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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATIONS

Volume I - Main Report

Lackawanna City Landfill
Lackawanna, New York

Site No. 915094
Erie County

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

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By:

ENGINEERING-SCIENCE

VOLUME I - MAIN REPORT

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

PHASE II INVESTIGATIONS - LACKAWANNA CITY LANDFILL
NYS SITE NUMBER 915094
ERIE COUNTY, NEW YORK

Prepared For:

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

SITE BACKGROUND

The Lackawanna City Landfill site is located approximately 3.5 miles southeast of Buffalo, New York on Abbott Road in the City of Lackawanna, Erie County, New York. The site is bordered by the Pennsylvania and Lehigh Valley Railway Lines on the north, the New York State Thruway on the south, a residential area on the west and a pond on the east. The site location is shown on the U.S.G.S. Buffalo, New York 7 1/2 minute quadrangle map (Figure I-1).

The Lackawanna City Landfill was operated by the City of Lackawanna from 1961 to 1981. The landfill was used for disposal of incinerator residue, and construction and demolition debris (Collareno, 1978; NYSDEC, 1982; NUS 1983; NYSDEC Permit 6/78). In 1981, approximately 1070 cubic yards of digested and dewatered sewage sludge was disposed in the landfill (Weisberger, 1980; Donovan, 1981).

Surface water and soil samples were collected in 1982 during a site investigation conducted by the New York State Department of Environmental Conservation (NYSDEC). Surface water results indicated low concentrations of heavy metals, total organic carbon and total halogenated organics. Soil sample results indicated lead, zinc, chromium, copper and mercury at concentrations exceeding background samples (NYSDEC, 1982).

A 1986 Phase I site investigation conducted by RECRA Environmental, Inc. recommended that a Phase II investigation be conducted to provide data necessary to calculate a final HRS score.

PHASE II INVESTIGATION

The Phase II field investigation included an electromagnetic (EM) survey to identify the presence of buried steel drums or conductive contaminant plumes in the subsurface. A magnetometer survey was conducted to help confirm and define the areal extent of the EM anomalies and to determine if large concentrations of ferromagnetic materials are present which could indicate the presence of buried drums. Five groundwater monitoring wells were also installed. Analyses of subsurface soil, surface soil, groundwater, surface water and sediment samples were conducted in addition to air monitoring to determine whether hazardous substances are present at the Lackawanna City Landfill.

SITE ASSESSMENT

The geological stratigraphy of the site can be summarized as Pleistocene proglacial lake deposits of upper Wisconsinan-age over Middle Wisconsinan-age moraine and outwash deposits (Muller, 1977). These glacial deposits unconformably overlie the Middle Devonian Skaneateles and Marcellus bedrock formations. The Devonian bedrock is predominantly gray and black shales (Richard & Fisher, 1970).

Five wells were installed through the pleistocene-age proglacial lake deposits and into the top of the Wisconsinan-age moraine and outwash deposits. The aquifer of concern is within these deposits and directly below the landfill material. The depth to water in monitoring wells at the site ranges from 3.45 to 8.65 feet, with regional groundwater flow to the northwest.

To evaluate the presence of contamination, samples of subsurface soil, groundwater, surface water, sediment and surface soil were collected and analyzed for Target Compound List (TCL) organic compounds (volatiles, semivolatiles, pesticides/PCBs), Target Analyte List (TAL) metals and cyanide. The New York State Department of Environmental Conservation (NYSDEC) Contract Laboratory Protocols (CLP) dated November 1987 were utilized for both analytical methods and reporting. The following paragraphs describe the analytical results by sample matrix. Summary tables list only those compounds and analytes detected in the samples. Table I-1 provides a list of footnotes and data qualifiers used on Tables I-2 through I-7.

Summary of Subsurface Soil Sample Results

Subsurface soil samples were collected during the drilling of well borings GW-1, GW-2, GW-3, GW4 and GW-5 and composited into five samples designated GW-1-S1, GW-2-S1, GW-3-S1, GW-4-S1 and GW-5-S1.

Three organic compounds were detected in the subsurface soil samples (Table I-2). Methylene chloride was detected at low concentrations (3 to 5 $\mu g/l$) in samples GW-1-S1, GW-2-S1, GW-3-S1; however the results have been attributed to laboratory contamination because it was also detected in the trip blank. Acetone was detected in sample GW-1-S1 and bis(2-ethylhexyl)phthalate was detected in all subsurface soil samples. The highest concentrations of bis(2-ethylhexyl)phthalate were detected near the western perimeter of the landfill in samples GW-3-S1 and GW-5-S1. No pesticides or PCBs were detected.

The concentrations of twenty TAL metals detected were within the published naturally-occurring ranges for New York State soils with the exception of lead in sample GW-3-S1 (Table I-3).

Summary of Surface Soil Sample Results

Two surface soil samples were collected and analyzed for TCL organic compounds, TAL metals and cyanide. As shown on Table I-2, nine polynuclear aromatic hydrocarbons (PAHs) were detected in the surface soil sample collected on top of the landfill (SS-1). PAHs occur naturally and artificially as a result of incomplete combustion of organic compounds and their presence may be the result of incinerator ash residue disposal on-site. PAHs in surface soils are a direct contact threat because several PAHs are known or probable carcinogens. Sixteen TAL metals were detected in the surface soil samples (Table I-3). The concentrations of all metals were within published naturally-occurring ranges for New York State soils.

Summary of Groundwater Sample Results

One groundwater sample was collected from each monitoring well installed at the Lackawanna City Landfill site (GW-1, GW-2, GW-3, GW-4, GW-5). Three organic compounds, methylene chloride, acetone and benzene, were detected in the groundwater samples (Table I-4). Methylene chloride was also detected in the trip blank and its presence is attributed to laboratory contamination. The concentrations of acetone in upgradient sample GW-5 (94 μg/l) and benzene in sample GW-4 (3 μg/l) exceeded NYS groundwater standards of 50 μg/l and 0 μg/l, respectively.

The groundwater results for metals indicate observed releases of thirteen metals in one or more downgradient samples. The concentrations of ten metals, aluminum, antimony, beryllium, chromium, copper, iron, lead, manganese, sodium and zinc exceeded NYS groundwater standards in one or more monitoring wells.

Summary of Surface Water Results

Five surface water samples, SW-1, SW-2, SW-3, SW-4 and SW-5 were collected around the perimeter of the landfill. A duplicate of sample SW-1 was collected and labeled SW-6. Methylene chloride was detected in three samples but its presence is attributed to laboratory contamination (Table I-5). Bis(2-ethylhexyl)phthalate was detected in surface water sample SW-4, but at a low concentration.

Twenty-one TAL metals and cyanide were detected in the surface water samples (Table I-5). Of those, sixteen metals and cyanide were in excess of three times the concentrations found in the upgradient sample (SW-2), constituting observed releases. The Class D surface water standard for iron was exceeded in all samples. The highest concentrations for most analytes were in Sample SW-4, the sample farthest downstream.

Summary of Sediment Sample Results

Five sediment samples were collected at locations corresponding to the surface water samples. Two volatile organic compounds, methylene chloride and acetone, were detected in sediment samples (Table I-6). The presence of methylene chloride in SED-2-RE is attributed to laboratory contamination. Acetone was detected in sample SED-5 at moderate concentrations (240 μg/kg) and at lesser concentrations in other sediment samples. Eleven semivolatile organic compounds, primarily PAHs, were detected in the sediment samples. Benzoic acid and beta-BHC, were also detected in one sample (SED-3 and SED-1, respectively). The most contaminated sample is SED-5, which contained moderately high concentrations of nine PAHs. These results indicate the sediments in the vicinity of SED-5 pose a direct contact threat.

Twenty TAL metals and cyanide were detected in the sediment samples (Table I-7). The concentrations of cadmium and lead exceeded the published naturally-ocurring ranges in sample SED-5. The highest concentrations of most analytes were in sample SED-5. Cyanide was detected in samples SED-3 and SED-5.

Contamination Assessment Summary

The results of groundwater and surface water analyses indicate releases of TAL metals and cyanide which are attributable to the site. The data suggest that contaminants are migrating radially outward from the landfill, with the strongest component being to the north. Contaminants of concern are acetone, benzene, metals and cyanide in the groundwater and surface water, and PAHs in the surface soils and sediments.

Although releases of contaminants attributable to the site have been documented, the potential impacts on groundwater and surface water users are not likely to be significant because there are no identified receptors. The most immediate threat to public health and the environment is the presence of PAHs in the surface soils and sediments. Because access to the site is largely unrestricted, and the presence of nearby homes suggests the likelihood for unauthorized persons occasionally being present on-site. Placing clean fill over the contaminated sediments is a relatively simple means of reducing the direct contact threat. Further investigation into the extent of PAH-contaminated soils and sediments may also be necessary.

HAZARDOUS RANKING SYSTEM SCORE

In an attempt to establish the relative risk associated with this site, the Hazard Ranking System (HRS) was applied. As currently used by the NYSDEC, the HRS is employed to aid the evaluation of inactive hazardous waste sites in New York State. This system takes into account the types of wastes at the site, receptors, and transport routes to calculate a numerical score for this site. As stated in 40CFR Subpart H Section 300.81, the HRS was developed for evaluating the relative potential of uncontrolled hazardous waste disposal facilities to cause human health or safety problems or ecological and environmental damage. It is assumed by the EPA that a uniform application of the ranking system in each state will permit EPA to identify releases of hazardous substances that pose the greatest hazard to human health and/or the environment.

Under the HRS, three numerical scores are computed to express the relative risk or danger from the site. These scores take into account the population at risk, the potential for contamination of drinking water supplies, for direct human contact, for destruction of sensitive ecological systems and other appropriate factors. The three scores are:

- S_m - reflects the potential for harm to humans or the environment from migration of a hazardous substance away from the facility by routes involving groundwater, surface water and air. It is a composite of separate scores for each of the three routes (S_{GW} = 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.
- S_{DC} - reflects the potential for harm and direct contact with hazardous substances at the facility (i.e., no migration need be involved).

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

$S_M = 6.67$	$S_{GW} = 4.47$
$S_{FE} = 0$	$S_{SW} = 10.63$
$S_{DC} = 62.5$	$S_A = 0$

RECOMMENDATIONS

There is no conclusive documentation of hazardous waste disposal on-site, listing the site on the inactive hazardous waste site registry may not be warranted. However, given the demonstrated contamination in the soils, sediments, surface water and groundwater, proper closure of the site in accordance with the Part 360 requirements is necessary at a minimum.

The results of the EM and magnetic surveys indicated the presence of anomalies which could be associated with buried metal objects. The possibility that the anomalies are caused by buried drums could not be confirmed with the analytical data from the wells installed around the perimeter of the landfill. Although no significant contamination was detected in the groundwater wells nearest the anomalies, it may be prudent to perform several exploratory test pits in the anomalous areas to confirm the absence or presence of drums.

TABLE I-1
DATA QUALIFIER KEY

FOOTNOTES:

(1) USGS, 1984. Professional Paper 1270: Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States.

(2) Booz, Allen & Hamilton, Inc. (1983): Range in U.S. Soils.

(3) New York State quality standard for class GA (source of potable water supply) groundwaters are the most stringent of applicable standards, criteria, or guidelines listed below:
a - NYSDEC Groundwater Quality Regulations, 6 NYCRR, Part 703, dated September, 1990.
b - NYSDOH Maximum Contaminant Levels, Public Water Supplies, 10 NYCRR, Subpart 5-1, dated January 1989.
c - NYSDOH Standards, Sources of Water Supply, 10 NYCRR, Part 170.
d - USEPA Maximum Contaminant Levels, 40 CFR 141.
e - NYS Ambient Water Quality Guidance Values, TOGS 1.1.1 dated September, 1990.
f - USEPA Health-based Criteria for Systemic Toxicants, dated May 1989.
* - If iron and manganese are present, total concentration of both should not exceed 500 ug/l.

(4) NYSDEC Surface Water Quality Standards, 6 NYCRR, part 701 and 702.

NS: No standard or guidance value established.

ND: The standard for this compound is below detection limit.

DATA QUALIFIERS (ORGANIC COMPOUNDS):

B: This flag is used when the analyte is found in the blank as well as the sample. It indicates possible or probable blank contamination and warns the data user to take appropriate action.

J: Indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero.

--: Indicates compound was analyzed for but not detected. Refer to Appendix D for detection limit.

X or T: Mass spectrum does not meet CLP criteria for confirmation, but compound presence is strongly suspected.

E: This flag is used to indicate that the quantitation of the analyte is outside the curve and that dilution was required to properly quantitate.

D: Flag is used to indicate the value for the target analyte was calculated from a dilution (see E flag above).

Y: Flag used when a matrix spike compound is also confirmed present in the unspiked sample.

R: Data Validation recommends that this value be rejected due to blank contamination.

@: This value, due to speadsheet characteristics, appears as boxed. The value DOES NOT exceed quoted standards.

NS: No standard or guidance value established.

F: Surrogate recovery values were outside the CLP criteria windows. Value is considered an estimated concentration.

NA: Not analyzed.

Values bolded and/or boxed exceed quoted standards.

DATA QUALIFIERS (METALS):

B: Reported value is less than the Contract Required Detection Limit (CRDL) but greater than the Instrument Detection Limit (IDL).

U or -: Reported value is less than IDL.

N: Spiked sample recovery not within control limits.

*: Duplicate analysis (Relative Percent Difference) not within control limits.

W: Post digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

S: The reported value was determined by the Method of Standard Additions (MSA).

+: Correlation coefficient for the MSA is less than 0.995.

E: Reported value is estimated because of the presence of interference.

M: Duplicate injection precision not met.

@: This value, due to speadsheet characteristics, appears as boxed. The value DOES NOT exceed quoted standards.

NS: No standard or guidance value established.

NA: Not analyzed.

Values bolded and/or boxed exceed quoted standards.

TABLE I-2 LACKWANNA CITY LANDFILL SUBSURFACE AND SURFACE SOIL SAMPLE RESULTS TCL ORGANIC COMPOUNDS (UG/KG)							
	SUBSURFACE SOILS					SURFACE SOILS	
COMPOUND	GW-1-S1	GW-2-S1	GW-3-S1	GW-4-S1	GW-5-S1	SS-1	SS-2
METHYLENE CHLORIDE	4 JR	3 JR	5 J	–	–	–	–
ACETONE	19	–	–	–	–	–	–
BENZOIC ACID	–	–	–	–	–	–	–
PHENANTHRENE	–	–	–	–	–	–	–
FLUORANTHENE	–	–	–	–	–	670 J	–
PYRENE	–	–	–	–	–	990	–
BENZO(A)ANTHRACENE	–	–	–	–	–	860 J	–
CHRYSENE	–	–	–	–	–	1,500	–
BIS(2-ETHYLHEXYL)PHTHALATE	300 J	200 J	3,900	260 J	3,400	–	–
BENZO(B)FLUORANTHENE	–	–	–	–	–	1,200	–
BENZO(K)FLUORANTHENE	–	–	–	–	–	790 J	–
BENZO(A)PYRENE	–	–	–	–	–	1,200	–
INDENO(1,2,3-CD)PYRENE	–	–	–	–	–	690 J	–
BENZO(G,H,I)PERYLENE	–	–	–	–	–	850 J	–

TABLE I-3
LACKAWANNA CITY LANDFILL
SUBSURFACE AND SURFACE SOIL SAMPLE RESULTS
TAL METALS (MG/KG)

ANALYTE	(1) AVG. RANGE IN NYS SOILS (mg/kg)	SUBSURFACE SOILS					SURFACE SOILS	
		GW-1-S1	GW-2-S1	GW-3-S1	GW-4-S1	GW-5-S1	SS-1	SS-2
ALUMINUM	700 - >100,000	16,200	13,700	10,400	14,600	11,900	6,940	13,400
ARSENIC	0.1 - 100	8.2 SN	5.8 N	10.4 N	13.0 SN	11.7 SN	2.7	34.5
BARIUM	10 - 500	155	65.8	138	81.1	74.0	24.4 B	86.5
BERYLLIUM	<1 - 15	-	1.2 B	0.92 B	1.1 B	1.2 B	-	-
CADMIUM	0.01 - 7 (2)	2.6	-	-	-	-	-	-
CALCIUM	130 - 330,000	13,600 E*	38,600 E*	48,700 E*	19,100 E*	49,200 E*	2,060 *	2,010 *
CHROMIUM (total)	1 - 2,000	58.5	18.9	20.1	21.2	16.6	13.0	235
COBALT	<3 - 70	6.9 B	10.4 B	7.7 B	11.8 B	9.7 B	1.3 B	14.1 B
COPPER	1 - 700	145	22.9	50.8	28.5	22.9	9.5 N*	22.7 N*
IRON	100 - >100,000	73,500 E	24,600 E	27,800 E	27,600 E	23,300 E	14,400 *	29,300 *
LEAD	<10 - 700	257	12.7	$\boxed{1,220}$	25.2	13.2	18.5 *	18.1 *
MAGNESIUM	50 - 50,000	2,570 *	10,000 *	6,900 *	8,650 *	15,800 *	574 B	5,000
MANGANESE	<2 - 7,000	502 EN*	325 EN *	366 EN*	420 EN*	371 EN*	182 N	469 N
MERCURY	0.02 - 0.5	0.12	-	-	-	-	-	-
NICKEL	<5 - 7000	54.9	31.3	27.1	28.4	27.5	7.9	34.3
POTASSIUM	2,200 - 65,000	1,060 B	2,170	1,680	2,130	1,960	167 B	1,860
SILVER		2.8	-	1.1 B	0.65 B	-	-	-
SODIUM	<500 - 100,000	863 B	191 B	256 B	698 B	280 B	119 B	223 B
THALLIUM		-	-	-	-	-	-	-
VANADIUM	20 - 500	14.1	24.0	18.4	26.9	21.8	11.0	24.8
ZINC	<5 - 3,500	1,220 E	73.9 E	274 E	74.5 E	61.7 E	20.6 EN	82.8 EN

TABLE I-4
LACKAWANNA CITY LANDFILL
GROUNDWATER SAMPLE RESULTS
TCL ORGANIC COMPOUNDS (UG/L) / TAL METALS (UG/L)

ANALYTE	(3) NYS STANDARDS (UG/L)	GW-1	GW-2	GW-3	GW-4	GW-5
METHYLENE CHLORIDE	5 a	3 JR	3 JR	-	3 JR	3 JR
ACETONE	50 b	-	-	-	10	94
BENZENE	ND a	-	-	-	3 J	-
ALUMINUM		28,300	50,900	26,000	5,410	8,120
ANTIMONY	3 e	29.5 B	26.1 B	-	-	24.6 B
ARSENIC	25 a	5.4 B	9.98 B	11.9	-	-
BARIUM	1,000 a	488	432	290	145 B	317
BERYLLIUM	3 e	-	3.2 B	-	-	-
CALCIUM		139,000	577,000	427,000	243,000	127,000
CHROMIUM (total)	50 a	69.6	89.1	52.4	7.7 B	13.4
COBALT		16.3 B	46.7 B	23.3 B	-	5.5 B
COPPER	200 a	250	96.2	100	10.3 B	10.2 B
IRON	300 a*	59,700	96,800	57,400	10,400	13,400
LEAD	25 a	348	53.3	46.0	11.1	8.0
MAGNESIUM	35,000 e	43,800	163,000	98,200	69,700	51,700
MANGANESE	300 a*	2,330	1,730	1,470	487	281
NICKEL	700 f	78.3	148	77.1	11.0 B	15.2 B
POTASSIUM		7,090	6,870	9,220	1,850 B	3,900 B
SILVER	50 a	10.4	7.6 B	7.4 B	-	-
SODIUM	20,000 a	209,000	33,900	47,400	890,000	27,800
VANADIUM		38.0 B	90.8	71.6	13.0 B	19.5 B
ZINC	300 a	1,420	357	333	51.2	39.2

TABLE I-5
LACKAWANNA CITY LANDFILL
SURFACE WATER SAMPLE RESULTS
TCL ORGANIC COMPOUNDS (UG/L) / TAL METALS (UG/L)

COMPOUND	(3) NYS STANDARDS CLASS D (UG/L)	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6
METHYLENE CHLORIDE		-	-	5 R	-	6 R	6 R
BIS(2 ETHYLHEXYL)PHTHALATE		-	-	-	22	-	-
ALUMINUM		227	170 B	252	68,200	1,550	216
ANTIMONY		-	-	-	146	-	-
ARSENIC	360 a*	-	-	-	19.0	-	-
BARIUM		60.8 B	58.4 B	51.0 B	8,180	375	71.1 B
BERYLLIUM		-	-	-	3.4 B	-	-
CADMIUM		-	-	-	6.6	-	-
CALCIUM		68,000	89,000	86,900	338,000	93,400	71,500
CHROMIUM (total)		-	-	-	123	13.0	-
COBALT	110 e	-	-	-	71.2	-	-
COPPER		4.6 B	9.3 B	-	337	20.8 B	-
IRON	300 a	$\boxed{1,090}$	$\boxed{3,580}$	$\boxed{1,010}$	$\boxed{1,380,000}$	$\boxed{9,510}$	$\boxed{1,240}$
LEAD		5.0	13.3 *	5.8	760	64.0	NR
MAGNESIUM		17,100	20,600	19,200	60,300	13,900	17,700
MANGANESE		250	495	178	41,700	1,370	263
MERCURY	0.2 e	-	-	-	$\boxed{0.57}$	-	-
NICKEL		-	-	-	192	-	-
POTASSIUM		4,030 B	4,370 B	4,400 B	13,000	10,600	4,090 B
SILVER		5.5 B	-	-	46.2	5.4 B	-
SODIUM		209,000	244,000	239,000	208,000	1,210,000	220,000
VANADIUM	190 a	4.9 B	5.6 B	4.4 B	214	6.7 B	-
ZINC		20.5	27.2	16.1 B	3,180	107	19.3 B
CYANIDE	22 a**	-	-	-	15.4	$\boxed{58.2}$	-

NOTES:

Sample SW-6 is a duplicate of SW-1.

Semivolatile and pesticide/PCB analyses for all samples missed holding time by one day.

NR = Not run due to analytical problems.

* - Dissolved Arsenic.

** - Free Cyanide - the sum of HCN and CN- expressed as CN.

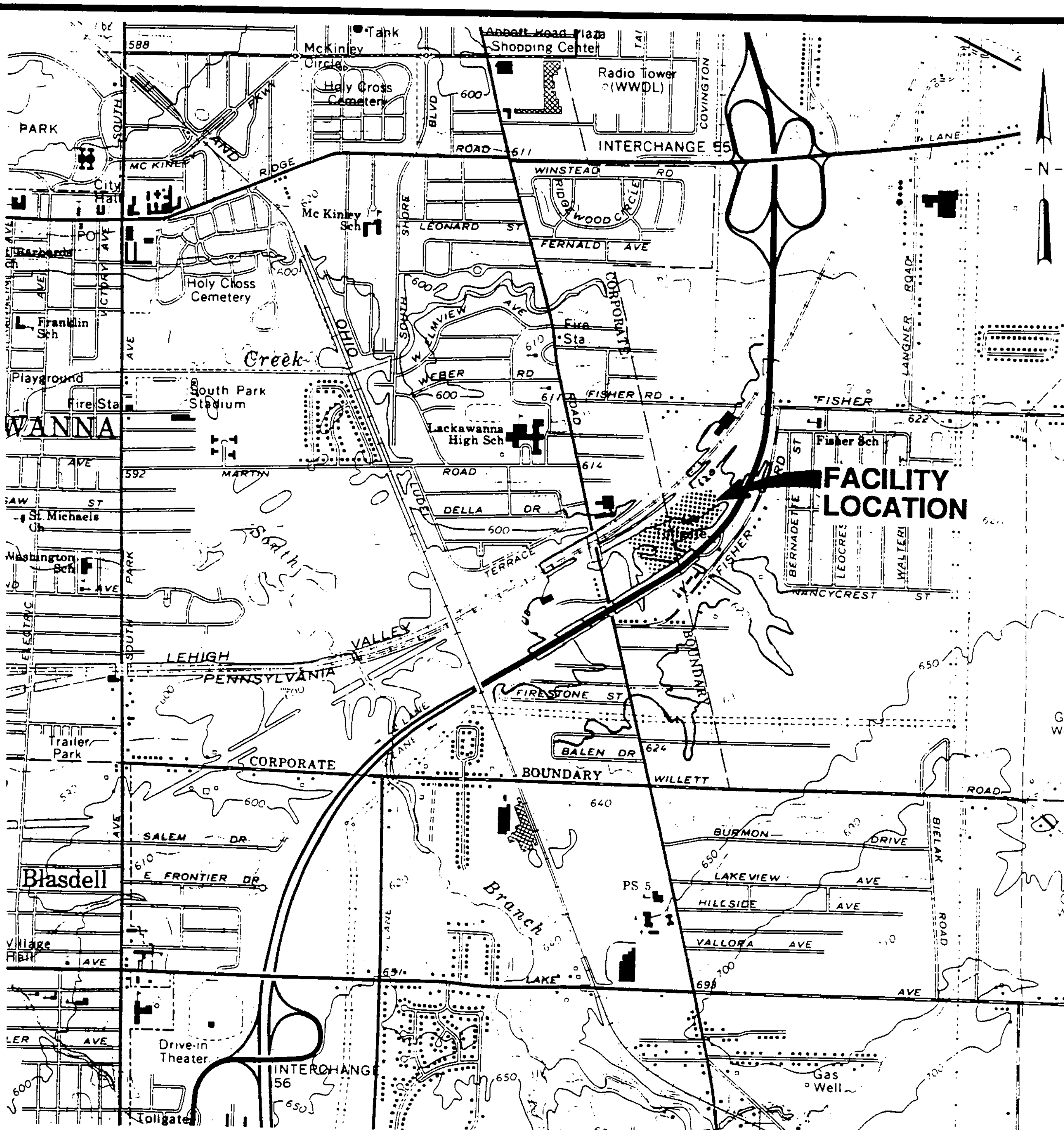
TABLE I-6
LACKWANNA CITY LANDFILL
SEDIMENT SAMPLE RSULTS
TCL ORGANIC COMPOUNDS (UG/KG)

COMPOUND / ANALYTE	SED-1	SED-2	SED-2-RE	SED-3	SED-4	SED-5	SED-5-RE
METHYLENE CHLORIDE	–	–	7 JR	–	–	–	–
ACETONE	19 X	17 J	37	24	29	240	110
BENZOIC ACID	–	–	NA	2,700 J	–	–	NA
PHENANTHRENE	–	–	NA	–	–	4,200	NA
FLUORANTHENE	580 J	500 J	NA	–	–	9,500	NA
PYRENE	500 J	440 J	NA	–	–	8,400	NA
BENZO(A)ANTHRACENE	–	–	NA	–	–	3,200	NA
CHRYSENE	–	–	NA	–	–	5,200	NA
BIS(2-ETHYLHEXYL)PHTHALATE	–	–	NA	–	–	5,100	NA
BENZO(B)FLUORANTHENE	–	–	NA	–	–	4,600 X	NA
BENZO(K)FLUORANTHENE	–	–	NA	–	–	4,000	NA
BENZO(A)PYRENE	–	–	NA	–	–	4,100	NA
INDENO(1,2,3-CD)PYRENE	–	–	NA	–	–	–	NA
BENZO(G,H,I)PERYLENE	–	–	NA	–	–	2,600 JX	NA
BETA-BHC	120	–	NA	–	–	–	NA

NA = Not analyzed

RE = Reanalysis

TABLE I-7 LACKAWANNA CITY LANDFILL SEDIMENT SAMPLE RESULTS TAL METALS (MG/KG)						
ANALYTE	(1) AVG. RANGE IN NYS SOILS (mg/kg)	SED-1	SED-2	SED-3	SED-4	SED-5
ALUMINUM	700 – >100,000	4,740	14,600	7,690	17,700	15,600
ARSENIC	0.1 – 100	4.3	8.0 S	4.2	11.2 S	13.2
BARIUM	10 – 500	63.1	112	72.6	95.9	361
CADMIUM	0.01 – 7 (2)	1.5	5.1	–	–	9.8
CALCIUM	130 – 330,000	105,000 *	7,650 *	8,290 *	18,500 *	24,100 8
CHROMIUM (total)	1 – 2,000	49.6	20.7	15.1	27.4	54.2
COBALT	<3 – 70	7.5 B	7.1 B	7.3 B	14.6 B	12.4 B
COPPER	1 – 700	76.2 N*	125 N*	39.1 N*	30.9 N*	116 N*
IRON	100 – >100,000	53,300 *	38,400 *	59,700 *	33,100 *	28,800 *
LEAD	<10 – 700	271 *	281 B*	52.7 *	62.4 *	809 *
MAGNESIUM	50 – 50,000	3,670	2,450	2,380	7,360	5,750
MANGANESE	<2 – 7,000	788 N	373 N	502 N	421 N	1,340 N
MERCURY	0.02 – 0.5	0.25	–	–	–	–
NICKEL	<5 – 7000	18.1	23.3	17.3	39.0	39.0
POTASSIUM	2,200 – 65,000	393 B	1,070 B	442 B	1,600	1,310 B
SILVER		–	–	–	–	–
SODIUM	<500 – 100,000	465 B	1,720 B	461 B	490 B	11,000
THALLIUM		–	–	–	–	–
VANADIUM	20 – 500	25.3	15.6 B	15.2 B	28.4	33.5 B
ZINC	<5 – 3,500	220 EN	774 EN	150 EN	151 EN	708 EN
CYANIDE		–	–	0.86 N	–	1.8 N



LOCATION

LONGITUDE 78°47'45"
LATITUDE 42°48'48"

QUADRANGLE LOCATION

SOURCE: BUFFALO SE QUADRANGLE
NEW YORK-ERIE COUNTY 7.5 MINUTE
SERIES (TOPOGRAPHIC)

2000 0 2000 FT.

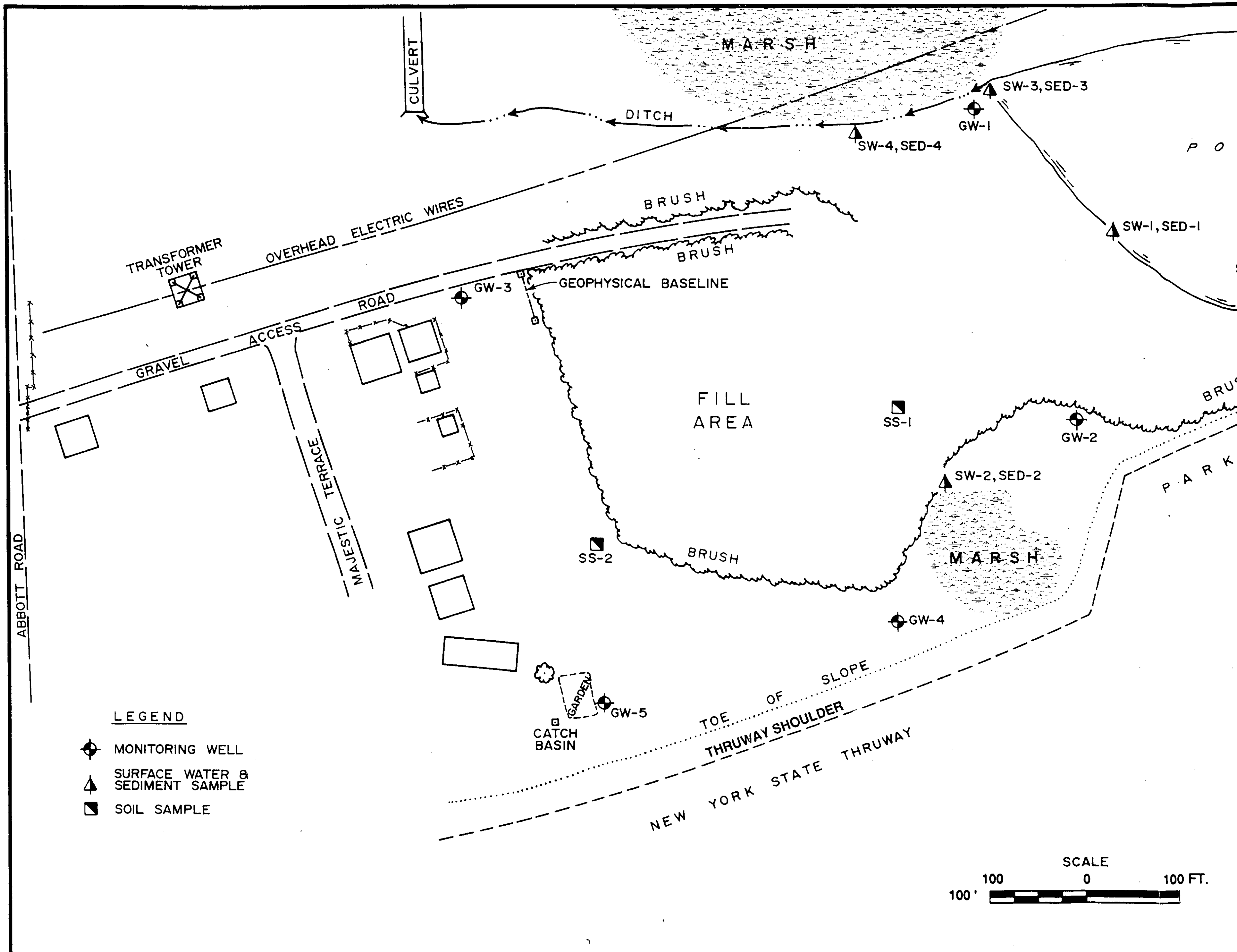
2000 '

ENGINEERING-SCIENCE

NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION
PHASE II REPORT

SITE LOCATION MAP
LACKAWANNA CITY LANDFILL

FIGURE I-1



ENGINEERING-SCIENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PHASE II REPORT

SITE LOCATION MAP LACKAWANA CITY LANDFILL

FIGURE I-2

SECTION II

PURPOSE

The objective of a Phase II investigation is to determine if hazardous wastes are present at the site, if contaminants are present in groundwater, surface water, soils or air at the site, and to determine if contaminants are migrating from the site posing a potential threat to human health and the environment. Information gathered during this investigation will allow the New York State Department of Environmental Conservation (NYSDEC) to establish the relative risk posed by the site, to reclassify the site on the New York State list of inactive hazardous waste sites, or remove the site from the list if justified by the findings of this investigation.

This NYSDEC Phase II investigation consisted of a preliminary hydrogeologic investigation and evaluation of the Lackawanna City Landfill site in order to: collect additional field data necessary to identify the occurrence and extent of contamination; determine if any imminent health hazards exist, and; prepare a site investigation report, including a final HRS score.

During the period from 1961 to 1981, the Lackawanna City Landfill was used for the disposal of incinerator residue, and construction and demolition debris (Callareno, 1978; NUS, 1983). In 1981, approximately 1070 cubic yards of digested and dewatered sewage sludge was disposed in the landfill (Weisberger, 1980; Donovan, 1981).

In 1982, analysis of surface water and soil samples indicated detectable concentrations of antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, zinc, total organic carbon (TOC) and total halogenated organics (THO) in samples taken on and near the landfill. This data provided evidence of surface sediment, surface water and soil contamination (NYSDEC, 1982). This Phase II investigation was designed to supplement the limited existing data for the site.

SECTION III

SCOPE OF WORK

INTRODUCTION

Field work for the Phase II investigation at the Lackawanna City Landfill site began on August 8, 1989. The Phase II Work Plan was prepared and approved by NYSDEC prior to commencing the field investigations. The Work Plan was later revised with NYSDEC approval, based on the preliminary findings of the field investigations. The original Work Plan included installation of four monitoring wells and collection of two surface water and two sediment samples. Based on the findings of the electromagnetic (EM) and magnetometer surveys, the well locations were revised and the number of wells was increased from four to five. The screen lengths of the wells are five to ten feet. A total of five surface water, five sediment samples and two surface soil samples were collected.

PHASE II SITE INVESTIGATION

The scope of the investigation is summarized in Table III-1 and is described below. All field work was performed or supervised by qualified Engineering-Science, Inc. (ES) staff in accordance with the NYSDEC-approved Quality Assurance Project Plan and the Health and Safety Project Plan. Field procedures for the site investigation tasks are presented in Appendix A.

Geophysical Survey

A geophysical survey utilizing electromagnetic (EM) methods was conducted from September 13 through September 20, 1989 at the Lackawanna City Landfill. Based on the EM data, a magnetic survey was conducted in the areas where EM anomalies were identified to confirm the presence or absence of buried drums in the area. Results of the EM survey helped locate buried materials and aided placement of the monitoring wells within conductive subsurface plumes. The geophysical survey methods and results are presented in Appendix B. The magnetic survey results indicated the presence of anomalies which could be associated with buried metal objects such as drums. Refer to Appendix B for details.

Monitoring Well Installations

Five monitoring wells were installed around the landfill on May 14 and 15, 1990 by American Auger and Ditching Company, Inc. The locations of these wells are shown in Figure III-1. Wells were installed upgradient of and around the perimeter of the landfill area. All wells monitor the water table aquifer (Table III-2).

The wells were drilled and constructed in accordance with NYSDEC guidelines. Split spoon samples generally were collected at 5-foot intervals throughout the depth of the well at each location and screened for volatile organic compounds with a photoionization detector (PID). Five composited soil samples with elevated PID readings were selected from the split spoon samples and analyzed for Target Compound List (TCL) organic (volatile, semivolatile and pesticide/PCB) compounds, Target Analyte List (TAL) metals and cyanide (Table III-3). The soil analyses, and all other TCL and TAL analyses, utilized the methods and reporting requirements of the NYSDEC Superfund and Contract Laboratory Protocols dated November 1987 (NYSDEC CLP).

Upon completion of the soil borings, monitoring wells were constructed in the boreholes with two-inch inside diameter threaded, flush-joint, NSF-approved PVC pipe and 0.010-inch slotted screen. Bentonite pellet seals were used to isolate the screened sections from above. Water levels in the wells were measured on at least two dates following installation and development.

Monitoring wells GW-1, GW-2, GW-3 and GW-5 were developed using a suction pump. Monitoring well GW-4 was developed using a bailer. All wells were developed until the water was visually sediment-free.

The monitoring wells were capped with a vented PVC cap and covered by a lockable protective steel casing. Field procedures for the monitoring well installations are presented in Appendix A. Boring logs, well schematics and results of geotechnical analyses are included in Appendix C. Analytical results for TCL and TAL substances are discussed in Section IV and listed in Appendix D.

Groundwater Sampling and Analyses

Groundwater samples were collected from each of the Phase II monitoring wells on May 25, 1990. These samples were analyzed for TCL organic compounds, TAL metals and cyanide. In addition, a trip blank was analyzed for TCL volatiles and a wash blank was analyzed for TCL organic compounds, TAL metals and cyanide. The laboratory quality control matrix spike (MS) and matrix spike duplicate (MSD) samples were collected from monitoring well GW-3. All laboratory analyses and reports utilized the applicable NYSDEC CLP (November, 1987) methods.

Groundwater samples were collected with disposable polyethylene bailers and dedicated polypropylene line. Field procedures for the groundwater sampling and all other sampling are presented in Appendix A. Analytical results are discussed in Section IV and are listed in Appendix D.

Surface Water and Sediment Sampling and Analyses

Five downgradient surface water (SW-1, SW-2, SW-3, SW-4 and SW-5) and five sediment samples (SED-1, SED-2, SED-3, SED-4 and SED-5) were collected on May 24, 1990. All surface water and sediment samples were analyzed for TCL organic compounds, TAL metals and cyanide. In addition, MS and MSD samples for sediments were collected from the SED-3 location. A duplicate sample was collected at SW-1 and labeled SW-6 to document the reproducibility of the sampling methods.

Surface water and sediment samples were collected along the south, east and north edges of Lackawanna City Landfill. Samples SW-2 and SED-2 were collected on the north edge of the marsh, where it borders the southeast side of the landfill (Figure III-1). Samples SW-3, SED-3, SW-4, SED-4, SW-5 and SED-5 were collected on the west side of the pond adjacent to the northeastern edge of the landfill. Samples SW-1 and SED-1 were collected from the pond outlet stream on the north side of the landfill site. Surface water samples were collected with a decontaminated stainless steel dipper and the sediment samples were collected with decontaminated stainless steel spoons.

Surface Soil Sampling and Analyses

Two surface soil samples were collected on May 24, 1990 and analyzed for TCL organic compounds, TAL metals and cyanide. The samples were collected with decontaminated stainless steel spoons from areas of stained or discolored soil on the landfill.

