT Ecology & Environment, Inc.
YQ-5040

BORING NO.
SAMPLE NO. GW-04
DEPTH 4'-6'

CLASSIFICATION
Clay
A-7-6 (15)

USCS: Lean clay with gravel (CL)

NATURAL % MOISTURE
LIQUID LIMIT 45
PLASTIC LIMIT 20
PLASTICITY INDEX 25
COLOR
REMARKS

Toledo Testing Laboratory, Inc.

T.T.L. Job No. 11420

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Figure Number 4

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APPENDIX G

FIELD LOG BOOKS

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E & E Job Number YQ-5000

Telephone Code Number

Site Name New Road Landfill

State/City Niagara Falls, New York

TDD

PAN

SSID

Start/Finish Date 9.12.90 / 9-13-90

Book 1 of

E & E Emergency Response Center: (716) 684-8940

9.12.90 Wed. YQ-5020/30

0900 - D. Johnson and S. Strauss met R. Watt @ Access road entrance to New Rd. landfill site.

0903 - John Malinchock of PASNY arrives onsite to give us a tour and offer assistance.

0905 - Weather: Sunny, winds are moderate (10 mph) from the south west, temp. 80° F.

0908 - Objectives: 1) Conduct site recon. w/ air monitoring survey. 2) Perform EM-31 and magnetometer geophysical surveys

0912-0950 - Tour site w/ John Malichock from access road. John is very informative as to health and safety concerns and supposed property boundaries. He will meet Rick and Scott @ 1400 hrs w/ a property map designating respective land ownership.

1000 - J. Malinchock departs site.

1005 - R. Watt turns on rad-mini radiation detector. ~~Background~~ DAT Ambient radiation is mean. at 15 clicks/per minute, and this level is acceptable.

1010 - R. Watt conducts site health and safety meeting. Tripping and ticks are mentioned DAT as primary and secondary hazards as the scope of work to be performed will involve minimal contact w/ contaminants at the site.

9.12.90 Wed. YQ-5020/30

1010 cont. -

1020 - R. Watt has obtained upgradient air monitoring readings as follows:

OVA - 3ppm (background) by south west access road entrance to site.

1028 - Set up geophysical equipment for EM-31 ~~and~~ DAT Mag surveys.

Downwind OVA reading = 0 ppm @ backhoe

1120 Don Johnson leaves site after setting up GRID No. 2

1155 Finish GRID # 2
Stake @ 20,20 is 152', N82°E to telephone pole w/ orange flagging tape & is 119', S82°E of to existing well along road (@A/B).
Mag. background station is ca. 50' S of 20,0.

1215 Set up GRID # 3 containing GW-3.
Stake @ 20,20 is 124' from road on east side of site & it is 94' S82°E to existing well 10R

1355 Finish grid No. 3. Mag. Bkgnd station 20's of 0,0

R. Watt

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WEDNESDAY 12 SEPT. 1990

1400 We are to meet John Malinchock NYPA here @ 1400. While waiting, Rick takes photos

1402 Photo 1 View W from concrete slab @ SE corner of site
1402 Photo 2 View NW " " " "
1404 Photo 3 View N past GW-3 from 55' S of GW-3

1405 John Malinchock arrives. Drops off real estate map for Don's reference.

1410 Malinchock leaves. Set up GW-1 location

1440 Conrail Police stop by to ask us what we're doing. He said we should carry the Conrail ~~Ass~~ Access agreement with us to show we have permission to use the road.

GW-1 107' due W of eastern access road sat of in the middle of the NE curve.
Stake @ 20,20 is 32', N5°W from metal sign post marked w/ orange flagging tape.

1515 Finish grid No. 1. Mag. Bkgrnd station 20' S of 0,0

Photo 4 - Crap
1519 Photo 5 - View S past GW-1 from 20' N of GW-1
1520 Photo 6 - Marsh W of GW-1 from 50' E of GW-1
1529 Photo 7 - "Creek" view E from Road on east of site
1529 Photo 8 - "Creek" View W " " " "
1530 Photo 9 - View W past GW-2 from 40' E of GW-2

1630 Scott & Rick return to HQ.
R. Watts

WEDNESDAY 12 SEPTEMBER 1990 YQ5030

GRID No. 2 containing GW-2 oriented N-S / E-W

TIME	STATION	N-S VERT.	N-S HORIZ.	E-W VERT.	E-W HORIZ.	COMMENTS
1134	40,40	34 ~~35~~	27 ~~29~~	38 36	25	
	40,30	35 ~~36~~	28	38 37	30	
	40,20	38	29	38	28	
	40,10	34	25	36	29	
	40,0	36	23	36	24	
	30,0	35	24	34	26	
	30,10	34	26	34	27	
	30,20	38	28	37	25	
	30,30	35	29	36	31	
1144	30,40	37	25	37	24	
	20,40	34	26	36	28	
	20,30	37	26	37	26	
	20,20	38	26	38	25	WELL STAKE
	20,10	33	26	35	29	
	20,0	36	26	35	25	
	10,0	36	26	35	25	
	10,10	34	26	34	26	
	10,20	36	26	35	25	
	10,30	38	28	38	34	
	10,40	33	27	35	31	
	0,40	33	28	35	29	
	0,30	38	27	37	24	
	0,20	35	25	35	25	
	0,10	35	24	34	25	
1155	0,0	36	25	36	25	

WEDNESDAY 12 SEPT. 1990 YQ5030

GRID No. 3 containing GW-3

orientation of Y-axis is: N-S ; X-axis: E-W

TIME	STATION	N-S VERT.	N-S HORIZ.	E-W VERT.	E-W HORIZ.	COMMENTS
1333	40,40	55	36	48	30	
	40,30	41	32	42	27	
	40,20	39	28	38	29	
	40,10	42	24	43	27	
1338	40,0	38	22	40	22	
	30,0	36	31	34	28	
	30,10	35	37	31	33	
	30,20	43	33	40	31	
	30,30	50	34	48	30	
1342	30,40	58	38	52	33	
	20,40	55	46	52	36	4'x8' concrete slab w/ ½" rebar on NE side of pin.
	20,30	50	37	48	29	
	20,20	45	34	44	30	well stake
	20,10	40	34	41	33	
1346	20,0	38	29	38	31	
	10,0	40	26	41	28	
	10,10	42	28	43	30	
	10,20	44	28	43	27	
	10,30	52	34	48	31	
1350	10,40	58	48	52	38	
	0,40	50	43	48	39	
	0,30	47	35	41	30	
	0,20	42	31	36	31	
	0,10	41	28	40	29	
1353	0,0	41	27	41	29	

WEDNESDAY 12 SEPT 1990 YQ5030

GRID No. 1 containing GW-1

orientation of Y-axis: N-S ; X-axis: E-W

TIME	STATION	N-S VERT.	N-S HORIZ.	E-W VERT.	E-W HORIZ.	COMMENTS
1456	40,40	44	24	43	23	
	40,30	39	24	39	24	
	40,20	37	23	37	22	
	40,10	33	22	32	21	
	40,0	33	24	32	21	
1500	30,0	36	23	36	24	
	30,10	36	23	36	23	
	30,20	39	24	40	22	
	30,30	42	23	42	22	
	30,40	43	25	40	27	
1505	20,40	26	39	20	37	
	20,30	43	25	41	21	
	20,20	44	21	44	21	well stake.
	20,10	40	22	41	23	
	20,0	38	26	39	26	
1508	10,0	44	28	42	29	
	10,10	46	24	45	25	
	10,20	46	22	46	25	
	10,30	29	31	24	40	
	10,40	36	30	35	30	
	0,40	32	26	31	24	
	0,30	37	31	32	31	
	0,20	32	33	28	42	
	0,10	45	31	42	27	
1515	0,0	43	34	40	32	

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THURSDAY 13 SEPTEMBER 1990

WEATHER: Clear, sunny, lt SW wind, 80°F
PERSONNEL: Rick Watt & Scott Straus (E+E)
OBJECTIVE: Complete geophysical survey of 3 remaining grids.

0720 Rick leaves HQ
0810 Rick + Scott meet @ site.
Load up equipment + walk up western access road (48th sth.) to find GW-4 location. Cant find existing well 4R so go about ½ way between Gill Creek + Conrail property to the north.

GW-4 will be South of the swampy low-lying area which seems to run north up to the Conrail tracks.

To Find GW-4, walk north on "48th str." past Gill Creek to a rusted "Private Property" sign w/ orange flagging tape (on E side of road). Then go 93', S80°E to the stake @ 20,20.
GW-4 Background station 20' S of 40,0.

0940 GRID No. 4 is ½ way between 2 sets of high power NiMo electric lines. It is 50' from the stake @ 20,20 due E+W to the first lines. When trying to use the EM-31, the needle fluctuated violently between 15 + 40 mmhos/m in the vert. + between 10 + 25 mmhos/m in the horiz. ∴ can not perform the EM-31 survey @ GRID No. 4.

0955 Photo 10 - View E of GW-4 from 50' W of GW-4
0956 Photo 11 - View E from road due W of GW-4

R. Watt

G-6

THURSDAY 13 SEPT. 1990

1000 There is 2 types of debris scattered along 48th St. - Household + construction debris, eg., appliances, furniture, asphalt shingles, scrap metal + wood, etc.

1020 Can't locate existing well 3R ∴ will put GW-5 in a small clearing alongside 48th st. about 115' South of Gill Creek.

1040 GW-5 mag background 20' S of 20,0
in grid No. 5, EM31 needle fluctuating about 15 mmhos ∴ will try to get some numbers We are ~45' from high tension lines, to the E of GW-5

1113 Photo 12 - View E of GW-5 from 48th st.
1114 Photo 13 - View E of Gill Creek from 48th st.
1114 Photo 14 - View E of Gill Creek from 48th St.