AIR MONITORING

A Photovac Total Ionizables Present (TIP-II) was used to monitor for volatile organic compounds present in the air. This monitoring was performed as a health and safety measure during on-site field work. Air in the breathing zone (four to five feet above the ground) was monitored during drilling and sampling activities. Soil samples were screened, as was the headspace over each monitoring well, as a preliminary means of determining the presence of volatile organic compounds.

TABLE III-1

SUMMARY OF PHASE II TASKS
LACKAWANNA CITY LANDFILL

Tasks	Description of Task
Review and Update Work Plan	Reviewed the information in the Phase I report and supplemental data, conducted a site visit, examined old maps and reviewed the Phase II work plan.
Records Search/Background Data Acquisition	Augmented Phase I information by contacting or visiting central and local offices of NYSDEC, and various Erie County and City of Lackawanna agencies.
Site Reconnaissance	Checked proposed monitoring well locations and examined terrain for accessibility by drill rigs. In addition, determined appropriate locations of surface water and sediment sampling points.
Conducted Geophysical Studies	Conducted EM and magnetometer surveys.
Soil Borings/Monitoring Well Installation	Installed five wells. Five borings were drilled to depths between 12 and 16 feet. Wells were constructed of 2-inch inside diameter PVC with 5 or 10 feet of 0.010-inch slotted well screen.
Sampling and Analysis	
Soil Samples from Borings	Split spoon samples were collected at two-to five-foot intervals from well borings. Five samples were analyzed for TCL organic compounds, TAL metals, and cyanide.

TABLE III-1, CONTINUED

Tasks	Description of Task
Sampling and Analysis, Continued	
Groundwater Samples	Five groundwater samples were collected and analyzed for TCL organic compounds, TAL metals, and cyanide.
Surface Water Samples	Five surface water samples were collected and analyzed for TCL organic compounds, TAL metals, and cyanide.
Sediment Samples	Five sediment samples were collected and analyzed for TCL organic compounds, TAL metals, and cyanide.
Surface Soil Samples	Two surface soil samples were collected and analyzed for TCL organic compounds, TAL metals and cyanide.
Air Monitoring	The presence of volatile organic compounds was monitored during on-site activities using a Photovac TIP-II.
Site Assessment	A preliminary site contamination assessment was conducted to complete the final HRS and HRS documentation records.
Report Preparation	Prepared a final report containing significant Phase I information, additional Phase II field data, final HRS and HRS documentation records, and site contamination assessments.
Project Management	Project coordination, administration and reporting.

TABLE III - 2

MONITORING WELL LOCATIONS AND SPECIFICATIONS
LACKAWANNA CITY LANDFILL

Well Number	Aquifer Screened	Location	Top of Screen Depth (ft)*	Top of Screen Elevation (ft)**	Bottom of Screen Depth (ft)*	Bottom of Screen Elevation (ft)**
GW-1	Water Table	Downgradient	4.0	607.09	14.0	597.09
GW-2	Water Table	Downgradient	4.0	604.63	14.0	594.63
GW-3	Water Table	Downgradient	11.0	600.29	16.0	595.29
GW-4	Water Table	Downgradient (@)	7.0	605.13	12.0	600.13
GW-5	Water Table	Upgradient	4.0	605.54	14.0	595.54

* Depths in feet below ground surface.
** Elevations in feet above Mean Sea Level as measured by Modi Associates during May 1990.
(@) Considered downgradient for the purpose of contamination assessment due to its proximity to the landfill.

KLB/SY053.10.00/0007

TABLE III-3

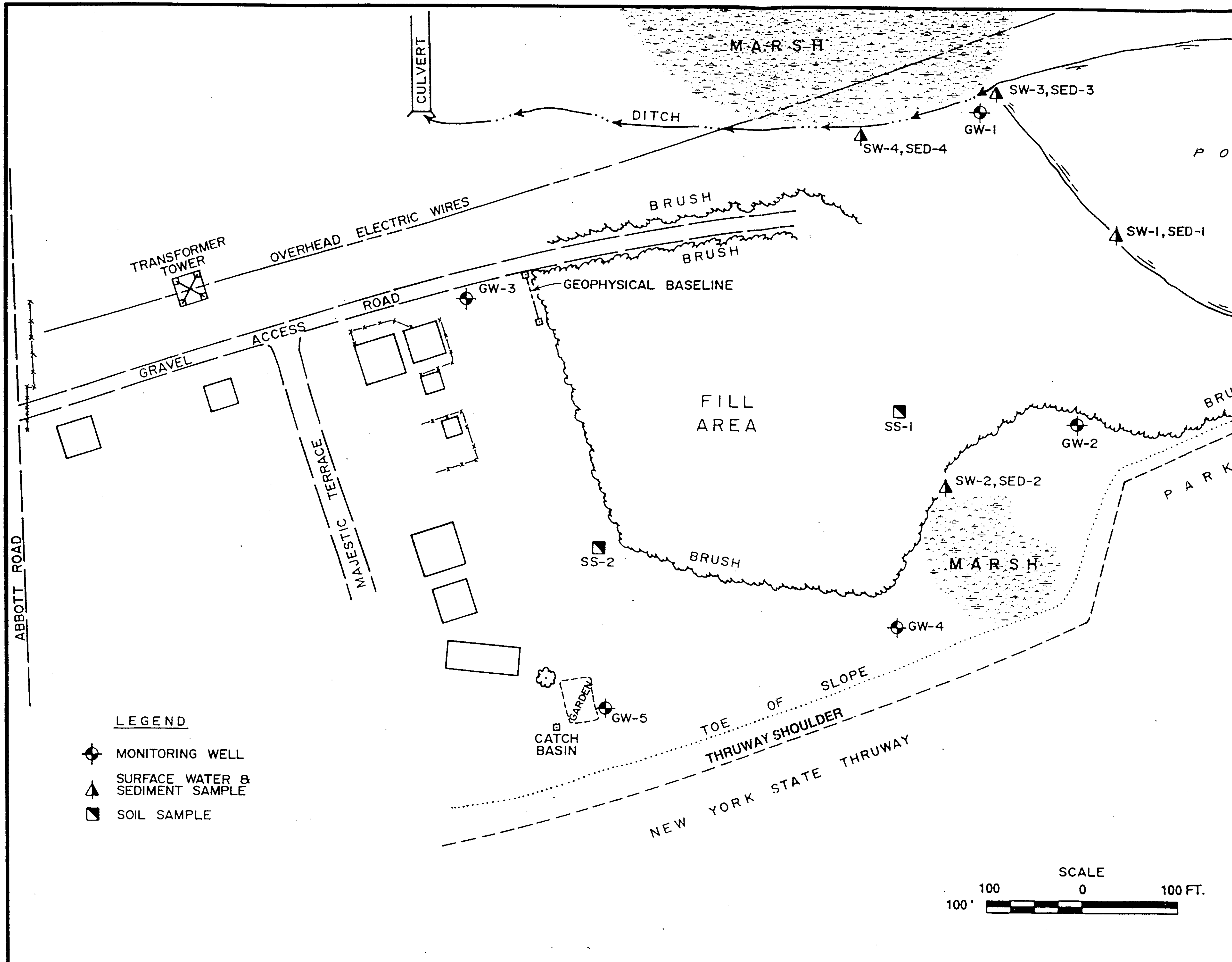
SPLIT-SPOON SAMPLE LOCATIONS

LACKAWANNA CITY LANDFILL

Sample I.D.	Matrix	Composite Sample Depth (ft.)*	Location
GW-1	Fill, Soil	0 - 12.5	Downgradient
GW-2	Soil	0- 13.5	Downgradient
GW-3	Fill, Soil	0 - 13.5	Downgradient
GW-4	Fill, Soil	0 - 10.5	Downgradient (@)
GW-5	Soil	0 - 11.5	Upgradient

* Depth in feet below ground surface.
@ Considered downgradient for the purpose of contamination assessment due to its proximity to the landfill.

KLB/SY053.10.00/0012



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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PHASE II REPORT

SAMPLE LOCATION MAP LACKAWANNA CITY LANDFILL

FIGURE III-1

SECTION IV

SITE ASSESSMENT

SITE HISTORY

The Lackawanna City Landfill site is a 15-acre site located on the east side of Abbott Road, in the City of Lackawanna, Erie County, New York. The site is an inactive landfill, owned by the City of Lackawanna.

The landfill was operated by the City of Lackawanna from 1961 to 1981 and accepted incinerator ash from the municipal incinerator. In 1973, the city experienced a surface water problem at the site due to storm water which drained off the NYS Thruway. To correct this, a catch basin and 550 feet of 24-inch diameter storm sewer pipe was installed from the Thruway embankment to a drainage ditch on the opposite side of the landfill (Collareno, 1978).

In 1980, the Lackawanna Sewage Treatment Plant underwent renovations and a request was made to the NYSDEC to haul sludge to the landfill (Weisberger, 1980a). A composite sample of the sludge from the digester was analyzed by ACTS Testing Labs, Inc. in September 1980 and was found not to exceed the Extraction Procedure (EP) Toxicity limits which are used to characterize wastes as hazardous (Termini, 1980). A site inspection for wetlands determination was conducted on July 1, 1980 (O'Connor, 1980). The inspection indicated a 10-acre wetland and pond were located on the site. To provide adequate separation of the waste material and the wetland, a five-foot high earthen berm was constructed to reduce the flow of storm runoff from the landfill sludge to the wetland (Weisberger, 1981).

On February 20, 1981, the NYSDEC approved disposal of the digested sludge at the landfill (Mitrey, 1981a). The approval was valid until March 31, 1981 and was specifically for a one-time clean-out of the Lackawanna Sewage Treatment plant digester. A request for extension until April 15, 1981 was granted on March 30, 1981 (Mitrey, 1981b). The sewage sludge was dewatered to a minimum solids concentration of 20 percent and mixed with clean fill material in a ratio of one part sludge to four parts fill. Approximately 1070 cubic yards of sludge were deposited at the landfill in 1981 (Selden, 1981).

On July 23, 1981, the NYSDEC conducted a site inspection to determine if the site was properly closed in compliance with Part 360 of the Environmental Conservation Law (Tygert, 1981). Several violations were noted including inadequate cover, improper grades and slopes, improper vegetative cover and poor access control. The report indicates that demolition debris had also been dumped at the site. In 1982, the NYSDEC conducted a site investigation and collected surface water and soil samples (NYSDEC, 1982). Several leachate breakouts were reported. Test results indicated elevated levels of heavy metals, total organic carbon and total halogenated organics.

A NYSDEC Phase I report was prepared in April 1986, and included a preliminary HRS score. The report recommended that a Phase II investigation be performed to provide data necessary to calculate a final HRS score.

REGIONAL SETTING

Regional Geology

The Lackawanna City Landfill is located in the Erie-Ontario Lowland physiographic province of New York State. The site and vicinity are underlain by Pleistocene proglacial lake deposits of upper Wisconsin age (Muller, 1977). During late Wisconsinan time, there were many lake level fluctuations caused by changes in the lowest available stream outlet. Glacial lake deposits accumulated, consisting of interbedded gray clay, brown silt, and in some cases fine sand. At depths of 10 to 12 feet, a fine to coarse sand and gravel was encountered in on-site borings (ES, 1990a). This sand and gravel is interpreted to be the top of the middle Wisconsinan moraine and outwash deposits. Middle Wisconsinan glacial deposits consist of end and ground moraines, outwash and delta gravel deposits (Muller, 1977).

Glacial deposits unconformably overlie the much older Middle Devonian Skaneateles and Marcellus formations of the Hamilton Group (Richard & Fisher, 1970). The Skaneateles formation consists of the Levanna black and gray shales and thin limestones and the Stafford dark gray limestone overlying the calcareous fissile black shales of the middle Devonian Marcellus formation. On-site borings did not penetrate the Skaneateles formation bedrock (ES, 1990a).

Regional Hydrology

The site lies within the Smoke Creek and South Branch of Smoke Creek drainage basin (USGS, 1965). Surface waters in this system ultimately reach the Atlantic Ocean via Lake Erie, the Niagara River, Lake Ontario and the St. Lawrence River (NYSDOH, 1982; Rand McNally & Co., 1989). Smoke Creek lies to the north of the Lackawanna City Landfill and flow in the creek is toward the west into Lake Erie. The south branch of Smoke Creek lies to the southwest of the Lackawanna City Landfill and it flows to the northwest where it joins Smoke Creek approximately 1.5 miles east of Lake Erie (USGS, 1965). Smoke Creek is classified by the NYSDEC as a Class D waterway, designated as suitable for fishing, primary and secondary contact recreation but not fish propagation (NYSDEC, 1985; Bureau of National Affairs, 1979). The South Branch of Smoke Creek is classified by the NYSDEC as a Class C waterway designated as suitable for fishing, fish propagation and primary and secondary contact recreation (NYSDEC, 1985; Bureau of National Affairs, 1979).

Groundwater is found locally in glacial deposits. Residents in the site area are served by a municipal water supply, and are not dependent on groundwater

(NYSDOH, 1982). The municipal water supply obtains water from Lake Erie at water intakes located 6.0 miles to the northwest (NYSDEC, 1986). Groundwater use within a three-mile radius is limited to two shale bedrock wells reportedly used for industrial purposes and lawn sprinkling (NYSDEC, 1986).

SITE TOPOGRAPHY

The Lackawanna City Landfill is a 15-acre site located in the southeastern part of the City of Lackawanna (Figure IV-1). The site is bordered on the east and southeast by the New York State Thruway and the Lackawanna Toll Barrier, on the southwest by the Majestic Terrace neighborhood, and by the Pennsylvania and Lehigh Valley railroad tracks to the northwest (ES, 1989; USGS, 1965; Rand McNally, 1989).

No borings were completed through the fill material to determine a fill thickness. Based on review of correspondence approximately 1,074 cubic yards of sewage treatment sludge (Weisberger, P.E., 1980) and as much as 80,000 cubic yards of incinerator ash (Callareno, 1978) were deposited in the landfill. The area is covered by heavy vegetation, with the exception of an area where slag is exposed at the surface.

The site is a low marshy area with ponds (ES, 1989; O'Connor, 1980). The maximum elevation difference on-site is approximately 10.4 feet as measured between the surface soil sample (SS-1) location at 613.8 above mean sea level (AMSL) and the surface water sample (SW-4) location at 603.4 AMSL (Figure IV-2). Elevation differences between the edge of the fill and original ground elevation range from about 2.6 feet near the Majestic Terrace neighborhood and about 8.1 feet near the pond and marsh areas (Figure IV-2). The New York State Thruway is the highest area topographically near the site.

Site access is limited by the New York State Thruway and marsh areas. A gate is present near Abbott Road, limiting access via the landfill service road. There are no access limitations from Majestic Terrace Road or the surrounding neighborhood (Tygert, 1981; ES, 1989). The nearest homes are approximately 160 feet away and the nearest business is 800 feet to the west, just west of Abbott Road. The NYS Thruway Lackawanna toll barrier is approximately 600 feet to the southeast of the Lackawanna City Landfill. A warehouse or industrial facility is approximately 500 feet to the east, on Fisher Road (USGS, 1965).

SOILS

This discussion of site soils is based on the Soil Survey of Erie County, New York (USDA, 1984) and soil borings conducted on-site as part of the Phase II investigation (ES, 1990a).

The original ground surface in the fill area has been covered by an undetermined thickness of fill material consisting of incinerator ash, dewatered waste treatment sludge mixed with or interbedded with soil (Weisberger, 1981), and concrete debris (Kuwik, 1978) (NUS, 1983). Soil fill and/or waste material extend beyond the bounds of the landfill in some places on site (ES, 1990a).

The soil beneath and beyond the limits of the landfill is mapped as the Niagara-Canandaigua-Cosad association, which are nearly level, deep, somewhat poorly-drained to very poorly-drained, medium-textured soils on lowland plains (USDA, 1984). These soils are formed in glacial lake sediments and have a high clay content.

SITE HYDROGEOLOGY

The information used to develop the discussions in this subsection includes the five monitoring well borings and installations, surface water samples, USGS topographic maps, Geological Map of New York (Niagara Sheet), Quaternary Geology of New York (Niagara Sheet), Ground-Water Resources of the Erie-Niagara Basin, New York (1968) and New York State Atlas of Community Water System Sources (1982).

The boring logs, well schematics and geotechnical analyses results are presented in Appendix C.

Geology

As part of the Phase II site investigation activities, five monitoring wells were installed at the site (Figure IV-2). The site subsurface stratigraphy can be characterized by up to 35 feet of Pleistocene upper Wisconsinan glacial lake deposits and possibly middle Wisconsinan gravel and glacial moraine and outwash deposits. Based on boring logs from borings taken one-half mile to the north at a NYS Thruway bridge project, the black shale bedrock is assumed to lie at a depth of approximately 35 feet (NYS Dept. of Public Works, 1954; Geologic Map of New York, 1970). A similar depth to bedrock is anticipated at the Lackawanna City Landfill Site. Well boring log information is summarized in Table IV-1. Cross sections of the site geology are identified on Figure IV-3 and are presented in Figure IV-4 and Figure IV-5.

Well boring GW-1 encountered as much as eight feet of red, brown and black clay, coarse sand and fill material. Well boring GW-3 encountered brown to black fine to coarse sand and possible landfill material. Based on the well boring location, the material may be attributed to subdivision construction, access road construction or the Lackawanna City Landfill. Brown and black coarse sand, brick and fine to medium gravel was encountered in the upper four feet of well boring GW-4. This is interpreted to be landfill material, but could be from NYS Thruway construction because well boring GW-4 is only 40 feet from the toe of the NYS Thruway. Well borings GW-2 and GW-5 encountered no fill material. Up to 13 feet of Pleistocene upper Wisconsinan proglacial lake deposits were encountered in all five well borings either below ground surface or below the fill material. The proglacial lake deposits are predominantly gray clay interbedded with brown clay, silt and traces of fine sand. Near the base of well borings GW-1, GW-2, GW-3 and GW-5 coarse sand and gravel with gray clay was encountered. This sand and gravel is interpreted as possible glacial moraine or outwash material of middle Wisconsinan age (Muller, 1977). The depth to the Skaneateles shales of Middle Devonian age is approximately 33 feet in the area (NYS. Dept. of Public Works, 1954).

The five well borings made as a part of this study were not deep enough to penetrate the Middle Devonian Skaneateles shales (Richard & Fisher, 1970).

Groundwater Hydrology

Five groundwater monitoring wells were installed at the Lackawanna City Landfill site to determine groundwater flow directions and to characterize groundwater quality. The locations of the wells are shown on Figure IV-3. Monitoring well construction data and water level data are presented on Table IV-2.

The wells at the site monitor shallow groundwater in the water table aquifer within the fill, proglacial lake, upper moraine and outwash deposits. Monitoring well GW-5 is considered to be least affected by the landfill and was used as the background well for contamination assessment. The drilling record for monitoring well GW-4 shows that the well penetrated fill material. The origin of the fill material in monitoring well GW-4 could be from either the landfill or from the construction of the NYS Thruway. Because of this ambiguity, GW-4 is considered downgradient of the landfill for the purpose of contamination assessment, independent of the water level elevation data. Monitoring wells GW-1, GW-2, and GW-3 are also downgradient. All wells were screened near the groundwater table as determined during boring operations. Monitoring wells GW-1, GW-2 and GW-5 have 10-foot screens and GW-3 and GW-4 have 5-foot screens. Depth to groundwater in the wells varied from 3.45 to 8.65 feet on May 24, 1990 (Table IV-2).

Based on information from two dates when water levels were measured (May 15 or 16 and May 24, 1990), groundwater flows toward the northwest (Table IV-2). A contour map of groundwater elevations as measured on May 24, 1990 (Figure IV-6) shows possible mounding of groundwater beneath the Lackawanna City Landfill. Local groundwater flow appears to be in a radial pattern. This interpretation is based on a limited number of data points. The pond and marsh areas give additional insight into the local groundwater table. Three water elevations were measured around the west and south sides of the pond and two water elevations were measured in the marsh areas, all corresponding to sampling locations (Figure III-1 and Figure IV-6).

The highest groundwater elevations were measured at monitoring well GW-4 (609.96 feet AMSL) and monitoring well GW-5 (608.09 feet AMSL). The lowest groundwater elevation was (603.4 feet AMSL) measured in the pond outlet stream (SW-4) in the marsh just north of the landfill (Figure IV-6). The lowest groundwater elevation measured in a monitoring well was (604.64 feet AMSL) in monitoring well GW-3 to the northwest of the site. The horizontal distance between GW-4 and SW-4 is 265 feet and the calculated hydraulic gradient is 0.0129 to the north assuming hydrologic connection between the groundwater and surface water. The horizontal distance between monitoring wells GW-4 and GW-3 is 567 feet and the calculated hydraulic gradient is .009 to the northwest.

The hydraulic conductivity of the landfill material was not measured but is expected to be variable due to the landfilling procedures and fill materials (Selden, 1981). Hydraulic conductivities in the proglacial lake clays are expected to be 10^{-3} to 10^{-5} m/day while the moraine and outwash sand mixed with gray clay are expected to be somewhat higher, 10^{-1} to 10^{-3} m/day (Driscoll, 1986).

SURFACE WATER HYDROLOGY

The Lackawanna City landfill site is virtually equidistant from Smoke Creek to the north and the South Branch of Smoke Creek to the southwest. The South Branch of Smoke Creek and Smoke Creek join approximately 9000 feet to the west of the landfill site. From the junction point, Smoke Creek flows about 8300 feet west into Lake Erie. Smoke Creek is classified by the NYSDEC as a Class D waterway and the South Branch of Smoke Creek is classified as a Class C waterway (NYSDEC, 1985).

SITE CONTAMINATION ASSESSMENT

Waste Characterization

The Lackawanna City Landfill is a 15-acre site which accepted incinerator ash from the municipal incinerator for approximately 20 years. The exact nature of the municipal waste material before incineration is not known. It is generally described as municipal refuse in the NYSDEC Permit (NYSDEC, 1978). The volume of incinerator ash dumped at the Lackawanna City Landfill was reported to be approximately 16 cubic yards per day. (Collareno, 1978). Intermediate cover was applied daily.

Approximately 1,070 cubic yards of dewatered sewage treatment plant sludge was deposited in an approximately one acre portion of the Lackawanna City Landfill in 1981 (Selden, 1981). The sludge was from a one-time clean-out of the Lackawanna Sewage Treatment plant digestor. The sewage sludge was dewatered to a minimum solids concentration of 20 percent. It was then mixed with clean fill material in a ratio of one part sludge to four parts fill.

A composite sample of the sludge from the digester was analyzed by ACTS Testing Labs, Inc. in September 1980 and was found not to exceed the Extraction Procedure (EP) Toxicity limits which are used to characterize wastes as hazardous (Termini, 1980).

The site inspection identified construction and demolition fill, foundry sands and slag, wood debris, metal pieces and assorted refuse (ES, 1989). A Phase I Investigation was conducted by RECRA Environmental, Inc. for the NYSDEC in April of 1986 after an earlier potential hazardous waste site evaluation in 1983 by NUS Corporation (NUS, 1983). The Phase I effort for the Lackawanna City Landfill included collection and review of existing data, preparation of a preliminary Hazard Ranking Score (HRS) for the site, development of a preliminary hydrogeologic model, completion of required documentation, development of a work plan and estimated costs for further investigations at the site, and preparation of a summary report. The Phase I report concluded that the available data was inadequate to prepare a final HRS score (NYSDEC, 1986).

Potential contamination within the site boundary was evaluated by a review of the character and quantity of wastes suspected at the site, chemical analysis of the groundwater, surface water, sediment, subsurface soils and surficial soils, subsurface geophysical surveys, and air quality monitoring with a Photovac TIP-II.

The following subsections summarize the results of the Phase II investigation sampling and analyses tasks. Whenever possible, samples were collected upstream or upgradient of the site to establish ambient or background conditions. These levels were compared to those found on-site, downstream or downgradient of the site. Concentrations downstream or downgradient of the site in excess of three times the upgradient concentration may indicate a release from a contaminant source located on-site. This criterion is generally recognized by the USEPA and NYSDEC as constituting a "significantly higher" concentration for purposes of scoring an HRS observed release for a particular pathway. Therefore, reference is made to the number and types of analytes considered to be releases under each pathway, as discussed in the following subsections.

The analytical results in this section have been validated by reviewing the sample holding times and evaluating laboratory blank samples. Sample holding time refers to the time between sample receipt by the laboratory and sample extraction and analysis. Maximum sample holding times are specified in the NYSDEC CLP methods. The analytical data summary tables found in this section identify any violations of sample holding times. In those cases the data are considered valid, but the concentrations are considered to be estimated values, likely to be biased low.

Data validation also includes an evaluation of laboratory blank results. If a compound is detected in one or more blank samples, the maximum concentrations reported in the blank(s) are used to validate the field sample concentrations. The presence of a compound in a field sample is considered attributable to laboratory contamination if the concentration in the field sample is less than five times the blank sample concentration. For common laboratory contaminants (methylene chloride, acetone, toluene, 2-butanone, and common phthalate esters) the criterion is ten times the blank sample concentration. These criteria were used as guidance limits to help determine whether blank contamination was potentially responsible for the presence of these constituents in the field samples.

The analytical results have also been compared to applicable New York State standards or guidance values. Standards and guidance values are provided for the applicable surface water and groundwater classifications. Standards that have been promulgated for surface water appear in 6NYCRR Parts 701 and 702, and for groundwater in 6NYCRR Part 703 and 10NYCRR Part 5. The standards referenced on the analytical summary tables in this section are the most stringent of the applicable standards, since one or more standards could apply. For example, the Class GA groundwater standard for benzene is "not detectable", while the maximum contaminant level (MCL) is 5 $\mu g/l$. In this case, the most stringent of the two, the Class GA standard, is listed on the summary table. Soil results have been compared to published naturally-occurring ranges in New York State or conterminous United States soils. A complete list of the footnotes and data qualifiers used is presented in Table IV-3.

The field procedures utilized for the sampling are presented in Appendix A. A complete list of analytical results can be found in Appendix D.

Subsurface Soil Contamination Assessment

A total of five subsurface soil samples were collected, one from each well boring at the Lackawanna City landfill. The samples were analyzed for TCL organic (volatiles, semivolatiles, pesticides/PCBs) compounds, TAL metals and cyanide. Sample GW-5-S1 is considered the background sample; GW-1-S1, GW-2-S1, GW-3-S1 and GW-4-S1 are the downgradient samples. Table III-3 shows the depth from which the samples were composited.

Two volatile organic compounds were detected in the subsurface soil samples (Table IV-4). Methylene chloride was detected at low concentrations (3 to 5 $\mu g/l$) in samples GW-1-S1, GW-2-S1, GW-3-S1. These results have been rejected because methylene chloride was also detected in the trip blank. Acetone was detected only in sample GW-1-S1.

Bis(2-ethylhexyl)phthalate was detected in all of the subsurface soil samples with the highest concentrations in samples GW-3-S1 (3,900 $\mu g/kg$) and GW-5-S1 (3,400 $\mu g/kg$) which are located near the western perimeter of the landfill. Bis(2-ethyhexyl)phthalate is a plasticizer commonly found in PVC resins and vinyl chloride copolymers. The presence of this compound in the subsurface soil samples may be due to the presence of plastic materials in the fill, such as vinyl upholstry, table clothes, shower curtains, raincoats, baby toys, and food wrap and many other products including adhesives, resins, polymeric coatings, components of paper and paperboard, vinyl surgical gloves, medical tubing and flexible bags. Bis(2-ethylhexyl)phthalate also is a common laboratory compound and it's presence in all five subsurface soil samples may indicate a laboratory artifact rather than groundwatercontamination, however, it was also detected in surface water sample SW-4 and sediment sample SED-5.

Twenty TAL metals were detected in the subsurface soil samples (Table IV-5). The concentration of lead in sample GW-3-S1 exceeded the published naturally-occurring range for New York State soils. The concentration of lead in sample GW-1-S1 was also elevated in relation to the other samples but was within the naturally-occurring range. The concentrations of metals in all other samples were within the published naturally-occurring ranges for New York State soils.

Surface Soil Contamination Assessment

Two surface soil samples were collected and analyzed for TCL organic compounds, TAL metals and cyanide. Sample SS-1 was collected from an area of dark colored soil on top of the fill area which may represent a mix of fill, ash and cover material. It is not, however, considered a waste sample. Sample SS-2 was collected from an area of stained soil near the base of the fill along the southwestern side of the landfill.

The only organic compounds detected in the surface soil samples were found in SS-1 (Table IV-4). These compounds are polynuclear aromatic hydrocarbons (PAHs) which occur naturally and artificially as a result of the incomplete combustion of organic compounds. Forest fires are a natural cause for the presence of PAHs; industrial activity such as a coal burning power plant is an artificial source. The presence of moderate concentrations of PAHs in the surface soil samples indicates that the fill materials may be from a source in which the waste was burned prior to disposal such as the incinerator ash residue known to have been disposed on-site. The presence of PAHs in surface soils pose a direct contact threat since several PAHs are carcinogenic through dermal exposure.

Sixteen TAL metals were detected in the surface soil samples (Table IV-5). The concentrations for all metals detected were within the published naturally-occurring ranges for New York State soils.

Groundwater Contamination Assessment

Groundwater samples were collected from the five monitoring wells surrounding the landfill area, and analyzed for TCL organic compounds, TAL metals and cyanide. Sample GW-5 is considered the background sample and samples GW-1, GW-2, GW-3, GW-4 are considered downgradient samples. Sample GW-5 may not be a true representation of the upgradient groundwater quality since radial flow off the fill area may be occurring, and the water table in the site vicinity is fairly flat. GW-4's close proximity to the fill and radial surface runoff make it susceptible to contaminant infiltration. GW-4 is considered to be a downgradient sample for the purpose of contamination assessment.

Three organic compounds, benzene, acetone and methylene chloride were detected in the groundwater samples (Table IV-6). Methylene chloride was also detected in the trip blank and its presence is attributed to laboratory contamination. The concentrations of acetone (94 μg/l) in upgradient sample GW-5 and benzene (3 μg/l) in sample GW-4 exceed the NYS groundwater standards.

Nineteen TAL metals were detected in the groundwater samples (Table IV-6). The concentrations of thirteen metals in one or more downgradient samples were in excess of three times the upgradient concentrations (GW-5), constituting observed release. This included all of the metals shown on Table IV-6 with the exception of antimony, arsenic, barium, beryllium, potassium and silver. The concentrations of ten metals, aluminum, antimony, beryllium, chromium, copper, iron, lead, manganese, sodium and zinc, exceeded the NYS groundwater standards in one or more samples including GW-5. The presence of benzene and sodium in well GW-4 may indicate a source related to the New York State Thruway rather than the landfill.

Surface Water Contamination Assessment

Five surface water samples (SW-1 through SW-5) and a duplicate sample (SW-6, taken from SW-1) were collected from various locations around the perimeter of the landfill and analyzed for TCL organic compounds, TAL metals and cyanide. Sample SW-2 was collected from a marshy area on the south side of the landfill and is considered the upgradient sample. This sample may not be a true representation of the upgradient surface water quality since radial surface water flow off of the fill area may be occurring. Surface water downgradient from the site flows northward via storm sewers to Smoke Creek. Smoke Creek is classified by the NYSDEC as a Class D waterway (6NYCRR). Surface water sample results were therefore compared to Class D surface water standards.

One volatile organic compound, methylene chloride, was detected in the surface water samples (Table IV-7). Methylene chloride was also reported in the trip blank, therefore, the presence of methylene chloride in the samples is attributed to laboratory contamination.

One semivolatile organic compound, bis(2-ethylhexyl)phthalate was detected in surface water sample SW-4 (Table IV-7). Bis(2-ethylhexyl)phthalate was also detected in all the subsurface soil samples but not the groundwater samples. Its presence on-site is not considered to present a significant threat.

Twenty-one TAL metals and cyanide were detected in the surface water samples (Table IV-7). The concentrations of sixteen metals and cyanide were in excess of three times the concentrations in SW-2, constituting observed releases. The NYS Class D surface water standard for iron was exceeded in all of the samples. NYS Class D surface water standards for vanadium and cyanide were exceeded in samples SW-4 and SW-5 respectively. NYS Class D Guidance values were exceeded for mercury in sample SW-4. The highest concentrations for most analytes were in sample SW-4, the sample located farthest downstream from the site. The concentrations of metals in SW-1 and the duplicate SW-6 were very similar, indicating the sampling methods yielded representative samples.

In summary, the surface water data indicates that the site is adversely impacting surface water quality. Contaminant releases from the site include sixteen metals and cyanide. Class D surface water standards for iron were exceeded in one or more samples. The surface water results are consistent with the groundwater results since both indicate releases of metals. Previous surface water sampling also indicated the presence of heavy metals (NYSDEC, 1982).

The extraction holding times for the semivolatile and pesticide/PCB analyses were exceeded by one day in all surface water samples. The data are still considered valid, but the results could be biased low. Since the main contaminants of concern are metals and PAHs, the surface water analyses results are still considered useable because PAHs are relatively immobile.

Sediment Contamination Assessment

Five sediment samples were collected from the same locations as the surface water samples and analyzed for TCL organic compounds, TAL metals and cyanide.

Two volatile organic compounds, methylene chloride and acetone, were detected in the sediment samples (Table IV-8). Methylene chloride was also detected in the trip blank and therefore its presence is attributed to laboratory contamination. Acetone was detected at moderately low concentrations in all sediment samples except SED-5 and the reanalysis sample SED-5-RE, which had relatively higher concentrations (240 μg/kg and 110 μg/kg, respectively). The presence of acetone is not a significant contamination problem, but its presence is fairly certain. It was also detected in the matrix spike and matrix spike duplicate samples (internal laboratory control samples) taken from the SED-3 location (at concentrations of 23 μg/kg and 57 μg/kg, respectively). Acetone was also detected in one or more subsurface soil and groundwater samples.

Eleven semivolatile organic compounds, primarily PAHs, were detected in the sediment samples (Table IV-8). The most highly contaminated sample is SED-5, located to the east of the landfill on the southern perimeter of the pond. Nine PAHs and bis(2-ethylhexyl)phthalate were detected in sample SED-5. Two PAHs were also detected in samples SED-1 and SED-2, and benzoic acid was detected in sample SED-3 (2,700 μg/kg). One pesticide compound, beta-BHC, was detected in sediment sample SED-1 (Table IV-8). No other pesticide compounds were detected in the sediment, surface water, groundwater or subsurface soil samples. The PAHs present in SED-5 are considered to pose a direct contact threat due to easy access to the site.

Twenty TAL metals and cyanide were detected in the sediment samples (Table IV-9). The concentrations of cadmium and lead barely exceeded the published naturally-occurring ranges in sample SED-5. The highest concentrations of most other analytes were also in sample SED-5. Cyanide was detected in samples SED-4 and SED-5.

In summary, the most significant sediment results were the low to moderate levels of acetone in all the samples, and nine PAHs in SED-5. The most contaminated surface water sample was SW-4, whereas the most contaminated sediment sample was SED-5. The sediment sample results are consistent with the previous sediment results which indicated elevated levels of lead and zinc (NYSDEC, 1982).

Contamination Assessment Summary

The results of groundwater and surface water analyses indicate releases of TAL metals and cyanide which are attributable to the site. The data suggest that contaminants are migrating radially outward from the landfill, with the strongest component being to the north. Contaminants of concern are acetone, benzene, metals and cyanide in the groundwater and surface water, and PAHs in the surface soils and sediments.

Although releases of contaminants attributable to the site have been documented, the potential impacts on groundwater and surface water users are not likely to be significant since there are no identified receptors. The most immediate threat to public health and the environment is the presence of PAHs in the surface soils and sediments. Since access to the site is largely unrestricted, and the presence of nearby homes suggests the likelihood for unauthorized persons occasionally being present on-site. It is considered necessary to undertake some type of action to limit the potential direct contact threat posed by PAH-contaminated sediments on-site. Placing clean fill over the contaminated sediments is a relatively simple means of reducing the direct contact threat. Further investigation into the extent of PAH-contaminated soils and sediments may also be necessary.

Because there is no conclusive documentation of hazardous waste disposal on-site, listing the site on the inactive hazardous waste site registry may not be warranted. However, given the demonstrated contamination in the soils, sediments, surface water and groundwater, proper closure of the site in accordance with the Part 360 requirements is necessary at a minimum.

The results of the EM and magnetic surveys indicated the presence of anomalies which could be associated with buried metal objects. The possibility that detected anomalies are buried drums could not be confirmed with the analytical data from the wells installed around the perimeter of the landfill. Although no significant contamination was detected in the groundwater wells nearest the anomalies, it may be prudent to perform several exploratory test pits in the anomalous areas to confirm the absence or presence of drums.

TABLE IV-1

STRATIGRAPHY SUMMARY
PHASE II WELL BORINGS
LACKAWANNA CITY LANDFILL

(Depth in feet below ground surface)

Stratigraphic Unit	GW-1	GW-2	GW-3	GW-4	GW-5
Fill	0-5.0	0	0-5.0	0-2.0	0
Lacustrine Clay/Silt	5.0-12.5	0-11.0	5.0-12.5	2.0-12.0	0-11.0
Moraine/ Outwash	12.5-14.0	11.0-14.0	12.5-16.0	DNP*	11.0-14.0

*DNP - Did not penetrate.

TABLE IV-2
WATER LEVEL DATA
LACKAWANNA CITY LANDFILL SITE

				Date : 5/15-16/90		Date : 5/24/90	
Well ID	Ground Surface Elevation (Feet*)	Top of PVC Well Pipe Elevation (Feet*)	Well Screen Interval Elevation (Feet*)	Depth to Water Level (Feet**)	Water Level Elevation (Feet*)	Depth to Water Level (Feet**)	Water Level Elevation (Feet*)
GW-1	611.09	614.09	607.09-597.09	7.95	606.14	6.58	607.51
GW-2	608.63	611.63	604.63-594.63	3.80	607.83	3.84	607.79
GW-3	611.29	613.29	600.29-595.29	8.65	604.64	8.65	604.64
GW-4	612.13	614.13	605.13-600.13	3.50	610.63	4.17	609.96
GW-5	609.54	611.54	605.54-595.54	3.37	608.17	3.45	608.09

*Feet above Mean Sea Level.

**Water level depth from top of PVC well pipe in feet.

KLB/SY053.10.00/0007

TABLE IV-3

DATA QUALIFIER KEY

FOOTNOTES:

(1) USGS, 1984. Professional Paper 1270: Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States.

(2) Booz, Allen & Hamilton, Inc. (1983): Range in U.S. Soils.

(3) New York State quality standard for class GA (source of potable water supply) groundwaters are the most stringent of applicable standards, criteria, or guidelines listed below:

a - NYSDEC Groundwater Quality Regulations, 6 NYCRR, Part 703, dated September, 1990.
b - NYSDOH Maximum Contaminant Levels, Public Water Supplies, 10 NYCRR, Subpart 5-1, dated January 1989.
c - NYSDOH Standards, Sources of Water Supply, 10 NYCRR, Part 170.
d - USEPA Maximum Contaminant Levels, 40 CFR 141.
e - NYS Ambient Water Quality Guidance Values, TOGS 1.1.1 dated September, 1990.
f - USEPA Health-based Criteria for Systemic Toxicants, dated May 1989.
* - If iron and manganese are present, total concentration of both should not exceed 500 ug/l.

(4) NYSDEC Surface Water Quality Standards, 6 NYCRR, part 701 and 702.

NS: No standard or guidance value established.

ND: The standard for this compound is below detection limit.

DATA QUALIFIERS (ORGANIC COMPOUNDS):

B: This flag is used when the analyte is found in the blank as well as the sample. It indicates possible or probable blank contamination and warns the data user to take appropriate action.

J: Indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero.

--: Indicates compound was analyzed for but not detected. Refer to Appendix D for detection limit.

X or T: Mass spectrum does not meet CLP criteria for confirmation, but compound presence is strongly suspected.

E: This flag is used to indicate that the quantitation of the analyte is outside the curve and that dilution was required to properly quantitate.

D: Flag is used to indicate the value for the target analyte was calculated from a dilution (see E flag above).

Y: Flag used when a matrix spike compound is also confirmed present in the unspiked sample.

R: Data Validation recommends that this value be rejected due to blank contamination.

@: This value, due to speadsheet characteristics, appears as boxed. The value DOES NOT exceed quoted standards.

NS: No standard or guidance value established.