To find GW-5, walk N on 48th str. Look for rusty hydrant on W side of road marked w/ orange paint then go 102' N48°E from the hydrant to the stake @ 20,20.

1210 EM-31 readings fluctuating violently. From 35-65 mmhos/m in horiz. + from 40-100 mmhos in vert. We are (GW-6) is ½ way between two sets of NiMo electric lines (50' in either direction (E-W) from stake @ 20,20 to lines).
∴ will not perform EM-31 survey.

1237 Photo 15 View E of GW-6 from 48th St. due W of GW-6
1238 Photo 16 View SE from 48th St. W of GW-6

R Watt

THURS. 13 SEPT. 1990

1240 To find GW-4, walk north on 418th St to first metal NiMo electic-line tower. From NE leg of tower go 1160' N20° E to stake @ 20,20

1245 Pack up equipment to leave site.

1430 After returning ~~to~~ equipment to ESC + returning van, return to E+E

R. Work

THURSDAY 13 SEPTEMBER 1990 YQ5030
GRID No. 4 containing GW-4
orientation of x-axis: E-W Y-axis: N-S

TIME	STATION	N-S VERT.	N-S HORIZ.	E-W VERT.	E-W HORIZ.	COMMENTS
	40,40					
	40,30					
	40,20					
	40,10					
	40,0					
	30,0					
	30,10					
	30,20					
	30,30					
	30,40					
	20,40					
	20,30					
	20,20					well stake
	20,10					
	20,0					
	10,0					
	10,10					
	10,20					
	10,30					
	10,40					
	0,40					
	0,30					
	0,20					
	0,10					
	0,0					

READINGS NOT OBTAINABLE SEE TEXT (P98)

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THURSDAY 13 SEPTEMBER 1990

GRID No. 5 (GW-5)

orientation of x-axis: E-W Y-axis: N-S

TIME	STATION	N-S VERT.	N-S HORIZ.	E-W VERT.	E-W HORIZ.	COMMENTS
1042	40,40	28	20	30	14	20-32 needle fluctuation
	40,30	20 25	18	27	15	18-30
	40,20	25	18	28	16	± 3-5 mmhos/m
	40,10	30	15	27	15	
1050	40,0	30	20	27	16	
	30,0	27	21	30	19	
	30,10	30	20	30	18	± 2-4 mmhos/m
	30,20	30	18	29	16	"
	30,30	25	17	25	16	"
1055	30,40	28	16	29	14	"
	20,40	25	18	23	15	"
	20,30	28	19	24	18	"
	20,20	30	21	26	18	well stake "
	20,10	33	20	29	16	"
1100	20,0	27	21	28	19	"
	10,0	23	17	28	20	"
	10,10	30	26	28	20	"
	10,20	29	22	27	21	"
1102	10,30	29	22	27	19	"
1103	10,40	27	20	27	18	"
	0,40	26	18	27	17	"
	0,30	27	22	29	19	"
	0,20	25	24	24	21	" some surface metal debris
	0,10	27	22	27	17	"
1108	0,0	27	20	23	15	"

THURSDAY 13 SEPTEMBER 1990

GRID No. 6 (GW-6)

orientation of x-axis: E-W Y-axis: N-S

TIME	STATION	N-S VERT.	N-S HORIZ.	E-W VERT.	E-W HORIZ.	COMMENTS
~~1042~~	40,40					
	40,30					
	40,20					
	40,10					
	40,0					
	30,0	Readings not obtainable see text p79				
	30,10					
	30,20					
	30,30					
	30,40					
	20,40					
	20,30					
	20,20					well stake
	20,10					
	20,0					
	10,0					
	10,10					
	10,20					
	10,30					
	10,40					
	0,40					
	0,30					
	0,20					
	0,10					
	0,0					

E & E Job Number Y0S040

Telephone Code Number

Site Name ~~Solfatt~~ New Road Landfill

City/State Niagara Falls, NY

TDD

PAN

SSID

Start / Finish Date 10-22-90 /

Book 1 of

E & E Emergency Response Center: (716) 684-8940
E & E Corporate Center: (716) 684-8060
MEDTOX Hotline: (501) 370-8263
E & E Safety Director (Home): (716) 655-1260

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MONDAY 22 OCTOBER 1990 YQSO40

WEATHER: Overcast, drizzle, occaissional rain, 50°F, 5mph W wind

~~PERSONNEL~~: Rick Watt - E&E FTL
Sybil Newchurch - E&E SSO

OBJECTIVE: Meet drillers on-site after mobilization. obtain water, decon all equipment, begin drilling, time permitting.

0800 Sybil picks up Rick. Begin mobilization.

1105 Arrive on site. Drillers have not arrived yet.
Inventory:
OVA 128 - Response Rentals
HNu w/ 10.2 eV & 11.7 eV probes
Explosimeter - Response Rentals.
Conductivity Meter - (HACH KIT) - 02-03-001-02
Turbidimeter - 02-03-001
Brunton Compass
Water Level Indicator 13-03-010
Level D Expendables
Rental van (Voyager) - Action Rental, Lic. # ZEP 164
Digital pH Meter - 02-02-001

1300 Drillers arrive on-site. American Auger & Ditching
Lee Penrod - Driller
Derek Grieve - Helper
All survey site - decide to begin @ GW-1
Will drill @ 30,30 as per Geophysical Report.

1330 Rick calls Glenn May, NYSDEC to let him know we will begin. Glenn says he will not be out today.

1335 Drillers unload rig & equipment. We will steam clean all equipment with water from the Macedon site, & then begin drilling.

R. Watt

G-10

MONDAY 22 OCTOBER 1990 YQSO40

1400 Conduct safety meeting. Topics include:
- chemical hazards,
- physical hazards, including drill rig,
- route to hospital,
- location of phone, etc.

All in attendance, sign:
R. Watt Richard M. Watt
S. Newchurch Sybil Newchurch
L. Penrod Lee Penrod
D. Grieve Derek Grieve

1435 Drillers begin decon of all equipment.

1525 Complete decon. Set up @ GW-1. Will split spoon every 5' until water, then continuous.

1545 Split spoon @ 0-2 ft 4ppm AB, BZ was 0 ppm AB.
- HNu will be used today and an OVA will be used for the remained of this project.
Calibrated 10.2 eV probe to 54 ppm w/ Cal span gas. Background 5ppm. The HNu is taking a long time to give readings and clean back to background. The readings are questionable. It may be caused by the humidity/rain.

1555 Split spoon @ 2-4 ft 2 ppm AB, BZ was 0 ppm AB
Borehole (BH) was 3 ppm AB.

1605 Split spoon @ 9-11 ft 2 ppm AB, BH was 1 ppm AB, BZ was 0 ppm AB.

1615 Split spoon @ 13-15 ft 0 ppm AB, BH was 0 ppm AB, BZ was 0 ppm AB (very wet sample)

1625 Split spoon @ 13-15 ft 0 ppm AB, BZ was 0 ppm AB

1635 Split spoon @ 15-15.3 ft 0 ppm AB, BH was 0 ppm AB, BZ was 0 ppm AB.

S. Newchurch

22 Oct 1990 Tuesday YQ 5040 S. Newchurch

1640 Auger refusal @ 15.5'

1650 Lee finishes chiseling out the auger bit - no water was used.

We will let the hole sit overnight to see where the static water level rises to.

1715 All leave site.

R. Watts

Mon TUESDAY 23 OCTOBER 1990 YQ5040

WEATHER: Overcast, drizzle, 5 mph NE wind, 42°/55°F

PERSONNEL: Rick Watts - E&E FTL
Sybil Newchurch - E&E SSO
Michele Giese - E&E H&S Trainee
Lee Penrod - American Auger Driller
Derek Grieve - American Auger Helper.

OBJECTIVE: Complete GW-1, begin GW-2.

0735 Sybil picks up Rick. Stop @ ESC for supplies.

0805 Pick up Michele.

0840 Arrive on site. Drillers already on-site.

0850 Discuss site safety w/ Michele. Set up equipment.

0905 Wk in GW-1 w/ augers to 14.5-15', is ca. 2' BGS
∴ will set 10' of screen.

1000 Finish pouring bentonite pellets.
10' PVC screen (2" ID, 0.010" slot) 5-15'
T.D. of well 15.2'
Sand (#3 Q-Rok): 4.5-15.2'
Bentonite seal: 3.5-4.5'
Grout: 0-3.5'
Jim Wilding, NYSDEC Reg. 9 arrives.

1050 Bentonite has hydrated, so mix grout + then complete GW-1 with a 5' long steel locked cover.

1100 GW-1 complete. Decon rig + tools. During hydration time (1000-1050), Derek deconned the augers + some tools.

1125 Decon complete. Begin mobilization to GW-2.

1215 Begin GW-2
Surface conditions: wet; standing water nearby, scattered debris.

1220 Background: Explosimeter / O_2 meter
0% LEL / 20.8% O_2
OVA - response rental - 50920 (S/N) - 3ppm
R. Watts

9

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23 Oct 1990 Tuesday YQ5040 S. Newcombe

1220 Split spoon @ 0-2 ft 0ppm AB, BZ was 0ppm AB.

1228 Augered to 4'. Pull auger to clean bit + see water in the hole @ 3-3.5' BGS

1235 Split spoon @ 4-6 ft 0ppm AB, BH was 0ppm AB, BZ was 0ppm AB.
- Calabrated HNU to use incase we encounted readings on OVA. Background is very high: 5ppm. (? due to humidity?)

1240 Split spoon at 6-8 ft. 0ppm A.B., BZ was 0ppm AB. BH reading was 0ppm A.B. Refusal @ 7.0' may be on a boulder. Move NE ~1' + try to auger to 8'.