F: Surrogate recovery values were outside the CLP criteria windows. Value is considered an estimated concentration.

NA: Not analyzed.

Values bolded and/or boxed exceed quoted standards.

DATA QUALIFIERS (METALS):

B: Reported value is less than the Contract Required Detection Limit (CRDL) but greater than the Instrument Detection Limit (IDL).

U or -: Reported value is less than IDL.

N: Spiked sample recovery not within control limits.

*: Duplicate analysis (Relative Percent Difference) not within control limits.

W: Post digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

S: The reported value was determined by the Method of Standard Additions (MSA).

+: Correlation coefficient for the MSA is less than 0.995.

E: Reported value is estimated because of the presence of interference.

M: Duplicate injection precision not met.

@: This value, due to speadsheet characteristics, appears as boxed. The value DOES NOT exceed quoted standards.

NS: No standard or guidance value established.

NA: Not analyzed.

Values bolded and/or boxed exceed quoted standards.

TABLE IV-4
LACKWANNA CITY LANDFILL
SUBSURFACE AND SURFACE SOIL SAMPLE RESULTS
TCL ORGANIC COMPOUNDS (UG/KG)

COMPOUND	SUBSURFACE SOILS GW-1-S1	GW-2-S1	GW-3-S1	GW-4-S1	GW-5-S1	SURFACE SOILS SS-1	SS-2
METHYLENE CHLORIDE	4 JR	3 JR	5 J	-	-	-	-
ACETONE	19	-	-	-	-	-	-
BENZOIC ACID	-	-	-	-	-	-	-
PHENANTHRENE	-	-	-	-	-	-	-
FLUORANTHENE	-	-	-	-	-	670 J	-
PYRENE	-	-	-	-	-	990	-
BENZO(A)ANTHRACENE	-	-	-	-	-	860 J	-
CHRYSENE	-	-	-	-	-	1,500	-
BIS(2-ETHYLHEXYL)PHTHALATE	300 J	200 J	3,900	260 J	3,400	-	-
BENZO(B)FLUORANTHENE	-	-	-	-	-	1,200	-
BENZO(K)FLUORANTHENE	-	-	-	-	-	790 J	-
BENZO(A)PYRENE	-	-	-	-	-	1,200	-
INDENO(1,2,3-CD)PYRENE	-	-	-	-	-	690 J	-
BENZO(G,H,I)PERYLENE	-	-	-	-	-	850 J	-

TABLE IV-5
LACKAWANNA CITY LANDFILL
SUBSURFACE AND SURFACE SOIL SAMPLE RESULTS
TAL METALS (MG/KG)

ANALYTE	(1) AVG. RANGE IN NYS SOILS (mg/kg)	SUBSURFACE SOILS					SURFACE SOILS	
		GW-1-S1	GW-2-S1	GW-3-S1	GW-4-S1	GW-5-S1	SS-1	SS-2
ALUMINUM	700 - >100,000	16,200	13,700	10,400	14,600	11,900	6,940	13,400
ARSENIC	0.1 - 100	8.2 SN	5.8 N	10.4 N	13.0 SN	11.7 SN	2.7	34.5
BARIUM	10 - 500	155	65.8	138	81.1	74.0	24.4 B	86.5
BERYLLIUM	<1 - 15	-	1.2 B	0.92 B	1.1 B	1.2 B	-	-
CADMIUM	0.01 - 7 (2)	2.6	-	-	-	-	-	-
CALCIUM	130 - 330,000	13,600 E*	38,600 E*	48,700 E*	19,100 E*	49,200 E*	2,060 *	2,010 *
CHROMIUM (total)	1 - 2,000	58.5	18.9	20.1	21.2	16.6	13.0	235
COBALT	<3 - 70	6.9 B	10.4 B	7.7 B	11.8 B	9.7 B	1.3 B	14.1 B
COPPER	1 - 700	145	22.9	50.8	28.5	22.9	9.5 N*	22.7 N*
IRON	100 - >100,000	73,500 E	24,600 E	27,800 E	27,600 E	23,300 E	14,400 *	29,300 *
LEAD	<10 - 700	257	12.7	$\boxed{1,220}$	25.2	13.2	18.5 *	18.1 *
MAGNESIUM	50 - 50,000	2,570 *	10,000 *	6,900 *	8,650 *	15,800 *	574 B	5,000
MANGANESE	<2 - 7,000	502 EN*	325 EN *	366 EN*	420 EN*	371 EN*	182 N	469 N
MERCURY	0.02 - 0.5	0.12	-	-	-	-	-	-
NICKEL	<5 - 7000	54.9	31.3	27.1	28.4	27.5	7.9	34.3
POTASSIUM	2,200 - 65,000	1,060 B	2,170	1,680	2,130	1,960	167 B	1,860
SILVER		2.8	-	1.1 B	0.65 B	-	-	-
SODIUM	<500 - 100,000	863 B	191 B	256 B	698 B	280 B	119 B	223 B
THALLIUM		-	-	-	-	-	-	-
VANADIUM	20 - 500	14.1	24.0	18.4	26.9	21.8	11.0	24.8
ZINC	<5 - 3,500	1,220 E	73.9 E	274 E	74.5 E	61.7 E	20.6 EN	82.8 EN

TABLE IV-6
LACKAWANNA CITY LANDFILL
GROUNDWATER SAMPLE RESULTS
TCL ORGANIC COMPOUNDS (UG/L) / TAL METALS (UG/L)

ANALYTE	(3) NYS STANDARDS (UG/L)	GW-1	GW-2	GW-3	GW-4	GW-5
METHYLENE CHLORIDE	5 a	3 JR	3 JR	-	3 JR	3 JR
ACETONE	50 b	-	-	-	10	94
BENZENE	ND a	-	-	-	3 J	-
ALUMINUM		28,300	50,900	26,000	5,410	8,120
ANTIMONY	3 e	29.5 B	26.1 B	-	-	24.6 B
ARSENIC	25 a	5.4 B	9.98 B	11.9	-	-
BARIUM	1,000 a	488	432	290	145 B	317
BERYLLIUM	3 e	-	3.2 B	-	-	-
CALCIUM		139,000	577,000	427,000	243,000	127,000
CHROMIUM (total)	50 a	69.6	89.1	52.4	7.7 B	13.4
COBALT		16.3 B	46.7 B	23.3 B	-	5.5 B
COPPER	200 a	250	96.2	100	10.3 B	10.2 B
IRON	300 a*	59,700	96,800	57,400	10,400	13,400
LEAD	25 a	348	53.3	46.0	11.1	8.0
MAGNESIUM	35,000 e	43,800	163,000	98,200	69,700	51,700
MANGANESE	300 a*	2,330	1,730	1,470	487	281
NICKEL	700 f	78.3	148	77.1	11.0 B	15.2 B
POTASSIUM		7,090	6,870	9,220	1,850 B	3,900 B
SILVER	50 a	10.4	7.6 B	7.4 B	-	-
SODIUM	20,000 a	209,000	33,900	47,400	890,000	27,800
VANADIUM		38.0 B	90.8	71.6	13.0 B	19.5 B
ZINC	300 a	1,420	357	333	51.2	39.2

TABLE IV-7
LACKAWANNA CITY LANDFILL
SURFACE WATER SAMPLE RESULTS
TCL ORGANIC COMPOUNDS (UG/L) / TAL METALS (UG/L)

COMPOUND	(3) NYS STANDARDS CLASS D (UG/L)	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6
METHYLENE CHLORIDE		-	-	5 R	-	6 R	6 R
BIS(2 ETHYLHEXYL)PHTHALATE		-	-	-	22	-	-
ALUMINUM		227	170 B	252	68,200	1,550	216
ANTIMONY		-	-	-	146	-	-
ARSENIC	360 a*	-	-	-	19.0	-	-
BARIUM		60.8 B	58.4 B	51.0 B	8,180	375	71.1 B
BERYLLIUM		-	-	-	3.4 B	-	-
CADMIUM		-	-	-	6.6	-	-
CALCIUM		68,000	89,000	86,900	338,000	93,400	71,500
CHROMIUM (total)		-	-	-	123	13.0	-
COBALT	110 e	-	-	-	71.2	-	-
COPPER		4.6 B	9.3 B	-	337	20.8 B	-
IRON	300 a	1,090	3,580	1,010	1,380,000	9,510	1,240
LEAD		5.0	13.3 *	5.8	760	64.0	NR
MAGNESIUM		17,100	20,600	19,200	60,300	13,900	17,700
MANGANESE		250	495	178	41,700	1,370	263
MERCURY	0.2 e	-	-	-	0.57	-	-
NICKEL		-	-	-	192	-	-
POTASSIUM		4,030 B	4,370 B	4,400 B	13,000	10,600	4,090 B
SILVER		5.5 B	-	-	46.2	5.4 B	-
SODIUM		209,000	244,000	239,000	208,000	1,210,000	220,000
VANADIUM	190 a	4.9 B	5.6 B	4.4 B	214	6.7 B	-
ZINC		20.5	27.2	16.1 B	3,180	107	19.3 B
CYANIDE	22 a**	-	-	-	15.4	58.2	-

NOTES:

Sample SW-6 is a duplicate of SW-1.

Semivolatile and pesticide/PCB analyses for all samples missed holding time by one day.

NR = Not run due to analytical problems.

* - Dissolved Arsenic.

** - Free Cyanide - the sum of HCN and CN- expressed as CN.

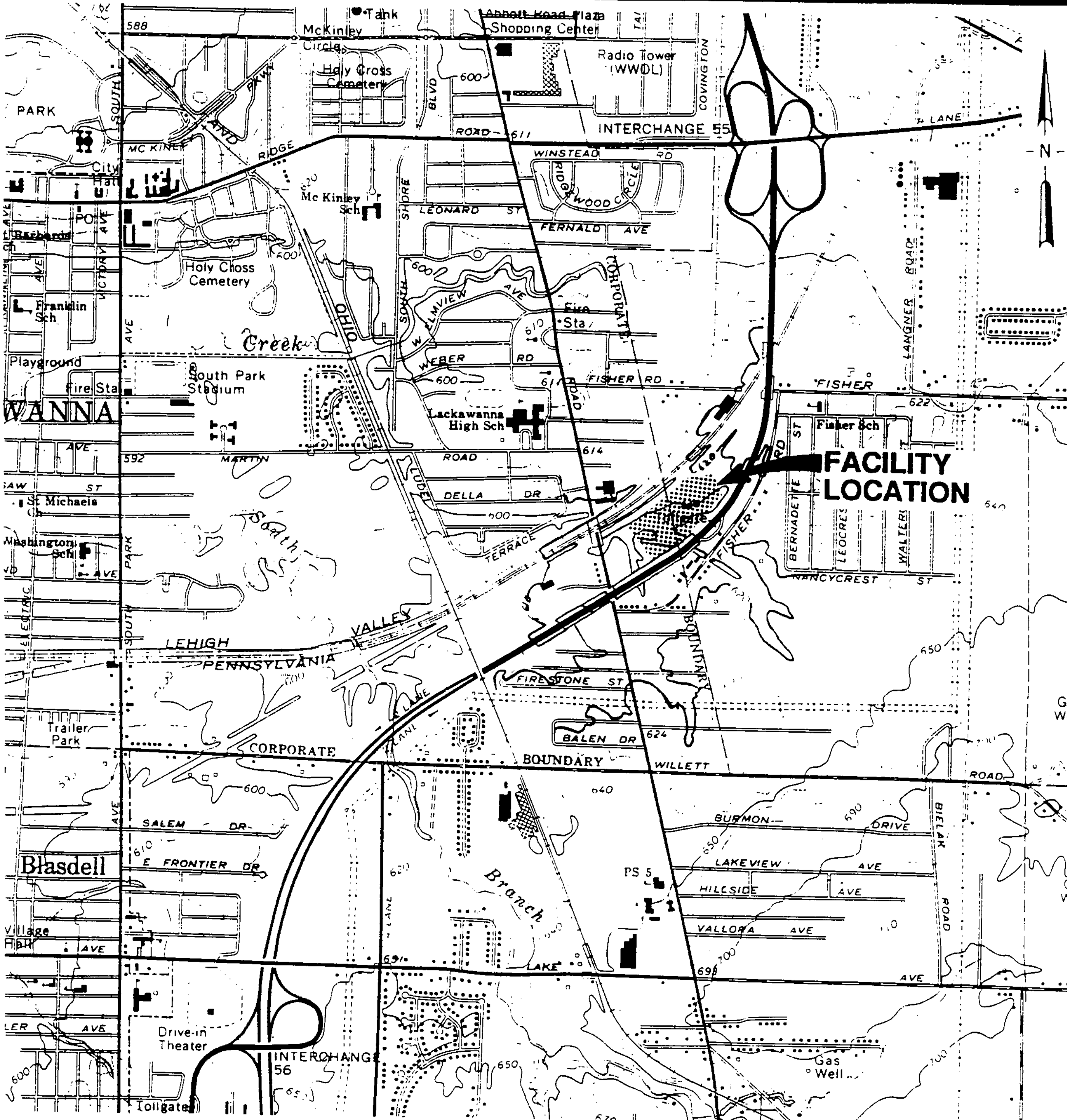
TABLE IV-8
LACKWANNA CITY LANDFILL
SEDIMENT SAMPLE RSULTS
TCL ORGANIC COMPOUNDS (UG/KG)

COMPOUND / ANALYTE	SED-1	SED-2	SED-2-RE	SED-3	SED-4	SED-5	SED-5-RE
METHYLENE CHLORIDE	-	-	7 JR	-	-	-	-
ACETONE	19 X	17 J	37	24	29	240	110
BENZOIC ACID	-	-	NA	2,700 J	-	-	NA
PHENANTHRENE	-	-	NA	-	-	4,200	NA
FLUORANTHENE	580 J	500 J	NA	-	-	9,500	NA
PYRENE	500 J	440 J	NA	-	-	8,400	NA
BENZO(A)ANTHRACENE	-	-	NA	-	-	3,200	NA
CHRYSENE	-	-	NA	-	-	5,200	NA
BIS(2-ETHYLHEXYL)PHTHALATE	-	-	NA	-	-	5,100	NA
BENZO(B)FLUORANTHENE	-	-	NA	-	-	4,600 X	NA
BENZO(K)FLUORANTHENE	-	-	NA	-	-	4,000	NA
BENZO(A)PYRENE	-	-	NA	-	-	4,100	NA
INDENO(1,2,3-CD)PYRENE	-	-	NA	-	-	-	NA
BENZO(G,H,I)PERYLENE	-	-	NA	-	-	2,600 JX	NA
BETA-BHC	120	-	NA	-	-	-	NA

NA = Not analyzed
RE = Reanalysis

TABLE IV-9
LACKAWANNA CITY LANDFILL
SEDIMENT SAMPLE RESULTS
TAL METALS (MG/KG)

ANALYTE	(1) AVG. RANGE IN NYS SOILS (mg/kg)	SED-1	SED-2	SED-3	SED-4	SED-5
ALUMINUM	700 - >100,000	4,740	14,600	7,690	17,700	15,600
ARSENIC	0.1 - 100	4.3	8.0 S	4.2	11.2 S	13.2
BARIUM	10 - 500	63.1	112	72.6	95.9	361
CADMIUM	0.01 - 7 (2)	1.5	5.1	-	-	9.8
CALCIUM	130 - 330,000	105,000 *	7,650 *	8,290 *	18,500 *	24,100 8
CHROMIUM (total)	1 - 2,000	49.6	20.7	15.1	27.4	54.2
COBALT	<3 - 70	7.5 B	7.1 B	7.3 B	14.6 B	12.4 B
COPPER	1 - 700	76.2 N*	125 N*	39.1 N*	30.9 N*	116 N*
IRON	100 - >100,000	53,300 *	38,400 *	59,700 *	33,100 *	28,800 *
LEAD	<10 - 700	271 *	281 B*	52.7 *	62.4 *	809 *
MAGNESIUM	50 - 50,000	3,670	2,450	2,380	7,360	5,750
MANGANESE	<2 - 7,000	788 N	373 N	502 N	421 N	1,340 N
MERCURY	0.02 - 0.5	0.25	-	-	-	-
NICKEL	<5 - 7000	18.1	23.3	17.3	39.0	39.0
POTASSIUM	2,200 - 65,000	393 B	1,070 B	442 B	1,600	1,310 B
SILVER		-	-	-	-	-
SODIUM	<500 - 100,000	465 B	1,720 B	461 B	490 B	11,000
THALLIUM		-	-	-	-	-
VANADIUM	20 - 500	25.3	15.6 B	15.2 B	28.4	33.5 B
ZINC	<5 - 3,500	220 EN	774 EN	150 EN	151 EN	708 EN
CYANIDE		-	-	0.86 N	-	1.8 N



LOCATION
LONGITUDE 78°47'45"
LATITUDE 42°48'48"

SOURCE: BUFFALO SE QUADRANGLE
NEW YORK-ERIE COUNTY 7.5 MINUTE
SERIES (TOPOGRAPHIC)

2000 0 2000 FT.
2000 '

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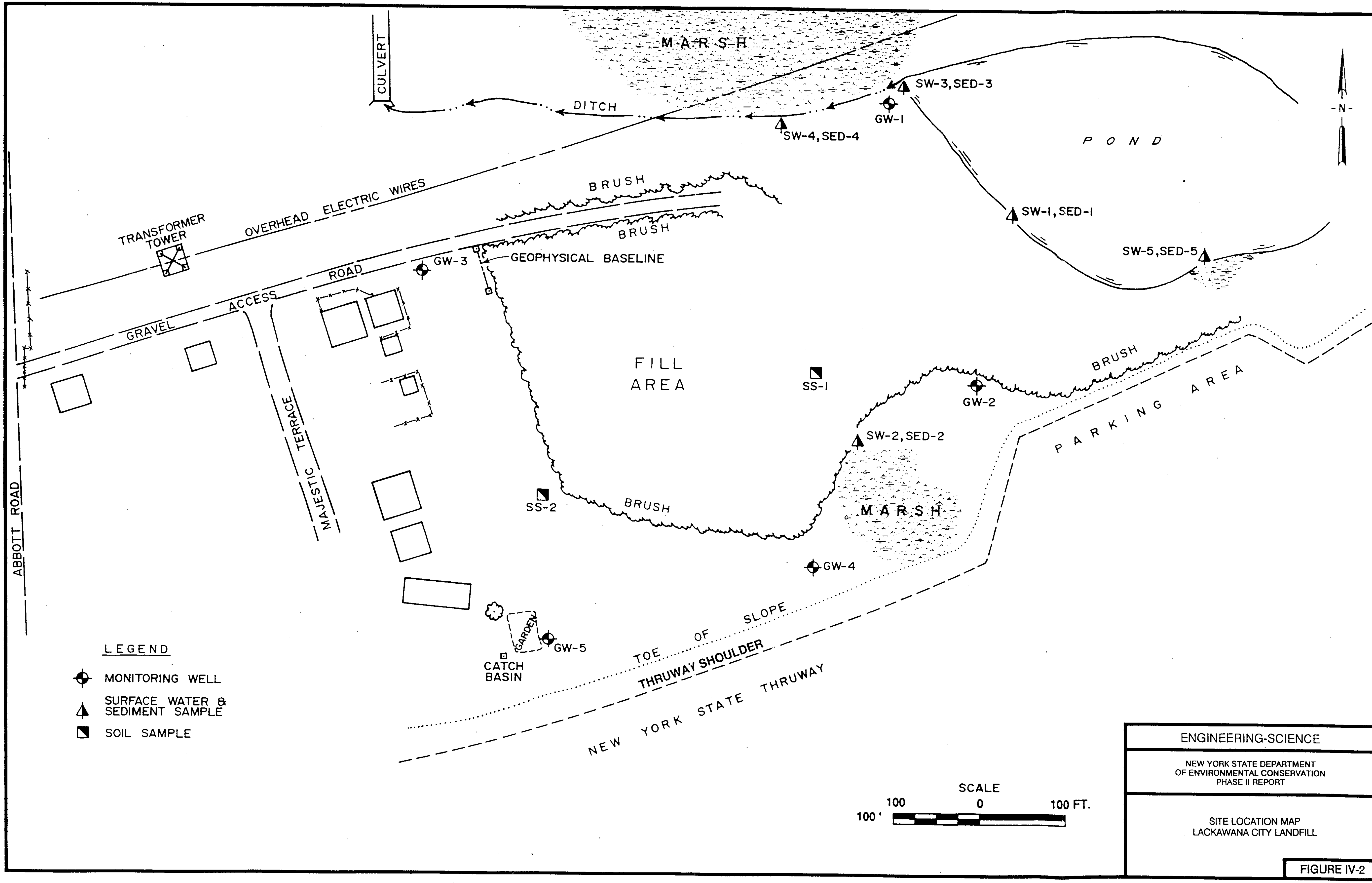
PHASE II REPORT

SITE LOCATION MAP
LACKAWANNA CITY LANDFILL

FIGURE IV-1


MARSH
CULVERT
DITCH
SW-3, SED-3
GW-1
SW-4, SED-4
POND
SW-1, SED-1
SW-5, SED-5
TRANSFORMER TOWER
OVERHEAD ELECTRIC WIRES
BRUSH
BRUSH
GEOPHYSICAL BASELINE
GW-3
GRAVEL ACCESS ROAD
FILL AREA
SS-1
BRUSH
GW-2
PARKING AREA
SW-2, SED-2
MAJESTIC TERRACE
ABBOTT ROAD
SS-2
BRUSH
MARSH
GW-4
GARDEN
GW-5
CATCH BASIN
TOE OF SLOPE
THRUWAY SHOULDER
NEW YORK STATE THRUWAY
LEGEND
MONITORING WELL
SURFACE WATER & SEDIMENT SAMPLE
SOIL SAMPLE
SCALE
100
0
100 FT.
100'
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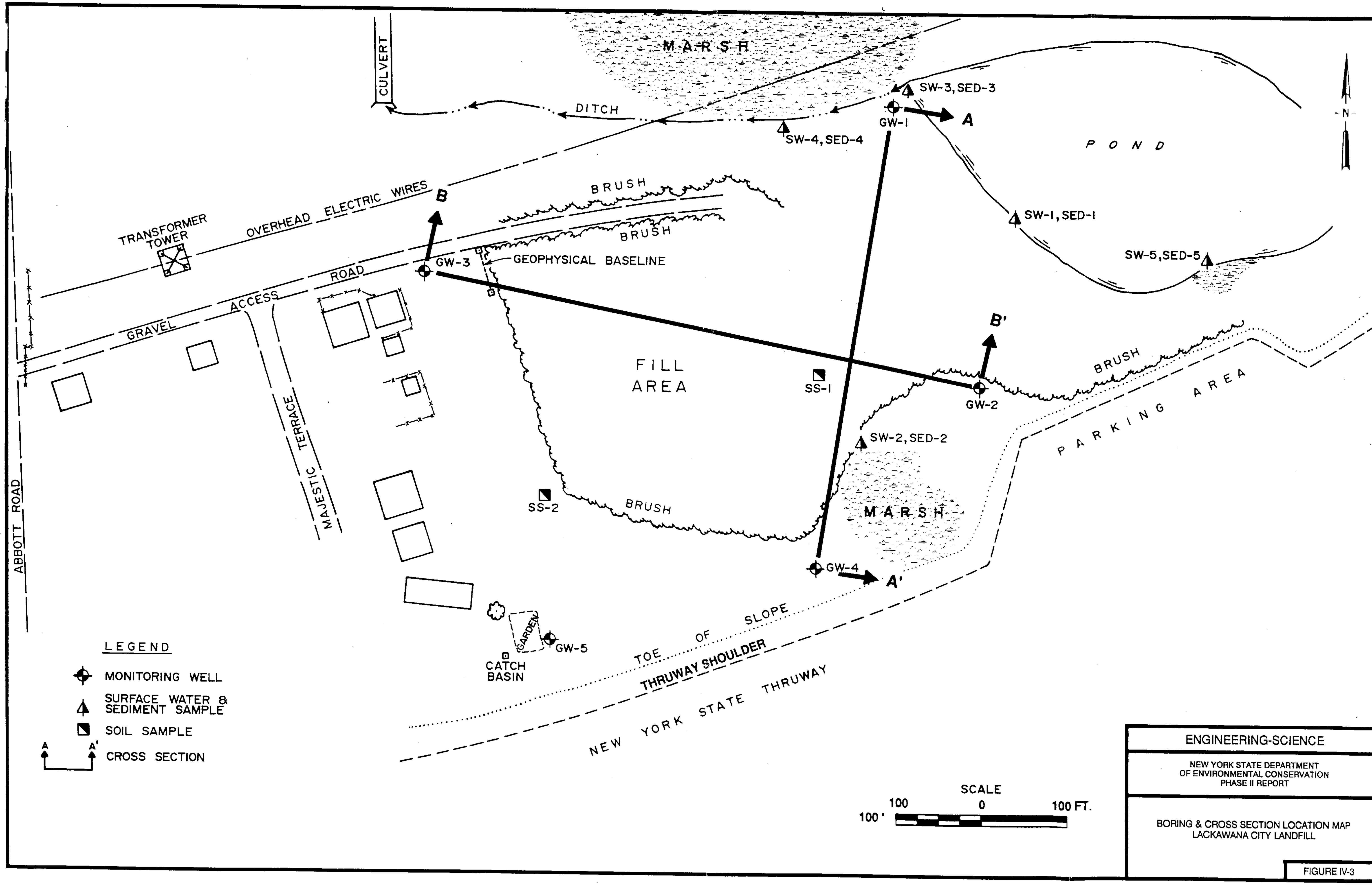
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PHASE II REPORT
SITE LOCATION MAP LACKAWANA CITY LANDFILL
FIGURE IV-2


MARSH
CULVERT
DITCH
SW-3, SED-3
GW-1
A
SW-4, SED-4
POND
N
B
OVERHEAD ELECTRIC WIRES
TRANSFORMER TOWER
BRUSH
BRUSH
SW-1, SED-1
SW-5, SED-5
GW-3
GEOPHYSICAL BASELINE
GRAVEL ACCESS ROAD
B'
FILL AREA
SS-1
GW-2
BRUSH
PARKING AREA
MAJESTIC TERRACE
ABBOTT ROAD
SW-2, SED-2
SS-2
BRUSH
MARSH
GW-4
A'
GARDEN
GW-5
CATCH BASIN
TOE OF SLOPE
THRUWAY SHOULDER
NEW YORK STATE THRUWAY
LEGEND
MONITORING WELL
SURFACE WATER & SEDIMENT SAMPLE
SOIL SAMPLE
A A'
CROSS SECTION
SCALE
100 0 100 FT.
100 '
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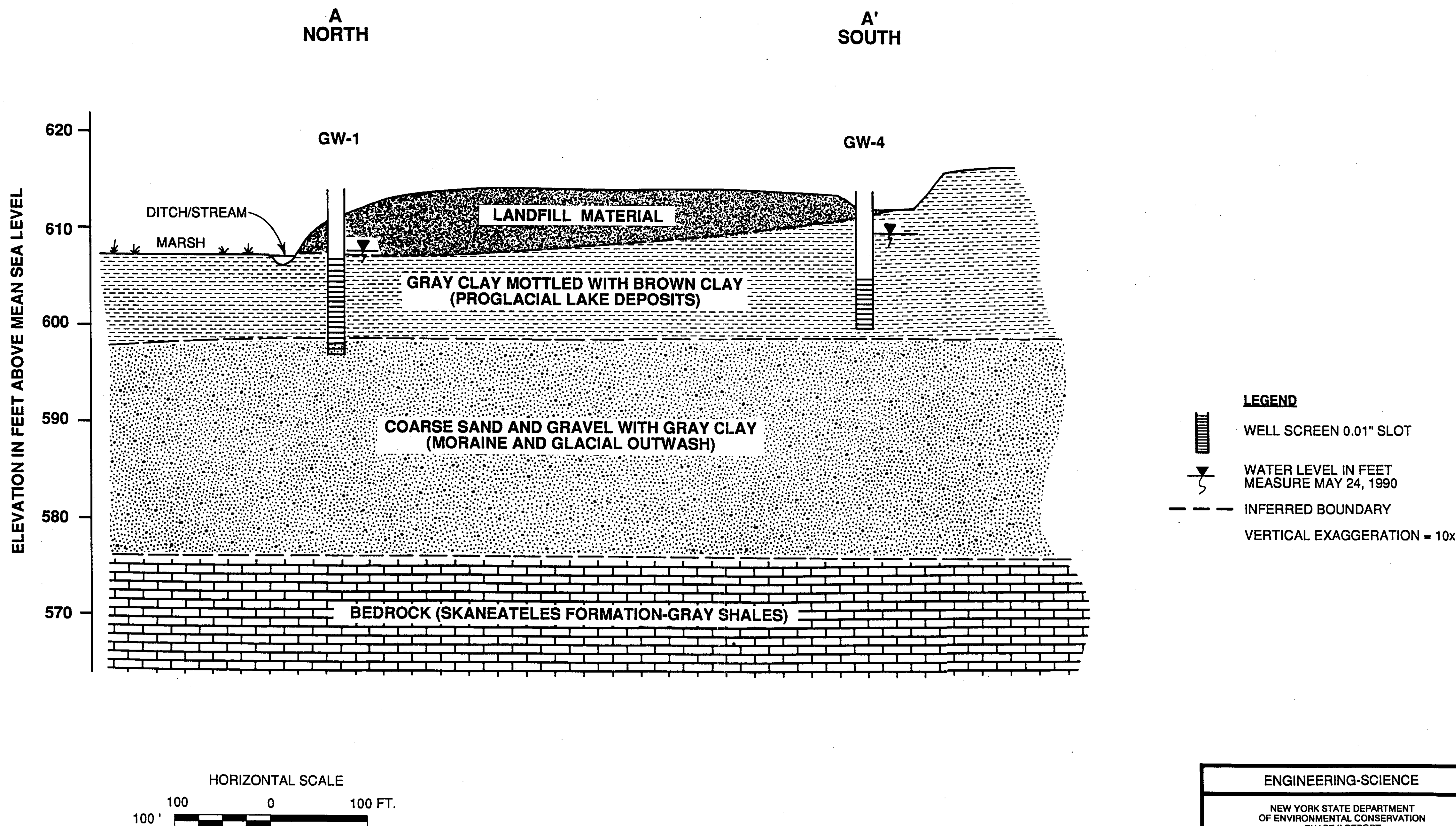
BORING & CROSS SECTION LOCATION MAP LACKAWANA CITY LANDFILL
FIGURE IV-3



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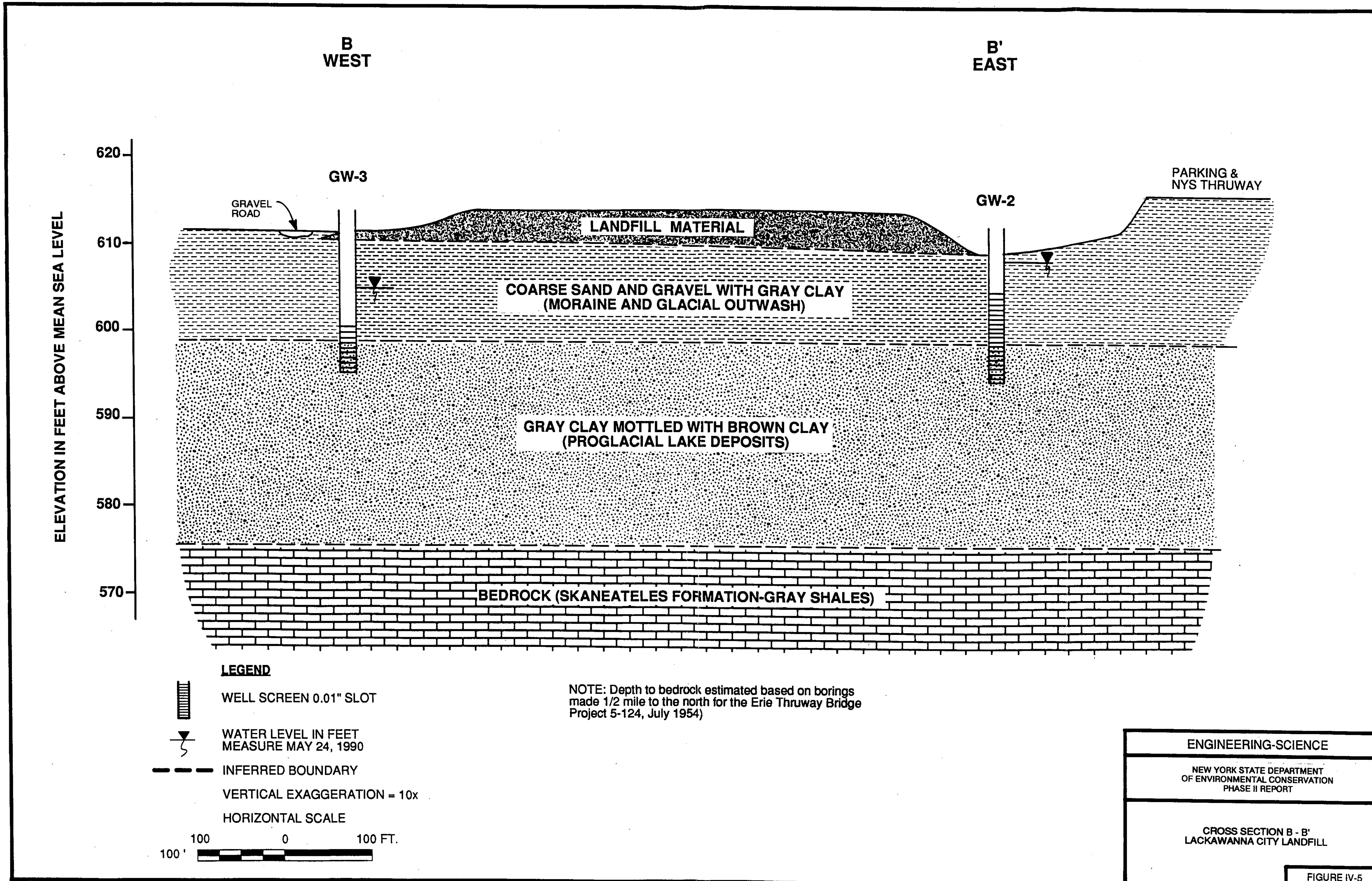
PHASE II REPORT

CROSS SECTION A - A'
LACKAWANNA CITY LANDFILL

FIGURE IV-4



B
WEST
B'
EAST
ELEVATION IN FEET ABOVE MEAN SEA LEVEL
620
610
600
590
580
570
GW-3
GW-2
GRAVEL ROAD
PARKING &
NYS THRUWAY
LANDFILL MATERIAL
COARSE SAND AND GRAVEL WITH GRAY CLAY
(MORAINE AND GLACIAL OUTWASH)
GRAY CLAY MOTTLED WITH BROWN CLAY
(PROGLACIAL LAKE DEPOSITS)
BEDROCK (SKANEATELES FORMATION-GRAY SHALES)
LEGEND
WELL SCREEN 0.01" SLOT
WATER LEVEL IN FEET
MEASURE MAY 24, 1990
INFERRED BOUNDARY
VERTICAL EXAGGERATION = 10x
HORIZONTAL SCALE
100
0
100 FT.
100 '
NOTE: Depth to bedrock estimated based on borings made 1/2 mile to the north for the Erie Thruway Bridge Project 5-124, July 1954)
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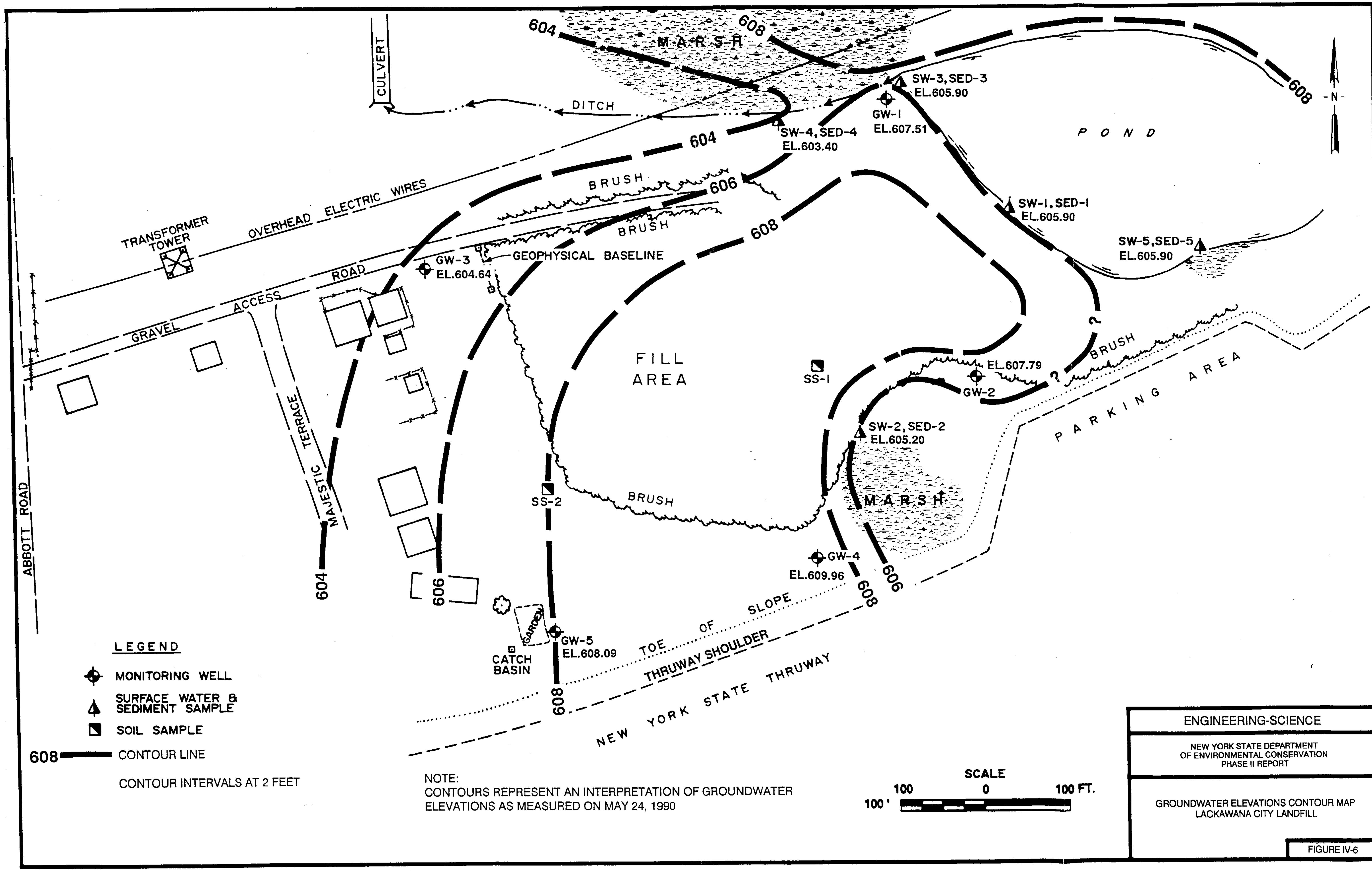
CROSS SECTION B - B'
LACKAWANNA CITY LANDFILL
FIGURE IV-5



GROUNDWATER ELEVATIONS CONTOUR MAP
LACKAWANA CITY LANDFILL

FIGURE IV-6

SECTION V

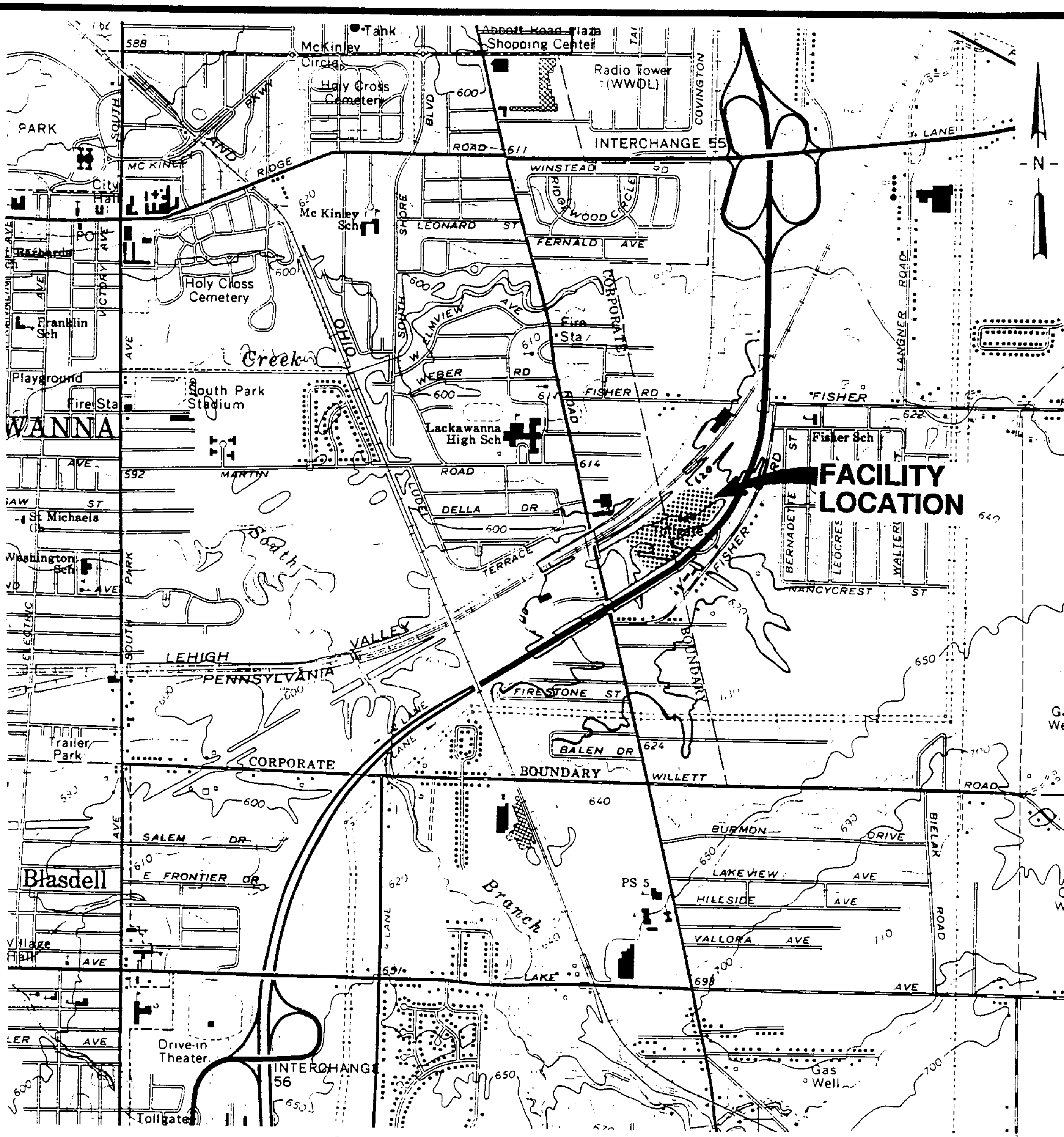
FINAL APPLICATION OF THE HAZARD RANKING SYSTEM

The Lackawanna City Landfill site is located approximately 3.5 miles southeast of Buffalo, New York on Abbott Road in the City of Lackawanna, Erie County, New York. The site is bordered by the Pennsylvania and Lehigh Valley Railway Lines on the north, the New York State Thruway on the south, a residential area on the west and a pond on the east. The site location is shown on the U.S.G.S. Buffalo, New York 7 1/2 minute quadrangle map (Figure V-1).

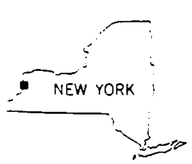
The Lackawanna City Landfill was operated by the City of Lackawanna from 1961 to 1981. The landfill was used for disposal of incinerator residue, and construction and demolition debris (Collareno, 1978; NYSDEC, 1982; NUS 1983; NYSDEC Permit 6/78). In 1981, approximately 1070 cubic yards of digested and dewatered sewage sludge was disposed in the landfill (Weisberger, 1980; Donovan, 1981).

The Phase II field investigation included an electromagnetic (EM) survey to identify the presence of buried steel drums or conductive contaminant plumes in the subsurface. A magnetic survey was conducted to help confirm and define the areal extent of the EM anomalies and to determine if large concentrations of ferromagnetic materials are present which could indicate the presence of buried drums. Five groundwater monitoring wells were also installed. Subsurface soil, surface soil, groundwater, surface water and sediment sampling and analysis and air monitoring were conducted to determine whether hazardous substances are present at the Lackawanna City Landfill.

Metals contamination in the groundwater and surface water indicate the site should be properly closed in accordance with applicable 6 NYCRR Part 360 requirements.



LOCATION
LONGITUDE 78°47'45"
LATITUDE 42°48'48"



QUADRANGLE LOCATION

SOURCE: BUFFALO SE QUADRANGLE
NEW YORK-ERIE COUNTY 7.5 MINUTE
SERIES (TOPOGRAPHIC)

2000 0 2000 FT.
2000 '

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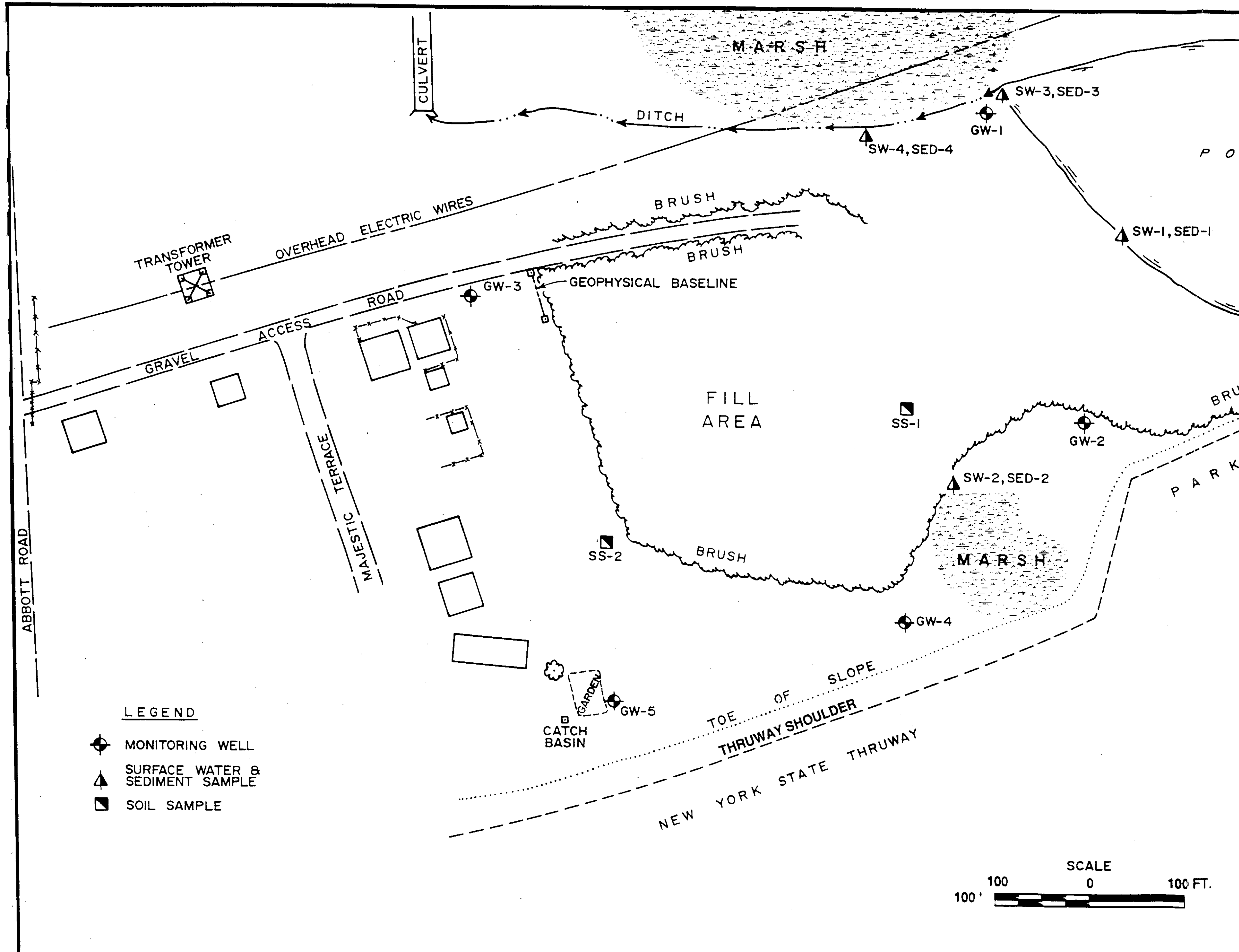
SITE LOCATION MAP
LACKAWANNA CITY LANDFILL

FIGURE V-1



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OF ENVIRONMENTAL CONSERVATION
PHASE II REPORT

SITE LOCATION MAP
LACKAWANA CITY LANDFILL

FIGURE V-2

Facility name: City of Lackawanna Landfill

Location: Abbott Road, City of Lackawanna, Erie County, N.Y.

EPA Region: Region II

Person(s) in charge of the facility: Officials of the City of Lackawanna

Name of Reviewer: Scott B. Dillman

Date: August 24, 1990

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 City of Lackawanna Landfill is a landfill which was operated between 1961 and 1981. Incinerator residue from the municipal incinerator was deposited at the landfill site. In 1981 1070 cubic yards of dewatered sewage sludge was disposed of in the landfill. Some construction and demolition debris was also disposed of in the site. The Lackawanna landfill site is located between the NYS Thruway, Pennsylvania and Lehigh Valley Railroad tracks and the Majestic Terrace neighborhood. Contamination was detected in groundwater, subsurface soil, surface soil, surface water and sediment samples

Scores: Sm = 6.67 (Sgw = 4.47 Ssw = 10.63 Sa = 0)

Sfe = 0

Sdc = 62.5

HRS COVER SHEET

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	1	3	
Physical State	0 1 2 3	1	3	3	
	Total Route Characteristics Score		12	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			2565	57,330	
7 Divide line 6 by 57,330 and multiply by 100		Sgw =	4.47		

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 score of 45, proceed to line 4 If observed release is given a score of 0, proceed to line 2					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1	3	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	3	3	
	Total Route Characteristics Score		14	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	2	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		8	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			6840	64,350	
7 Divide line 6 by 64,350 and multiply by 100		Ssw =	10.63		

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: May 14, 1990

Sampling Protocol: Photovac TIP II

If line 1 is 0, the Sa = 0. Enter on line 5
If line 1 is 45, then proceed to line 2

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
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	24	30	
Distance to Sensitive Environment	0 1 2 3	2	2	6	
Land Use	0 1 2 3	1	3	3	
	Total Targets Score		29	39	
4 Multiply 1 X 2 X 3			0	35,100	
5 Divide line 4 by 35,100 and multiply by 100		Sa =	0		

AIR ROUTE WORK SHEET

	S	S^2
Groundwater Route Score (Sgw)	4.47	19.98
Surface Water Route Score (Ssw)	10.63	113.00
Air Route Score (Sa)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		132.98
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		11.53
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}/1.73 = S_m =$		6.67

WORKSHEET FOR COMPUTING Sm

Fire and Explosion Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Containment	1 3	1	3	3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 3	1	0	3	
Ignitability	0 1 2 3	1	0	3	
Reactivity	0 1 2 3	1	0	3	
Incompatibility	0 1 2 3	1	0	3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	0	8	
	Total Route Characteristics Score		0	20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1	4	5	
Distance to Nearest Building	0 1 2 3	1	2	3	
Distance to Sensitive Environment	0 1 2 3	1	0	3	
Land Use	0 1 2 3	1	3	3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1	5	5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1	5	5	
	Total Targets Score		19	24	
4 If line 1 is 45, multiply 1 X 2 X 3			0	1,440	
5 Divide line 4 by 1,440 and multiply by 100		Sfe =	0		

FIRE AND EXPLOSION WORK SHEET

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	20	20	
Distance to a Critical Habitat	0 1 2 3	4	0	12	
	Total Targets Score		20	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			13500	21,600	
7 Divide line 6 by 21,600 and multiply by 100		Sdc =	62.5		

DIRECT CONTACT WORK SHEET

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: **The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry an should be bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.**

FACILITY NAME: Lackawanna City Landfill

LOCATION: Abbott Road, Lackawanna, N.Y. 14218

KLB/SY053.10.00/0006

GROUND WATER ROUTE

1. OBSERVED RELEASE

Contaminants detected (5 maximum): **Score:** 45

Chromium Aluminum

Manganese

Lead

Vanadium (ES, 1990a).

Rationale for attributing the contaminants to the facility:

Documented releases by comparison of upgradient (GW-5) and downgradient (GW-2, GW-3) groundwater samples from monitoring wells (ES, 1990a).

***

2. ROUTE CHARACTERISTICS

<u>**Depth to Aquifer of Concern**</u> **Score:** 3

Name/description of aquifer(s) of concern:

Water Table Aquifer (ES, 1990b) (ES, 1990c).

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

0.80 feet at monitoring well GW-2 on May 15, 1990 (ES, 1990d; ES, 1990e).

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

Depth of fill material undetermined by borings. Based on site topography, 7 feet is estimated. There is possible contact between groundwater and the base of the waste (ES, 1990d).

<u>**Net Precipitation**</u> **Score:** 2

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

37 inches (USDOC, 1968).

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

27 inches (USDOC, 1968).

Net precipitation (subtract the above figures):

10 inches

Score = 2 (USDOC, 1968).

<u>**Permeability of Unsaturated Zone**</u> **Score:** 1

Soil type in unsaturated zone:

Niagara-Canandaigua-Cosad soil, which is nearly level, deep, somewhat poorly drained to very poorly drained, medium textured soil formed from glacial lake sediments with high clay content (USDA, 1984).

Permeability associated with soil type:

10^{-5} - 10^{-7} cm/sec. (USEPA, 1984).

Physical State **Score:** 3

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

Incinerator ash and residue, dewatered and digested sewage sludge roadbed material, asphalt, concrete and soil (Selden, 1981; Collareno, 1978, NUS, 1983).

***

3. CONTAINMENT

Containment **Score:** 3

Method(s) of waste or leachate containment evaluated:

Landfill with no liner, landfill surface encourages ponding (ES, 1989).

Method with highest score:

Landfill with no liner.

4. WASTE CHARACTERISTICS

Toxicity and Persistence **Score:** 18

	Toxicity	Persistence
Aluminum	-	3
Chromium	-	3
Lead	3	3
Manganese	3	3
Vanadium	3	3

(ES, 1990a; Sax, 1984)

Compound with highest score:

Lead

Hazardous Waste Quantity **Score:** 1

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):

Minimum quantity score is assigned.

Basis of estimating and/or computing waste quantity:

Documentation of sewage sludge disposal on-site exists, although there is no conclusive evidence that hazardous wastes have been disposed on-site (Weisberger, 1980a; Collareno, 1978; Donovan, 1981). The presence of hazardous substances in groundwater, surface water and sediments indicates the minimum quantity score is warranted.

***

5. TARGETS

Groundwater Use — **Score: 1**

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

Industrial (LaSala, 1968).

Distance to Nearest Well — **Score: 1**

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

Industrial well located west of site, reported to be 40 feet deep.

(LaSala, 1968).

Distance to above well or building:

Approximately 2.5 miles (NYS Conservation Dept., 1968).

Population Served by Groundwater Wells Within a 3-Mile Radius — **Score: 0**

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

No community or individual water system sources identified (NYSDOH, 1982).

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 known irrigation occurring from groundwater sources. Score = 0 (NYSDOH, 1982). No groundwater wells identified which provide irrigation.

Total population served by ground water within a 3-mile radius:

No known municipal or non-municipal supplies identified (LaSala 1968; NYSDOH, 1982).

SURFACE WATER ROUTE

1. OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum): **Score:** 45

Lead, mercury, silver, vanadium, cyanide (ES, 1990f; NYSDEC, 1982).

Rationale for attributing the contaminants to the facility:

Documented release by comparing analytical data for upgradient (SW-2) and downgradient (SW-4) surface water samples (ES, 1990a; ES, 1990f).

***

2. ROUTE CHARACTERISTICS

<u>Facility Slope and Intervening Terrain</u> **Score:** 3

Average slope of facility in percent:

<3% (USGS, 1965).

Name/description of nearest downslope surface water:

A ditch flowing adjacent to the landfill transports surface water run-off through a storm sewer to Smokes Creek, 0.8 miles away. The drainage ditch is judged to be perennial for HRS scoring purposes (Collareno, 1978).

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

<1 percent (USGS, 1965).

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

Partially, the site contains a freshwater wetland and ponded area (O'Connor, 1980; ES, 1989).

Is the facility completely surrounded by areas of higher elevation?

No (USGS, 1965).

<u>1-Year 24-Hour Rainfall in Inches</u> **Score:** 2

2.2 inches (USEPA, 1984).

<u>Distance to Nearest Downslope Surface Water</u> **Score:** 3

0.0 miles pond, marsh and perennial drainage ditch are adjacent to the landfill and receive drainage from the landfill. (ES, 1989; O'Connor, 1980).

<u>Physical State of Waste</u> **Score:** 3

Fine material-incinerator ash and residue, dewatered and digested sewage sludge.

(Selden, 1981; Collareno, 1978).

***

3. CONTAINMENT

Containment Score: 3

Method(s) of waste or leachate containment evaluated:

No containment system, some areas not adequately covered (ES, 1989; Tygert, 1981).

Method with highest score:

No containment system, some areas not adequately covered.

4. WASTE CHARACTERISTICS

Toxicity and Persistence Score: 18

Compound(s) evaluated	Toxicity	Persistence	
Lead	3	3	
Mercury	3	3	
Silver	3	3	
Vanadium	3	3	
Cyanide	3	3	(ES, 1990f)

Compound with highest score:

Lead; all 5 compounds have Sax toxicity values of 3. Lead is both toxic (3) and persistent (3) (Sax, 1984).

Hazardous Waste Quantity Score: 1

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):

Minimum score of 1 is assigned.

Basis of estimating and/or computing waste quantity:

Documentation of sewage sludge disposal on-site exists; although there is no conclusive evidence of hazardous waste disposal on-site (Weisberger, 1980a; Collareno, 1978; Donovan, 1981). Since hazardous substances are present in the sediments and surface water on-site. The minimum quantity score is assigned.

***

5. TARGETS

Surface Water Use Score: 2

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

Smoke Creek is a Class "D" surface water which is suitable for secondary contact recreation. South Branch Smoke Creek is a Class "C" surface water which is suitable for fishing and all other uses except as a source of water supply for drinking, culinary or food processing purposes and primary contact recreation. Usage of both water resources is limited to casual recreation.
(NYCRR, 1982; Bureau of National Affairs, Inc., 1979)

Is there tidal influence?

Not applicable (USGS, 1965).

Distance to a Sensitive Environment **Score: 1**

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

Not applicable (USGS, 1965).

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

0.7 miles to the northeast (NYSDEC wetland map, 1975).

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

>1 mile (NYSDEC, 1989).

Population Served by Surface Water **Score: 0**

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:

There are no water-supply intakes within 3 miles of the site (LaSala, 1968; NYSDOH, 1982).

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

Not applicable (LaSala, 1968; NYSDOH, 1982).

Total population served:

Not applicable (LaSala, 1968; NYSDOH, 1982).

Name/description of nearest of above water bodies:

Lake Erie (NYSDOH, 1982).

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

Greater than 3 miles (NYSDOH, 1982)

AIR ROUTE

1. OBSERVED RELEASE

Contaminants detected: Score: 0

No contaminants detected (ES, 1989).

Date and location of detection of contaminants:

No contaminants detected (ES, 1989).

Methods used to detect the contaminants:

Photovac (TIP II), (ES, 1989).

Rationale for attributing the contaminants to the site:

No air contamination detected (ES, 1989).

***

2. WASTE CHARACTERISTICS

Reactivity and Incompatibility Score: 0

Most reactive compound:

None identified with the potential to impact the air pathway.

Most incompatible pair of compounds:

None identified with the potential to impact the air pathway.

Toxicity Score: 0

Most toxic compound:

None identified with the potential to impact the air pathway

Hazardous Waste Quantity Score: 0

Total quantity of hazardous waste:

None with the potential to impact the air pathway.

Basis of estimating and/or computing waste quantity:

***

3. TARGETS

Population Within 4-Mile Radius Score: 24

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
12,231 within a 1 mile radius, (USDOC, 1980).

Distance to a Sensitive Environment Score: 1

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

Not applicable (USGS, 1965).

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

0.7 miles to the northeast (NYSDEC, 1975)

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

>1 mile (NYSDEC; 1989) Natural Heritage Program

<u>Land Use</u> **Score:** 3

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

0.5 miles to Lackawanna High School, commercial buildings 1/4-1/2 mile to northwest and southeast (Airphoto, 1989) (USGS, 1965).

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

No parks, forests or wildlife reserves in area

Score = 0 (USGS, 1965)

Distance to residential area, if 2 miles or less:

0.1 mile

Score = 3 (USGS, 1965; ES, 1989).

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

None within 1 mile radius, urban area.
Score = 0 (USDA, 1979).

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

Within a 2 mile radius there is an area classified as 25% to 75% prime farmland.
Score = 1 (USDA, 1979).

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

No (Dept. of Interior-National Park Service, 1988).

FIRE AND EXPLOSION

1. CONTAINMENT

__Hazardous substances present__: **Score:** 3

No fire or explosion hazard is known to exist (ES, 1990a; Ruby, 1989).

Type of containment, if applicable:

Not applicable.

***

2. WASTE CHARACTERISTICS

__Direct Evidence__ **Score:** 0

Type of instrument and measurements:

Explosimeter

No readings indicating potentially flammable or explosive materials on site (ES, 1989).

__Ignitability__ **Score:** 0

Compound used:

No ignitable material is present (Collareno, 1978; Weisberger, 1980; ES, 1989).

__Reactivity__ **Score: 0**

Most reactive compound:

No reactive compounds are known to be present on-site.

__Incompatibility__ **Score: 0**

Most incompatible pair of compounds:

No incompatible compounds with the potential to present a fire and explosion threat are known to exist on-site.

__Hazardous Waste Quantity__ **Score: 0**

Total quantity of hazardous substances at the facility:

None with the potential to pose a fire or explosion threat.

Basis of estimating and/or computing waste quantity:

No hazardous substances with fire and explosion potential are known to exist on-site.

***

3. TARGETS

__Distance to Nearest Population__ **Score:** 4

200 feet (USGS, 1965; Airphoto, 1989).

Distance to Nearest Building **Score: 2**

0.1 miles (USGS, 1965; Airphoto, 1989; ES, 1990g).

Distance to Sensitive Environment **Score: 0**

Distance to wetlands:

0.7 miles (NYSDEC, 1975; O'Connor, 1980; Klemp, 1980).

Distance to critical habitat:

No critical habitats identified (NYSDEC, 1989).

Land Use **Score: 3**

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

0.5 miles to Lackawanna High School, commercial buildings 1/4-1/2 mile to northwest and southeast (USGS, 1965; Airphoto, 1989).

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

No parks, forests or wildlife reserves in area (USGS, 1965).

Distance to residential area, if 2 miles or less:

0.1 miles.
(USDA, 1979; USGS, 1965).

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

None within 1 mile radius
(USDA, 1979; USGS, 1965).

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

Within a 2 mile radius, there is an area classified as 25% to 75% prime farmland. (USDA, 1979).

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

No

Population Within 2-Mile Radius **Score: 5**

48,926 estimated population (USDOC, 1980).

Buildings Within 2-Mile Radius **Score: 5**

Approximately 12,875 estimated by dividing population by 3.8 (USDOC, 1980).

DIRECT CONTACT

1. OBSERVED INCIDENT

Date, location, and pertinent details of incident: **Score:** 0

None reported (Kociela, 1989; Callareno, 1978) based on Phase II file searches.

***

2. ACCESSIBILITY

Describe type of barrier(s): **Score:** 3

A locked gate at Abbott Road but there is unrestricted access through the Majestic Terrace neighborhood and street (ES, 1989; NYSDEC, 1986; ES, 1990g; Tygert, 1981).

***

3. CONTAINMENT

Type of containment, if applicable: **Score:** 15

The landfill waste was mixed with soil material and covered (Collareno, 21978; Weisberger, 1980a) on-site, however, some areas were found with inadequate cover (ES, 1989).

***

4. WASTE CHARACTERISTICS

Toxicity **Score:** 3

Compounds evaluated:

PAHs were detected in sediment samples at concentrations ranging up to 9,500 μg/l in SED-5. Cyanide in concentrations of up to 58.3 μg/l were detected in surface water sample SW-5 (Weisberger, 1980b; Termini, 1980; ES, 1990f,h).

Compound with highest score:

Cyanide (Sax, 1984).

5. TARGETS

Population within one-mile radius **Score:** 5

Estimated population in one mile radius-12,231 (USDOC, 1980).

Distance to critical habitat (of endangered species) **Score:** 0

> 1 mile (NYSDEC, 1989) Natural Heritage Program.

EPA	Potential Hazardous Waste Site Site Inspection Report Part 1 - Site Location and Inspection Information	I. Identification 01 State: NY 02 Site Number: 915094

II. Site Name and Location

01 Site Name (Legal, common, or descriptive name of site): Lackawanna City Landfill

02 Street, Route No. or Specific Location Identifier: Abbott Road

03 City	04 State	05 Zip Code	06 County	07 County Code	08 CONG Dist
Lackawanna	NY	14218	Erie		

09 Coordinates
Latitude: 42 48' 48".
Longitude: 078 47' 45".

10 Type of Ownership (Check one)
__ A. Private __ B. Federal _____ __ C. State __ D. County
x E. Municipal __ F. Other ________ __ G. Unknown

III. Inspection Information

01 Date of Inspection: 08/08/89 (Month/Day/Year)

02 Site Status
__ Active
X Inactive

03 Years of Operation: 1961/1981 (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 Engineering-Science (Name of Firm) G. Other ________ (Specify)

05 Chief Inspector	06 Title	07 Organization	08 Telephone No.
K. Leonard		Engineering-Science	(315) 451-9560

09 Other Inspectors	10 Title	11 Organization	12 Telephone No.
M. Schumaker		Engineering-Science	(315) 451-9560

13 Site Representatives Interviewed	14 Title	15 Address	16 Telephone No.

17 Access Gained By (Check One)
X Permission
__ Warrant

18 Time of Inspection: 12:30 PM

19 Weather Conditions: Sunny, Breezy, 70s

IV. Information Available From

01 Contact	02 OF (Agency/Organization)	03 Telephone No.

04 Person Responsible For Site Inspection Form	05 Agency	06 Organization	07 Telephone No.	08 Date Month/Day/Year

EPA	Potential Hazardous Waste Site Site Inspection Report Part 2 - Waste Information	I. Identification 01 State 02 Site Number NY 915094

II. Waste States, Quantities, and Characteristics

01 Physical States (Check all that apply)

__ A. Solid __ E. Slurry
__ B. Powder, Fines __ F. Liquid
X C. Sludge __ G. Gas
__ D. Other ________ (Specify)

02 Waste Quantity At Site (Measures of waste quantities must be independent)

Tons ____
Cubic Yards 81,000
No. of Drums ____

03 Waste Characteristics (Check all that apply)

X A. Toxic __ E. Soluble __ I. Highly Volatile
__ B. Corrosive __ F. Infectious __ J. Explosive
__ C. Radioactive __ G. Flammable __ K. Reactive
X D. Persistent __ H. Ignitable __ L. Incompatible
__ M. Not Applicable

III. Waste Type

Category	Substance Name	01 Gross Amount	02 Unit of Measure	03 Comments
SLU	Sludge	1074	cubic yards	(Donovan, 1981)
OLW	Oily Waste			
SOL	Solvents			
PSD	Pesticides			
OCC	Other Organic Chemicals			
IOC	Inorganic Chemicals	80,000	cubic yards	Incinerator residue
ACD	Acids			
BAS	Bases			
MES	Heavy Metals			

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
MES	Arsenic			3.9 - 8.6	μg/g
MES	Beryllium			<1 - 1.8	μg/g
MES	Cadmium			<.4 - 1.5	μg/g
MES	Chromium			29 - 44	μg/g
MES	Copper			15 - 66	μg/g
MES	Lead			9 - 250	μg/g
MES	Mercury			<.07 - .89	μg/g
MES	Nickel			4.4 - 2.4	μg/g
MES	Selenium			<.2 - .79	μg/g
MES	Zinc			100 - 730	μg/g
OCC	Bis (2-Ethylhexyl) Phthalate			200 - 3900	μg/kg
MES	Aluminum			170 - 68200	μg/l
MES	Antimony			24.6 - 29.5	μg/l
MES	Arsenic			5.4 - 11.9	μg/l
MES	Barium			51 - 8180	μg/kg
MES	Cadmium			1.5 - 9.8	μg/l
MES	Calcium			127,000 - 577,000	μg/l

EPA	Potential Hazardous Waste Site Site Inspection Report Part 2 - Waste Information	I. Identification 01 State 02 Site Number NY 915094

MES	Chromium	7.7 - 123	μg/l
MES	Cobalt	5.5 - 71.2	μg/l
MES	Copper	10.2 - 100	μg/l
MES	Iron	1010 - 1,380,000	μg/l
MES	Lead	5 - 760	μg/l
MES	Manganese	178 - 41700	μg/l
MES	Mercury	0 - .57	μg/l
MES	Nickel	5.4 - 46.2	μg/l
MES	Silver	5.4 - 46.2	μg/l
MES	Vanadium	13.0 - 214	μg/l
MES	Zinc	19.3 - 3180	μg/l
MES	Cyanide	15.4 - 58.2	μg/l
MES	Pyrene	990	μg/kg
MES	Chrysene	1500	μg/kg
MES	Benzo (B) Fluoranthene	1200	μg/kg
MES	Benzo (A) Pyrene	1200	μg/kg

V. Feedstocks (See Appendix For CAS Numbers)

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

VI. Sources of Information (Cite Specific References, e.g., state files, sample analysis reports)

NYSDEC Site Investigation, March 31, 1982.
Weisberger, 1980a, Letter to Robert Mitrey, NYSDEC.
Collareno, 1978, Letter to John McMahon, NYSDEC.
Donovan, 1981, Daily Inspection Report, April 3 and March 2, 1981.

EPA	Potential Hazardous Waste Site Site Inspection Report Part 3 - Description of Hazardous Conditions and Incidents	I. Identification 01 State 02 Site Number NY 915094

II. Hazardous Conditions and Incidents

01 _X_ A. Groundwater Contamination **02 _X_ Observed (Date: 5/25/90)** **_ Potential** **__ Alleged**

03 Population Potentially Affected: unknown

04 Narrative Description

No known receptors of groundwater in area, 111,196 people living within 4 mile radius. Municipal water supply from Lake Erie available. Contamination of groundwater by aluminum, chromium, copper, iron, lead, manganese, vanadium and zinc as measured in groundwater samples taken May 25, 1990.

01 _X_ B. Surface Water Contamination **02 _X_ Observed (Date: 5/24/90)** **_ Potential** **__ Alleged**

03 Population Potentially Affected: unknown

04 Narrative Description

Observed releases of bis(2-Ethylhexyl)phthalate, aluminum, antimony, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, vanadium, zinc and cyanide was measured in samples collected on May 24, 1990 by E-S. Released metals may eventually enter Smoke Creek, a Class D waterway. A NYSDEC test (1982) also detected metals, TOC and THO in surface waters at the site.

01 __ C. Contamination of Air **02 __ Observed (Date: ______)** **_ Potential** **__ Alleged**

03 Population Potentially Affected: ___________

04 Narrative Description

Photovac TIP II readings during boring operations detected no air contamination, May 1990.

01 __ D. Fire/Explosive Conditions **02 __ Observed (Date: ______)** **_ Potential** **__ Alleged**

03 Population Potentially Affected: ___________

04 Narrative Description

Based on E-S site inspection, analytical test data and description of material deposited in landfill in literature, no fire/explosive conditions are known to exist. Lackawanna Fire Chief Frank Ruby had no record of fire/explosive conditions at the site.

01 _X_ E. Direct Contact **02 __ Observed (Date: ______)** **_X_ Potential** **__ Alleged**

03 Population Potentially Affected: unknown

04 Narrative Description

No fence around site except on Abbot Road. Very easy access for children in neighborhood of Majestic Terrace (E.S. site inspection, 8/8/89).

01 __ F. Contamination of Soil **02 _X_ Observed (Date: 3/31/82)** **_ Potential** **__ Alleged**

03 Population Potentially Affected: unknown

04 Narrative Description

Soil analysis indicated elevated concentrations of As, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn (NYSDEC site investigation, March 31, 1982) Nine polynuclear aromatic hydrocarbons and sixteen TAL metals were detected in surface soil samples taken May 24, 1990 by E-S. No metals exceeded published average values for NYS soils.

01 __ G. Drinking Water Contamination **02 __ Observed (Date: ______)** **_ Potential** **__ Alleged**

03 Population Potentially Affected: ___________

04 Narrative Description

Unknown Groundwater is not used as a drinking water source. Municipal water used.

01 __ H. Worker Exposure/Injury **02 __ Observed (Date: ______)** **_ Potential** **__ Alleged**

03 Population Potentially

04 Narrative Description

Affected: ____________ John Kociela, Erie County Health Dept, knew of no injuries/exposures attributed to the Lackawanna landfill.

01 __ I. Population Exposure/Injury **02 __ Observed (Date: ______)** **X Potential** **__ Alleged**
03 Population Potentially **04 Narrative Description**
Affected: ____________ Exposure/injury potential by direct contact of local residents exists due to lack of access control at the Lackawanna Landfill site.

01 __ J. Damage to Flora **02 __ Observed (Date: ______)** **__ Potential** **__ Alleged**
03 Population Potentially **04 Narrative Description**
Affected: ____________ Unknown, stressed vegetation was not observed during E-S site inspection on August 1989.

01 __ K. Damage to Fauna **02 __ Observed (Date: ______)** **__ Potential** **__ Alleged**
03 Population Potentially **04 Narrative Description**
Affected: unknown

II. Hazardous Conditions and Incidents (Continued)

01 __L. Contamination of Food Chain **02 __ Observed (Date: ______)** **X Potential** **__ Alleged**
04 Narrative Description Ducks and migratory birds observed using pond. Residence times and potential contamination levels unknown.

01 X M. Unstable Containment of Wastes **02 X Observed (Date: 3/31/82)** **__ Potential** **__ Alleged**
(Spills/Runoff/Standing Liquids/Leading drums) **04 Narrative Description**
03 Population Potentially
Affected: unknown Leachate breakouts were observed at two locations on the site (NYSDEC site investigation 3/31/82). Potential for groundwater and surface water contamination (ES, 1990).

01 __ N. Damage to Offsite Property **02 __ Observed (Date: ______)** **__ Potential** **__ Alleged**
04 Narrative Description Unknown

01 __ O. Contamination of Sewers, Storm Drains, WWTPs **02 __ Observed (Date: ______)** **__ Potential** **__ Alleged**
04 Narrative Description Unknown

01 __ P. Illegal/Unauthorized Dumping **02 __ Observed (Date: ______)** **__ Potential** **__ Alleged**
04 Narrative Description Unknown

05 Description of Any Other Known, Potential or Alleged Hazards

Unknown

III. Total Population Potentially Affected: Estimated 48,926 people in 2 mile radius

IV. Comments

The landfill was used by the city for disposal of incinerator residue (Phase I invest. ref #4 & 8) demolition debris (Phase I invest ref #23) and digested sewage sludge (Phase I investing ref #12, 17, 20, 21, 22 & Nussbaumer & Clarke, Inc. letters) cover problems, improper grades and access control have been reported (Phase I invest, ref 23).

V. Sources of Information (Cite specific references, e.g., state files, sample analysis, reports)

NYSDEC site investigation, March 31, 1982.
Engineering Science site inspection August 8, 1989.
Engineering-Science Phase II Investigation August 1990.
NYSDEC files, Phase I Investigation of Lackawanna Landfill by Recra Environmental, Inc.
Frank Ruby, Lackawanna Fire Chief, interview Nov. 8, 1989.
John Kociela, Erie County Health Dept., interview Oct. 20, 1989.

EPA	Potential Hazardous Waste Site Site Inspection Report Part 4 - Permit And Descriptive Information	I. Identification 01 State 02 Site Number NY 915094

II. Permit Information

01 Type of Permit Issued (Check all that apply)	02 Permit Number	03 Date Issued	04 Expiration Date	05 Comments
__ A. NPDES				
__ B. UIC				
__ C. Air				
__ D. RCRA				
__ E. RCRA Interim Status				
__ F. SPCC Plan				
x G. State (Specify)	2204	6/1/78	6/1/81	
__ H. Local (Specify)				
__ I. Other (Specify)				
__ J. None				

III. Site Description

01 Storage/Disposal (Check all that apply)	02 Amount	03 Unit of Measure	04 Treatment (Check all that apply)	05 Other
__ A. Surface Impoundment	____	____	X A. Incineration offsite	A. Buildings on Site
__ B. Piles	____	____	__ B. Underground Injection	
__ C. Drums, above ground	____	____	__ C. Chemical/Physical	
__ D. Tank, above ground	____	____	__ D. Biological	
__ E. Tank, below ground	____	____	__ E. Waste Oil Processing	
x F. Landfill	1,000	cu yds	__ F. Solvent Recovery	06 Area of Site
__ G. Landfarm	____	____	__ G. Other Recycling/Recovery	15 (Acres)
__ H. Open Dump	____	____	__ H. Other ________ (Specify)	Phase I invest ref #4
__ I. Other ________	____	____		

07 Comments

Most of the site is heavily vegetated except for a small area in the center that contains black sand and rusty metal fragments. Ponded water was observed at 2 locations on the site with a long marshy area north of the site. No visible leachate was observed (Engineering-Science site inspection 8/8/89).

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.

No observed man-made containment, some possible natural containment provided by marshy areas (Engineering-Science site inspection 8/8/89).

V. Accessibility

01 Waste Easily Accessible: X Yes __ No

02 Comments

No fence around site except on Abbott Road. Very easy access for children in neighborhood of Majestic Terrace (Engineering-Science site inspection 8/8/89). Thruway very close as well as powerline right of way.

VI. Sources of Information (Cite specific references, e.g., state files, sample analysis, reports)

Engineering-Science site inspection 8/8/89; Phase I Investigation ref #4; NYSDEC files.

EPA	Potential Hazardous Waste Site Site Inspection Report Part 5 - Water, Demographic, and Environmental Data	I. Identification 01 State 02 Site Number NY 915094

II. Drinking Water Supply

01 Type of Drinking Water Supply (Check as applicable) — **02 Status** — **03 Distance To Site**

	Surface	Well	Endangered		Affected	Monitored
Community	A. X	B. __	A. __	B. __	C. __	A. 6 (Mi.)
Non-Community	C. __	D. __	D. __	E. __	F. __	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 unknown

03 Distance to nearest drinking water well unknown (mi)

04 Depth to Groundwater 3.45 to 8.65 (ft)

05 Direction of Groundwater Flow Northwest

06 Depth to Aquifer of Concern 3.45 (ft)

07 Potential Yield of Aquifer unknown (gpd)

08 Sole Source Aquifer __ Yes X No

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

Well approximately 2.5 miles west of site, reported to be 40 ft deep, used for industrial purposes (Groundwater Resources of the Erie-Niagara basin, New York, 1968). No sustained pumping tests were run. Rates as high as 8 gpm were attained during pumping for well development.

10 Recharge Area

X Yes
__ No

Comments: Pond and low marshy area. Contamination of groundwater indicates recharge from landfill area

11 Discharge Area

__ Yes
__ No

Comments

IV. Surface Water

01 Surface Water Use (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
Name: Smoke Creek	_____	.5 (mi)
Name: South Branch	_____	.6 (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. 12,231	B. 48, 926	C. 111,196
No. of Persons	No. of Persons	No. of Persons

02 Distance To Nearest Population .03 (mi.)

03 Number of Buildings Within Two (2) Miles of Site 12,875

04 Distance to Nearest Off-Site Building .03 (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)

Urban area-population is evenly spread over the 3, 2 and 1 mile radius from site. Population estimates are from 1980 US Census Data.