1300 Borehole reading at 3ft 2ppm AB, BZ was 0ppm AB.

1305 Have augered to 4', pulled auger, however no water in hole as in previous attempt 5' away.

1325 Split spoon @ 8-10 0ppm AB, BH was 80ppm AB, (heat from drilling through rocks) BZ was 0ppm AB.

1335 Split spoon @ 10-12 2ppm AB, BH was 30ppm AB, BZ was 0ppm AB.

1355 Split spoon @ 14-16 0ppm AB, BH was 5ppm AB, BZ was 0ppm AB.

1430 Split spoon at 16-16.2 0ppm AB, BH was 7ppm AB, BZ was 0ppm AB.

1440 Begin flushing + drilling out auger bit w/ 3 7/8" rollerbit will put bentonite from 16.5-16.0' to seal off bedrock aquifer from overburden.

1520 Pour bentonite pellets from bottom of hole (~16.5') to 15.9" to seal off the bedrock (hit @ 16.2')
Derek decons 10' of screen. (Sch. 40 PVC, 2" ID, .010" slot)

1530 T.D. to bentonite = 15.75'
Bottom of screen @ 15.5'
TZ WW

TUESDAY 23 OCTOBER 1990 YQ5040

1555 Finish pouring sand (#3) to 5.0' BGS

1600 Finish pouring bentonite pellets to 3.5' BGS.
Allow time to hydrate during which we'll decon.

1715 Finish grouting GW-2. complete with locking steel protective casing + drainage pad.

1730 Rick & Lee complete drainage pad on GW-1
Derek completes decon.

1805 All leave site.

R. Watt

10

WEDNESDAY 24 OCTOBER 1990 YQ5040

WEATHER: overcast, calm, 40°F. Forecast calls for 10-15mph NE winds, sunny periods, + a high of 55°F.

PERSONNEL: Rick Watt - E&E FTL
Sybil Newchurch - E&E SSO
Lee Penrod - American Auger Driller
Derek Grieve - American Auger Helper

0735 Sybil picks up Rick. Stop @ ESC for more supplies, Stop to purchase warm drink. Rick attempts to call Don Johnson re progress on site - not in + audix malfunctioning.

0850 Arrive on-site. Drillers already on site. This morning we will clean up @ GW-2, complete decon (chemical lines, etc.) + then move on

OBJECTIVE: Drill + construct GW-3 + GW-4 if possible

NOTE: Yesterday, on GW-2, two auger teeth broke off when we past the edge of a boulder @ 7'. Hopefully, the auger bit will work okay today. A new bit has been ordered from Mobile Drill + will arrive on Thursday.

0915-0930 Decon
0930 Mobilize to GW-3
1025 Fire up OVA + Explosimeter/O_2 meter. Background readings are: OVA 3ppm, 0% LEL/20.8% O_2.
1030 Split spoon @ 0-2' Oppm AB, BZ was Oppm AB.
0930-0945 Visit from Don Johnson.
1045 Pull auger after 4' to clean out bit. There is a much longer than usual soil plug due to the 2 missing teeth.
1100 Split spoon @ 4-6 Oppm AB, BH was Oppm AB, BZ was Oppm AB. — S. Newchurch

24 Oct 1990 Wednesday YQ5040 S. Newchurch

- Calibrated HNu 10.2eV probe to 54ppm w/ cal span gas. All readings will be taken with the OVA if there is a reading AE a second reading will be taken with the HNu. Background HNu - .5ppm.

1110 Split spoon @ 9-11 Oppm AB, BH was Oppm AB, BZ was Oppm AB.
1130 Split spoon @ 13-14 7 ppm AB, BH was Oppm AB BZ was Oppm AB. HNu on sample was 4ppm AB. There was a sweet, tear like smell but dissipated along with the readings after about 1 minute.
1140 Split spoon @ 14-14.75 Oppm AB, BH was Oppm AB, BZ was Oppm AB.
1148 With augers on bottom, T.D. = 14.5' WL = 12.35' BGS
1152 After pulling augers up 1' + pounding out the bit plug, T.D. = 14.25', WL = 10.1' BGS
1200 WL rose to 9.8' BGS
1230 Pull remaining augers - hole is stable WL = 9.5'
1250 Bail a few gallons of water out of hole. WL drops to 10.2'
1253 WL came back to 9.6' BGS. Will set well here.
1310 WL to 9.2' BGS
Derek decons 5' screen + 10' Riser
1340 Bentonite seal between rock + screen from 14.5' - 12.8'
Cap from 12.7 - 12.8'
Screen (2" ID, Sch. 40 PVC, 0.010" slot) 7.7 - 12.7'
Sand: (#3 grade) 7 - 12.8'
1350 seal (bentonite pellets): 5.0 - 7.0'
grout: 0 - 5'
Allow bentonite to hydrate before grout is added during which time drillers decon.

R. Watt

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WEDNESDAY 24 OCTOBER 1990 YQ5040

1350 Paul Stefano of NiMo drops by. He says E+E has not returned the right-of-access agreement to NiMo ∴ we can't drill on their land yet. Paul S. has not been able to get a hold of Don Johnson to straighten it out.

1420 Rick goes to call Don Johnson re: Paul Stefano's visit. Don's not in - talk to Jim Griffis. Jim says postpone drilling GW-4, -5, & -6 until the DEC signs the agreement.

1430 Rick returns

1450 Complete grouting GW-3. Install 5' steel locking cover & drainage pad.

1510 Complete decon. Mobilize to GW-1 to develop.

1530 WL in GW-1 = 7.65' TOC TD = 17.5' TOC
WL = 5.55' BGS Fine material in bottom of well.
Set up development equipment.

1759 GW-1 Development complete.
Water remained >200 NTU by visual classification (the instrument wasn't working).

1815 All leave site.

1900 Return to HQ

R. Watts

WEDNESDAY 24 OCTOBER 1990 YQ5040

GW-1 Development

TIME	GALLONS PURGED	pH	COND (µS/cm)	TEMP (°C)	TURBIDITY (NTU)	
15:59	0	7.59	820	15	> 1000	
16:02	1	7.49	1005	15	> 1000	
16:03	2	7.39	1105	14.5	> 1000	
16:06	3	7.28	1185	14.2	> 1000	
16:08	5	7.46	1180	13.8	> 1000	
16:29	10	7.02	1670	13.4	> 1000	
16:46	15	6.97	1705	13.2	> 1000	
16:58	20	6.91	1800	13.0	>1000	
17:05	25	6.93	1805	13.0	>1000	
17:12	30	6.96	1850	13.0	730	
17:19	35	6.88	1880	12.8	99 *	Turbidimeter
17:26	40	6.90	1850	13.2	-*	not working prop
17:35	45	6.94	1810	13.2	>200	it reads 19 on a
17:41	50	6.94	1825	13.0	7250	scale, 55 on anoth
17:46	55	6.87	1890	13.0	>200	& the water is
17:52	60	6.86	1910	13.0	7200	visually >200
17:58	65	6.91	1860	13.0	>200	

R. Watts

G-14

THURSDAY 25 OCTOBER 1990 YQ5040

WEATHER: Overcast, calm, 40°F. Chance of showers, high 45°F

PERSONNEL: Rick Watt - E&E FTL
Sybil Newchurch - E&E SSO
Lee Penrod - American Auger Driller
Derek Grieve - Amer. Auger Helper

OBJECTIVE: Develop GW-2 & -3, drill if possible.

0740 Sybil picks up Rick. Stop @ HQ.
0800 Arrive @ ESC to pick up Magnetometer + EM-31.
Wait while Pete F. repairs mag.
We may move GW-4, -5, & -6 ∴ we will resurvey.
0915 Arrive on-site. Drillers on-site. Set up to develop GW-2.
0940 WL in GW-2 is 12.8' TOC + 10.8' BGS
0950 Begin development of GW-2
1150 Complete development
1200 Leave site to get gas + call Don Johnson re geophysics + relocation of GW-4 to -6.
Don not in so we'll go to ESC to have ~~pool~~
Peter F. look @ pH meter then return to site to ~~to~~ develop GW-1
1510 Return to site
Set up to develop GW-3
15:40 GW-3 WL = 7.5 FT BGS
1745 ~~A~~ GW-3 development complete.
Go to steam clean rental van
1815 All leave site.

* All 3 wells developed by hand bailing.
All 3 are very turbid (high clay content) but all cleaned up somewhat - became less viscous

THURSDAY 24 OCTOBER 1990 YQ5040

GW-2 Development:

TIME	GALLONS PURGED	pH	COND. (µS/cm)	TEMP. (°C)	TURBIDITY (NTU)
0950	0	~~7.50~~ 6.60	1010	12.5	>200
0952	1	6.59	970	12.5	>200
10:05	2	6.78	990	12.5	>200
10:09	3	6.45	1010	12.5	>200
10:16	5	6.25	1100	12.5	>200
10:21	10	6.60	1205	11.8	>200
10:27	15	* SEE NOTE	1200	12.0	>200
10:32	20	*	1270	12.6	>200
10:38	25	*	1250	12.5	>200
10:44	30	*	1280	12.5	>200
10:50	35	*	1280	12.5	>200
10:58	40	*	1295	12.5	>200
11:03	45	*	1270	12.5	>200
11:08	50	*	1280	12.5	>200
11:13	55	*	1290	12.5	>200
11:18	60	*	1260	12.5	>200
11:22	65	*	1290	12.5	>200
11:27	70	*	1280	12.5	>200
11:33	75	*	1290	12.5	>200
11:38	80	*	1320	13.0	>200
11:50	85	*	1300	13.0	>200

* pH meter keeps going out of calibration - can't get readings - low battery light is not on.