EPA	Potential Hazardous Waste Site Site Inspection Report Part 5 - Water, Demographic, and Environmental Data	I. Identification 01 State 02 Site Number NY 915094

VI. Environmental Information

01 Permeability of Unsaturated Zone (Check One)

__ A. 10^{-6}-10^{-8} cm/sec _X_ 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) _X_ **B. Relatively Impermeable** (10^{-4}-10^{-6} cm/sec) __ **C. Relatively Permeable** (10^{-2}-10^{-4} cm/sec) __ **D. Very Permeable** (Greater than 10^{-2} cm/sec)

03 Depth to Bedrock 35 **(ft)**

04 Depth of Contaminated Soil Zone Unknown **(ft)**

05 Soil pH Unknown

06 Net Precipitation 10 **(in)**

07 One Year 24-Hour Rainfall 2.2 **(in)**

08 Slope

Site Slope 1.0 **%**

Direction of Site Slope **SW**

Terrain Average Slope 1.0 **%**

09 Flood Potential

Site is in ____ year floodplain

10

____ **Site is on Barrier Island, Coastal High Hazard Area, Riverine Floodway**

11 Distance to Wetlands (5 acre minimum)

Estuarine **A.** ____ **(mi)**

Other **B.** 0.7 **(mi)**

12 Distance to Critical Habitat (of endangered species)

None **(mi)**

Endangered Species: None

13 Land Use In Vicinity

Distance To:

Commercial/Industrial Land **A.** .5 **(mi.)**

Residential Areas: National State Parks, Forests or Wildlife Reserves **B.** 0.5 **(mi.)**

Agricultural Lands

Prime Ag Land **C.** None **(mi.)**

Ag **D.** 2 **(mi.)**

14 Description of Site In Relation To Surrounding Topography

The site is located on a rectangular tract of land between the Lehigh Valley railroad just north of the site and the NYS Thruway to the south. Three sets of power lines are located just south of and parallel to the railroad tracks. The western edge of the site is bounded by a series of homes along Majestic Terrace. The site is heavily vegetated with a large marshy area just north of the landfill. Ponded water was observed at two locations. Run off water from the NYS Thruway drains northward through a 24' storm sewer pipe into a drainage ditch which transports the water into another existing storm sewer and eventually into Smoke Creek (Engineering-Science site inspection 8/8/89 & Phase I investigation reference 25 page 2).

VII. Sources of Information (Cite specific references, e.g., state files, sample analysis, reports)

New York State Atlas of Community Water System Sources, 1982 New York State Department of Health
Climatic Atlas of the United States, 1968, U.S. Department of Commerce
Engineering-Science site inspection August 8, 1988
Phase I investigation reference 25 page 2, reference 2 fig 8, ref 27

EPA	Potential Hazardous Waste Site Site Inspection Report Part 6 - Sample And Field Information	I. Identification 01 State 02 Site Number NY 915094

II. Samples Taken: None taken

Sample Type	01 Number of Samples Taken	02 Samples Sent To	03 Estimated Date Results Available
Groundwater	5	Versar Inc., Springfield, VA	July 1990
Surface Water	5	Versar Inc., Springfield, VA	July 1990
Waste			
Air			
Runoff			
Spill			
Soil/subsurface	5	Versar Inc., Springfield, VA	July 1990
Soil/surface	2	Versar Inc., Springfield, VA	July 1990
Vegetation			
Other-Sediment	5	Versar, Inc., Springfield, VA	July 1990

III. Field Measurements Taken

01 Type	02 Comments
PID meter	No readings taken because of very wind conditions 8/8/89.
PID meter	Readings taken during boring operations May 1990.

IV. Photographs And Maps

01 Type X **Ground** X **Aerial** **02 In Custody of** Engineering-Science, Inc.
(Name of Organization or Individual)

03 Maps **02 Location of Maps**

X Yes Engineering-Science, Inc., Syr., N.Y., Phase II Investigation

No

V. Other Field Data Collected (Provide Narrative Description)

None

VI. Sources of Information (Cite specific references, e.g., state files, sample analysis, reports)

Engineering-Science site inspection August 8, 1989.
Engineering-Science Phase II Investigation August 1990.

EPA	Potential Hazardous Waste Site Site Inspection Report Part 7 - Owner Information	I. Identification 01 State 02 Site Number NY 915094

II. CURRENT OWNER(s)			PARENT COMPANY (If Applicable)		
01 Name: City of Lackawanna		02 D+B Number	08 Name: N/A		09 D+B Number
03 Street Address City Hall, Ridge Road		04 SIC Code	10 Street Address		11 SIC Code
05 City: Lackawanna	06 State: N.Y.	07 Zip Code: 14218	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
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 list most recent first)		
01 Name:		02 D+B Number	08 Name		09 D+B Number
03 Street Address		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
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

V. Sources of Information (Cite specific references, e.g., state files, sample analyses, reports)

Phase I investigation ref #8

EPA	Potential Hazardous Waste Site Site Inspection Report Part 8 - Operator Information	I. Identification 01 State 02 Site Number NY 915094

II. CURRENT Operator (Provide if different from Owner)

01 Name Site is inactive
02 D+B Number
03 Street Address (P.O. Box, RFD #, etc)
04 SIC Code
05 City
06 State
07 Zip Code
08 Years of Operation
09 Name of Owner

OPERATOR'S PARENT COMPANY

10 Name
11 D+B Number
12 Street Address (P.O. Box, RFD #, etc)
13 SIC Code
14 City
15 State
16 Zip Code

III. PREVIOUS OPERATOR(s)

01 Name None
02 D+B Number
03 Street Address (P.O. Box, RFD #, etc)
04 SIC Code
05 City
06 State
07 Zip Code
08 Years of Operation
09 Name of Owner During This Period

01 Name
02 D+B Number
03 Street Address (P.O. Box, RFD #, etc)
04 SIC Code
05 City
06 State
07 Zip Code
08 Years of Operation
09 Name of Owner During This Period

01 Name
02 D+B Number
03 Street Address (P.O. Box, RFD #, etc)
04 SIC Code
05 City
06 State
07 Zip Code
08 Years of Operation
09 Name of Owner During This Period

PREVIOUS OPERATORS' PARENT COMPANIES (If Applicable)

10 Name
11 D+B Number
12 Street Address (P.O. Box, RFD #, etc)
13 SIC Code
14 City
15 State
16 Zip Code

10 Name
11 D+B Number
12 Street Address (P.O. Box, RFD #, etc)
13 SIC Code
14 City
15 State
16 Zip Code

10 Name
11 D+B Number
12 Street Address (P.O. Box, RFD #, etc)
13 SIC Code
14 City
15 State
16 Zip Code

IV. Sources of Information (Cite specific references, e.g., state files, sample analysis, report(s))

EPA	Potential Hazardous Waste Site Site Inspection Report Part 9 - Generator/Transporter Information	I. Identification 01 State 02 Site Number NY 915094

II. On-Site Generator

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)

01 Name City of Lackawanna **02 D+B Number** **01 Name** **02 D+B Number**

03 Street Address City Hall, 714, Ridge Road **04 SIC Code** **03 Street Address (P.O. Box, RFD #, etc)** **04 SIC Code**

05 City Lackawanna **06 State** NY **07 Zip Code** 14218 **05 City** **06 State** **07 Zip Code**

IV. Transporter(s)

01 Name City of Lackawanna **02 D+B Number** **01 Name** **02 D+B Number**

03 Street Address Sanitation Bureau, S. Park Ave. **04 SIC Code** **03 Street Address (P.O. Box, RFD #, etc)** **04 SIC Code**

05 City Lackawanna **06 State** NY **07 Zip Code** 14218 **05 City** **06 State** **07 Zip Code**

01 Name Niagara Sanitation, Inc. **02 D+B Number** **01 Name** **02 D+B Number**

03 Street Address 262 Pullman Ave. **04 SIC Code** **03 Street Address (P.O. Box, RFD #, etc)** **04 SIC Code**

05 City Kenmore **06 State** NY **07 Zip Code** 14217 **05 City** **06 State** **07 Zip Code**

V. Sources of Information (Cite specific references, e.g., state files, sample analysis, reports)

Phase I investigation reference #8, reference #21

EPA	Potential Hazardous Waste Site Site Inspection Report Part 10 - Past Response Activities	I. Identification 01 State 02 Site Number NY 915094

II. Past Response Activities (Continued)

01 ___ T. Bulk Tankage Repaired — 02 Date ________ 03 Agency ______________
04 Description

01 ___ U. Grout Curtain Constructed — 02 Date ________ 03 Agency ______________
04 Description

01 ___ V. Bottom Sealed — 02 Date ________ 03 Agency ______________
04 Description

01 ___ W. Gas Control — 02 Date ________ 03 Agency ______________
04 Description

01 ___ X. Fire Control — 02 Date ________ 03 Agency ______________
04 Description

01 ___ Y. Leachate Treatment — 02 Date ________ 03 Agency ______________
04 Description

01 ___ Z. Area Evacuated — 02 Date ________ 03 Agency ______________
04 Description

01 ___ 1. Access To Site Restricted — 02 Date ________ 03 Agency ______________
04 Description

01 ___ 2. Population Relocated — 02 Date ________ 03 Agency ______________
04 Description

01 ___ 3. Other Remedial Activities — 02 Date ________ 03 Agency ______________
04 Description

None

III. Sources of Information (Cite specific references, e.g., state files, sample analysis, reports)

EPA	Potential Hazardous Waste Site Site Inspection Report Part 10 - Past Response Activities	I. Identification 01 State 02 Site Number NY 915094

II. Past Response Activities None

01 __ A. Water Supply Closed **02 Date ________** **03 Agency ______________**
04 Description

01 __ B. Temporary Water Supply Provided **02 Date ________** **03 Agency ______________**
04 Description

01 __ C. Permanent Water Supply Provided **02 Date ________** **03 Agency ______________**
04 Description

01 __ D. Spilled Material Removed **02 Date ________** **03 Agency ______________**
04 Description

01 __ E. Contaminated Soil Removed **02 Date ________** **03 Agency ______________**
04 Description

01 __ F. Waste Repacked **02 Date ________** **03 Agency ______________**
04 Description

01 __ G. Waste Disposed Elsewhere **02 Date ________** **03 Agency ______________**
04 Description

01 __ H. On Site Burial **02 Date ________** **03 Agency ______________**
04 Description

01 __ I. In Site Chemical Treatment **02 Date ________** **03 Agency ______________**
04 Description

01 __ J. In Situ Biological Treatment **02 Date ________** **03 Agency ______________**
04 Description

01 __ K. In Situ Physical Treatment **02 Date ________** **03 Agency ______________**
04 Description

01 __ L. Encapsulation **02 Date ________** **03 Agency ______________**
04 Description

01 __ M. Emergency Waste Treatment **02 Date ________** **03 Agency ______________**
04 Description

01 __ N. Cutoff Walls **02 Date ________** **03 Agency ______________**
04 Description

01 __ O. Emergency Diking/Surface Water Diversion **02 Date ________** **03 Agency ______________**
04 Description

01 __ P. Cutoff Trenches/Sump **02 Date ________** **03 Agency ______________**
04 Description

01 __ Q. Subsurface Cutoff Wall **02 Date ________** **03 Agency ______________**
04 Description

01 __ R. Barrier Walls Constructed **02 Date ________** **03 Agency ______________**
04 Description

01 __ S. Capping/Covering **02 Date ________** **03 Agency ______________**
04 Description

EPA	Potential Hazardous Waste Site Site Inspection Report Part 11 - Enforcement Information	I. Identification 01 State 02 Site Number NY 91504

II. Enforcement Information

01 Past Regulatory/Enforcement Action __ Yes _X_ No

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

III. Sources of Information (Cite specific references, e.g., state files, sample analysis, reports)

Phase I investigation

NYSDEC files

HRS REFERENCES

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REFERENCE 1

TABLE IV-6
LACKAWANNA CITY LANDFILL
GROUNDWATER SAMPLE RESULTS
TCL ORGANIC COMPOUNDS (UG/L) / TAL METALS (UG/L)

ANALYTE	(1) NYS STANDARDS (UG/L)	GW-1	GW-2	GW-3	GW-4	GW-5
METHYLENE CHLORIDE	5 b	3 JR	3 JR	–	3 JR	3 JR
ACETONE	50 b	–	–	–	10	94
BENZENE	ND a	–	–	–	3 J	–
ALUMINUM		28,300	50,900	26,000	5,410	8,120
ANTIMONY	3 e	29.5 B	26.1 B	–	–	24.6 B
ARSENIC	25 a	5.4 B	9.98 B	11.9	–	–
BARIUM	1,000 a	488	432	290	145 B	317
BERYLLIUM	3 e	–	3.2 B	–	–	–
CALCIUM		139,000	577,000	427,000	243,000	127,000
CHROMIUM (total)	50 b	69.6	89.1	52.4	7.7 B	13.4
COBALT		16.3 B	46.7 B	23.3 B	–	5.5 B
COPPER	200 c	250	96.2	100	10.3 B	10.2 B
IRON	300 b*	59,700	96,800	57,400	10,400	13,400
LEAD	25 a	348	53.3	46.0	11.1	8.0
MAGNESIUM	35,000 e	43,800	163,000	98,200	69,700	51,700
MANGANESE	300 b*	2,330	1,730	1,470	487	281
NICKEL	700 f	78.3	148	77.1	11.0 B	15.2 B
POTASSIUM		7,090	6,870	9,220	1,850 B	3,900 B
SILVER	50 a	10.4	7.6 B	7.4 B	–	–
SODIUM	20,000 c	209,000	33,900	47,400	890,000	27,800
VANADIUM		38.0 B	90.8	71.6	13.0 B	19.5 B
ZINC	300 c	1,420	357	333	51.2	39.2

REFERENCE 2

TABLE IV-2
WATER LEVEL DATA
LACKAWANNA CITY LANDFILL SITE

				Date : 5/15-16/90		Date : 5/24/90	
Well ID	Ground Surface Elevation (Feet*)	Top of PVC Well Pipe Elevation (Feet*)	Well Screen Interval Elevation (Feet*)	Depth to Water Level (Feet**)	Water Level Elevation (Feet*)	Depth to Water Level (Feet**)	Water Level Elevation (Feet*)
GW-1	611.09	614.09	607.09-597.09	7.95	606.14	6.58	607.51
GW-2	608.63	611.63	604.63-594.63	3.80	607.83	3.84	607.79
GW-3	611.29	613.29	600.29-595.29	8.65	604.64	8.65	604.64
GW-4	612.13	614.13	605.13-600.13	3.50	610.63	4.17	609.96
GW-5	609.54	611.54	605.54-595.54	3.37	608.17	3.45	608.09

*Feet above Mean Sea Level.

**Water level depth from top of PVC well pipe in feet.

REFERENCE 3

ENGINEERING-SCIENCE DRILLING RECORD

Contractor: AMERICAN AUGER
Driller: LEE PENROD
Inspector: MARK J SCHUMACHER
Rig Type: MOBIL B-57
Drilling Method: 4.25" HSA

BORING NO. GW-1
Sheet 1 of 1

PROJECT NAME LACKAWANNA LANDFILL
PROJECT NO. SY053-10.00

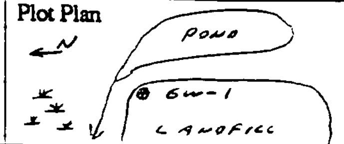
Location NE CORNER OF SITE; ADJ TO STREAM OUTLET FROM POND

Weather: 60's SUNNY
Date/Time Start 5-14-90 / 1200
Date Time Finish 5-14-90 / 1415

GROUNDWATER OBSERVATIONS

Water Level	TOC 7.95'		
Time	910		
Date	5-15-90		

Plot Plan



Photovac Reading	Sample I.D.	Sample Depth	% Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0		SS	GL 511.09 0
1.7	S1		25	1	BRN, CLAY WITH FILL, SOFT, MOIST
		1		2	
				4	
		2		4	
		3			
		4			4.0
1.9	S1		35	3	RED BRN - BLK, CO. SAND AND FILL, MOIST
		5		2	
				2	WET AT ≈ 5.5 FT
		6		1	
NA			0	2	
		7		1	
				1	
		8		1	
1.0	S1		30	3	8.6'
		9		1	GRY, CLAY, SOFT, WET
				1	
		10		1	10.0'
1.6	S1		10	4	GRY, MED - VY CO. SAND WITH FILL, WET
		11		3	
				1	
		12		2	
NA			5	3	WITH MED GRAVEL
		13		2	
				1	
		14		1	14.0
					BORING TERMINATED AT 14.0'
		15			
		16			
		17			

WELL SCHEMATIC

COMMENTS

PROTECTIVE STEEL CASING

2" ID PVC RISER

3.0' STICK-UP

CEMENT 0-2'

BENTONITE PELLETS 2-3'

SAND PACK 3-14'

2" ID PVC 0.01" SLOT WELL SCREEN 4-14

WELL BOTTOM 14.0'

STANDARD PENETRATION TEST

SS = SPLIT SPOON A = AUGER CUTTINGS C = CORED

SUMMARY 0-4 CLAY, 4-8.6 SAND + FILL 8.6-10 CLAY 10-14 SAND

G1-

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

Site Name: LACKAWANNA Date: 5-14-90

Job Number: 57053.10.00 By: MARK J SCHUMACHER

Boring Number: GW-1

****

Depth of Hole: 14' Comments

Diameter of Hole: 8"

ALL MATERIALS INSPECTED PRIOR TO INSTALLATION?
Yes X No ___

SCREEN
Material: 2" ID PVC
Slot Size: 0.01"
Length: 10'
Threaded: Yes X No ___

RISER PIPE
Material: 2" ID PVC
Total Length of Well - Screen Length = 17-10 = 7'
Threaded: Yes X No ___

END CAP
Material: PVC
Threaded: Yes X No ___

ALL JOINTS TEFLON TAPED: Yes ___ No X

TOTAL LENGTH OF WELL CASING (Includes screen and stick-up.) 17'

SAND PACK
Type/Size: #3 Q ROK / US SILICA
Amount (Calculated): 250 lb
Amount (Actual): 250 lb
Installed with Tremie: Yes ___ No X

BENTONITE SEAL(S):
Type/Size: BENTONITE PELLETS 3/4"
Amount (Calculated): 2.5 GAL
Amount (Actual): 2.5 GAL
Installed with Tremie: Yes ___ No X
Secondary Seal(s) Used: Yes ___ No X
Explain: ___

Bentonite allowed to swell at least 30 minutes? Yes X No

12

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

GROUT/CEMENT

Mixture (#Cement/#Bentonite): ____

Mixture (Gal. water/#dry mix): 10/94

Amount (calculated): 10 GAL

Amount (actual): 10 GAL

Installed with TREMIE: Yes ____ No X

LOCKING PROTECTIVE CASING INSTALLED: Yes X No ____

Locked immediately after installation: Yes X No ____

Grout sloped at surface to allow run-off: Yes X No ____

Drain hole drilled prior to development: Yes X No ____

Stick-up: 3.0'

ANY FOREIGN OBJECTS LOST IN THE WELL: Yes ____ No X

If yes:

(1) What was lost:

(2) Depth:

(3) Stage of well installation:

(4) Was object retrieved: Yes ____ No ____

(All or part/how):

WELL CAPPED: Yes X No ____

WELL IDENTIFIED: Yes X No ____

DISPOSAL OF CUTTINGS:

Left in pile: ____

Spread out: X (Hnu reading: 0 ppm)

Containerized: ____

Other: ____

DISPOSAL OF FLUIDS:

Run off on ground surface: X

Containerized: ____

Other: ____

[signature]
Engineering-Science Representative

5-14-90
Date

ENGINEERING-SCIENCE DRILLING RECORD

Contractor: AMERICAN AUGER	BORING NO. GW-2
Driller: LEE PENROD	Sheet 1 of 1
Inspector: NICHOLAS A. SMITH	PROJECT NAME LACKAWANNA LANDFILL
Rig Type: MOBIL B-57	PROJECT NO. SY053.10.00
Drilling Method: 4.25" HSA	Location SE CORNER OF SITE ADJ. TO NYS THRUWAY

GROUNDWATER OBSERVATIONS

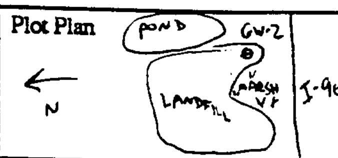
Water Level	TOC 3.80		
Time	12:30		
Date	5-15-90		

Weather: SUNNY, 70's

Date/Time Start 5-14-90 / 1510

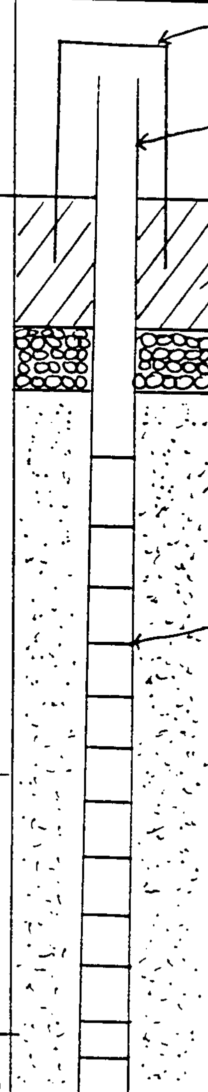
Date Time Finish 5-14-90 / 1725

Plot Plan



Photovac Reading	Sample I.D.	Sample Depth	% Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0		SS	GL 509.63 0
1.1	S1		75	3	
		1		4	GRAY CLAY, SOME BROWN SILT, DRY TO MOIST
				6	
		2		9	
		3			
		4			
0.8			100	1	
		5		1	WET AT 5.0 ft
				1	
		6		1	
1.0			75	1	
		7		1	TR. FINE SAND
				2	
		8		2	
1.0	S1		100	1	
		9		1	9.0
				1	
		10		2	GRAY CLAY, LITTLE FINE BROWN SAND, WET
1.0	S1		62.5	1	
		11		3	TR. F-MED GRAVEL
				4	
		12		6	
1.0	S1		100	5	
		13		7	13.0
				7	GRAY CLAY AND MED GRAVEL (SHALE FRAGMENTS), WET
		14		8	14.0
					BORING TERMINATED AT 14.0 ft (5[illegible])
		15			

WELL SCHEMATIC



COMMENTS

PROTECTIVE STEEL CASING AND LOCK

2.0" ID PVC RISER 3.0 FT STICKUP

CEMENT 0-2'

BENTONITE PELLETS 2-3'

SAND PACK 3'-14'

2.0" ID 0.01" SLOT WELLSCREEN 4'-14'

WELL BOTTOM 14.0'

STANDARD PENETRATION TEST

SS = SPLIT SPOON A = AUGER CUTTINGS C = CORED

SUMMARY 0-9 CLAY, SOME SILT 9-13 CLAY, LITTLE F SAND 13-14 CLAY + GRAVEL

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

Site Name: LACKAWANNA CITY LANDFILL Date: 5/14/90
Job Number: SY053.10.00 By: NICHOLAS A. SMITH
Boring Number: GW-2

****

Depth of Hole: 14' Comments

Diameter of Hole: 8"

ALL MATERIALS INSPECTED PRIOR TO INSTALLATION?
Yes X No ____

SCREEN
Material: 2" ID PVC
Slot Size: 0.01"
Length: 10'
Threaded: Yes X No ____

RISER PIPE
Material: 2" ID PVC
Total Length of Well - Screen Length = 14 + 3 ft stickup - 10 = 7 ft
Threaded: Yes X No ____

END CAP
Material: PVC
Threaded: Yes X No ____

ALL JOINTS TEFLON TAPED: Yes ____ No X

TOTAL LENGTH OF WELL CASING (Includes screen and stick-up.) 17 ft

SAND PACK
Type/Size: US SILICA / #3 Q-ROK
Amount (Calculated): 250
Amount (Actual): 250
Installed with Tremie: Yes ____ No X

BENTONITE SEAL(S):
Type/Size: PELLETS | 3/8"
Amount (Calculated): 2.5 GAL
Amount (Actual): 2.5 GAL
Installed with Tremie: Yes ____ No X
Secondary Seal(s) Used: Yes ____ No X
Explain: ____

Bentonite allowed to swell at least 30 minutes? Yes X No

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

GROUT/CEMENT

Mixture (#Cement/#Bentonite): ______

Mixture (Gal. water/#dry mix): 10/94

Amount (calculated): 10 GAL

Amount (actual): 10 GAL

Installed with TREMIE: Yes ____ No X

LOCKING PROTECTIVE CASING INSTALLED: Yes X No ____

Locked immediately after installation: Yes X No ____

Grout sloped at surface to allow run-off: Yes X No ____

Drain hole drilled prior to development: Yes X No ____

Stick-up: 3.0 ft

ANY FOREIGN OBJECTS LOST IN THE WELL: Yes ____ No X

If yes:

(1) What was lost:

(2) Depth:

(3) Stage of well installation:

(4) Was object retrieved: Yes ____ No ____

(All or part/how):

______

______

WELL CAPPED: Yes X No ____

WELL IDENTIFIED: Yes X No -

DISPOSAL OF CUTTINGS:

Left in pile: ______

Spread out: X (Hnu reading: 0 ppm)

Containerized: ______

Other: ______

DISPOSAL OF FLUIDS:

Run off on ground surface: X

Containerized: ______

Other: ______

[signature]
Engineering-Science Representative

5/14/90
Date

ENGINEERING-SCIENCE DRILLING RECORD

Contractor: AMERICAN AUGER
Driller: ROCKY BAYE
Inspector: MARK J SCHUMACHER
Rig Type: MOBIL B-57
Drilling Method: 4.25" HSA

BORING NO. GW-3
Sheet 1 of 1

PROJECT NAME LACKAWANNA LANDFILL
PROJECT NO. 57053.10.00

Location NW CORNER OF SITE, ADJ TO ACCESS RD

GROUNDWATER OBSERVATIONS

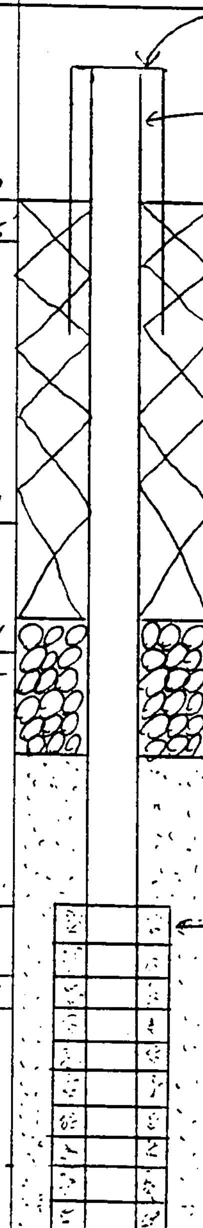
Water Level	TOC 8.65'		
Time	815		
Date	5-16-90		

Weather: 60'S OVERCAST
Date/Time Start 5-15-90 / 940
Date Time Finish 5-15-90 / 1120

Plot Plan: LANDFILL ← N, RD, ● GW-3

Photovac Reading	Sample I.D.	Sample Depth	% Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0		55	GL 611.29 — 0
0			50	5	BRN, SILT, STIFF, MOIST
		1		10	0.6' BRN-BLK, F-CO SAND AND FILL, MOIST
				6	
		2		4	
		3			
		4			
		5			5.0'
0	S1		20	3	BRN, SILT, W/ LITTLE FILL, VY MOIST
		6		6	
				4	
		7		5	7.0'
0	S1		100	4	BRN, CLAY WITH GRY MOTTLING, SOFT, MOIST
		8		3	
				3	
		9		3	
0	S1		100	2	TR SILT STRINGERS ≈ 1/8 - 1/4" THICK WET
		10		2	
				2	
		11		2	11.9'
0	S1		100	2	BRN, CLAY, VY MOIST, SOFT
		12		3	12.0
				5	BRN, CLAY, W/LITTLE F-CO SAND AND GRAVEL, WET ▼
		13		9	GRY, CO. SAND, WET
0			5	2	
		14		15	
				12	
		15		2	
				A	
		16		A	16.0'
					BORING TERMINATED AT 16.0FT
		17			
		18			

WELL SCHEMATIC



COMMENTS

PROTECTIVE STEEL CASING

2" ID PVC RISER 2.0' STICK-UP

CEMENT 0-6.5'

BENTONITE PELLETS 6.5-8.5'

SAND PACK 8.5-16'

1.22" OD PRE-PACKED WELL SCREEN W/2" ID WELL SCREEN 0.01" SLOT 11-16'

WELL BOTTOM 16.0'

STANDARD PENETRATION TEST
SS = SPLIT SPOON A = AUGER CUTTINGS C = CORED

SUMMARY 0-0.6 SILT, 0.6-5.0 SAND+FILL, 5-7 SILT 7-12.5 CLAY, 12.5-16 SAND

G1- ~~[illegible]~~

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

Site Name: LACKAWANNA Date: 5-15-90

Job Number: 54053.10.00 By: MARK J SCHUMACHER

Boring Number: GW-3

****

Depth of Hole: 16'

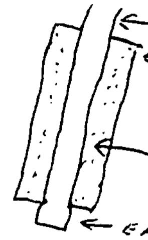
Diameter of Hole: 8"

Comments

ALL MATERIALS INSPECTED PRIOR TO INSTALLATION?
Yes X No ____

SCREEN
- Material: PVC
- Slot Size: 0.01"
- Length: 5'
- Threaded: Yes X No ____

PREPACKED SCREEN



RISER PIPE
- Material: 2" ID PVC
- Total Length of Well - Screen Length = 18-5=13'
- Threaded: Yes X No ____

END CAP
- Material: PVC
- Threaded: Yes X No ____

ALL JOINTS TEFLON TAPED: Yes ____ No X

TOTAL LENGTH OF WELL CASING (Includes screen and stick-up.) 18'

SAND PACK
- Type/Size: #3 Q-ROK / US SILICA
- Amount (Calculated): 100 lb
- Amount (Actual): 100 lb
- Installed with Tremie: Yes ____ No X

PREPACKED SCREEN SAND PACK INSTALLED AROUND PRE PACK SCREEN

BENTONITE SEAL(S):
- Type/Size: BENTONITE PELLETS 3/8"
- Amount (Calculated): 5 GAL
- Amount (Actual): 5 GAL
- Installed with Tremie: Yes ____ No X
- Secondary Seal(s) Used: Yes ____ No ____
- Explain: ____________

Bentonite allowed to swell at least 30 minutes? Yes X No

1J2 -

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

GROUT/CEMENT

Mixture (#Cement/#Bentonite): ______

Mixture (Gal. water/#dry mix): 22/188

Amount (calculated): 22 gal

Amount (actual): 22 gal

Installed with TREMIE: Yes ____ No X

LOCKING PROTECTIVE CASING INSTALLED: Yes X No ____

Locked immediately after installation: Yes X No ____

Grout sloped at surface to allow run-off: Yes X No ____

Drain hole drilled prior to development: Yes X No ____

Stick-up: 2.3'

ANY FOREIGN OBJECTS LOST IN THE WELL: Yes ____ No X

If yes:

(1) What was lost:

(2) Depth:

(3) Stage of well installation:

(4) Was object retrieved: Yes ____ No ____

(All or part/how):

______

______

WELL CAPPED: Yes X No ____

WELL IDENTIFIED: Yes X No ____

DISPOSAL OF CUTTINGS:

Left in pile: ______

Spread out: X (Hnu reading: 0 ppm)

Containerized: ______

Other: ______

DISPOSAL OF FLUIDS:

Run off on ground surface: X

Containerized: ______

Other: ______

[signature]

Engineering-Science Representative

5-15-90

Date

ENGINEERING-SCIENCE DRILLING RECORD

Contractor: AMERICAN AUGER
Driller: LEE PENROD
Inspector: NICHOLAS A. SMITH
Rig Type: MOBIL B-57
Drilling Method: 4.25" HSA

BORING NO. GW-4
Sheet 1 of 1
Location ALONG NYS THRUWAY BETWEEN GW-2 AND GW-5

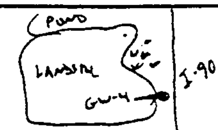
PROJECT NAME LACKAWANNA LANDFILL
PROJECT NO. SY053.10.00

Weather: 60s LIGHT RAIN - SUN
Date/Time Start 5/15/90 8:30
Date Time Finish 5/15/90 10:30

GROUNDWATER OBSERVATIONS

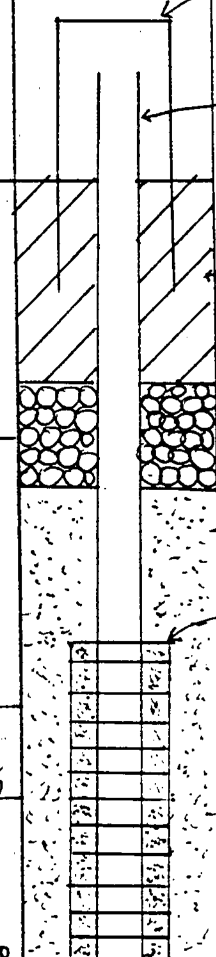
Water Level	TOC, 3.5'		
Time	8:25		
Date	5-16-90		

Plot Plan



PID Reading	Sample I.D.	Sample Depth	% Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0		SS	GL 612.13 — 0
0.4	S1		50	5	BROWN SILT AND BLACK CO.SAND, BRICK, FINE-MED GRAVEL (FILL)
		1		5	WITH SOME GRAY CLAY, DRY
				3	
		2		4	
		3			
		4			4.0
0.2			75	5	GRAY CLAY AND BROWN SILT, DRY TO MOIST
		5		4	
				6	
		6		6	▼ WET AT 5.75'
0.4	S1		100	1	
		7		2	LITTLE MED. SAND
				3	
		8		3	8.0
0.5	S1		87.5	2	GRAY CLAY WITH LITTLE BROWN SILT, MOIST
		9		1	
				1	9.5
		10		1	GRAY CLAY, WET
0.4	S1		100	1	
		11		1	TR FINE SAND
				1	
		12		1	12.0
					BORING TERMINATED AT 12.0 FT
		13			
		14			

WELL SCHEMATIC



COMMENTS

PROTECTIVE STEEL CASING AND LOCK
2" ID PVC RISER 2.0' STICKUP
CEMENT 0-3'
BENTONITE PELLETS 3-5'
SAND PACK 5-12'
4.22" OD PRE-PACKED WELL SCREEN W/ 2" ID PVC SCREEN 0.01" SLOT 7-12'
WELL BOTTOM 12.0'

STANDARD PENETRATION TEST
SS = SPLIT SPOON A = AUGER CUTTINGS C = CORED

SUMMARY 0-4 SILT + FILL 4-8 CLAY + SILT 8-9.5 CLAY W/ LTL SILT
9.5-12 CLAY

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

Site Name: LACKAWANNA CITY LANDFILL Date: 5/15/90
Job Number: 34053.10.00 By: NICHOLAS A. SMITH
Boring Number: GW-4

****

Depth of Hole: 12 ft. Comments

Diameter of Hole: 8 in.

ALL MATERIALS INSPECTED PRIOR TO INSTALLATION?
Yes X No ____

SCREEN
Material: 4.22" OD PREPACKED PVC
Slot Size: 0.01"
Length: 5 ft.
Threaded: Yes X No ____

RISER PIPE
Material: 2" ID PVC
Total Length of Well - Screen Length = 12.0 + 2.0' Stickup - 5 = 8 ft
Threaded: Yes X No ____

END CAP
Material: PVC 2"
Threaded: Yes ____ No X

ALL JOINTS TEFLON TAPED: Yes ____ No X

TOTAL LENGTH OF WELL CASING (Includes screen and stick-up.) 14 ft.