Rwatt

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GW-3 Development

TIME	GALLONS PURGED	pH	COND. (µS/cm)	TEMP (°C)	TURBIDITY (NTU)
1545	0	6.90	1620	13.0	>200 (208)
1550	1	6.97	1450	12.3	>1000
1555	2	6.79	1380	11.6	>1000
1600	3	6.95	1420	10.8	>1000
1610	5	7.12	1440	11.9	>1000
~~HE~~					
17:45	7	7.00	1600	11.2	>1000

Development complete. Recharge slow but it is recharging.

F. Watts

E & E Job Number YQ-5040

Telephone Code Number

Site Name New Road Landfill

City/State Niagara Falls, NY

TDD —

PAN —

SSID —

Start / Finish Date 1.2.91 /

Book 2 of 2

E & E Emergency Response Center: (716) 684-8940
E & E Corporate Center: (716) 684-8060
MEDTOX Hotline: (501) 370-8263
E & E Safety Director (Home): (716) 655-1260

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YQ-5040 Wed. Jan. 2, 1991

0920 - E+E personnel D. Johnson picks up rental van at Budget.

0950 - D. Johnson loads air monitoring and various health and safety equipment into van.

1015 - Return to E+E Corp. Center, meet w/ L. Roedl and discuss todays objectives):
1) Review health and safety plan w/ American Auger and Drilling Co. (AA+D).
2) Commence drilling and well installation at proposed GW-6 location.

1115 - Meet w/ E+E personnel G. Jones, he will oversee the health and safety on the 1st day of work.

1130 - Depart E+E

1155 - Arrive @ New Rd. Landfill. AA+D arrive moments later. NYSDEC representative Jim Tuk arrives @ 1200 hrs.

1210 - All personnel familiarize themselves with site and health and safety plan. Drillers begin to unload equipment, and set up for steam decon.

1220 - E+E prepares to break for lunch

1300 - E+E returns from lunch drillers are decon'ing with steam

1330 - Drillers are finished w/ decon

1340 - Drillers begin to mobilize to GW-6 location w/ rig etc.

Don Johnson

G-18

YQ-5040 Wed. Jan. 2, 1991

1450 - Commence at GW-6 location

0'-2'-SS 2/2/4/5 Rec. = 2.0' 3/6/9/13
0'-0.35' - M-moist silty clay w/ grass and rootlets, med. brown
0.35'-2.0' M moist Clay with minor silt, med. brown

4'-6' Rec. = 3/6/9/13
4'-6' - Moist Clay with minor silt (lenses), extremely irregular interbeds <1 mm in thickness. med. brown-reddish color, plastic, cohesive

1507 hrs. 9'-11' Moist, red-brown Clay w/ minor silt
Rec. = 2.0' ... As above.
9'-11' 3/3/4/4
10.6' - Moisture increased slightly, slightly less plastic than above.

13'-15' 4/5/9/21
Moist, red-brown sandy clay, low plasticity.
- Dolostone blocking shoe, attempt to acquire another sample.
Rec. = 0.6'

15'-D' Rec. = 1.45' 10/12/17/20
Moist - red-brown silty clay with sub angular dolostone fragments ≤ 2" Ø.

Don Johnson

YQ-5040 Thurs. 1-3-91

1600 hrs. – Due to the fact that no significant zone of saturation was observed during augering at GW-6, Decision is reached to install a rock socket at this location in order to monitor groundwater.

1610 hrs. – Crew begins to break down equipment for the day and winterize those components filled w/ water for the night.

1628 hrs. E+E locks Nimo gate as all personnel leave site.

1631 hrs. – E+E personnel D. Johnson and L. Roedl offsite.

Don Johnson

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ecology and environment

YQ-5040 1-3-91

0800 hrs. – E+E personnel D. Johnson and L. Roedl arrive onsite.

0805 hrs – AA+D personnel onsite thawing various drilling equipment.

0810 hrs – E+E personnel leave site to obtain batteries for combustionable gas indicator (CGI).

0825 hrs – E+E personnel return to site. DEC representative Jim Tuk onsite.

0835 hrs – AA+D is consolidating HQ rock coring equipment for rock socket installation at MW-06.

0850 – AA+D steam cleaning coring rods, bit, etc.

0905 – AA+D completes steam cleaning and sets up over at Mobile D-57 ATV rig at MW-06.

0908 – Daily health and safety meeting is conducted by L. Roedl. Driller demonstrates that rig "kill-switch" is operational.

0915 – Drillers begin to assemble HQ rock coring string at MW-06

Don Johnson

YQ-5040 1-3-91

0925 – Drillers set up coring (HQ) equip. @ MW-06. Preparing to test rock competency for rock socket installation.

0948 – Commence HQ coring from 17.5' @ MW-06, rock appears competent

1004 – Complete first 5' run 17.5'-22.5' @ MW-06, rate is 3.2 min/ft.

Run No. 1 17.5'-22.5'
Rec = 5.0' = 100%
RQD = 100%

Med. grey dolostone (lockport), no calcite observed. Moderate solutioning from 19.5'-21.0', but any fractures are drilling related or do not exhibit much significant weathering.

1025 hrs. We will set the rock socket in this 5' interval 17.5'-22.5'.

1115 hrs. PVC is at 21'8" below ground surface 8" above bottom of HQ core hole. 25 gallons of water, (3) 94 lbs bags of Lafarge Type I Portland Cement & 1/2 50 lb. bag of bentonite.

Don Johnson

YQ-5040 1-3-91

1130-1150 hrs. Break-down equipment at MW-06, AA+D prepares casing equipment and augers (following their removal) for steam cleaning

1200 hrs. – E&E personnel breaks for lunch DEC rep. to travel to Love Canal for lunch break. AA+D continue breakdown from MW-06

1240 hrs – E&E personnel return to site. AA+D decoming equip. with steam, began at 1230 hrs.

1315 hrs. NYSDEC personnel Jim Tuk returns to site, AA+D complete decon.

1325 hrs. E&E personnel locate stake at proposed GW-5 well location, ~~50~~ 150 yds. south of Gill Creek

1345 hrs. AA+D mobilizes support truck to next location, look over access.

1400 hrs. AA+D return with drill rig, move onto GW-5 stake.

1422 hrs. Commence at GW-5.
0'-0-18'- Grass, rootlets
0'-2' 0.18-1.8' Moist, med. brown, clay w/minor
2/3/4/2 silt, med – high plasticity.
Rec. = 1.8'

Don Johnson

YQ-5040 1-3-91

4'-6' GW-5 cont.
Rec. = 1.6'
4/6/8/11

6.0'-5.6' Moist, red-brown clay w/ minor silt. Med. plasticity, compact

15M— 9.0'-11.0' 9/5/4/4 Rec=0

Driller encounters rocky material at 8.5'-9.0'

Re-attempt w/ core catcher Rec. = 0.65'

Wet, med. brown clay with minor med. sand and dolostone fragments ≤ 0.5" ∅ - angular.

11.0'-13.0' Rec = 0.3'

Bedrock refusal, Wet, med. brown clay with minor med. sand, as above.

1600 hrs. Decision is made by D. Johnson and J. Tuke to wait until 1-4-91 AM to measure recovery of H_2O in bore hole GW-5 to determine if an overburden well here will be appropriate.

Meas. with electronic indicator shows recovery of ≈ 0.05' per 3 mins. ≈ 1.2' of water is standing in bottom of bore hole and is rising slowly.

1615 hrs. - E-E, AA-D, and NYSDEC offsite.

Don Johnson

YQ-5040 1-4-91

0830 - E-E personnel onsite. AA-D present, but locked out of site.

0830-0845 - E-E personnel drive to get Mr. R. Banks of Ni Mo to unlock gates.

0836 - Enter site. Inform Mr. Dunks that we will return on Monday 1-7-91 and probably work thru 1-9-91

0900 - Weather: Cold, clear, 15°F, winds are moderate from the south west at 15-20 mph. Wind chill is ≈ -11° F.

0905 - Objective: Measure H_2O level out MW-5. Decide on whether to install an overburden well construction here.

0910 - Measure water level at GW-5 @ 5.0' bgs., ≈ 1' of leave in bottom of auger., No HNu response from HSA.

0915 - We will construct a 2" well (overburden) here.

0945 - Drillers have been working on steam cleaner in order to clean 2" ID PVC prior to lowering into GW-5 bore hole.

Don Johnson

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G-21
ecology and environment

YQ-5040 2.4.91

1005- We are informed that the internal coils in the steam cleaner are frozen and therefore it will have to be fixed in the shop. Jim Tuk of NYSDEC offers that we use a steam Jenny located in the garage at Love Canal. We will drive the well casing over to that facility to clean the pipe.

1030- Arrive at Love Canal facility, nobody is answering gate. J. Tuk drives to office on 91st street to gain access to the site.

1020- Jim returns and informs us that nobody was present at the office. We decide to return in ½ hour in the event that someone returns to let us in the site.

1025- NYSDEC personnel returns to gate as we are leaving. Lets us in to use steam cleaner.

1030-1045 - Decon 5' of PVC screen (2" ID 0.01 slot) and 10' of 2" PVC riser.

1110- Return to site to continue construction of GW-5.

1125- Lower PVC screen and riser into GW-5 borehole, and begin adding No.3 Sand.