SAND PACK
Type/Size: #3 Q-ROK
Amount (Calculated): 50 lb INSTALLED AROUND PREPACKED SCREEN
Amount (Actual): 50 lb
Installed with Tremie: Yes ____ No X

BENTONITE SEAL(S):
Type/Size: PELLETS / 3/8"
Amount (Calculated): 5 GAL
Amount (Actual): 5 GAL
Installed with Tremie: Yes ____ No X
Secondary Seal(s) Used: Yes ____ No X
Explain: ____

Bentonite allowed to swell at least 30 minutes? Yes X No

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

GROUT/CEMENT

Mixture (#Cement/#Bentonite): ____

Mixture (Gal. water/#dry mix): 10/100

Amount (calculated): 10 GAL

Amount (actual): 10 GAL

Installed with TREMIE: Yes ____ No X

LOCKING PROTECTIVE CASING INSTALLED: Yes X No ____

Locked immediately after installation: Yes X No ____

Grout sloped at surface to allow run-off: Yes X No ____

Drain hole drilled prior to development: Yes ____ No X

Stick-up: 2.0 ft

ANY FOREIGN OBJECTS LOST IN THE WELL: Yes ____ No X

If yes:

(1) What was lost:

(2) Depth:

(3) Stage of well installation:

(4) Was object retrieved: Yes ____ No ____

(All or part/how):

WELL CAPPED: Yes X No ____

WELL IDENTIFIED: Yes X No ____

DISPOSAL OF CUTTINGS:

Left in pile: ____

Spread out: X (Hnu reading: 0 ppm)

Containerized: ____

Other: ____

DISPOSAL OF FLUIDS:

Run off on ground surface: X

Containerized: ____

Other: ____

Nicholas A. Smith

Engineering-Science Representative

5/15/90

Date

ENGINEERING-SCIENCE DRILLING RECORD

Contractor: AMERICAN AUGER
Driller: ROCKY BAYE
Inspector: MARK J SCHUMACHER
Rig Type: MOBIL B-57
Drilling Method: 4.25" HSA

BORING NO. GW-5
Sheet 1 of 1

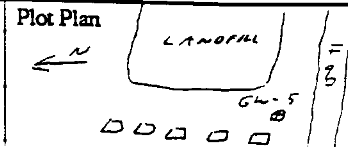
PROJECT NAME: LACKAWANNA LANDFILL
PROJECT NO. 54053.10.00

Location: SW CORNER OF SITE, ADJ TO NYS THRUWAY

GROUNDWATER OBSERVATIONS			
Water Level	TOC 3.37'		
Time	1510		
Date	5-15-90		

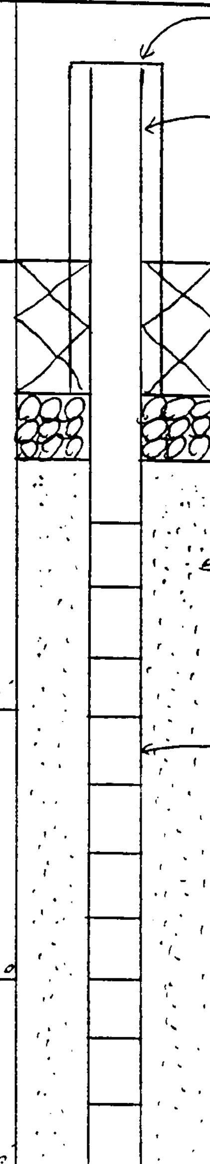
Weather: 60's SUNNY
Date/Time Start: 5-14-90 / 1520
Date Time Finish: 5-14-90 / 1821

Plot Plan



Photovac Reading	Sample I.D.	Sample Depth	% Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
						PROTECTIVE STEEL CASING
						2.0" ID PVC RISER
						2.0' STICK-UP
		0		SS	GL 509.54 — 0	
0	S1		100	4	BRN, SILT, W/ LITTLE CLAY, TR. GRY MOTTLING, SOFT, MOIST	CEMENT 0-2
		1		5		
				5		
		2		5		
		3				BENTONITE PELLETS 2-3
		4				
		5				SAND PACK 3-14'
0	S1		100	2		
		6		3		
				3		
		7		3	7.9	
					GRY, CLAY, V. MOIST	
		8			WET AT 8.0 FT	2" ID PVC 0.01" SLOT WELL SCREEN 4-14'
		9				
0	S1		100	WT		
		10		1		
				1		
		11		1	11.0	
0	S1		50	5	GRY, MED-CO SAND AND F-CO GRAVEL (SMALL FRAGMENTS), WET	
		12		8		
				C		
		13		6		WELL BOTTOM 14.0 FT
				A		
		14		A	14.0	
					BORING TERMINATED AT 14.0'	BEDROCK MAY BE AT ≈ 14.0 FT HIGHLY WEATHERED
		15				
		16				
		17				

WELL SCHEMATIC



STANDARD PENETRATION TEST
SS = SPLIT SPOON A = AUGER CUTTINGS C = CORED

SUMMARY 0-7.9 SILT 7.9-11 CLAY, 11-14 SAND + GRAVEL

G1-~~5~~

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

Site Name: LACKAWANNA   Date: 5-14-97

Job Number: 57053.10.01   By: MARK J SCHUMACHER

Boring Number: GW-5

****

Comments

Depth of Hole: 14'

Diameter of Hole: 8"

ALL MATERIALS INSPECTED PRIOR TO INSTALLATION?
Yes X No ___

SCREEN
Material: 2" ID PVC
Slot Size: 0.01"
Length: 10'
Threaded: Yes X No ___

RISER PIPE
Material: 2" ID PVC
Total Length of Well - Screen Length = 17-10 = 7'
Threaded: Yes X No ___

END CAP
Material: PVC
Threaded: Yes X No ___

ALL JOINTS TEFLON TAPED: Yes ___ No X

TOTAL LENGTH OF WELL CASING (Includes screen and stick-up.) 17'

SAND PACK
Type/Size: #3 Q ROK / US SILICA
Amount (Calculated): 250 lb
Amount (Actual): 250 lb
Installed with Tremie: Yes ___ No X

BENTONITE SEAL(S):
Type/Size: BENTONITE PELLETS 3/8"
Amount (Calculated): 2.5 GAL
Amount (Actual): 2.5 GAL
Installed with Tremie: Yes ___ No X
Secondary Seal(s) Used: Yes ___ No X
Explain: ___

Bentonite allowed to swell at least 30 minutes? Yes X No

ĵ2 -

WELL INSTALLATION CHECKLIST
PHASE II INVESTIGATIONS

GROUT/CEMENT

Mixture (#Cement/#Bentonite): ________

Mixture (Gal. water/#dry mix): 10/94

Amount (calculated): 10 GAL

Amount (actual): 10 GAL

Installed with TREMIE: Yes ____ No ____

LOCKING PROTECTIVE CASING INSTALLED: Yes X No ____

Locked immediately after installation: Yes X No ____

Grout sloped at surface to allow run-off: Yes X No ____

Drain hole drilled prior to development: Yes X No ____

Stick-up: 3.0'

ANY FOREIGN OBJECTS LOST IN THE WELL: Yes ____ No X

If yes:

(1) What was lost:

(2) Depth:

(3) Stage of well installation:

(4) Was object retrieved: Yes ____ No ____

(All or part/how):

____

____

WELL CAPPED: Yes X No ____

WELL IDENTIFIED: Yes X No ____

DISPOSAL OF CUTTINGS:

Left in pile: ________

Spread out: X (Hnu reading: 0 ppm)

Containerized: ________

Other: ________

DISPOSAL OF FLUIDS:

Run off on ground surface: X

Containerized: ________

Other: ________

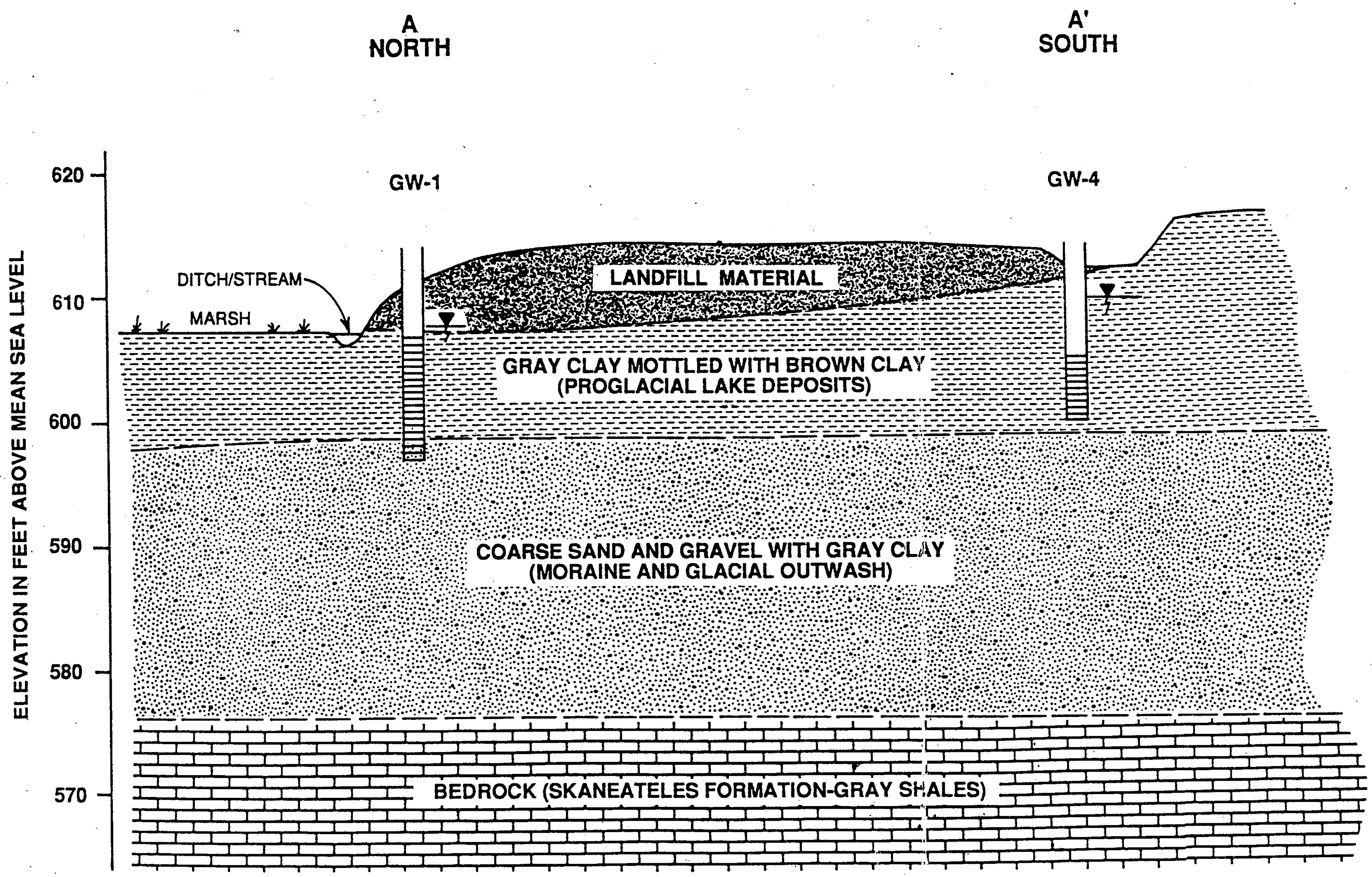
[signature]

Engineering-Science Representative

5-14-90

Date

REFERENCE 4



LEGEND

WELL SCREEN 0.01" SLOT

WATER LEVEL IN FEET MEASURE MAY 24, 1990

INFERRED BOUNDARY

VERTICAL EXAGGERATION = 10x

HORIZONTAL SCALE

100 0 100 FT.

100 '

ENGINEERING-SCIENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PHASE II REPORT

CROSS SECTION A - A' LACKAWANNA CITY LANDFILL

FIGURE IV-4

REFERENCE 5

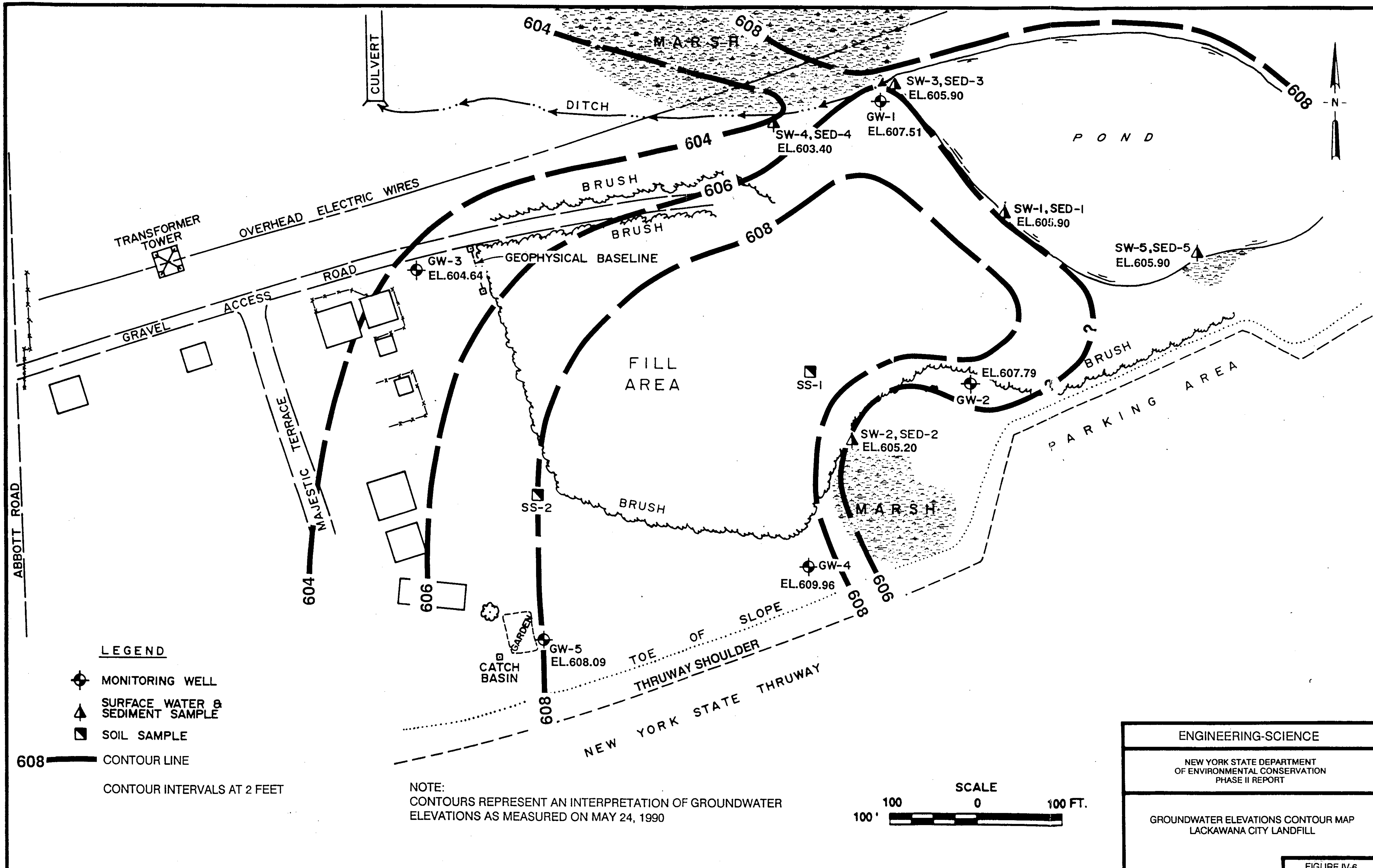
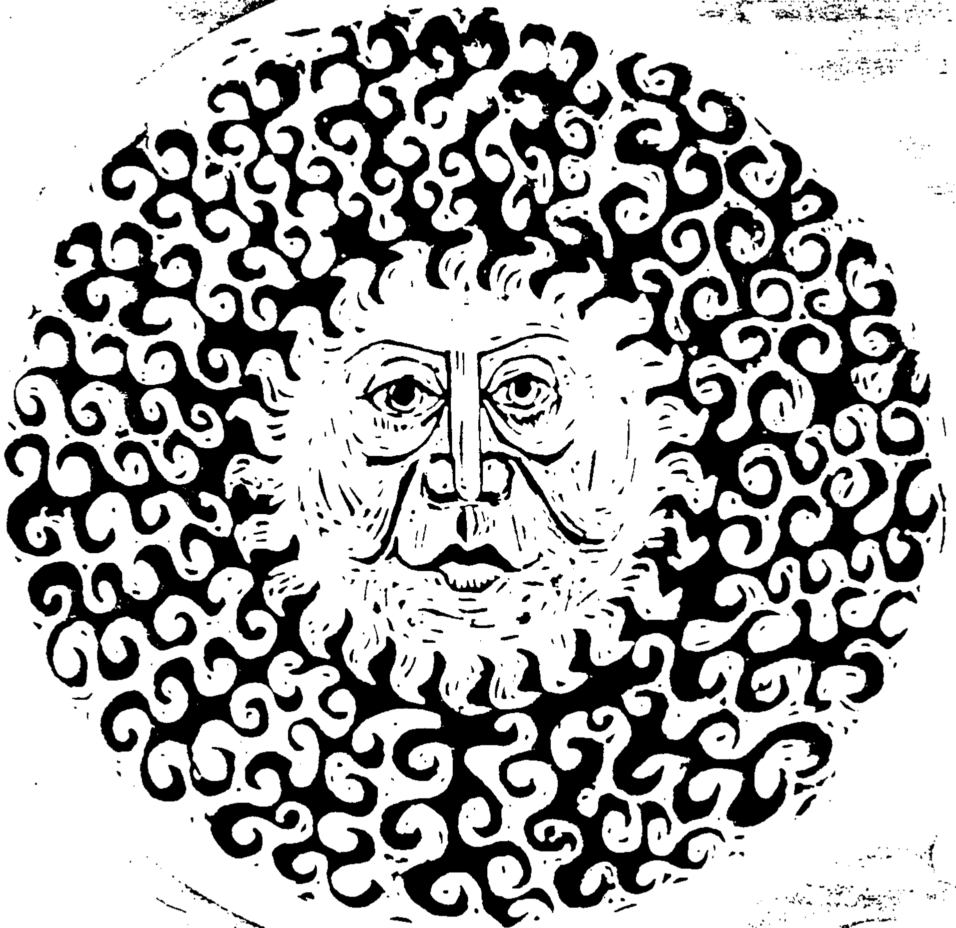


FIGURE IV-6

GROUNDWATER ELEVATIONS CONTOUR MAP
LACKAWANA CITY LANDFILL

REFERENCE 6



CLIMATIC ATLAS OF THE UNITED STATES

Science Services Administration . Environmental Data Serv

NORMAL ANNUAL TOTAL PRECIPITATION (Inches)

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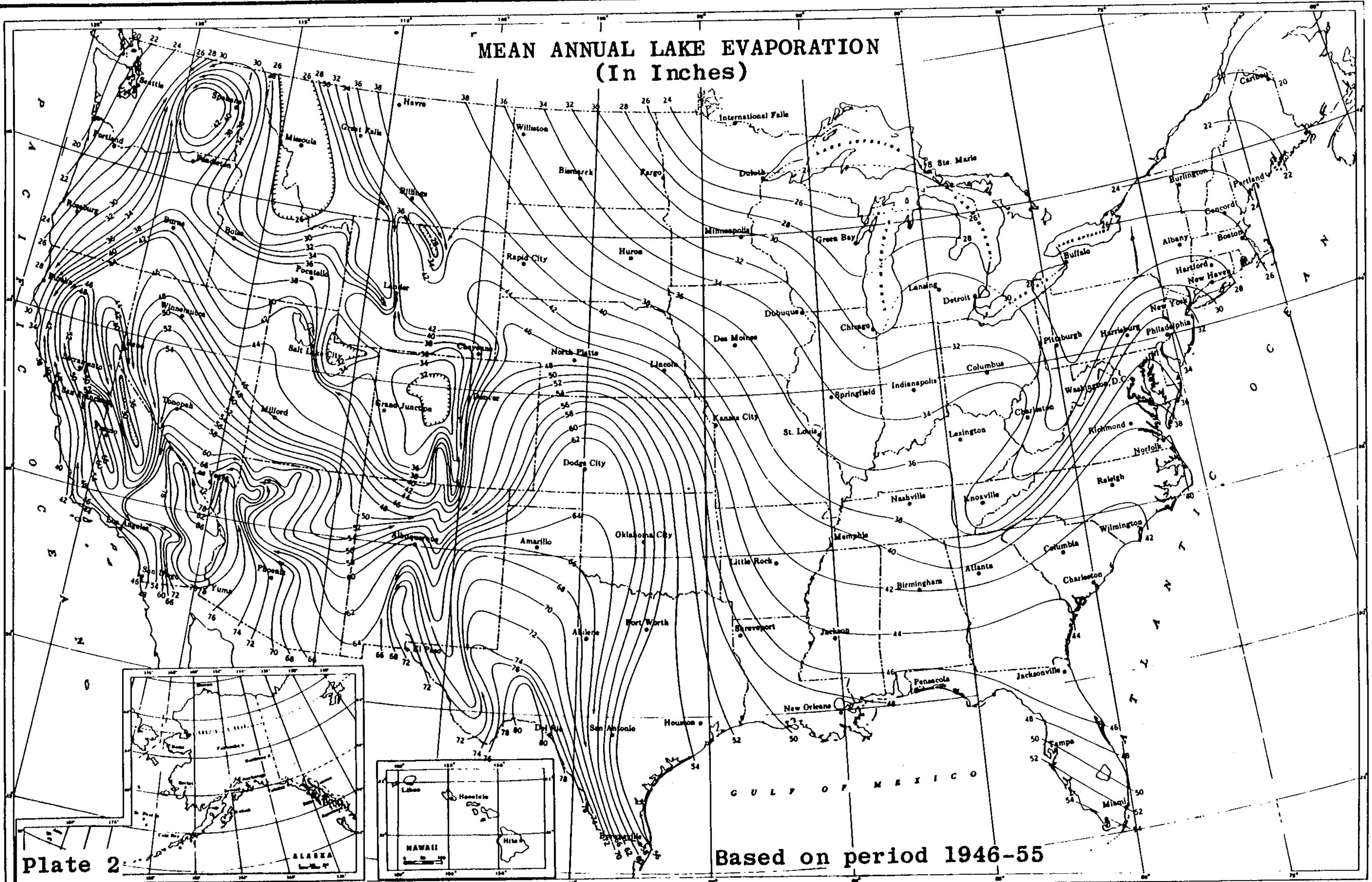
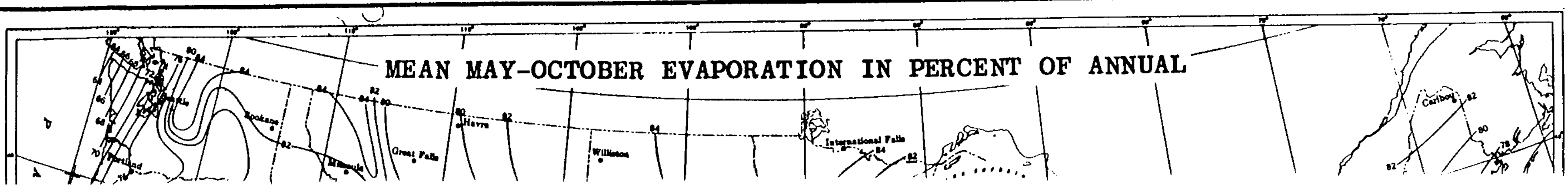
D LAKE EVAPORATION





REFERENCE 7

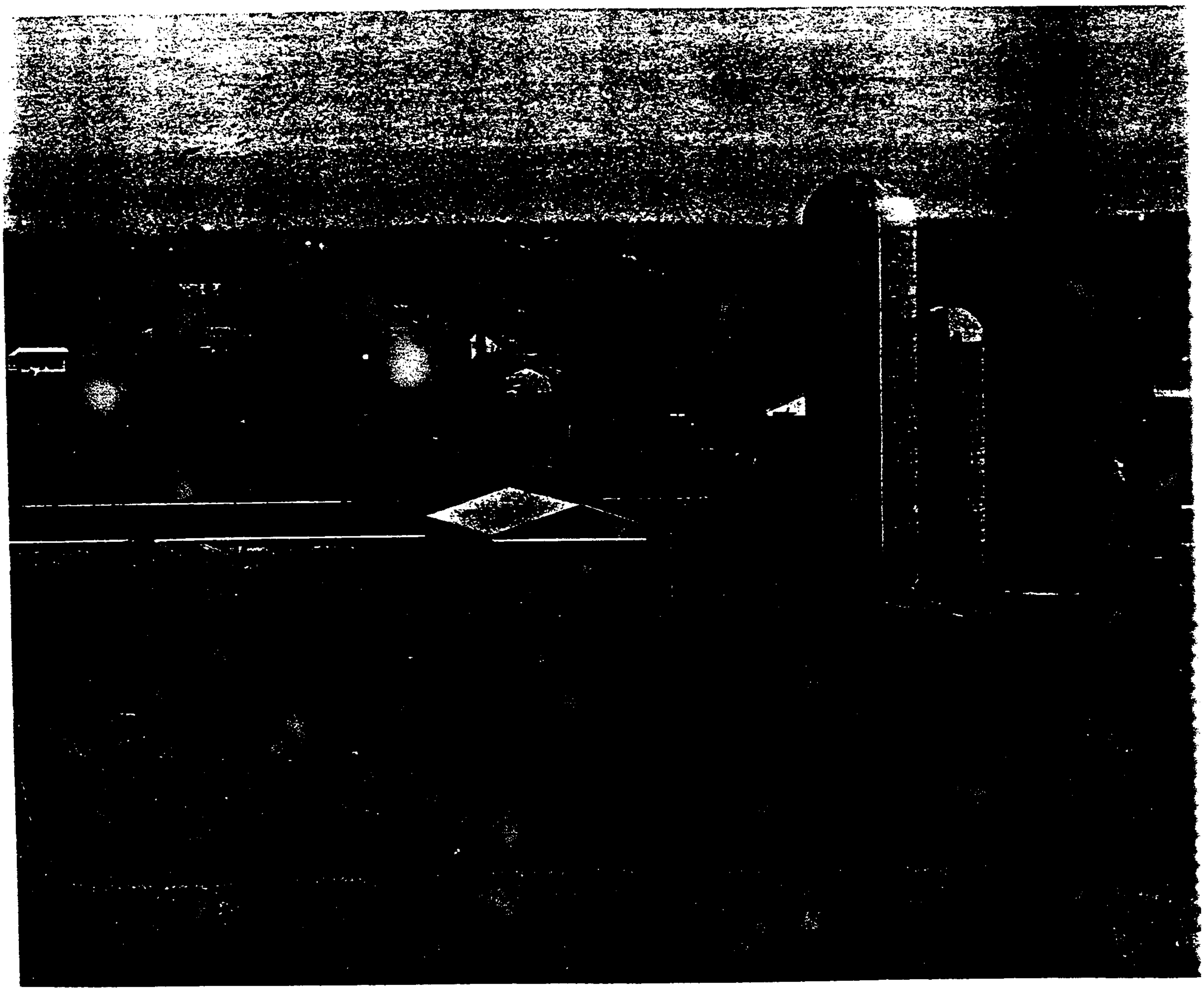
United States Department of Agriculture

Soil Conservation Service

In Cooperation with the Cornell University Agricultural Experiment Station

Soil Survey of Erie County, New York

RWY



LEGEND*

AREAS DOMINATED BY DEEP SOILS FORMED IN GLACIAL TILL DEPOSITS

1 — Churchville-Ovid-Lima: Dominantly nearly level, deep, somewhat poorly drained and moderately well drained, medium textured soils; on lowland plains

Darien-Remsen-Angola: Dominantly nearly level and gently sloping, deep and moderately deep, somewhat poorly drained, medium textured and moderately fine textured soils; on uplands underlain by alkaline shale bedrock

3 — Volusia-Mardin-Erie: Dominantly gently sloping and sloping, deep, somewhat poorly drained and moderately well drained, medium textured soils that have a fragipan; on uplands

AREAS DOMINATED BY MODERATELY DEEP AND SHALLOW SOILS FORMED IN GLACIAL TILL DEPOSITS

4 — Orpark-Manlius-Derb: Dominantly nearly level through very steep, moderately deep and deep, somewhat poorly drained to excessively drained, moderately fine textured or medium textured soils; on uplands underlain by acid shale bedrock

5 — Wassaic-Benson-Farmington: Dominantly nearly level, moderately deep and shallow, moderately well drained to excessively drained, medium textured soils; on uplands underlain by limestone bedrock

AREAS DOMINATED BY DEEP SOILS FORMED IN GLACIAL LAKE SEDIMENTS

6 — Hudson-Varysburg-Valois: Dominantly gently sloping through moderately steep, deep, moderately well drained and well drained, medium textured and moderately fine textured soils; in valleys

7 — Niagara-Canandaigua-Cosad: Dominantly nearly level, deep, somewhat poorly drained to very poorly drained, medium textured soils; on lowland plains

8 — Odessa-Schoharie-Rhinebeck: Dominantly nearly level and gently sloping, deep, somewhat poorly drained to well drained, medium textured and moderately fine textured soils; on lowland plains

AREAS DOMINATED BY DEEP SOILS FORMED IN GLACIAL OUTWASH DEPOSITS

Chenango-Castile-Varysburg: Dominantly nearly level through moderately steep, deep, somewhat excessively drained to moderately well drained, medium textured soils; on plains and in valleys

Blasdell-Farnham-Alton: Dominantly nearly level through sloping, deep, moderately well drained to somewhat excessively drained, medium textured soils; in valleys and on plains

AREAS DOMINATED BY SOILS IN URBAN AREAS

Urban Land: Dominantly nearly level urbanized areas and areas of well drained to poorly drained soils and disturbed soils; on lowland plains

*The texture given in the descriptive heading refers to the texture of the surface layer of the major soils in each map unit. Depth to bedrock and drainage classes given are also for the major soils.

Compiled 1984

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CORNELL UNIVERSITY AGRICULTURAL
EXPERIMENT STATION

GENERAL SOIL MAP

ERIE COUNTY, NEW YORK

Scale 1:316,800

1 0 1 2 3 4 5 Miles

1 0 5 10 Km

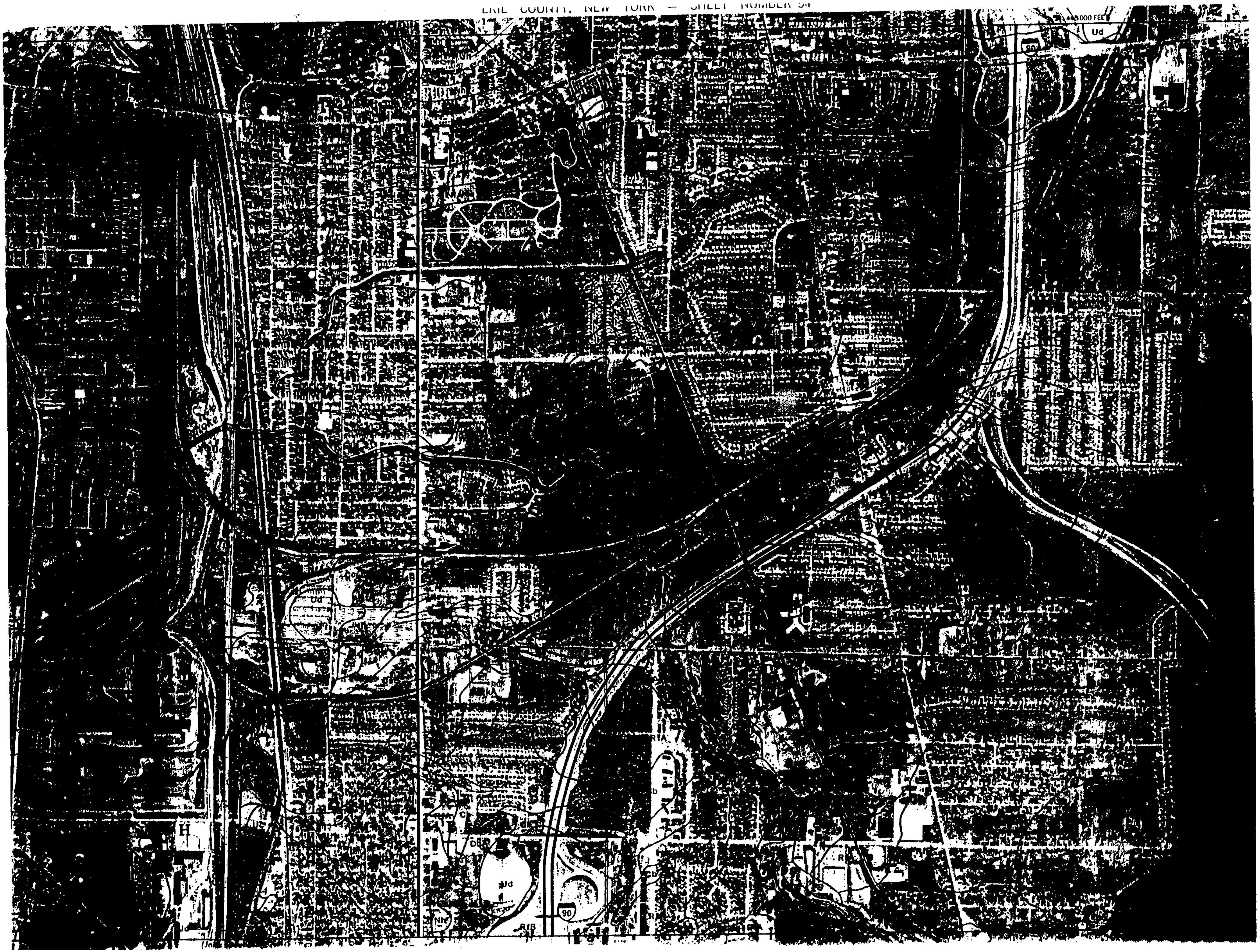
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SOIL LEGEND

The publication symbol consists of letters. The first letter always a capital, is the initial letter of the mapping unit name. The second letter is a small letter. The third letter, always a capital A, B, C, D, E, or F, indicates the slope. Symbols without a slope letter are those of nearly level soils. A final number, 3, shows that the soil is severely eroded.

SYMBOL	NAME
AlA	Allard silt loam, 0 to 3 percent slopes
AlB	Allard silt loam, 3 to 8 percent slopes
AmA	Alton fine gravelly loam, 0 to 3 percent slopes
AmB	Alton fine gravelly loam, 3 to 8 percent slopes
AmC	Alton fine gravelly loam, 8 to 15 percent slopes
AnB	Alton gravelly loam, silty substratum, 3 to 8 percent slopes
AnC	Alton gravelly loam, silty substratum, 8 to 15 percent slopes
AoA	Angola silt loam, 0 to 3 percent slopes
AoB	Angola silt loam, 3 to 8 percent slopes
ApA	Appleton silt loam, 0 to 3 percent slopes
ApB	Appleton silt loam, 3 to 8 percent slopes
ArB	Arkport very fine sandy loam, 3 to 8 percent slopes
ArC	Arkport very fine sandy loam, 8 to 15 percent slopes
ArD	Arkport very fine sandy loam, 15 to 25 percent slopes
ArE	Arkport very fine sandy loam, 25 to 40 percent slopes
AuC	Aurora shaly silt loam, 8 to 15 percent slopes
Be	Beaches
BfA	Benson very cherty loam, 0 to 3 percent slopes
BfB	Benson very cherty loam, 3 to 8 percent slopes
BgC	Benson very cherty loam, very rocky, 8 to 15 percent slopes
BhB	Benson-Rock outcrop complex, 3 to 8 percent slopes
BlA	Blasdell shaly silt loam, 0 to 3 percent slopes
BlB	Blasdell shaly silt loam, 3 to 8 percent slopes
BlC	Blasdell shaly silt loam, 8 to 15 percent slopes
BlD	Blasdell shaly silt loam, 15 to 25 percent slopes
BrA	Brockport silty clay loam, 0 to 3 percent slopes
BrB	Brockport silty clay loam, 3 to 8 percent slopes
Ca	Canadice silt loam
Cb	Canadice silt loam, shaly till substratum
Cc	Canandaigua silt loam
Cd	Canandaigua mucky silt loam
CeA	Castile gravelly loam, 0 to 3 percent slopes
CeB	Castile gravelly loam, 3 to 8 percent slopes
CfB	Cayuga silt loam, 3 to 8 percent slopes
CfC	Cayuga silt loam, 8 to 15 percent slopes
CgB	Cazenovia silt loam, 3 to 8 percent slopes
CgC	Cazenovia silt loam, 8 to 15 percent slopes
Ch	Cheektowaga fine sandy loam
CkA	Chenango gravelly loam, 0 to 3 percent slopes
CkB	Chenango gravelly loam, 3 to 8 percent slopes
CkC	Chenango gravelly loam, 8 to 15 percent slopes
CkD	Chenango gravelly loam, 15 to 25 percent slopes
ClA	Chenango channery silt loam, fan, 0 to 3 percent slopes
ClB	Chenango channery silt loam, fan, 3 to 8 percent slopes
CmE	Chenango and Palmyra soils, 25 to 40 percent slopes
Cn	Chippewa silt loam
CoA	Churchville silt loam, 0 to 3 percent slopes
CoB	Churchville silt loam, 3 to 8 percent slopes
CrA	Claverack loamy fine sand, 0 to 3 percent slopes
CrB	Claverack loamy fine sand, 3 to 8 percent slopes
CsA	Collamer silt loam, 0 to 3 percent slopes
CsB	Collamer silt loam, 3 to 8 percent slopes
CsC	Collamer silt loam, 8 to 15 percent slopes
CtB	Collamer silt loam, till substratum, 3 to 8 percent slopes
CuB	Colonie loamy fine sand, 3 to 8 percent slopes
CuC	Colonie loamy fine sand, 8 to 15 percent slopes
Cv	Cosad loamy fine sand
DeB	Danley silt loam, 3 to 8 percent slopes
DeC	Danley silt loam, 8 to 15 percent slopes
DeD	Danley silt loam, 15 to 25 percent slopes
DbA	Darien silt loam, 0 to 3 percent slopes
DbB	Darien silt loam, 3 to 8 percent slopes
DbC	Darien silt loam, 8 to 15 percent slopes
DcB	Darien silt loam, silty substratum, 3 to 8 percent slopes
DdA	Derb silt loam, 0 to 3 percent slopes
DdB	Derb silt loam, 3 to 8 percent slopes
DdC	Derb silt loam, 8 to 15 percent slopes
Dp	Dumps
Du	Dumps, slag
Ed	Edwards muck
ElA	Elnora loamy fine sand, 0 to 3 percent slopes
ElB	Elnora loamy fine sand, 3 to 8 percent slopes
ErA	Erie channery silt loam, 0 to 3 percent slopes
ErB	Erie channery silt loam, 3 to 8 percent slopes
ErC	Erie channery silt loam, 8 to 15 percent slopes
FaA	Farmington cherty loam, 0 to 3 percent slopes
FaB	Farmington cherty loam, 3 to 8 percent slopes
FbA	Farnham shaly silt loam, 0 to 3 percent slopes
FbB	Farnham shaly silt loam, 3 to 8 percent slopes
FcA	Farnham shaly silt loam, fan, 0 to 3 percent slopes
FcB	Farnham shaly silt loam, fan, 3 to 8 percent slopes
Fu	Fluvaquents and Udifluvents, frequently flooded
GaA	Galen very fine sandy loam, 0 to 3 percent slopes
GaB	Galen very fine sandy loam, 3 to 8 percent slopes
GbB	Galen fine sandy loam, till substratum, 3 to 8 percent slopes
Ge	Getzville silt loam
Ha	Halsey silt loam
Hn	Haplaquolls, ponded
Hm	Hamlin silt loam
HoA	Honeoye loam, 0 to 3 percent slopes
HoB	Honeoye loam, 3 to 8 percent slopes
HrA	Hornell silt loam, 0 to 3 percent slopes
HrB	Hornell silt loam, 3 to 8 percent slopes
HsC	Hornell silt clay loam, 8 to 15 percent slopes
HuB	Hudson silt loam, 3 to 8 percent slopes
HuC	Hudson silt loam, 8 to 15 percent slopes
HvD	Hudson silty clay loam, 15 to 25 percent slopes
HvE	Hudson silty clay loam, 25 to 40 percent slopes
HwD	Hudson gravelly loam, hilly
In	Ilion silt loam
Ke	Kendaia silt loam
La	Lakemont silt loam
Lb	Lakemont mucky silt loam
Lc	Lamson very fine sandy loam
Ld	Lamson mucky very fine sandy loam
LfB	Langford channery silt loam, 3 to 8 percent slopes
LfC	Langford channery silt loam, 8 to 15 percent slopes
LfD	Langford channery silt loam, 15 to 25 percent slopes
LgC	Langford channery silt loam, silty substratum, 8 to 15 percent slopes
LgD	Langford channery silt loam, silty substratum, 15 to 25 percent slopes
LmA	Lima loam, 0 to 3 percent slopes
LmB	Lima loam, 3 to 8 percent slopes
Ly	Lyons silt loam
Lz	Lyons mucky silt loam
MaA	Manlius shaly silt loam, 0 to 3 percent slopes
MaB	Manlius shaly silt loam, 3 to 8 percent slopes
MaC	Manlius shaly silt loam, 8 to 15 percent slopes
MaD	Manlius shaly silt loam, 15 to 25 percent slopes
MbE	Manlius very shaly silt loam, 25 to 35 percent slopes
MbF	Manlius very shaly silt loam, 35 to 50 percent slopes
McB	Mardin silt loam, 3 to 8 percent slopes
McC	Mardin silt loam, 8 to 15 percent slopes
MdB	Mardin channery silt loam, 3 to 8 percent slopes
MdC	Mardin channery silt loam, 8 to 15 percent slopes
MdD	Mardin channery silt loam, 15 to 25 percent slopes
MeF	Mardin-Valois complex, 25 to 50 percent slopes
MfA	Marilla shaly silt loam, 0 to 3 percent slopes
MfB	Marilla shaly silt loam, 3 to 8 percent slopes
MfC	Marilla shaly silt loam, 8 to 15 percent slopes
Mg	Middlebury silt loam
Mh	Minoa very fine sandy loam
Ne	Newstead loam
NfA	Niagara silt loam, 0 to 3 percent slopes
NfB	Niagara silt loam, 3 to 8 percent slopes
Ng	Niagara silt loam, fan
Nh	Niagara silt loam, till substratum
Od	Odessa silt loam
Oe	Odessa-Lakemont silt loams
OrA	Orpark silty clay loam, 0 to 3 percent slopes
OrB	Orpark silty clay loam, 3 to 8 percent slopes
OrC	Orpark silty clay loam, 8 to 15 percent slopes
OvA	Ovid silt loam, 0 to 3 percent slopes
OvB	Ovid silt loam, 3 to 8 percent slopes
Pa	Palms muck
PbA	Palmyra gravelly loam, 0 to 3 percent slopes
PbB	Palmyra gravelly loam, 3 to 8 percent slopes
Pc	Patchin silt loam
PhA	Phelps gravelly loam, 0 to 3 percent slopes
PhB	Phelps gravelly loam, 3 to 8 percent slopes
Pt	Pits, borrow
Pu	Pits, gravel
Qu	Quarries
RaA	Raynham silt loam, 0 to 3 percent slopes
RaB	Raynham silt loam, 3 to 8 percent slopes
Re	Red Hook silt loam
RfA	Remsen silty clay loam, 0 to 3 percent slopes
RfB	Remsen silty clay loam, 3 to 8 percent slopes
RfC	Remsen silty clay loam, 8 to 15 percent slopes
RgA	Rhinebeck silt loam, 0 to 3 percent slopes
RgB	Rhinebeck silt loam, 3 to 8 percent slopes
RhC3	Rhinebeck silty clay loam, 8 to 15 percent slopes, severely eroded
RkA	Rhinebeck gravelly loam, 0 to 3 percent slopes
RkB	Rhinebeck gravelly loam, 3 to 8 percent slopes
RmA	Rhinebeck silty clay loam, stratified substratum, 0 to 3 percent slopes
RmB	Rhinebeck silty clay loam, stratified substratum, 3 to 8 percent slopes
Ro	Rock outcrop
SaA	Schoharie silt loam, 0 to 3 percent slopes
SaB	Schoharie silt loam, 3 to 8 percent slopes
SbC3	Schoharie silty clay loam, 8 to 15 percent slopes, severely eroded
ScD	Schuyler silt loam, 15 to 25 percent slopes
ScE	Schuyler silt loam, 25 to 40 percent slopes
Sd	Scio silt loam
Sw	Swormville clay loam
Te	Teel silt loam
To	Tioga silt loam
Uc	Udorthents, smoothed
Ud	Urban land
UeB	Urban land-Benson complex, 3 to 6 percent slopes
Uf	Urban land-Canandaigua complex
Ug	Urban land-Cayuga complex
Uh	Urban land-Churchville complex
Uk	Urban land-Claverack complex
UmA	Urban land-Collamer complex, 1 to 6 percent slopes
UnB	Urban land-Colonie complex, 3 to 6 percent slopes
Uo	Urban land-Cosad complex
Up	Urban land-Galen complex
UrA	Urban land-Lima complex, 1 to 6 percent slopes
Us	Urban land-Niagara complex
Ut	Urban land-Odessa complex
Uu	Urban land-Schoharie complex
Uv	Urban land-Swormville complex
Uw	Urban land-Teel complex
Ux	Urban land-Wassaic complex
VaB	Valois gravelly silt loam, 3 to 8 percent slopes
VaC	Valois gravelly silt loam, 8 to 15 percent slopes
VaD	Valois gravelly silt loam, 15 to 25 percent slopes
VbA	Varysburg gravelly loam, 0 to 3 percent slopes
VbB	Varysburg gravelly loam, 3 to 8 percent slopes
VbC	Varysburg gravelly loam, 8 to 15 percent slopes
VbD	Varysburg gravelly loam, 15 to 25 percent slopes
VbE	Varysburg gravelly loam, 25 to 40 percent slopes
VoA	Volusia silt loam, 0 to 3 percent slopes
VoB	Volusia silt loam, 3 to 8 percent slopes
VpA	Volusia channery silt loam, 0 to 3 percent slopes
VpB	Volusia channery silt loam, 3 to 8 percent slopes
WaA	Wassaic silt loam, 0 to 3 percent slopes
WaB	Wassaic silt loam, 3 to 8 percent slopes
WbB	Wassaic very stony loam, 3 to 8 percent slopes
WcE	Wassaic-Rock outcrop complex, 25 to 40 percent slopes
Wd	Wayland silt loam
WeB	Williamson silt loam, 3 to 8 percent slopes
WeC	Williamson silt loam, 8 to 15 percent slopes

ERIE COUNTY, NEW YORK — SHEET NUMBER 34



REFERENCE 8

GAry Christopher

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

TABLE 2

PERMEABILITY OF GEOLOGIC MATERIALS*

Type of Material	Approximate Range of Hydraulic Conductivity	Assigned Value
Clay, compact till, shale; unfractured metamorphic and igneous rocks	$<10^{-7}$ cm/sec	0
Silt, loess, silty clays, silty loams, clay loams; less permeable limestone, dolomites, and sandstone; moderately permeable till	$10^{-5} - 10^{-7}$ cm/sec	1
Fine sand and silty sand; sandy loams; loamy sands; moderately permeable limestone, dolomites, and sandstone (no karst); moderately fractured igneous and metamorphic rocks, some coarse till	$10^{-3} - 10^{-5}$ cm/sec	2
Gravel, sand; highly fractured igneous and metamorphic rocks; permeable basalt and lavas; karst limestone and dolomite	$>10^{-3}$ cm/sec	3

*Derived from:

Davis, S. N., Porosity and Permeability of Natural Materials in Flow-Through Porous Media, R.J.M. DeWest ed., Academic Press, New York, 1969

Freeze, R.A. and J.A. Cherry, Groundwater, Prentice-Hall, Inc., New York, 1979

TABLE I

EPA Hazard Ranking System Waste Characteristics Values
(Toxicity/Persistence Matrix)

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Acenapthene	9	3
Acetaldehyde	6	6
Acetic Acid	6	6
Acetone	6	6
2-Acetylaminoflourene	18	9
Aldrin	18	9
Ammonia	9	9
Aniline	12	9
Anthracene	15	9
Arsenic	18	9
Arsenic Acid	18	9
Arsenic Trioxide	18	9
Asbestos	15	9
Barium	18	9
Benzene	12	9
Benzidine	18	9
Benzoapyrene	18	9
Benzopyrene, NOS	18	9
Beryllium & Compounds NOS	18	9
Beryllium Dust, NOS	18	9
Bis (2-Chloroethyl) Ether	15	9
Bis (2-Ethylhexyl Phthalate	12	3
Bromodichloromethane	15	6
Bromoform	15	6
Bromomethane	15	9
Cadmium	18	9
Carbon Tetrachloride	18	9
Chlordane	18	9
Chlorobenzene	12	6
Chloroform	18	6
3-Chlorophenol	12	6
4-Chlorophenol	15	9
2-Chlorophenol	12	6
Chromium	18	9
Chromium, Hexavalent (Cr^{+6})	18	9

Table I (cont.)

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Chromium, Trivalent (Cr^{+3})	15	6
Copper & Compounds, NOS	18	9
Creosote	15	6
Cresols	9	6
4-Cresol	12	9
Cupric chloride	18	9
Cyanides (soluble salts), NOS	12	9
Cyclohexane	12	6
DDE	18	9
DDT	18	9
Diaminotoluene	18	6
Dibromochloromethane	15	6
1, 2-Dibromo, 3-chloropropane	18	9
Di-N-Butyl-Phthalate	18	6
1, 4-Dichlorobenzene	15	6
Dichlorobenzene, NOS	18	6
1, 1-Dichloroethane	12	6
1, 2-Dichloroethane	12	9
1, 1-Dichloroethene	15	9
1, 2-cis-Dichloroethylene	12	3
1, 2-trans-Dichloroethylene	12	3
Dichloroethylene, NOS	12	3
2, 4-Dichlorophenol	18	6
2, 4-Dichlorophenoxyacetic Acid	18	9
Dicyclopentadiene	18	9
Dieldrin	18	9
2, 4-Dinitrotoluene	15	9
Dioxin	18	9
Endosulfan	18	9
Endrin	18	9
Ethylbenzene	9	6
Ethylene Dibromide	18	9
Ethylene Glycol	9	6
Ethyl Ether	15	3
Ethylmethacrylate	12	6

Table I (cont.)

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Fluorine	18	9
Formaldehyde	9	9
Formic Acid	9	6
Heptachlor	18	9
Hexachlorobenzene	15	6
Hexachlorobutadiene	18	9
Hexachlorocyclohexane, NOS	18	9
Hexachlorocyclopentadiene	18	9
Hydrochloric Acid	9	6
Hydrogen Sulfide	18	9
Indene	12	6
Iron & Compounds, NOS	18	9
Isophorone	12	6
Isopropyl Ether	9	3
Kelthane	15	6
Kepone	18	9
Lead	18	9
Lindane	18	9
Magnesium & Compounds, NOS	15	6
Manganese & Compounds, NOS	18	9
Mercury	18	9
Mercury Chloride	18	9
Methoxychlor	15	6
4, 4-Methylene-Bis-(2-Chloroaniline)	18	9
Methylene Chloride	12	6
Methyl Ethyl Ketone	6	6
Methyl Isobutyl Ketone	12	6
4-Methyl-2-Nitroaniline	12	9
Methyl Parathion	9	9
2-Methylpyridine	12	6
Mirex	18	9

Table I (cont.)

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Naphthalene	9	6
Nickel & Compounds, NOS	18	9
Nitric Acid	9	9
Nitroaniline, NOS	18	9
Nitrogen Compounds, NOS	12	0
Nitroguanidine	12	9
Nitrophenol, NOS	15	9
m-Nitrophenol	15	
o-Nitrophenol	12	
p-Nitrophenol	15	
Nitrosodiphenylamine	12	6
Parathion	9	9
Pentachlorophenol (PCP)	18	9
Pesticides, NOS	18	9
Phenanthrene	15	9
Phenol	12	9
Phosgene	9	9
Polybrominated Biphenyl (PBB), NOS	18	9
Polychlorinated Biphenyls (PCB), NOS	18	9
Potassium Chromate	18	9
Radium & Compounds, NOS	18	9
Radon & Compounds, NOS	15	9
RDX (Cyclonite)	15	
2, 4-D, Salts & Esters	18	9
Selenium	15	9
Sevin (Carbaryl)	18	9
Sodium Cyanide	12	9
Styrene	9	6
Sulfate	9	0
Sulfuric Acid	9	9
2, 4, 5-T	18	9
1, 1, 2, 2-Tetrachloroethane	18	9
Tetrachloroethane, NOS	18	9
1, 1, 2, 2-Tetrachloroethene	12	6

Table I (cont.)

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Tetraethyl Lead	18	9
Tetrahydrofuran	15	6
Thorium & Compounds, NOS	18	9
Toluene	9	6
TNT	12	
Toxaphene	18	9
Tribromomethane	18	9
1, 2, 4-Trichlorobenzene	15	6
1, 3, 5-Trichlorobenzene	15	6
1, 1, 1-Trichloroethane	12	6
1, 1, 2-Trichloroethane	15	6
Trichloroethane, NOS	15	6
Trichloroethene TCE	12	6
1, 1, 1-Trichloropropane	12	6
1, 1, 2-Trichloropropane	12	6
1, 2, 2-Trichloropropane	12	6
1, 2, 3-Trichloropropane	15	9
Uranium & Compounds, NOS	18	9
Varsol	12	6
Vinyl Chloride	15	9
Xylene	9	6
Zinc & Compounds, NOS	18	9
Zinc Cyanide	18	9

REFERENCE 9

Nussbaumer & Clarke Inc

RSM

April 8, 1981

Re: City of Lackawanna
Sewage Treatment Plant
Contract 14
NCI File No. 79-122

1. MH
2. File 15106

N.Y.S.D.E.C.
584 Delaware Avenue
Buffalo, New York 14202

Attention: Mr. Robert Mitrie:

Gentlemen:

Enclosed are copies of our Resident Inspector's Daily Reports, and daily logs of containers of dried sludge delivered, and mixed with earth at the landfill site on Abbott Road.

The entrance into the bermed area of the landfill has been securely blocked up with similar clay used to build the original berms.

If you have any questions, please contact this office.

Very truly yours,

NUSSBAUMER & CLARKE, INC.

Kenneth R. Selden

Kenneth R. Selden, A.I.A.
Resident Engineer

KRS:Ml

cc: M.O.
S. Weisberger
R. Wutz
M. L. Scharf
File

Enclosures

LACKAWANNA STP

DAILY INSPECTION REPORT

DATE 4 / 3 / 81 PAGE 1 OF 1
DAY M. T. W. Th (F) S.

NUSSBAUMER & CLARKE INC.
MASTER EVENT LOG SHEET

REPORT NO. 200 A
N. & C. JOB NO. 79-122

CONTRACT NO.

TEMPERATURE RANGE 66 TO 73

SITE CONDITIONS-DRY X MUDDY__ DUSTY__ OTHER ___
WEATHER-CLEAR X CLOUDY__ RAIN__ SNOW__ WINDY X OTHER ___

CONTRACT DRAWING NO. AND/OR SPECIFICATION PAGE REFERENCE

CONTRACTOR F.L. CIMINELLI CONSTR CO

WORK PERFORMED TWO (2) LOADS OF SLUDGE FROM THE LACKAWANNA SEWAGE TREATMENT PLANT WERE DISPOSED OF AT THE ABBOTT ROAD SANITARY LANDFILL TODAY.
THIS COMPLETES THE SLUDGE DISPOSAL OPERATION AT THE LANDFILL SITE.
THE TOTAL NUMBER OF CONTAINERS OF SLUDGE DISPOSED OF AT THE LANDFILL IS 136.
AFTER TODAY'S LOADS OF SLUDGE WERE MIXED WITH DIRT, THE OPEN END OF THE BERMED AREA WAS CLOSED IN WITH DIRT SO THAT THE SLUDGE MIXTURE IS FULLY CONTAINED WITHIN THE BERMED AREA.

WORK FORCE
1 - OPERATOR
1 - TRUCK DRIVER

DELIVERIES—

VISITORS NONE

SIGNATURE & TITLE

NC-8-1

DISTRIBUTION—ORIGINAL AND YELLOW TO RESIDENT, PINK TO INSPECTOR

REFERENCE 10

DEPARTMENT OF PUBLIC WORKS
RONALD S. CARDINALE
CHIEF ENGINEER
ANTHONY E. COLLARENO
SENIOR ENGINEER
BRUCE L. COLELLO
PRINCIPAL CLERK

CITY OF LACKAWANNA
ERIE COUNTY, NEW YORK

ROOM 311, CITY HALL, RIDGE ROAD
LACKAWANNA, NEW YORK 14218
TELEPHONE 716—826-4555 EXT. 21 & 22

HSPHB
Water YL
Air
Gen
Circ
File

January 13, 1978

Mr. John C. McMahon, P.E.
Sr. Environmental Quality Engineer
Bureau of Water Resources
NYSDEC
Region 9 Office
584 Delaware Avenue
Buffalo, New York 14202

Re: Permit to Continue Operating Solid Waste Facility in City of Lackawanna.

Dear Mr. McMahon:

On December 30, 1977, the City of Lackawanna received instructions and application forms from Mr. Anthony Voell, Chief, Bureau of Water Resources, Erie County, pertaining to the City of Lackawanna filing an application with the NYSDEC which would authorize us to continue the operation of our landfill.

Using the items he mentions in their numerical sequence, I have attempted to explain the operations involved in our present landfill and also apply for a permit to continue our present operation.

1. Enclosed please find completed form 47-19-4.

2. Enclosed please find a site survey of our landfill area as drawn and certified in 1961 by Mr. Timothy McCormick, P.E., Lic. No. 615.

3. At the present time, the City of Lackawanna has no detailed program for the closure of our facility since it still has approximately 10 years more of useful life.

The City of Lackawanna is utilizing the area in a west to east direction, and as each area reaches its maximum capacity it is left at its temporary finished grade. Cover material has previously been deposited at the site and at the end of each working day a six inch earth cover is placed over the incinerated residue

-con't-

dumped that day. (It should be noted at this point that only incinerated residue is deposited at this landfill).

By operating as stated above, when the full capacity of our landfill has been reached, the City of Lackawanna will be in possession of approximately 15 acres of cleared land suitable for just about any purpose.

As we progress along we close up the area previously filled and dress it to its temporarily finished state. Upon permanently closing the landfill, the City will cover the entire area with an additional 24 inches of soil. Also the City of Lackawanna will comply with any requirements stipulated by County, State of Federal Agencies pertaining to the final closure of our landfill.

4. On a daily basis, the City of Lackawanna deposits approximately two loads of incinerated residue (approximately 16 cu. yds.) at our disposal site. At the end of each working day a six inch layer of earth (primarily clay, silt, and loam) is spread over the freshly deposited material. This earth fill was brought to the site and stored there specifically to be used as cover material.

Since our operation is a relatively simple one, equipment breakdowns present no problem. A city-owned truck equipped with a special scow body is loaded at our municipal incinerator and hauls the incinerated residue to our landfill. Once the material is dumped, a front-end loader is used to spread the material and cover it with the above mentioned cover material. The only piece of equipment needed at the site is the front-end loader and if this should become inoperable, as it has in the past, the City rents another until ours is repaired and put back in service.

In 1973, the City experienced a runoff water problem at our landfill site due to storm water which drained off and through the NYS Thruway roadbed which was collecting on our site. The City corrected this problem by installing 550 linear feet of 24" diameter storm sewer pipe from the origin of the water at the Thruway embankment to a point on the opposite side of our landfill leading into a drainage ditch which transports the water into another existing storm sewer and eventually into Smokes Creek.

We do not deposit hazardous or toxic materials at our site.

Actual operations at the site are so limited that air contamination due to dust or exhaust emissions are negligible. We do spray oil on our access road to keep road dust from being raised during the hot weather months. This is done in spite of the fact that the road is used only three times daily: 2 truck trips and 1 trip for the front-end loader.

All material deposited on our site has been completely incinerated and left to cool before it is loaded and transported to our landfill, therefore, danger of fire is extremely slight.

5. Pertaining to Section 360.8a -

1. No incinerated material shall be placed in surface water or ground waters. As explained earlier (in Item 4) the City of Lackawanna went to considerable expense in 1973 to install storm sewer pipe across our landfill in such a manner so as to prevent storm water from ponding in our landfill area.

2. Our landfill area is not located in an agricultural area.

3. We have no surface water at our site, so Leachate does not present a problem.

4. Our landfill only receives incinerated residue which has no salvage value.

5. No access to our facility is allowed at any time to anyone not directly concerned with the operation of our landfill.

6. Our facility has only one access road which is protected by a gate which is kept locked at all times.

7. Our landfill only receives incinerated residue, therefore, we have no problem with blowing papers.

8. Our landfill area is regularly baited by a competent exterminator to control rodent infestation.

To control dust from our access road due to truck traffic to and from the site, the City applies oil to the road surface thereby eliminating any dust problem.

9. The access road to our landfill area is kept in a safe passable condition at all times.

10. The facility is operated in such a manner as to eliminate any unsafe conditions, as far as possible.

11. It is our belief that Item 11 does not apply to our situation We have only one truck making two trips per day, and at the completion of the second dumping, a front-end loader arrives at the site to spread and cover the material.

Our truck and front-end loader are both muffler equipped and neither is in operation long enough to cause any distractions or disturbances to neighboring residents.

12. Our Lackawanna Municipal Garage is located approximately 1.52 miles from our landfill site, and all facilities required for personnel are available there.

Personnel running the landfill are based at our city garage since the landfill is in such close proximity to it.

13. All equipment at our municipal garage is considered usable at our landfill if needed.

At the present time, the City of Lackawanna owns and maintains a truck with a special scow body and two front end rubber-tire loaders for use at our landfill site.

14. Equipment is sheltered at our municipal garage.

15. No open burning shall take place at our site.

16. All dumping of incinerated residue is confined to small area, and covered over at the end of the day.

17. No hazardous wastes shall ever be brought to our landfill site.

18. Same as above.

19. The City of Lackawanna will submit any required forms to any overseeing agency upon request.

20. The City of Lackawanna will continue to operate and maintain its landfill to meet all requirements pursuant to Part 360, Proposed New Rules and Regulations Solid Waste Management Facilities 6NYCRR Part 360.

All equipment used at the facility shall be maintained to operate efficiently.

In the event of equipment failure, the City will contract with outside agencies to acquire equipment to continue operations.

21. Our landfill site is not located in a flood plain.

Pertaining to 360.8b -

(1) Sanitary Landfill

(i) The groundwater elevation in the general area of our landfill facility is approximately 591.0 above sea level. The approximate low ground elevation in our landfill area is 608.0 feet above sea level, so we easily meet the minimum verticle separation required between our residue deposits and groundwater.

(ii) No surface waters are present at our landfill site.

(iii) The City of Lackawanna has no monitoring wells at its landfill facility. Since we are operating at an existing facility none are required.

(iv) Does not apply to our situation.

(v) Does not apply to our situation.

(vi) Complete combustion has taken place in all residue deposited at our landfill so no decomposition gases can be generated from our residue.

(vii)

a. All deposits placed shall be kept to a maximum of two feet in depth and properly compacted.

b. Lift heights will not exceed ten feet.

c. Daily cover shall be placed upon all exposed deposits at the close of each working day.

d. Should the City ever forsee a time period of 30 days when we will not make any deposits (highly unlikely) we will apply intermediate cover, as required.

e. The City will apply final cover in each of the following circumstances: If additional refuse is not to be placed in an area within 90 days of attaining final elevation of an area; upon termination of the life of the landfill for any reason.

(viii) The area has been and will continue to be graded in such a manner as to assure proper rainfall runoff so as to prevent ponding, etc.

(ix) Grass will be planted and maintained by the City of Lackawanna within 4 months after final cover has been placed.

(x) The City of Lackawanna agrees to maintain the landfill area for a period of five years after placement of final cover.

(xi) No hazardous wastes, or wastes of any kind other than incinerated residue, shall be placed at our landfill.

(xii) The City agrees not to deposit fill or excavate any areas within fifty feet of the boundary line of the landfill area.

(xiii) A surveying bench mark will be established and maintained on the site.

(xiv) In the event the City of Lackawanna should sell the landfill area at any time, provisions shall be included in the deed indicating the period of time the area was used as a landfill, a description of the wastes contained therein, and the fact that records for the facility have been filed with the NYSDEC. Included shall be a survey of the area.

(xv) Any additional requirements deemed necessary by any licensing agency will be honored by the City of Lackawanna.

6. The City of Lackawanna fully believes that we now meet and shall continue to meet the standards set forth in these regulations.

7. The City of Lackawanna landfill accepts neither industrial nor hazardous wastes.

8. Application is signed by Mayor Edward Kuwik, City of Lackawanna.

Yours truly,

Anthony Collareno

ANTHONY COLLARENO
SENIOR ENGINEER

AC:li

enc.

REFERENCE 11

1. KH
2. FILE: 15106

NUS CORPORATION

POTENTIAL HAZARDOUS WASTE SITE

EXECUTIVE SUMMARY

Lackawanna City Landfill	NYD980506976
Site Name	**EPA Site ID Number**
1938 Abbott Road Lackawanna, New York	F2-8303-110
Address	**TDD Number**

Date of Site Visit: May 10, 1983

SITE DESCRIPTION

The Lackawanna City Landfill is surrounded by the N.Y. Thruway to the south and east, the Lehigh Valley railroad to the north and Abbott Road to the west. A series of power lines run parallel to the railroad tracks. A drainage ditch flowing east empties into a small pond adjacent to the northeast portion of the site. The site was used by the City of Lackawanna for the disposal of incinerator residue from 1968 to 1976. The site is presently covered by vegetation and a marsh. No hazardous waste was observed or is known to be present at the Lackawanna City Landfill.

PRIORITY FOR FURTHER ACTION: High ___ Medium ___ Low X

RECOMMENDATIONS

No further action recommended.

Prepared by: Jerry Gill[?] Date: 6/9/83
of NUS Corporation

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D980506976

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Lackawanna City Landfill	1938 Abbott Road				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
Lackawanna	NY	14218	Erie	029	37

09 COORDINATES LATITUDE 42° 48' 50". N LONGITUDE 78° 47' 51". W

10 DIRECTIONS TO SITE (Starting from nearest public road)

From N.Y. Thruway, get off at exit 55, take Ridge Road west, toward Lackawanna. Proceed about ½ mile for Abbott Road, make a left onto Abbott Road. Follow Abbott for a mile until railroad tracks. Site is just past railroad tracks on left.

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)		
City of Lackawanna	Ridge Road, City Hall		
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 TELEPHONE NUMBER**
Lackawanna	NY	14218	(716) 827-6444
07 OPERATOR (If known and different from owner)	**08 STREET (Business, mailing, residential)**		
Same as owner			
09 CITY	**10 STATE**	**11 ZIP CODE**	**12 TELEPHONE NUMBER**
			( )

13 TYPE OF OWNERSHIP (Check one)

☐ A. PRIVATE ☐ B. FEDERAL: ____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☒ E. MUNICIPAL

☐ F. OTHER: ____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☐ A. RCRA 3001 DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☒ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES DATE 5/10/83 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply)

☐ A. EPA ☒ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR

☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: ____ (Specify)

CONTRACTOR NAME(S): NUS Corporation

02 SITE STATUS (Check one)

☐ A. ACTIVE ☒ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION 1968 (BEGINNING YEAR) 1976 (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Roadbed material, concrete, asphalt, and incinerator residue consisting of burnt cans and ash.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

No hazard to the environment and/or population exists.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☒ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)		03 TELEPHONE NUMBER	
Mark Haulenbeek	USEPA, Region II, Edison, NJ		(201) 321-6685	
04 PERSON RESPONSIBLE FOR ASSESSMENT	**05 AGENCY**	**06 ORGANIZATION**	**07 TELEPHONE NUMBER**	**08 DATE**
Jerry Cirilli		NUS Corporation	(201) 225-6160	5/12/83 (MONTH DAY YEAR)

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☒ A. SOLID
- ☐ B. POWDER, FINES
- ☐ C. SLUDGE
- ☐ D. OTHER ________ (Specify)
- ☐ E. SLURRY
- ☐ F. LIQUID
- ☐ G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

- TONS: unknown
- CUBIC YARDS: ________
- NO. OF DRUMS: ________

03 WASTE CHARACTERISTICS (Check all that apply)

- ☐ A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☐ D. PERSISTENT
- ☐ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☐ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☒ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			No hazardous waste was observed or is
SOL	SOLVENTS			known to be present at the site.
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

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
	Not Applicable.				

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	Not Applicable.		FDS		
FDS			FDS		

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

Site Investigation, NUS Corporation, 5/10/83

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE: ______) — ☒ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 100 — 04 NARRATIVE DESCRIPTION

A potential for groundwater contamination exists, although no leachate was observed on site.

01 ☐ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: ______) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE: ______) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE: ______) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☒ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: ______) — ☒ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 100 — 04 NARRATIVE DESCRIPTION

Site is not fenced along perimeter, therefore, a potential for direct contact exists.

01 ☒ F. CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE: ______) — ☒ POTENTIAL — ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: 10 (Acres) — 04 NARRATIVE DESCRIPTION

A potential for soil contamination exists, although no direct contamination of soil was observed on site.

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: ______) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: ______) — ☐ POTENTIAL — ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: ______) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
No potential exists.

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)
No potential exists.

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
No potential exists.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 100 — 04 NARRATIVE DESCRIPTION
Landfill is unlined. A potential for leachate runoff exists.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
No potential exists.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
No potential exists.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
No potential exists.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
None

III. TOTAL POPULATION POTENTIALLY AFFECTED: 100

IV. COMMENTS

The landfill was used by the city for the disposal of roadbed material. Asphalt, concrete, and soil used for fill material are present in the landfill.

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

Site Investigation, NUS Corporation, 5/10/83

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D980506976

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	Lackawanna City Landfill
02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER	1938 Abbott Road
03 CITY	Lackawanna
04 STATE	NY
05 ZIP CODE	14218
06 COUNTY	Erie
07 COUNTY CODE	029
08 CONG DIST	37
09 COORDINATES LATITUDE	42° 48' 50" N
LONGITUDE	78° 47' 51" W
10 TYPE OF OWNERSHIP (Check one)	☐ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☒ E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION (MONTH DAY YEAR)	5 / 10 / 83
02 SITE STATUS	☐ ACTIVE ☒ INACTIVE
03 YEARS OF OPERATION	1968 (BEGINNING YEAR) – 1976 (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A. EPA ☒ B. EPA CONTRACTOR NUS Corporation (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ______ (Name of firm)

☐ E. STATE ☐ F. STATE CONTRACTOR ______ (Name of firm) ☐ G. OTHER ______ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Keith Keller	Environmental Scientist	NUS	(201) 225-6160
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO.**
Jerry Cirilli	Geologist	NUS	(201) 225-6160
Mike Kramer	Environmental Scientist	NUS	(201) 225-6160
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
Mike Klaich	Sanitation Inspector	City of Lackawanna Lackawanna, NY	(716) 827-6443
Tony Collareno	City Engineer	City of Lackawanna Lackawanna, NY	(716) 827-6425
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	9:45 a.m.	Sunny, temperature: 40-45°F 5-10 mph winds from the north.

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Mark Haulenbeek	USEPA Region II, Edison, NJ	(201) 321-6685

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE (MONTH DAY YEAR)
Jerry Cirilli		NUS Corporation	(201) 225-6160	5 / 16 / 83

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES *(Check all that apply)*

- ☒ A. SOLID
- ☐ B. POWDER, FINES
- ☐ C. SLUDGE
- ☐ D. OTHER ______ *(Specify)*
- ☐ E. SLURRY
- ☐ F. LIQUID
- ☐ G. GAS

02 WASTE QUANTITY AT SITE *(Measures of waste quantities must be independent)*

TONS unknown

CUBIC YARDS ______

NO. OF DRUMS ______

03 WASTE CHARACTERISTICS *(Check all that apply)*

- ☐ A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☐ D. PERSISTENT
- ☐ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☐ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☒ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			No hazardous waste was observed or known
OLW	OILY WASTE			to exist at the Lackawanna City Landfill.
SOL	SOLVENTS			Incinerator waste consisting of burnt
PSD	PESTICIDES			cans and ash were disposed at the site
OCC	OTHER ORGANIC CHEMICALS			for approximately eight years.
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

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
	Not Applicable.				

V. FEEDSTOCKS *(See Appendix for CAS Numbers)*

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	Not Applicable.		FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

Site Investigation of 5/10/83

Conversation with Mr. Mike Klaich, Sanitation Inspector, (716) 827-6443.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

EPA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D980506976

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 100 — 04 NARRATIVE DESCRIPTION

A potential for groundwater contamination exists, although no leachate was observed on site.

01 ☐ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☒ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 100 — 04 NARRATIVE DESCRIPTION

Site is not fenced along perimeter, therefore, a potential for direct contact exists.

01 ☒ F. CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: 10 (Acres) — 04 NARRATIVE DESCRIPTION

A potential for soil contamination exists, although no direct contamination of soil was observed on site.

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

No potential exists.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION *(Include name(s) of species)*

No potential exists.

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential exists.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/Runoff/Standing liquids, Leaking drums)* — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 100 — 04 NARRATIVE DESCRIPTION

Landfill is unlined. A potential for leachate runoff exists.

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential exists.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No potential exists.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

None

III. TOTAL POPULATION POTENTIALLY AFFECTED: 100

IV. COMMENTS

The landfill was used by the city for the disposal of roadbed material and incinerator waste consisting of burnt cans and ash. Asphalt, concrete and soil was used for fill material.

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

Site Investigation, NUS Corporation, 5/10/83
Conversation with Mr. Tony Collareno, City Engineer, (716) 827-6425

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ 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		
☒ F. LANDFILL	unknown	
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

none

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER

☐ A. BUILDINGS ON SITE

none

06 AREA OF SITE

10 (Acres)

07 COMMENTS

Site is heavily vegetated. Some areas containing roadbed material were observed. No leachate was observed on site.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☒ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

Landfill is unlined.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☒ YES ☐ NO

02 COMMENTS

Site is accessible, however, no hazardous waste is known to exist on site.

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

Site Investigation, NUS Corporation, 5/10/83

Conversation with Mr. Mike Klaich, Sanitation Inspector, (716) 827-6443

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D980506976

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. ☒	B. ☐
NON-COMMUNITY	C. ☐	D. ☐

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☒
D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE

A. 6 (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) ☒ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 0

03 DISTANCE TO NEAREST DRINKING WATER WELL No drinking water wells. (mi)

04 DEPTH TO GROUNDWATER 15-20 (ft)

05 DIRECTION OF GROUNDWATER FLOW north

06 DEPTH TO AQUIFER OF CONCERN not applicable (ft)

07 POTENTIAL YIELD OF AQUIFER not applicable (gpd)

08 SOLE SOURCE AQUIFER ☐ YES ☒ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

Private wells do exist, however, these wells do not supply potable water. All potable water is derived from the surface waters of Lake Erie.

10 RECHARGE AREA

☒ YES ☐ NO

COMMENTS Marsh and pond are adjacent to the site, flow into Smoke Creek which empties into Lake Erie.

11 DISCHARGE AREA

☐ YES ☒ NO

COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☒ 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
Smoke Creek	☐	0.5 (mi)
Lake Erie	☐	3.0 (mi)
	☐	(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. 5000 NO. OF PERSONS	B. 17000 NO. OF PERSONS	C. 54000 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 0.1 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE 4000

04 DISTANCE TO NEAREST OFF-SITE BUILDING 0.1 (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)

Site is located adjacent to a rural area consisting of single family homes. A high school and various shops are located in a shopping district approximately one half mile from site.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE *(Check one)*

☐ 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) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
30 (ft)	unknown (ft)	5.8 - 6.8

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
15 (in)	2.2 (in)	1 %	NE	1 %

09 FLOOD POTENTIAL

SITE IS IN 100 YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS *(5 acre minimum)*

Not Applicable

ESTUARINE A. ______ (mi) OTHER B. ______ (mi)

12 DISTANCE TO CRITICAL HABITAT *(of endangered species)*

Not applicable. ______ (mi)

ENDANGERED SPECIES: ______

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. 0.5 (mi)	B. 0.1 (mi)	C. 0.25 (mi)	D. 0.1 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site is located on a rectangular tract of land. It is surrounded by the NY Thruway to the south and east, the Lehigh Valley railraod to the north and Abbott Road to west. A series of power lines run parallel to the railroad tracks. The site was heavily vegetated, especially along the north perimeter near the pond. A small drainage ditch was located in the center of the site. This creek emptied into the pond along the north perimeter of the site. The topography in the surrounding area is somewhat flat.

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

Site Investigation, NUS Corporation, 5/10/83

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. SAMPLES TAKEN

No samples taken.

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER			
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Air Monitoring	HNU detected no contaminants above background level.

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF NUS Corporation
(Name of organization or individual)

03 MAPS
☒ YES
☐ NO

04 LOCATION OF MAPS
Maps attached, in possession of NUS Corporation.

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Field notes.

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

Site Investigation, NUS Corporation, 5/10/83

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
City of Lackawanna		Ridge Road, City Hall		Lackawanna	NY	14218

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE
Not applicable						

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
City of Lackawanna		Ridge Road, City Hall		Lackawanna	NY	14218

IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
No realty owner						

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

Conversation with Mike Klaich, (716) 827-6443

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE	08 YEARS OF OPERATION	09 NAME OF OWNER
Site is inactive								

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	14 CITY	15 STATE	16 ZIP CODE
Not applicable						

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE	08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
None								

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	14 CITY	15 STATE	16 ZIP CODE
Not applicable						

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

Site Inspection NUS Corporation, 5/10/83

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
None						

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
City of Lackawanna		Ridge Road, City Hall		Lackawanna	NY	14218

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
City of Lackawanna		Sanitation Department, Ridge Road		Lackawanna	NY	14218

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

Conversation with Mike Klaich, (716) 827-6443

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ F. WASTE REPACKAGED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ H. ON SITE BURIAL — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ L. ENCAPSULATION — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ N. CUTOFF WALLS — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ S. CAPPING/COVERING 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ T. BULK TANKAGE REPAIRED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ U. GROUT CURTAIN CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ V. BOTTOM SEALED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ W. GAS CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ X. FIRE CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ Y. LEACHATE TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ Z. AREA EVACUATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ 1. ACCESS TO SITE RESTRICTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ 2. POPULATION RELOCATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
Not applicable.

01 ☐ 3. OTHER REMEDIAL ACTIVITIES 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
none

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

Conversation with Mike Klaich, (716) 827-6443

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D980506976

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☒ 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)

Conversation with Mike Klaich, (716) 827-6443

EPA FORM 2070-13 (7-81)

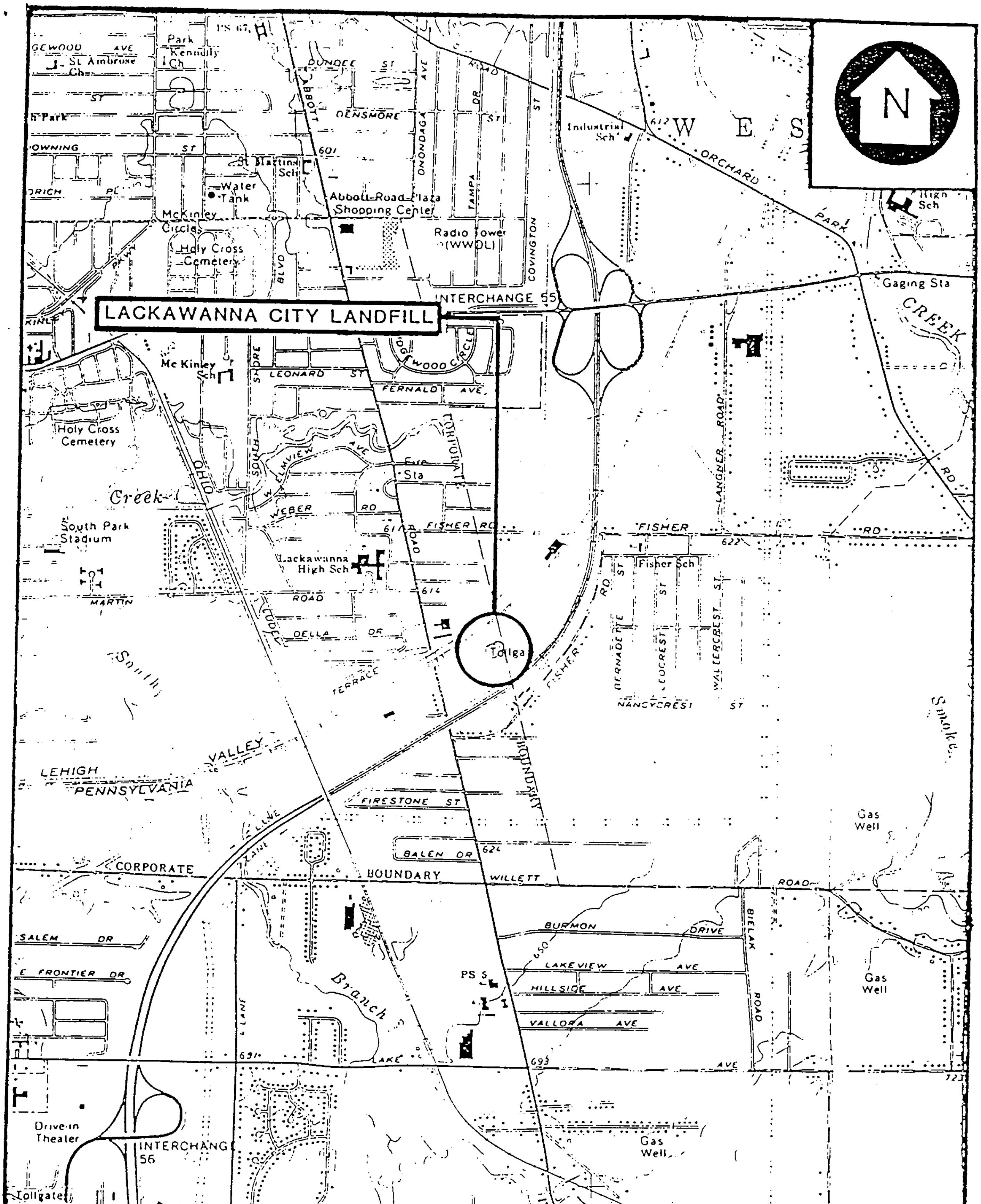
MAPS AND PHOTOS

Figure A-1 provides a Site Location Map.

Figure A-2 provides a Site Map.

Figure A-3 provides a Photo Location Map.

Exhibit A-1 provides photographs of the site.