Don Johnson

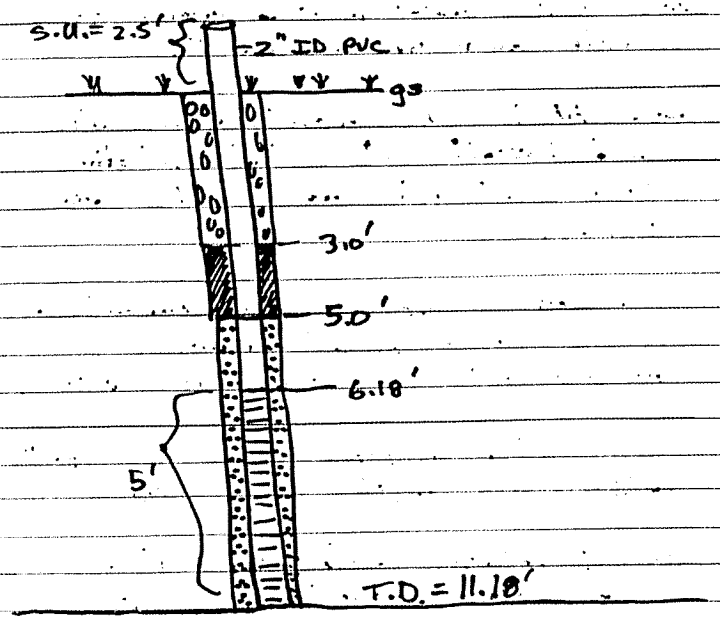
YQ-5040 1.4.91

1135- Drillers will add sand to ≈5' bgs. (1' above top of well screen)

1145- Drillers have measured T.D. for well at 11'2" bgs. Sand is added to (as HSA is pulled) 5' bgs even. ½ bag of sand used. (U.S. Silica No. 3 Quick

1200- Driller adds bentonite pellets down borehole to 3' bgs. We will allow the bentonite pellets to swell for 1 hour prior to adding grout above it.

GW-5 const. diagram



Dolostone Bedrock

Don Johnson

YQ-5040 Friday, 1-4-91

1210 hrs. - It is agreed that we will allow the 2-foot bentonite seal to swell for 1 hour prior to grouting the upper 3 feet of borehole @ GW-5 location.

1225 hrs. - AA+D are putting away equipment for the weekend, winterizing components which contain water. AA+D loads steam cleaning equipment into pick up truck. It will be serviced over the weekend.

1205 hrs. - AA+D begins mixing grout to complete construction at GW-5.

1210 hrs. - AA+D adds grout to borehole and installs 4" Ø steel protective casing w/ lock over 2" Ø PVC well casing.

94 lb. bags of grout (portland cement) used, mixed w/ a small amount of no. 3 Q-rock for aggregate effect.

hrs. - After assisting J. Turk w/ stuck vehicle, E+E offsite, gate locked.

1505 hrs - E+E returns rental vehicle at Budget and reserves another for 1-7-91.

Don Johnson

YQ-5040 Mon. 1-7-91

1030 hrs - E+E personnel D. Johnson arrives onsite. E+E personnel L. Roedl and AA+D are already present.

Weather: Sunny, cold ~20° F, winds are 10-15 mph from the south west.

Objectives:
1) Commence augering at GW-4 location.
2) Depending on available time, begin coring (NX) in rock socket @ GW-6.

1045 - AA+D fills 1300 gal. water tank w/ potable water.

1115 - AA+D are finished filling water truck.

1120 - Return to GW-5 area to get equipment and perform necessary decon prior to moving to GW-4.

1130 - AA+D decon rig and appurtenant
1215 hrs. equipment with high pressure steam.

1220 hrs. mobilize ATV rig to GW-4 location and set-up on borehole location.

Don Johnson

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YQ-5040 Mon. 1.7.91

1240 hrs. Commence @ GW-4

0'-2'
4|5|8|7
Rec. = 1.2'
No HNu response

Moist, med. brown, Clay with minor silt and angular dolostone fragments throughout ϕx 0.75cm. Sample exhibits moderate plasticity. Grass and rootlets 0-0.3'.

4'-6' - 1300 hrs.
4|11|15|17
Rec. = 1.85'
No HNu response

V. Moist from 4.0-4.25', med. brown clay w/ various silt seams moderate to low plasticity due to low moisture 4.25-5.85' dolostone fragments observed in upper 0.25' only. Lower portion - compact.

1315 hrs.
9'-11'
4|3|3|4
Rec. = 2.0'
No HNu response

9.0-9.92' - Moist, med. brown clay w/ minor silt as above
9.92'-11.0' - Very moist, med. brown clay with v. fine sand and silt., non plastic.

1317 - Bedrock auger refusal at 12.0' bgs.
1320 hrs. - NYSDEC representative J. Tuk arrives onsite, we update him as to progress at MOAJ GW-4. It is agreed that due to the absence of an appreciable zone of saturation at GW-4 a rock socket and bedrock well will be installed.

Don Johnson

G-24

YQ-5040 1.7.91

1352 hrs. Driller begins HQ coring at GW-4 @ 12.0' 300 lbs of downward pressure

1406 - Run No. 1 12.0'-16.84'
Rate of advancement = 2.89 min/ft. ~ 35'/min.

.85 / .25 / 4.10 — 3.85/4.10

Rec = 4.10'/4.84' run = 85%
RQD = 3.85'/4.10' recovery = 94%

1415 - Drillers decon 3" ID PVC well pipe
1430 for rock socket.

Description of Run No 1 (NQ) at GW-4 is as follows:

Med. grey, non fossiliferous, non-vuggy, tight, fine grained, massive dolostone. Lockport formation.

1440 - Drillers mix grout for GW-4 construction. (3) 94 lb. bags used 1 bag of bentonite powdered bentonite added (50 lb. bag).

1500 - Drillers have pushed 3" ID PVC into rock socket. Bottom of PVC rests at 16.5' bgs.

Don Johnson

YQ-5040 Mon. 1-7-91

1510 hrs — AA+D is raising 4¼" ID HSA's from GW-4 borehole while grouting the well annular space.

1525 hrs. Grouting of GW-4 is complete.
1530 hrs. 4" Ø steel protective casing with lock is installed over 2" PVC riser. PVC stick-up ~2.5' above ground surface.

1540 hrs. AA+D begin cleaning up area and prepare to move ATV rig off of GW-4 location.

1600 hrs. NYSDEC rep. J. Tuk offsite.

1650 hrs. AA+D continue cleaning and winterization of drilling equipment.

Total decon for day = 1 hours.

1700 hrs. E+E and AA+D offsite to find part (copper tubing) for steam cleaner.

1710 hrs — Locate needed replacement at Forest City Auto parts - Niagara Falls Blvd.

Tom Johnson

YQ-5040 Tues. 1-8-91

0715 hrs. D. Johnson arrives at E+E HQ to meet w/ L. Roedl.

0735 hrs. Depart HQ for equipment center (Bemboss drive) to pick up pH, cond., temp. meter for use during well development.

0755 hrs. arrive Bemboss Dr. and obtain meter(s).

0844 hrs. arrive at New Rd. Landfill site. AA+D are onsite, NYSDEC rep. J. Tuk onsite. Drillers have steam cleaner working and are preparing to steam clean HSAs from 1-7-91 work and NX coring equipment.

0858 hrs. - D. Johnson and L. Roedl leave site to obtain new batteries for explosimeter and coffee for AA+D.

0930 - E+E returns to site, AA+D is in process of decorning equipment w/ steam. Steam cleaner is working very well. NYSDEC rep. offsite.

0933 - Weather: Very cold (10°F), sunny, winds are 10-15 mph from the west.

Tom Johnson

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G-25
ecology and environment

YQ-5040 1-8-91

0933 Cont. - Objectives: 1) begin NX-coring at GW-6 until a significant water bearing zone is encountered 2) Develop GW-6 3) Develop GW-5 4) If time allows begin NX-coring at GW-4.

1000 hrs. AA+D have completed steam decon and are winterizing equipment.

1000 hrs.– AA+D has problems starting ATV
1115 hrs. rig motor – for driving vehicle. Jumps battery from water van. Engine operations. Problems are encountered starting Diesel motor on support truck. After using ether and thawing the diesel fuel lines with a torch (propane). Support truck motor is started.

1120 hrs– ATV rig is mobilized to GW-6 location to begin NX-coring

1200 hrs. – AA+D has mobilized water truck to GW-6 location.

1313 hrs. – Drillers have had extensive problems thawing water lines for NX coring. D. Johnson assists. 3" ϕ main line is thawed.

Don Johnson

YQ-5040 1-8-91

1318- Commence NX-rock coring at GW-6 @ ~ 19.0' (3.5' of grout inside 3"ϕ PVC casing. Coring progresses smoothly @ ~ 3 min/ft.

1335- Recover Run No. 1 ~~21.64'~~ ~~26.6'~~ DAT ~~22.5~~ ~~26.3'~~ ~~27.5'~~ DAT
STET 1
3.8 DMT
Rec = 3.8'/50' = ~~76%~~ 100%
RQD = 3.8'/3.8' = 100%

Med. Grey, unweathered, lockport dolostone, fine grained, compact, massive.

1353- Commence Run No. 3 26.3'-31.3'

1402- Complete 5' Run 26.3 5'/9 min = 1.8 min/ft.

Rec = 5.1' = +100%
RQD = 4.2'/5.1' = 82%

Massive, med. grey lockport dolostone as above.

1420- Complete 5' Run No. 4 31.3-36.3'
Rec = 100%
RQD = 100%

Massive, med.-grey lockport dolostone, occasional weathered fracture @ 31.8' b.g.s. 32.0' DAT
otherwise weathering is minimal.

Don Johnson

YQ-5040 1-8-91

1430- Begin development of GW-6
Pumping rate = .8 gals. min.

Time 1500 hrs
pH 7.84
temp 10.4°C
cond. 751 μmhos cm

T	pH	Temp	Cond.	Turbidity/ Comments
3:08	7.94	11.2°C	930	Milky turbidity ~~<2~~ >200 NTUs
10 gals				
3:20	7.90	9.9°C	934	Milky >200 NTUs
10 gals DRY 3:32 3:40	7.89	10.2°C	974	Milky >200 NTUs
10 gals 3:44 1605 hrs.	7.50	7.6°C	922	Milky >200 NTUs
10 gals 3:56 1617 hrs.	7.69	5.7°C	879	Milky >200 NTUs

1542- Drill rig runs out of gas. AA-D go to Mobil for more

1600- Drillers return w/ gasoline

1602- NYSDEC rep. J. Tutt offsite.

Don Johnson

YQ-5040 1-8-91

1630- After completing last field measurements for GW-6 development, E+E assists AA+D in putting away equipment for the day.

1645- E+E and AA+D offsite.

Don Johnson

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G-27
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Wed. YQ-5040 1.9.91

0830 - E+E personnel D. Johnson and C. Rodd arrive onsite.

AA+D and NYSDEC onsite.
AA+D is fully decomed and set up w/ ATV rig on GW-4 to begin NX-rock coring.

Weather: Light rain, warmer (33°F), winds are light 5-10 mph from the southwest.

Objective(s): 1) Complete NX-rock coring at GW-4 location; 2) Develop GW-4; and 3) Develop GW-5.

0840 - AA+D is thawing 3" ø water line - line is cleared.

0855 - AA+D leaves site to pick up new propane torch head and hose

0915 - AA+D returns to site, torch head not available, but rubber hose is fixed.

0925 - Drill rig is grounded w/ steel rod and jumper cables

0926 - Commence Run No. 2 (1st NX run) @
Don Johnson

YQ-5040 1.9.91

0926 cont.
GW-4

Run No. 2 ~ 16.5' - 21.84'

Complete at 0940

Rec. = 100%
5.0'/5.0'
RQD = 100%
5.0'/5.0'

DMJ
16.5 - 16.84 is grout
16.84 - 21.84'
Massive, med. grey, fine grained dolostone. Narrow, moderately weathered horizontal fracture at 17.14', ~0.5" wide

Run No. 3 Commence @ 0948 21.84 - 26.59'
Complete at 0958 .75 .59

Rec. = 4.75/
5.0' = 95%
RQD = 100%
4.75'/4.75'

Massive, med. grey dolostone, as above
Narrow (< 0.25" ø) horizontal moderately weathered fractures at 22.14', 22.54', 26.14'

Run No. 4 Commence at 1002 hrs.
26.59 - 31.59'
10:14 hrs. - complete Run no. 4
Rec. = 100%
5.0'/5.0'
RQD =

Massive, med. grey dolostone, as above, weathered fractures (narrow) at , Vuggy zone observed from , sphalerite XLS fill voids.
Don Johnson

Wed. YQ-5040 1-9-91

1020- We will attempt to measure the presence of natural recharge at GW-4 corehole.

Water level is measured at ≈ 26' bgs, dropping extremely slowly. We will pump corehole dry with rig pump and determine if recharge is from formation.

1025- After pumping 5 minutes we are unable to pump the corehole dry, using a pump rate of ~ 2 gals. per ~~quart~~ minute.

1045- After ~ 40 gals of water have been removed, development measurements are begun as follows:

Time / Gals	pH	Temp.	Cond.	Turb.	Comments
~~1045~~/1050	6.99	10°C	1066	Clear	Sulfur odor
1100/50	7.09	9.5°C	1513	"	"
1110/90	7.15	9.7	1522	"	"
1120/110	7.20	10.3	1636	"	"
1130/130	7.22	10.1	1647	"	"

Don Johnson

YQ-5040 1-9-91

1145- AA+D mobilizes ATU rig off GW-4.

1200 hrs. E+E @ GW-5 to develop the well (overburden) with a bailer.

Water Level in GW-5 = 11.2 from Top of Steel Standing well volume =

12.05 7.46 6.1 1734

Time / gals pr	pH	Temp.	Cond.	Turb.	Comments
1250/ ~~DRY~~	7.50	6.2	1543		
2.5 gal/60 :345 / 30"	7.35	6.5	1536		
4.0 gallons 1400 / 15"	7.37	7.0	1547		
/20"					
/25"					
/30"					
/35"					
/40"					
/45"					
/50"					

* 12:16 evacuated to Dryness. Amount of water out of well 1.5 gallons

1410- Following final well development measurements at GW-5, well protective casing is locked. Teflon bailer is returned to AA+D.

1415 - E+E, NYSOEC, and AA+D personnel offsite, gate locked

Don Johnson

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E & E Job Number YQ-5060

Telephone Code Number

Site Name New Road
PHASE II

City/State NIAGARA FALLS, NY

TDD

PAN

SSID

Start/Finish Date 2-13-91, 2-16-91

Book 1 of 1

E & E Emergency Response Center: (716) 684-8940
E & E Corporate Center: (716) 684-8060
MEDTOX Hotline: (501) 370-8263
E & E Safety Director (Home): (716) 655-1260

WEDNESDAY FEBRUARY 13, 1991

WEATHER: OVERCAST, COLD ~30°F
LT. WIND SE

PERSONNEL: C. ELCH, B. MEYERS, D. JOHNSON

0730 C.E. STOPS AT ESC TO PICK UP BAILERS AND SAMPLE BOTTLES.

0815 MET BM + DJ AT E+E HQ
DISCUSSED DAYS ACTIVITIES. (TO PURGE 9 WELLS FOR SAMPLING TOMORROW. LOCATE SW + SS. SAMPLE LOCATIONS. DISCUSSED SSP.

1015 ARRIVE AT NEW RD. SITE.
DROVE AROUND SITE TO LOCATE WELLS. HAVE TO CUT LOCKS OFF OF MALCOLM PIRNIE WELLS. (M.P.)

1030 C.E + B.M. DON LEVEL D.
CALIBRATE HNU TO 54ppm, SPAN 9.8, 10.2 PROBE.

1037 OPENED GW-1 - Oppm ON HNU
W.L. 4.84' TOC (PVC)
T.D. 17.1'
12.26' OF WATER
6 GALLONS TO PURGE (3 WELL VOL's)

Chad E 2-13-91

2-13-91

1045 1ST BAILER GW-1
TEMP 6°C
pH 7.05
COND 1565 uS
TURB >200 NTU DK. BROWN

1050 LAST BAILER (6 GALS REMOVED) GW-1
TEMP 8°C
pH 7.05
COND 1829 uS
TURB. >200 NTU DK BROWN

1102 AT WELL GW-2. DON HAVING TROUBLE CUTTING LOCKS OFF M.P. WELLS W/ HACKSAW
OPENED GW-2 - Oppm ON HNU
W.L. 12.3' TOC (PVC)
T.D. 18.33' TOC
FT. OF WATER 6.03
GALS TO PURGE 3.0 (3 WELL VOL's)

1110 BEGAN PURGING GW-2
TEMP 8°C
pH 6.85
COND 1314 uS
TURB. >200 NTU DK. BROWN

Chad M 2-13-91

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2-13-91

1114 LAST BAILER GW-2 (3 GALS)
TEMP 8°C
pH 7.15
COND 1341
TURB >200 DK. BROWN

1122 AT WELL GW-3 - 0ppm ON HNu
W.L. - 6.0'
T.D. - 15.25
FT. OF WATER - 9.25'
GALS. TO PURGE - 4.5 (3. WELL VOL's)
D.J. COULD NOT SAW 'LOCKS OFF
M.P. WELLS. GOING TO FIND BOLT
CUTTER OR EQUIV.

1129 1ST BAILER IN GW-3
TEMP 8°C
pH 7.35
COND 1731 uS
TURB. >200

1135 LAST BAILER GW-3 (5 GALS)
TEMP 8°C
pH 7.25
COND 1791 uS
TURB 7200 DK BROWN
PURGED ALMOST DRY.

CE. 2-13-91

2-13-91

1146 AT WELL GW-6
OPENED CAP. - 0ppm ON HNu
W.L. 27.35' TOC
T.D 38.6
FT. WATER 11.25'
GALS. TO PURGE - 5.5

1150 BEGAN PURGING GW-6
TEMP 7°C
pH 7.55
COND 1353 uS
TURB. >200 NTU LT. BROWN

1201 LAST BAILER IN GW-6 (~6 GALS)
TEMP 8°C
pH 7.8
COND 1260 uS
TURB. >200 NTU - LT. GRAY

D.J. ENLISTED HELP OF NYPA TO
GET A TORCH TO CUT LOCKS OFF M.P.
WELLS.

1210 ARRIVE AT GW-5 -
OPENED CAP - 0ppm ON HNu
W.L. - 10.3' TOC (PVC)
T.D. - 14.2'
FT. OF WATER - 3.9'
GALS TO PURGE - 2.0 CE 2-13-91

2-13-91

1217 1ST BAILER IN GW-5.
Temp 7°C
pH 6.85
COND 1316 µS
TURB >200 NTU DK. BROWN
1220 LAST BAILER GW-5. (2 GALS)
Temp 7°C
pH 7.5
COND 1442 µS
TURB >200 DK BROWN
1233 AT WELL GW-4
OPENED CAP- 0ppm HNU
W.L. 21.15' TOC
T.D. 33.9' TOC
FT WATER 12.75
GALS TO PURGE 6.25 GALS
1237 1ST BAILER IN GW-4
Temp 8°C
pH 6.80
COND 1099 µS
TURB >200 LT. BROWN
LAST BAILER IN GW-4 (7 gals)
TEMP 8°C
pH 7.05
COND 1125 TURB >200 DK. BRN.

CE 2-13-91

2-13-91

CAN HEAR BUBBLING IN WELL 4
ALSO HAS H_2S ODOR - 0ppm on HNU
WHILE BAILING
1245 COMPLETED BAILING 6 WELLS.
LOCKS CUT OFF M.P. WELLS.
WILL PURGE THEM AFTER LUNCH
1300 INSPECTED M.P. WELLS 1R + 10R. 0ppm ON HNU SNIFF OF BOTH. WELL RISER IS 1½" O.D. PVC (SAME DIAM. AS BAILER)
WILL NEED SMALLER DIAM BAILER TO SAMPLE M.P. WELLS
GOING TO MEET D.J.
TOLD DJ ABOUT M.P. WELL DIAM.
HE'S TRYING PETER F. TO SEE IF WE HAVE THINNER BAILERS. BUSY.
WE'LL (CE. + BM) GO BACK TO SITE TO MEASURE WELL DIAM + GET W.L's + T.D's. D.J. WILL GET LOCKS FOR WELLS
1350 CE + BM ON-SITE.
WELL 1R - I.D. ~ 1¼" (1/16" UNDER)
W.L. 17.14' TOC (PVC)
T.D. 27.6' TOC

2-13-91

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1404 WELL 10R
W.L. 11.67' TOC
T.D. 19.68' TOC

2 WELLS - EITHER COULD BE 5R
W.L. 4.85 TOC } NORTH
T.D. 22.35
0 PPM ON HNu
W.L. 9.75' } SOUTH OF ACCESS RD.
TD. 16.73
0 ppm on HNu
1609 B. Meyers & Chad Eich report to Don Johnson & Finalize plans for Tomorrow
1620 Complete work day after going to warehouse.

2-13-91
2 wells

weather: 32°, overcast, drizzle

THURSDAY 2-14-91

0708 B. Meyers & C. Eich meet @ office, check inventory etc, we need ice & baggies.
0732 Depart office, heading to site & store.
0811 Arrive on site & meet with consultant Jim Marschner & John Malenchek (Power Authy)
0817 Begin by purging well 10R. CALCULATED PURGING VOLUME IN 10R TO BE 2.2 GALS. B.M. & C.E DON LEVEL D PROTECTION TYVEKS, BOOTIES, SURGICAL GLOVES CALIBRATE HNu TO 54 ppm, 9.8 ppm 10.2 probe.
0840 Jim Marschner takes field blank from thin (1") bailer obtained from warehouse yesterday, after decon with methanol & D.I. water.
0900 PURGED ~1.5 GALS FROM WELL 10R & IT WENT DRY.
TEMP 6°C TURB >200 OKBEN.
pH 10.05
COND 454 uS

2-14-91

2-14-91

0924 AT WELL 1R. CALCULATED PURGE VOLUME OF ~ 3 GALS

0940 PURGED 3 GALS, @ 3" WATER LEFT
TEMP 7.5°C
pH 6.3
COND 882 uS
TURB > 200 NTU DR. BROWN

0950 DROVE TO WELL 5R LOCATION 2 WELLS, 1 N, 1 S OF ACCESS RD. NO DEC REP HERE, NO SITE CONTACT HERE. ON MAP WELL 5R SHOWN SOUTH OF ACCESS RD. SO WE WILL SAMPLE THE SOUTHERN WELL.
CALCULATED PURGE VOLUME 2 GALS

1002 PURGED ~ 1 GAL + WENT DRY
TEMP 6°C
pH 6.75
COND > 2000 uS
TURB. > 200 NTU

1015 AT WELL GW-1 to Sample

1025 COLLECTED SAMPLE GW-1
pH 7.10 TURB > 200
TEMP 8°C
COND 1797

Chd. 2-14-91

2-14-91

1052 LOCATED LOCATION FOR SAMPLE SW-3 IN SWAMPY (CATTAILS) AREA S. OF ACCESS RD.

1100 COLLECTED SAMPLE SED-3

1132 Collected sample SW-3

1145 Collected sample S-2 (Soil)
B. KOHRN ARRIVES ON-SITE FOR QA/QC AUDIT.
SAMPLE S-2 IS 0-16" SOIL COMPOSITE. SOIL ROCKY + FROZEN + COULD NOT GET DEEPER THAN 16".

1219 Collect sample No. SW-1 ~~& S-4.~~ CE MS/MSD
EXTRA VOLUME FOR MS/MSD

1225 COLLECTED SAMPLE S-4
NEAR OLD PAINT / TAR CANS + VARIOUS OTHER DEBRIS. 0-2' DEPTH CA

1258 COLLECTED SAMPLE SED-1
SAME LOCATION AS SW-1

1327 COLLECTED SAMPLE SED-5 RAM
FROM LARGE DITCH UNDER OVERHEAD POWER LINES. WEST OF S-4 LOCATION CE 2-14-91
NO WATER IN DITCH FOR SW SAMPLE

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2-14-91

1336 Collected Sample GW-2.
pH 7.15
Temp 8°C
Cond 1287
Turb. >200 DK. Brown
1350 Jim Tuttle (NYSDEC) arrives on site, he agreed with our choice & putting SW-1 location west of RR. Tracks and he OK'd the sampling of 10R now for VOA's and BNA only due to a near dry well

Jim Tuttle

1410 Began. sampling well 10R.
Collected VOA's & almost 1/2 of A BNA Bottle. Letting well Recharge for a little while
1440 Collected Sample GW-3 *
B.M. Back at well 10R to get more water
1520 Move to S-3 location
1542 Take sample S-3, 0" to 16"

Chad Eich 2-14-91

2-14-91

J.M. Leaves site
1550 B. Kohrn leaves site
Collected remaining volume for BNA from well 10R
* Field Chem. for GW-3
Temp 8°C
pH 7.20
Cond 1508
Turb >200 NTU DK. Brown
Field Chem for well 10R
Temp 7°C
pH 9.80
cond 427
Turb >200 NTU

1610 Depart site
1615 Chad Eich calls Don Johnson RAM to inform him of progress and ask if we can wait until tomorrow to sample wells GW 4, 5 & 6 which were purged 2-13-91, Don said it would be alright according to Mike Ryan (DEC).
1620 Depart area, head to lab.

Robert A Muyzee

2-14-91

List of Things to do Tomorrow

- Sample wells
  - GW-4, 5 & 6
  - R1 & R5
  - Complete R10
- Take samples
  - SW-4 & SED-4
  - S-1
  - SW-2 & SED-2

1705 Drop off samples @ ASC
1716 Return to HQ

Robert A Meyer 2-14-91

FRIDAY FEBRUARY 15, 1991
WEATHER: CLOUDY, COLD 18°F (-10° WINDCHILL)
PERSONNEL: B. MEYERS, C. EICH
0730 C.E. + B.M. MEET AT E+E HQ
0800 DEPART FOR SITE
0903 Arrive on site, Road's very slow & slippery. DONNED LEVEL "D" LABELED SAMPLE CONTAINERS. PREPARED MONITORING EQUIP.
1006 AT WELL 10R TO COLLECT REMAINING VOLUMES
1022 Filled Metals bottle & 1/2 Pest/PCB, extreme cold, serious Frostbite hazards to hands
1026 COLLECTED DRILLWATER SAMPLE DW-1 FROM HYDRANT ALONG S. ACCESS RD.
1054 Collect GW-6 SAMPLE (SEE pg. 16 FOR FIELD PARAM's, ALL SAMPLED) METALS CLEARISH BUT >200
1120 COLLECTED SAMPLE GW-4. METALS LT. BRN.

Chad H 2-15-91

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2-15-91

FIELD CHEM. PARAMETER FOR WELL SAMPLES

1022 10R
pH 9.65
Temp 0°C
Cond 470 uS
Turb >200 NTU's

1054 GW-6
pH 7.7
Temp 7°C
Cond 1293 uS
Turb >200 NTU's

1120 GW-4
pH 6.95
Temp 8°C
Cond 1137 uS
Turb >200 NTU's

1150 1R
pH 6.45
Temp 8°C
Cond 960 uS
Turb >200 NTU

CE 2-15-91

2-15-91

1147 Finally Completed Taking Sample 10R
1150 Begin Collecting Sample 1R
AFTER DECONNING BAILER w/ TSP, METHANOL + DI WATER
1217 Complete Collecting 1R sample
Head to 5R to take sample.
1230 Transmission on van won't go into reverse, we will walk to plaza (good ½ mile away) to call for help. The van is trapped because we can't go forward + we can't go in Reverse.
Call Don Johnson + Acton Van Rental, arrange for Tow Truck to come.
- Tow Truck came + Towed van to plaza, B. Mayers waits for Chad & to return with Tow Truck driver.
1540 C.E. RETURNS. HAD TO GO TO BANK FOR MONEY TO PAY TOW TRUCK DRIVER ($53.50)

CE 2-15-91

2-15-91

1545 CALLED D. JOHNSON. LEFT MESSAGE TO CALL US

1600 D.J. NEVER CALLED BACK.

1640 ~~oc~~ WENT BACK TO attempt to complete sampling GW-5 which we began @ ~1130, we got an additional 2 liters or so of water. Heading for home (HQ) etc.

1620 FOR GW-5, COULD ONLY GET 1 ½ GAL AMBER. LAB CAN RUN BOTH BNA + PEST/PCB ON THAT BOTTLE, SO WE HAVE A FULL SAMPLE FOR GW-5

NOTE: Todays weather on site was Terrible: high winds, extreme cold, heavy snowfall, very low visibility, 24" accumulation during site visit.

pH 7.35
Temp 7°C
Cond 1412 uS
Turb > 200

1700 DROPPED SAMPLERS AT LAB. TOOK EQUIP. TO E+E. CE 2-15-91

TUESDAY FEBRUARY 16, 1991

WEATHER: DRIZZLE, ~ 50°F, WINDS W. 5-10 mph

PERSONNEL: C. ELCH, T. SUMMERS

0900 C.E. PICKS up RENTAL VAN. DROVE TO LAB & THEN TO E+E HQ TO PICK UP T.S.

0945 DROVE T.S. HOME TO GET P.P.E

1015 LEFT FOR SITE

1100 C.E. + T.S. ARRIVE ON SITE. DON LEVEL "D" - TYVEKS, BOOTIES ETC.

1110 CALIBRATE HNU. 55 ppm @ SPAN 9.8, 10.2 PROBE

1130 C.E + T.S ARRIVED AT WELL 5R. 0 ppm ON HNU

W.L.: 10.4' TOC

T.D.: 16.75' TOC

1135 PURGED ~ 2 GALS + DRY.

pH 6.35
Temp 7°C
Cond 1947 uS
Turb > 200 NTU

RELABLED SAMPLE CONTAINERS W/ TODAYS DATE. ATE LUNCH

1240 AT WELL ~~GW~~ 5R. NOT SURE HOW FAST IT WILL RECHARGE SO WE WILL BEGIN CE 2-16-91

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2-16-91

HERE. ~½ GAL. + DRY.
MET MIKE IVES ON POPLI + PAM. THEY ARE HERE TO START SURVEYING.
SHOWED THEM WELLS + SAMPLE LOCATIONS.
1310 WALKED TO SW-2 LOCATION WHERE CONDUIT COMES OUT ON WEST SIDE OF ACCESS RD.
1320 COLLECTED SAMPLE SW-2 AND SAMPLE SED-2. SED-2 IS ALSO MS/MSD. C.E. WALKED BACK TO VAN TO PACKAGE SAMPLES. STOPPED AT WELL 5R TO CONTINUE SAMPLING
1350 T.S. COLLECTS SAMPLE S-1. BACKGROUND TAKEN ~ 30' N OF SW-2 + 20' W. OF ACCESS RD.
1420 CONTINUED SAMPLING WELL 5R. NOT MUCH WATER. ASSITED SURVEYORS BY FLAGGING SW-2 + S-1 LOCATIONS.

CE. 2-16-91

2-16-91

1510 COMPLETED SAMPLING 5R. ONLY HAVE 1, ½ GAL AMBER FOR BOTH TEST/PCB AND BNA ANALYSIS
DECONNED BAILER W/ TSP, METHANOL + DI
1540 COLLECTED SAMPLE FB-1 FIELD BLANK BY PASSING DI WATER INTO BAILER + THEN FILLING BOTTLES.
1530 COLLECTED SAMPLE SW-4 AND EXTRA VOL. FOR MS/MSD ALSO COLLECTED SAMPLE SED-4 SAMPLES COLLECTED FROM SWAMPY AREA IN S.W. CORNER OF SITE.
SHOWED SURVEYORS SW-4 LOCATION.
PACKAGED SAMPLES.
1545 DEPARTED SITE FOR ASC
1615 DELIVERED SAMPLES TO LAB, C.E. DROVE T.S HOME + THEN HOME FOR DAY

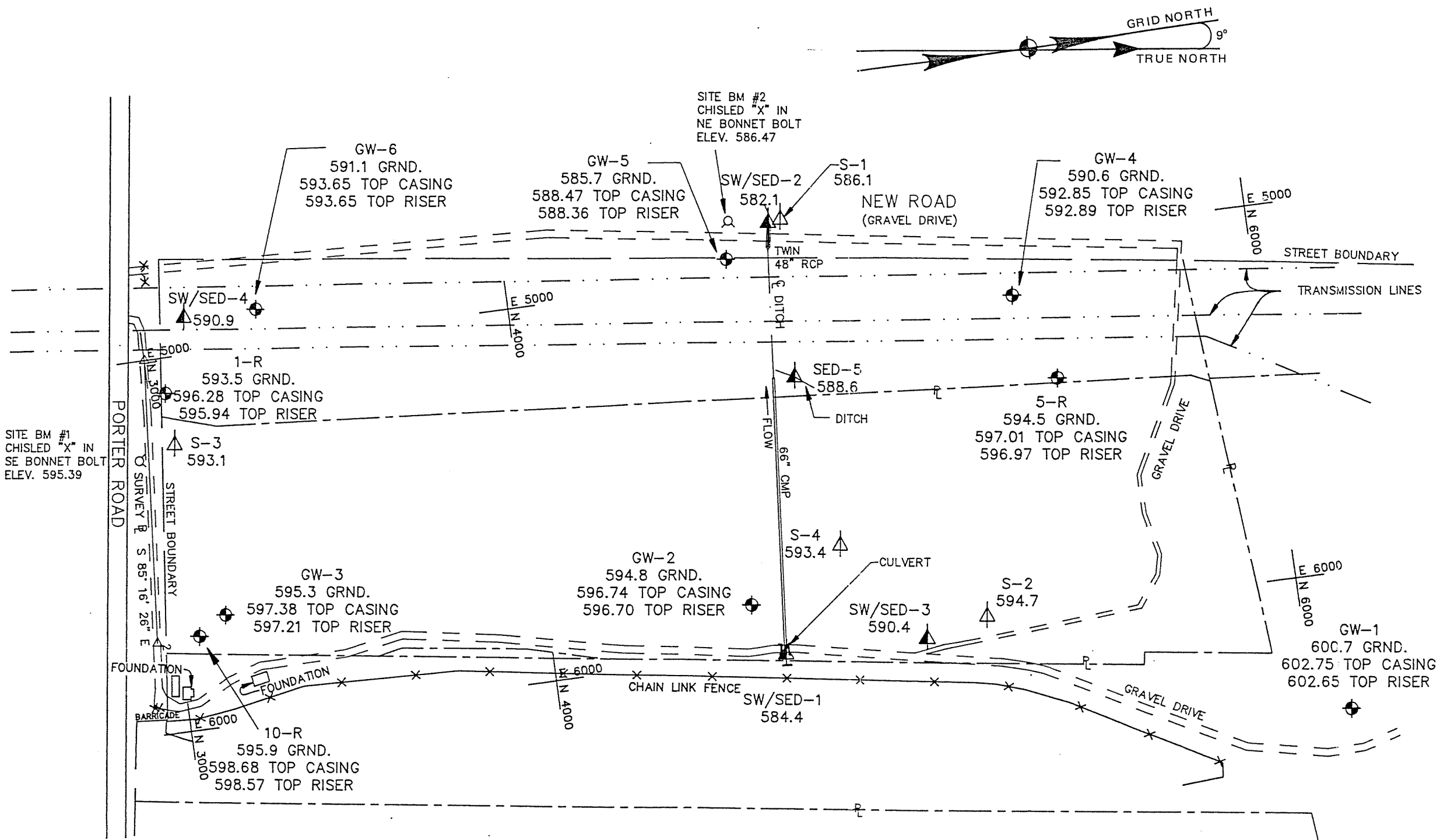
CE 2-16-91

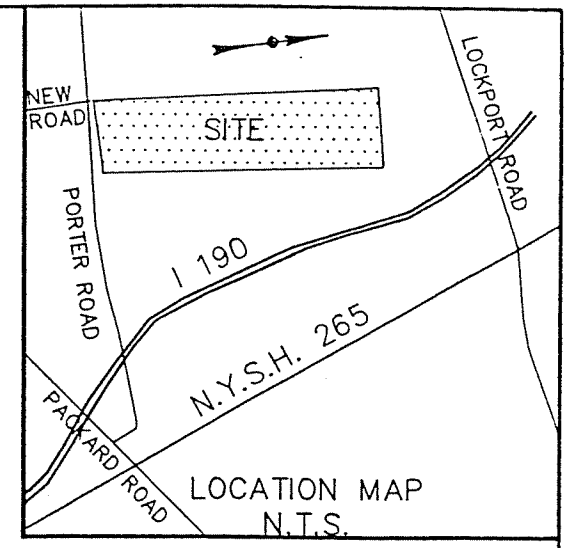
APPENDIX H

SITE SURVEY MAP

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COORDINATE LIST		
NAME	NORTH	EAST
GW-1	6101	6364
GW-2	4548	5873
GW-3	3134	5705
GW-4	5355	5150
GW-5	4602	4949
GW-6	3323	4910
1-R	3048	5097
5-R	5446	5385
10-R	3055	5752
SW/SED-1	4619	6016
SW/SED-2	4731	4875
SW/SED-3	5008	6025
SW/SED-4	3124	4901
SED-5	4746	5288
S-1	4757	4864
S-2	5171	5988
S-3	3055	5240
S-4	4807	5742
PK 1	3000.00	5000.00
PK 2	2937.64	5754.26

NOTE: Coordinate grid system is assumed

Site B.M. 1 & 2 are a chisled "X" on a bonnet bolt of the hydrants as shown hereon.

Elevations are referenced to a spot elevation of 590 from U.S.G.S. quadrangle Niagara Falls, located in the centerline of Porter Road at the intersection of the overhead transmission lines west of New Road.

Baseline points 1 and 2 are PK nails.

Property lines shown are approximate and were derived from portions of tax maps supplied by Ecology & Environment, Eng.,P.C.

LEGEND

- *MONITORING WELL*
- *SURFACE SOIL SAMPLE LOCATION*
- *SURFACE WATER/SEDIMENT SAMPLE LOCATION*

REVISED: 04/08/91 CHANGED SAMPLE LABELS; MOVED S-4

ENGINEERING INVESTIGATIONS AT NEW ROAD LANDFILL Site No. 932083

New York State Department of Environmental Conservation

Prepared for:
Ecology and Environment Eng., P.C.
368 Pleasantview Drive
Lancaster, New York 14086

DATE	SCALE	SHEET
02/27/91	1"= 300'	1

Prepared by:
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