LACKAWANNA CITY LANDFILL

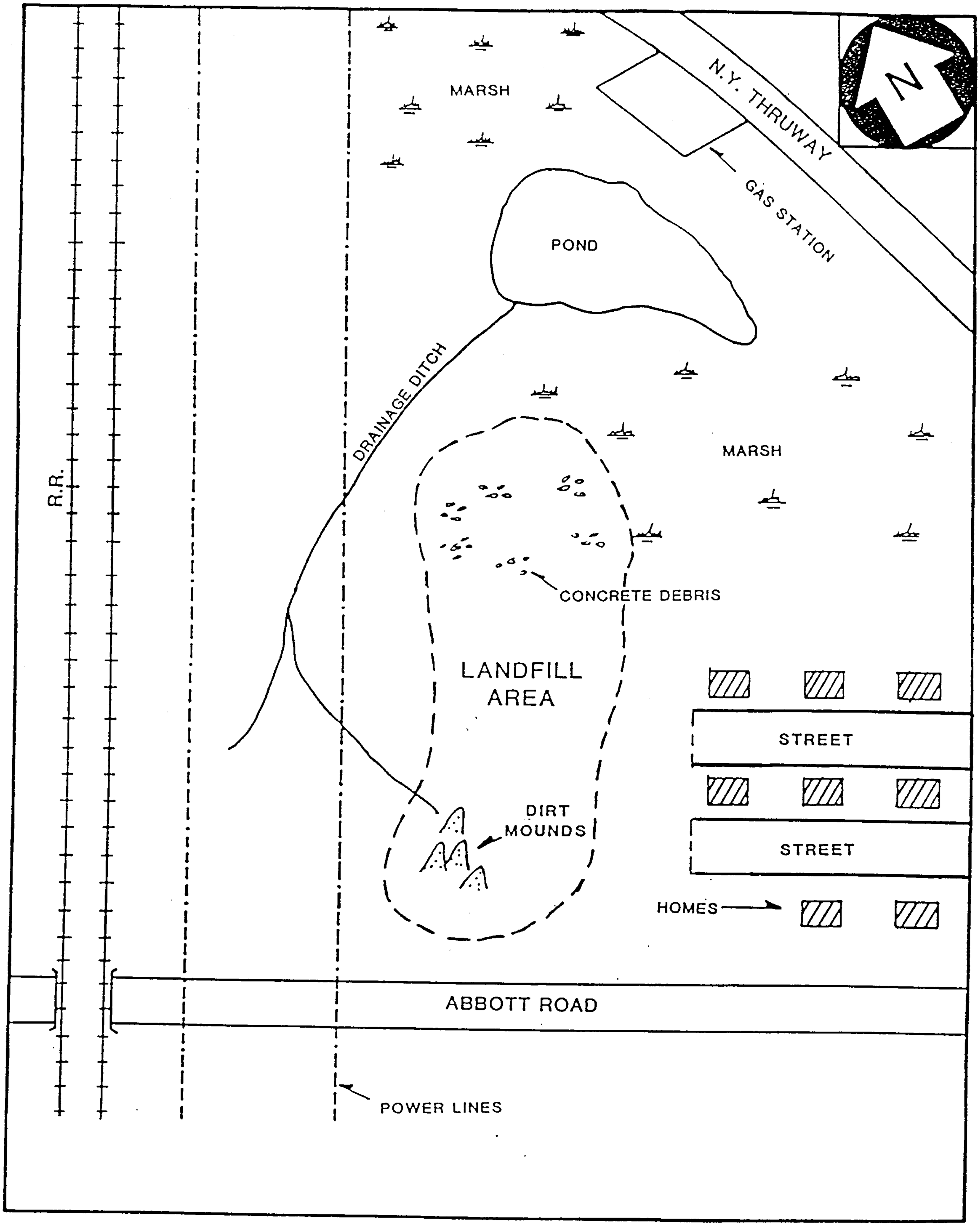
LACKAWANNA, NY

SITE LOCATION MAP

1000 0 1000 2000 ft

FIGURE A-1

NUS CORPORATION



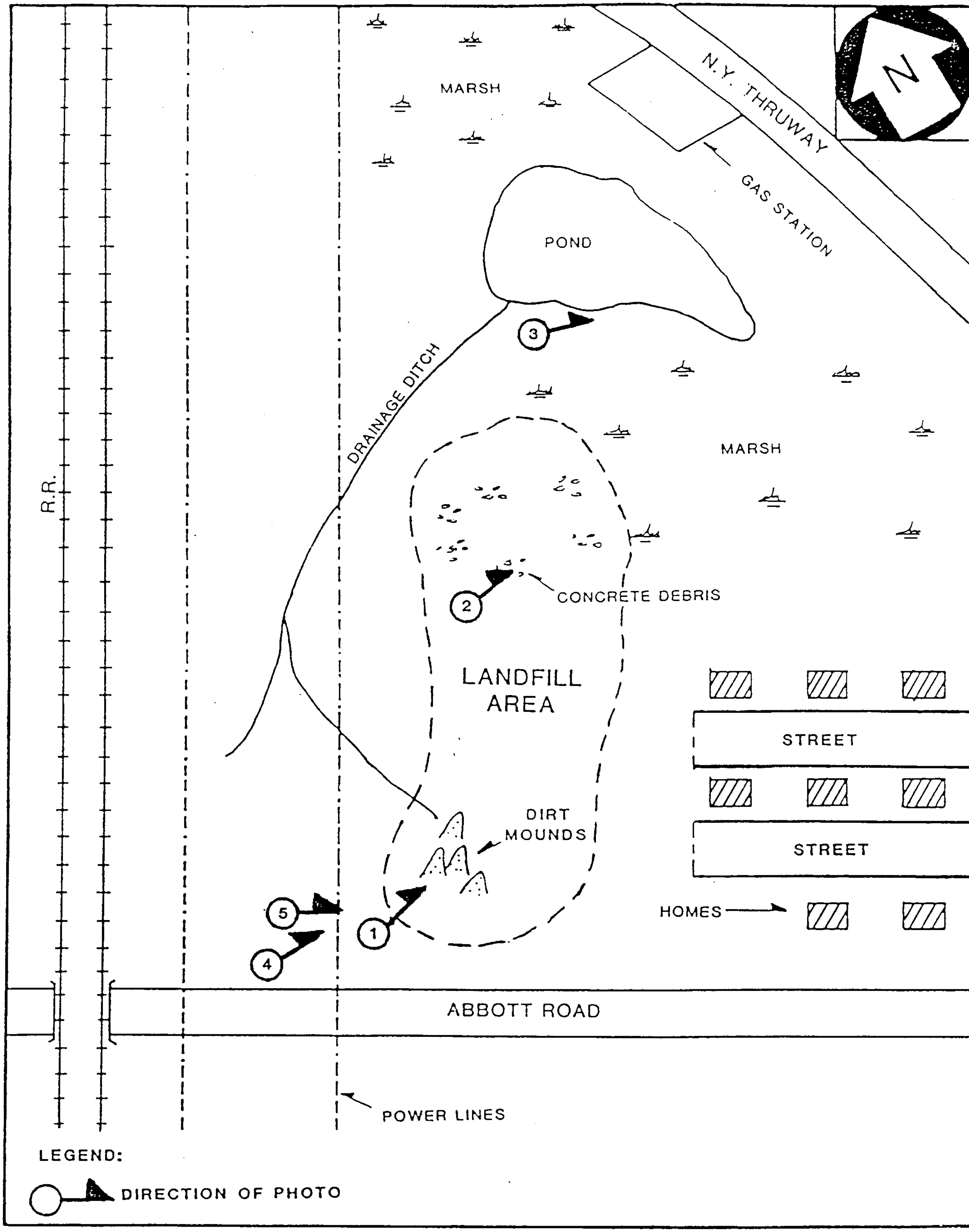
LACKAWANNA CITY LANDFILL
LACKAWANNA, N.Y.

SITE MAP

(NOT TO SCALE)

FIGURE A-2

NUS CORPORATION



LACKAWANNA CITY LANDFILL
LACKAWANNA, N.Y.

PHOTO LOCATION MAP

(NOT TO SCALE)

FIGURE A-3

NUS CORPORATION

PHOTOGRAPH INDEX

LACKAWANNA CITY LANDFILL

Lackawanna, New York

02-8303-110

May 10, 1983

1. View, facing east, of mounds around fill area.

2. View, facing east, of road and concrete debris.

3. View, facing southeast of pond, thruway toll is visible in background.

4. View, facing east, along site. Power lines are visible in the background. A rope barrier is visible in foreground.

5. View, facing southeast along landfill, of power lines and neighboring homes.

PHOTOGRAPH INDEX

LACKAWANNA CITY LANDFILL

Lackawanna, New York

02-8303-110

May 10, 1983

1. View, facing east, of mounds around fill area.

2. View, facing east, of road and concrete debris.

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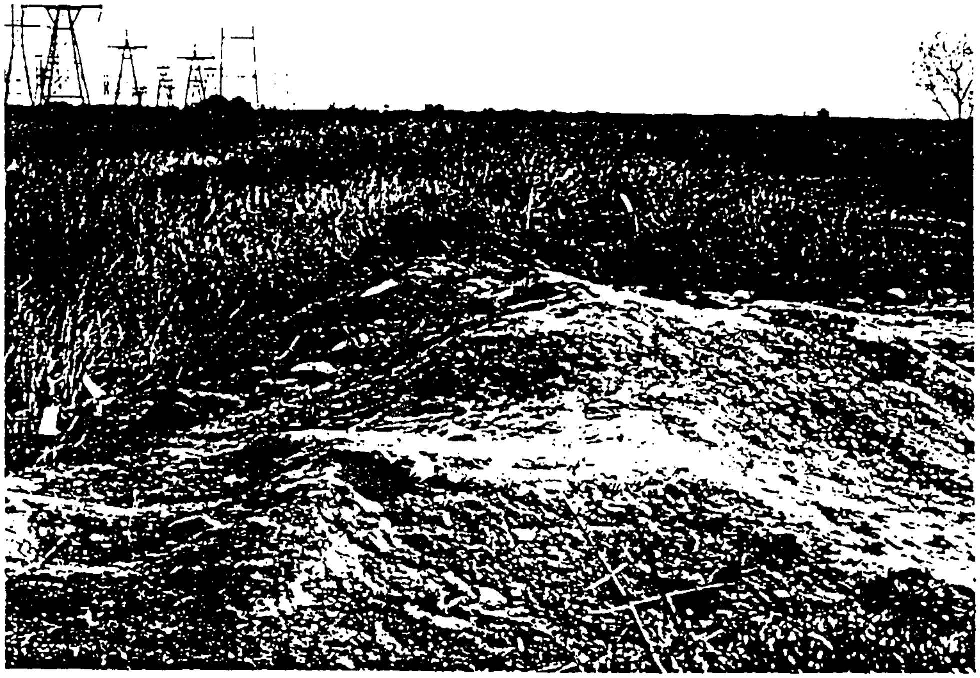
5. View, facing southeast along landfill, of power lines and neighboring homes.

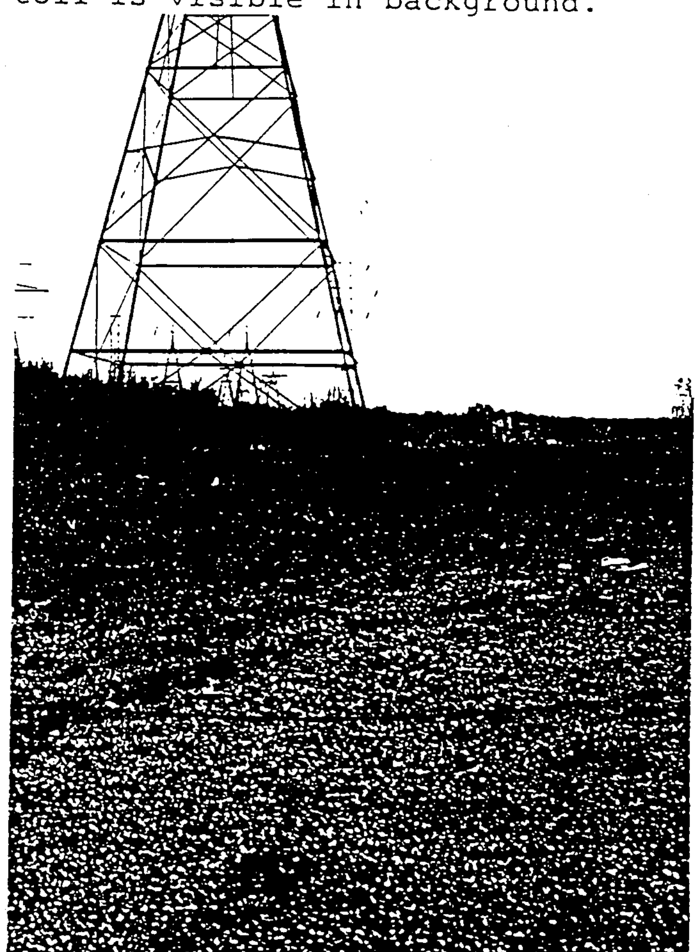


1. View, facing east, of mounds around fill area.

2. View, facing east, of road and concrete debris.

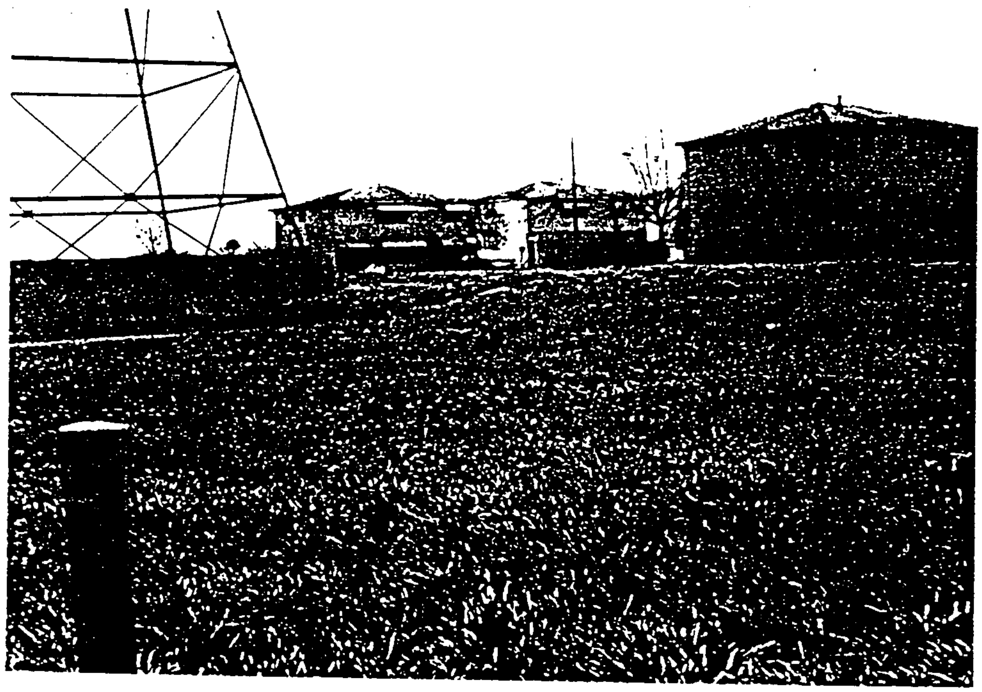
LACKAWANNA CITY LANDFILL, Lackawanna, New York, May 10, 1983

3. View, facing southeast of pond, thruway toll is visible in background.



4. View, facing east, along site. Power lines are visible in the background. A rope barrier is visible in foreground.

NUS CORPORATION



5. View, facing southeast along landfill, of power lines and neighboring homes.

LACKAWANNA CITY LANDFILL, Lackawanna, New York, May 10, 1983

REFERENCE 12

SY053.1C

SITE INSPECTION FORM

Site Name LACKAWANNA CITY LF

Site ID Number 915094

Site Location (Directions) (1) I 90 to Exit 55 (Ridge Rd) (2) Ridge Rd West to Abbot Rd (3) Left (South) on Abbot Rd past RR tracks & powerlines (3 sets)

Date/Time 8/8/89 1:30 p Weather Sunny, Breezy, 70's

Inspection Team K. LEONARD

M. SCHUMACHER

Site Representatives none (City Engineer contacted prior to visit)

Other Parties none

Landfill on Rt. Can be accessed via Mayer Terrace (see map)

Site Description

1. Prepare a site location sketch and site map (Figure 1) noting approximate area of site, site boundary, surface water features, streets, north arrow, access roads, containment or storage areas, impoundments, areas of contamination, odor and leachate or seepage areas, vegetative stress areas, monitoring well locations, areas of past waste surface water, sediment or soil sampling. A previous site map can be updated (if applicable).

See attached

NYSDEC4 1:25

Site Map (Figure 1)

See Attached

2. Take 35mm photographs of significant site features. Provide a description and reference for each photo.

a. ______________________________

b. ______________________________

c. ______________________________

d. ______________________________

e. ______________________________

f. ______________________________

g. ______________________________

h. ______________________________

i. ______________________________

j. ______________________________

Observations

Site Status Closed landfill

Accessibility (Describe potential for direct contact at site, i.e., are there any fences, gates, security guards, natural barriers, etc.)
No fence except on Elliot Rd. Very easy access for children in neighborhood of Majestic Terrace

Waste Types (Describe type, quantity, and physical state of waste present) See phase I report

Waste Type	Quantity	Time Period Disposed On-site
See Phase I report		

Storage of Wastes (Record number, condition and location of drums, tanks, surface impoundments, etc.) See Phase I for BKG. No impoundments. Marshy areas surround fill area

Waste Type	Quantity	Time Period Disposed On-site

Contamination (Record any visual evidence of contamination)

a. ~~HNU~~ PID Meter readings upwind (background) VERY WINDY CONDITIONS.

Site ~~HNU~~ PID readings

Readings	Locat~~ed~~ion On-site
none	

b. Odor none

c. Vegetative stress no veg growing in area of black sand

d. Drum/Tank leakage None observed

e. Visible leachate, seepage (Describe location on-site)
None observed.

f. Surface discoloration (Describe location on-site) none observed

g. Surface water runoff (Describe location on-site)
Ponded water at 2 locations marked on map. Long marshy area to north of site

Comments on special site conditions
thruway very close, as are residences on Majestic Terrace ALSO - POWERLINE RIGHT - OF WAY N OF SWAMPY AREA N OF LF

Containment (Record presence and characteristic features of natural or manmade containment measures such as dikes, barriers, pits, slurry walls, ets. No man-made observed. "Natural containment" to some extent provided by marshy areas.

Present/Proposed Facility Management Practices (Describe based on personnel interviews and site visit) Not discussed with City Engr. during phone conversation

NYSDEC4 1:25

Remedial Actions (Record status and extend of any remedial activity such as:

a. Liners, dikes, barrier walls

None at present observed

b. Monitoring well installation

Number	Location On-site
None at present	

c. Describe access restrictions Fence on Abbot Road. No access restrictions from Majestic Terrace or Thruway Parking

d. Leachate/waste treatment

None observed

e. Describe drum/soil/waste removal See phase I for background

f. Covers, surface water diversions Heavy vegetation over surface except in area of possible slag.

Area Land Use (Note proximity of residential areas, industrial commercial entities and any environmentally sensitive areas)

Name of business/resident	Address	No. of People	Direction from Site
Numerous homes on Majestic Terrace - Closest are approx. 50 - 100 yards from edge of fill area.			
THRUWAY TO SOUTH			
POWERLINES, RR TO N			

NYSDEC4 1:25

Water Supply Wells (Describe residences/businesses which have water supply wells in vicinity of site)

____

____

____

____

____

____

Signature H Leonard

Date 8/8/89

NYSDEC4 1:25

DATA CHECKLIST

1. Observed releases
2. Groundwater
3. Surface water
4. Air
5. Route Characteristics
6. Groundwater
7. Depth to aquifer
8. Net precipitation
9. Permeability
10. Physical State
11. Surface Water
12. Slope/Terrain
13. 1 year, 24 hour Rainfall
14. Neares Surface Water
15. Containment
16. Waste Characteristic
17. Toxicity
18. Quantity
19. Targets
20. Groundwater
21. Water Use
22. Well Distance/Population
23. Surface Water
24. Use
25. Distance Sensitive Environment
26. Population Served/Water intake
27. Direct Contact
28. Population (1 mi. radius)
29. Distance Critical Habitat
30. Accessibility

KK access

[illegible]

Fulton Farm Report

[illegible] Well logs + [illegible]

[illegible] Dist.

[illegible]

[illegible]

OUTLINE OF REQUESTED INFORMATION

Site Ownership History

- Present ownership (corporate name and address)
- Previous owners of the site and the type of business activities engaged in by those parties
- Names of previous facility operators (if applicable), time period of operation, and business activities engaged in by those operators
- Principal contact for site (corporate officer if applicable)

Waste Management Activities

- History of waste management activities of site
  - types and time period of operations that affect the waste disposal practices at the site/facility
- Physical characteristics of waste disposal facilities
- Future waste management plans
- Regulatory/enforcement action(s) and/or site remediation that has occurred on-site in the past
- Types of permits obtained for the site (NPDES or RCRA permits)
- List of chemicals typically handled at the site (time period used)
- History of waste disposal activities on-site

Analytical Data

- Summary of monitoring efforts conducted on-site
- Analytical data from monitoring efforts (groundwater, surface water, soil and air)
- Data reports from previous site investigative efforts (if applicable)

DATA CHECKLIST

Review the checklist below to ensure that all available information has been collected for the site. This information is needed to complete the HRS Score. Review the HRS Documentation Instructions to understand what each route characteristic means.

1) Observed Releases (upgradient/downgradient data comparison needed)
   - Groundwater
   - Surface Water
   - Air
   - Soil

2) Groundwater (route characteristics)
   - Depth to aquifer of concern
   - Net precipitation of site per year (HRS)
   - Soil permeability (HRS)
   - Physical state (HRS)

3) Surface Water (route characteristics)
   - Slope/terrain
   - 1 yr/24 hour rainfall
   - Location of nearest surface water (miles)

4) Waste Characteristics
   - Toxicity
   - Quantity/time period
   - Targets (population)
   - Site containment (liner system, etc.)

5) Water Use

- Wells within vicinity of site
- Depth to aquifer of concern
- Distance of site from population utilizing well
- Observed release affecting nearby residences

6) Surface Water Use

- Distance to public water supply intake(s) (upstream/downstream)
- Recreation (type)

7) Distance to Sensitive Environment

8) Distance to Critical Habitat

9) Populaton Data (provided by Engineering-Science, Fairfax)

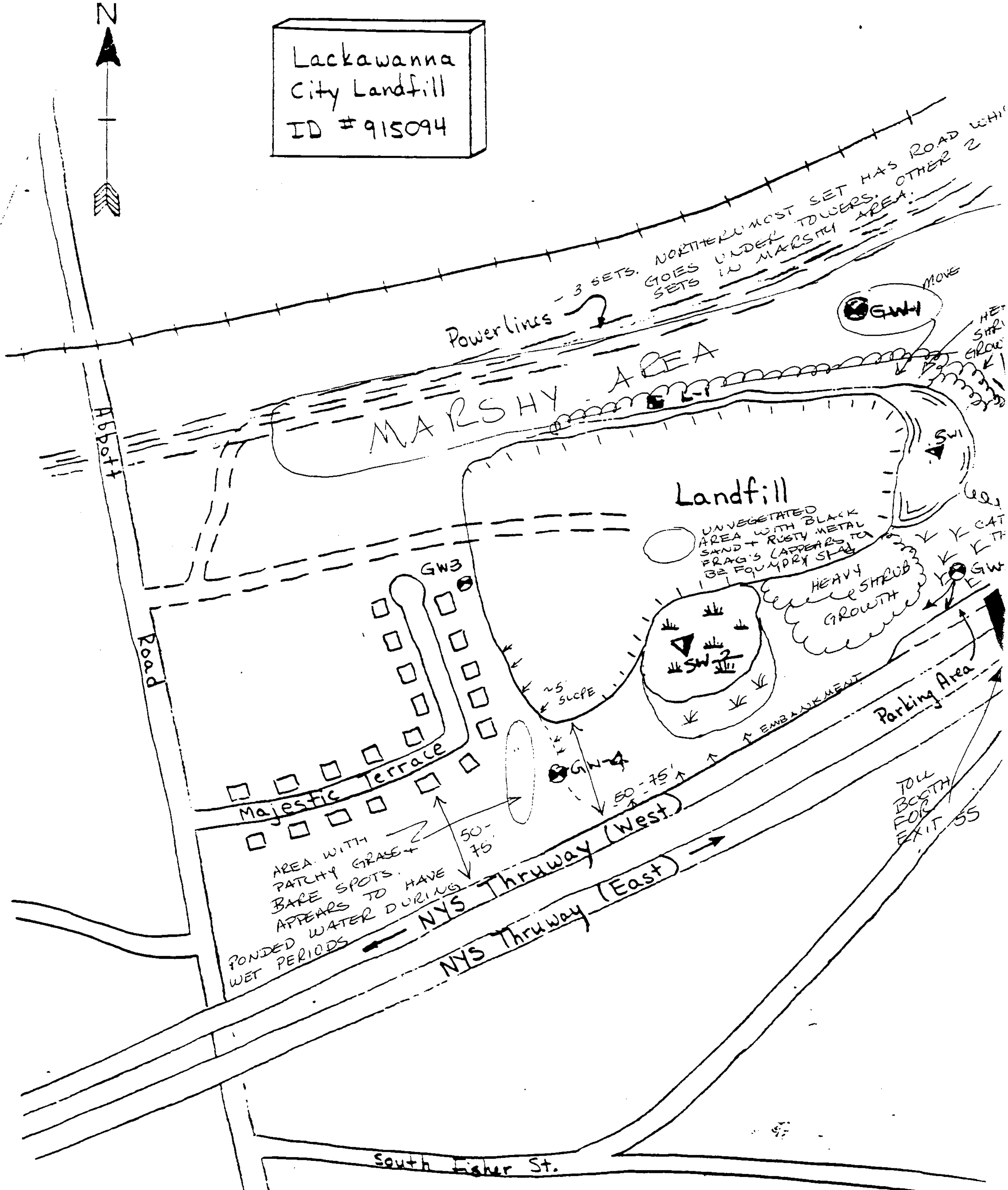
10) Accessibility

11) Site Owner/Operator Information

12) Waste Management Information

SOURCES CONTACTED SUMMARY SHEET

Contact	Date Contacted	Person Contacted	Telephone Number	Location	Information Collected



⊗ - Groundwater monitoring Well locations.
▼ - Surface Water and Sediment sampling locations

FIGURE 2.

Om 08 LACKAWANNA LANDFILL / NYSDOC RA 4 PHASE II
54753.12.00

General Information

1) Waste type(s), quantity (if known), and method(s) of containment: especially note containment condition. C + D FILL, FOUNDRY SANDS SLAG, WOOD DEBRIS, METAL PIECES, ASSORTED REFUSE.

2) Evidence of leachate outbreaks etc. which may indicate direct release to surface water. YES N AND W SLOPES OF FILL

Groundwater

1) Name/description of aquifer(s) of concern. OVERBURDEN

2) Depth(s) from ground surface to the highest seasonal level of the saturated zone (water table(s)) of the aquifer of concern.
3.5'

3) Depth from the ground surface to the lowest point of waste disposal/storage. ? EST ≃ 10 FT

4) Soil type in the unsaturated zone (from soil survey - verify in field). SILT AND CLAY

Surface Water

1) Average slope of site (in %). 2-5 %

2) Name/description of nearest downslope surface water. POND ALONG W MARGIN, STREAM DISCHARGING FROM POND, FLOW NW INTO MARSH ALONG N MARGIN

3) Average slope of terrain between site and above-cited surface water (in %). 33 %

4) Is the site located either totally or partially in surface water?
YES, SURFACE WATER UP TO FILL SLOPES

5) Is the site completely surrounded by areas of higher elevation?
NO

Air

1) Is there a potential air emission problem? NO

2) Is a historic or landmark site (National Register of Historic Places to National Landmarks) within view of the site? NO

Fire & Explosion

1) Is there a potential for fire and explosion? NO

Direct Contact

1) Describe any barriers which limit access to the site. In general, how easy is it to get into the site? NONE, RIGHT BEHIND HOMES ON MAJESTIC TERRACE, NO ACCESS LIMITATIONS

REFERENCE 13

√ √

i-VALERYL-k-STROPHANTHIDIN

CAS RN: 63979737 NIOSH #: FH 4980000
mf: $C_{28}H_{40}O_7$; mw: 488.68

SYN: ISOVALERYL-K-STROPHANTHIDIN

TOXICITY DATA: 3	CODEN:
ivn-cat LDLo:880 ug/kg	AEPPAE 185,329,37
ivn-rbt LDLo:700 ug/kg	AEPPAE 185,329,37

THR: HIGH ivn.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

VALINE

CAS RN: 72184 NIOSH #: YV 9361000
mf: $C_5H_{11}NO_2$; mw: 117.17

An essential amino acid; white crystalline solid; sol in water; very slightly sol in alc; insol in ether; mp (dl): 298° (decomp); mp (1): 315°; d (1): 1.230.

SYNS:
L(+)-ALPHA-AMINOISOVALERIC ACID
L-VALINE

TOXICITY DATA: 1	CODEN:
ipr-rat LD50:5390 mg/kg	ABBIA4 58,253,55

Reported in EPA TSCA Inventory, 1980.
THR: LOW ipr. A nutrient and/or dietary supplemental food additive.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

d-VALINE

CAS RN: 640686 NIOSH #: YV 9360000
mf: $C_5H_{11}NO_2$; mw: 117.17

TOXICITY DATA: 1	CODEN:
ipr-rat LD50:6093 mg/kg	ABBIA4 64,319,56

Reported in EPA TSCA Inventory, 1980.
THR: LOW ipr.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

VALINOMYCIN

CAS RN: 2001958 NIOSH #: YV 9468000
mf: $C_{54}H_{90}N_6O_{18}$; mw: 1111.50

Shiny rectangular platelets. mp: 190°. Almost insol in water; very sol in petr ether, ether, benzene, chloroform, glacial acetic acid, butyl acetate, acetone.

SYN: ANTIBIOTIC N-329 B

TOXICITY DATA: 3	CODEN:
orl-mus LD50:2500 ug/kg	85ERAY 1,325,78
ipr-mus LD50:980 ug/kg	85ERAY 1,325,78
scu-mus LD50:4140 ug/kg	85ERAY 1,325,78

Reported in EPA TSCA Inventory, 1980.
THR: HIGH orl, ipr, scu.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

VALISONE

CAS RN: 2152445 5000
mf: $C_{27}H_{37}FO_6$; mw: 476

SYNS:
BETAMETHASONE-17-VALERATE RATE

TOXICITY DATA:
scu-rat LDLo:2000 mg/kg
scu-mus LDLo:100 mg/kg

THR: HIGH scu; MOD ...
Disaster Hazard: When heated to decomp it emits tox fumes of F^-.

VALONEA TANNIN

NIOSH #: YW 0305000

SYNS:
QUERCUS AEGILOPS L. TANNIN
TANNIN FROM VALONEA

TOXICITY DATA: 3	CODEN:
scu-rat TDLo:750 mg/kg/2W-I TFX:ETA	BJCAAI 14,147,60

THR: An exper ETA. See also tannin.

√ VANADIUM

CAS RN: 7440622 NIOSH #: YW 1355000
af: V; aw: 50.94

A bright white, soft ductile metal; slightly radioactive; bp: 3000°; d: 6.11 @ 18.7°; mp: 1917°. Insol in water.

TOXICITY DATA: 3	CODEN:
ims-rat TDLo:340 mg/kg/43W-I TFX:ETA	NCIUS* PH 43-64-886,SEPT,71

TLV: Air: 0.05 mg/m3 DTLVS* 4,425,80. Occupational Exposure to Vanadium recm std: Air: TWA 1.0 mg(V)/m3 NTIS**. "NIOSH Manual of Analytical Methods" VOL 3 S391, VOL 5 173#,290#. Reported in EPA TSCA Inventory, 1980.
THR: An exper ETA. See also vanadium compounds.
Fire Hazard: MOD in dust form from heat or flame, sparks.
Disaster Hazard: Violent reaction with BrF_3, Cl_2, Li, oxidants.

VANADIUM AZIDE TETRACHLORIDE

mf: Cl_4N_3V; mw: 234.76

THR: No tox data. See also vanadium compounds, azides, chlorides. Explosive.
Disaster Hazard: When heated to decomp it emits very tox fumes of Cl^- and NO_x.

√ VANADIUM COMPOUNDS

THR: Variable. Vanadium compounds act chiefly as irr to the conjunctivae and respiratory tract. Prolonged exposures may lead to pulmonary involvement. There is still some controversy as to the effects of industrial exposure on other systems of the body. Responses are acute, never chronic.

Silver

SYNS:
SILICON TETRACHLORIDE TET

TOXICITY DATA: 2
ihl-rat LC50:8000 ppm/4H

Aquatic Toxicity Rating: T
WQCHM* 4,-,74. DOT: Cor
Corrosive FEREAC 41,57018
TSCA Inventory, 1980. EPA
Assessment Information Proposed Rule FEREAC
45,13646,80.

SKIN AND EYE IRRITATION DATA: CODEN:
skn-rbt 500 mg/24H SEV 28ZPAK -,14,72
eye-rbt 20 mg/24H SEV 28ZPAK -,14,72

THR: SEV skn, eye irr. MOD ihl. Decomp by water with much heat into silicic acid and HCl.
Disaster Hazard: Dangerous; when heated to decomp it emits highly tox fumes of HCl; will react with water or steam to produce heat and tox and corrosive fumes.
Incomp: Dimethyl sulfoxide, K, Na.

SILICON FLUORIDE

CAS RN: 7783611 NIOSH #: VW 2327000
mf: F_4Si; mw: 104.09

Colorless gas, very pungent odor; mp: −77°; bp: −65° @ 181 mm; d: 4.67.

TOXICITY DATA: 3 CODEN:
DOT: Nonflammable Gas, Label: Nonflammable Gas FEREAC 41,57018,76. Reported in EPA TSCA Inventory, 1980.
THR: No data. See also fluorides and hydrofluoric acid. Very irr to skn, eyes and mu mem.
Disaster Hazard: When heated to decomp it emits tox fumes of F^-.

SILICON OXIDE

mf: OSi; mw: 44.09

THR: No tox data. Explodes spontaneously in air.

SILICON TETRAAZIDE

mf: $N_{12}Si$; mw: 196.17

THR: No tox data. See also azides. Has exploded spont.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

SILK

NIOSH #: VW 2700000

TOXICITY DATA: 3 CODEN:
imp-rat TDLo:36 mg/kg:ETA CNREA8 15,333,55

THR: An exper ETA. In the form of dust it is an allergen and a nuisance dust. A MOD fire hazard and expl hazard.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

SILVER

CAS RN: 7440224 NIOSH #: VW 3500000
af: Ag; aw: 107.87

Soft, ductile, malleable, lustrous, white metal. mp: 961.93°, bp: 2212°, d: 10.50 @ 20°.

SYNS:

ARGENTUM	SILBER (GERMAN)
C.I. 77820	SILVER ATOM
SHELL SILVER	

TOXICITY DATA: 3	CODEN:
mul-rat TDLo:330 mg/kg/43W-I TFX:ETA	ZEKBAI 63,586,60
imp-rat TDLo:2400 mg/kg TFX:ETA	CNREA8 16,439,56
imp-mus TDLo:11 gm/kg TFX:ETA	NATWAY 42,75,55
imp-rat TD:2570 mg/kg TFX:ETA	NATWAY 42,75,55
ihl-hmn TCLo:1 mg/m3 TFX:SKN	DTLVS* 3,231,71

TLV: Air: 0.1 mg/m3 DTLVS* 4,367,80. *Toxicology Review:* FOREAE 7,313,42; MIBUBI 9(4),321,75; PTPAD4 1,127,76; AJMEAZ 38,409,65; PEXTAR 12,102,69. OSHA Standard: Air: TWA 10 ug/m3 (SCP-N) FEREAC 39,23540,74. Reported in EPA TSCA Inventory, 1980.
THR: An exper ETA. A hmn SKN. See also silver compounds.
Fire Hazard: Mod, in the form of dust, when exposed to flame or by chemical reaction with C_2H_2, NH_3, bromoazide, ClF_3, ethylene imine, H_2O_2, oxalic acid, H_2SO_4, tartaric acid. See also powdered metals.
For further information see Vol. 1, No. 1 of *DPIM Report*.

SILVER ACETYLIDE

mf: C_2HAg; mw: 132.90

THR: No tox data. See also silver compounds.
Explosion Hazard: Very high.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

SILVER AMIDE

mf: AgH_2N; mw: 123.89

THR: No tox data. See also silver compounds. Very explosive when dry.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

SILVER 5-AMINOTETRAZOLIDE

mf: CH_2AgN_5; mw: 191.93

THR: No tox data. See also silver compounds. When heated it explodes.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

SILVER AMMONIUM COMPOUNDS

THR: See silver compounds.
Explosion Hazard: Severe, when shocked, exposed to heat or by chemical reaction.

145,165,167, VOL 4 S199*, VOL 5 175#. Reported in EPA TSCA Inventory, 1980.

THR: A hmn GIT, CNS. An exper ETA. HIGH ihl. See also mercury compounds. Reacts violently with acetylene, NH_3, BPI_2, Cl_2, ClO_2, CH_3N_3, Na_2C_2, nitromethane, (butyne diol + acid).

Incomp: Acetylenic compounds; ammonia; boron diiodophosphide; ethylene oxide; metals; methyl azide; methylsilane, oxygen; oxidants; tetracarbonylnickel, oxygen.

For further information see Vol. 1, No. 3 of *DPIM Report.*

MERCURY AMIDE CHLORIDE

CAS RN: 10124488 NIOSH #: OV 7020000
mf: ClH_2HgN; mw: 252.07

White pulverulent lumps or powder.

SYNS:
AMINOMERCURIC CHLORIDE
MERCURIC AMMONIUM CHLORIDE, SOLID
MERCURIC CHLORIDE, AMMONIATED
MERCURY AMINE CHLORIDE
MERCURY AMMONIATED
WHITE MERCURY PRECIPITATED
WHITE PRECIPITATE

TOXICITY DATA:
Aquatic Toxicity Rating: TLm96:under 1 ppm WQCHM* 3,-,74. *Toxicology Review:* SDGTB3 1(2),177,71; 27ZTAP 3,15,69. DOT: Poison B, Label: Poison FEREAC 41,57018,76. Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: A poison. See also mercury compounds.

Disaster Hazard: When heated to decomp it emits very tox fumes of Cl^-, NO_x and Hg.

MERCURY(II)-o-ARSENATE

CAS RN: 7784374 NIOSH #: OV 7040000
mf: $AsHO_4 \cdot Hg$; mw: 340.52

Yellow powder; mp: decomp. Insol in H_2O, sol in HCl or HNO_3.

SYN: MERCURIC ARSENATE

TOXICITY DATA: 3
Aquatic Toxicity Rating: TLm96:under 1 ppm WQCHM* 3,-,74. Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**. Occupational Exposure to Inorganic Arsenic recm std: Air: CL 2 ug/m3/15M NTIS**.

THR: A poison. See also mercury and arsenic compounds.

Disaster Hazard: When heated to decomp it emits very tox fumes of Hg and As.

MERCURY(I) AZIDE

mf: Hg_2N_6; mw: 485.22

THR: Explodes on heating in air. HIGH tox. See also azides, mercury compounds.

Disaster Hazard: When heated to decomp it emits very tox fumes of NO_x and Hg.

MERCURY(II) AZIDE

mf: HgN_6; mw: 284.65

THR: High friction sensitivity; brisance on explosion. HIGH tox. See also mercury compounds, azides.

Disaster Hazard: When heated to decomp it emits very tox fumes of Hg and NO_x.

MERCURY(II) BENZOATE

CAS RN: 583153 NIOSH #: OV 7060000
mf: $C_{14}H_{10}O_4 \cdot Hg$; mw: 442.83

White crystalline powder; odorless. mp: 165°. Very sol in NaCl soln; slightly sol in alc. Protect from light.

SYNS:
MERCURIC BENZOATE
MERCURIC BENZOATE, SOLID (DOT)

TOXICITY DATA: 3
Aquatic Toxicity Rating: TLm96:under 1 ppm WQCHM* 3,-,74. DOT: Poison B, Label: Poison FEREAC 41,57018,76. Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**.

THR: A poison. See also mercury compounds.

Disaster Hazard: When heated to decomp it emits tox fumes of Hg.

MERCURY(I) BROMIDE (1:1)

CAS RN: 10031182 NIOSH #: OV 7410000
mf: BrHg; mw: 280.50

White-yellow tetrg cryst or powder; odorless. d: 7.307; vap d: 19.3. Darkens on exposure to light. Sublimes @ approx 390° (decomp); Insol in H_2O, alc, ether; decomp by hot HCl or alkali bromides. Protect from light.

SYN: MERCUROUS BROMIDE, SOLID (DOT)

TOXICITY DATA: 3
Aquatic Toxicity Rating: TLm96:under 1 ppm WQCHM* 3,-,74. DOT: Poison B, Label: Poison FEREAC 41,57018,76. Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**.

THR: A poison. See also mercury compounds and bromides.

Disaster Hazard: When heated to decomp it emits very tox fumes of Br^- and Hg.

MERCURY(II) BROMIDE (1:2)

CAS RN: 7789471 NIOSH #: OV 7415000
mf: Br_2Hg; mw: 360.41

White crystals or cryst powder. Sensitive to light; mp: 237°; bp: 322° (sublimes); d: 6.109 @ 25°; vap press: 1 mm @ 136.5°; sublimes @ higher temp; very sol in hot alc, methanol, HCl, HBr, alkali bromide solns; slightly sol in chloroform.

SYNS:
MERCURIC BROMIDE
MERCURIC BROMIDE, SOLID (DOT)

Hg ↓

SYN: MERCURY NUCLEATE, SOLID (DOT)

TOXICITY DATA: 3

DOT: Poison B, Label: Poison FEREAC 41,57018 Occupational Exposure to Inorganic Mercury recm Air: TWA 0.05 mg(Hg)/m3 NTIS**.

THR: A poison. See also mercury compounds.

Disaster Hazard: When heated to decomp it emits fumes of Hg.

MERCUROPHEN

CAS RN: 17140737 NIOSH #: OW 4550000

mf: $C_6H_4HgNO_4 \cdot Na$; mw: 377.70

Brick-red odorless powder. Sol in hot H_2O.

TOXICITY DATA: 3	CODEN:
ivn-rat LDLo:8 mg/kg	12VXA5 8,661,68
ims-rat LDLo:12 mg/kg	12VXA5 8,661,68
ivn-rbt LDLo:4 mg/kg	12VXA5 8,661,68

Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**.

THR: HIGH ivn, ims. See also mercury compounds. Poison.

Disaster Hazard: When heated to decomp it emits very tox fumes of NO_x and Hg vapors.

MERCUROPHYLLINE

CAS RN: 8012348 NIOSH #: OV 8650000

SYNS:

MERCUPURIN
MERCUZANTHIN

TOXICITY DATA: 3-2	CODEN:
ivn-hmn TDLo:28 mg/kg:CNS	JAMAAP 117,1806,41
scu-mus LD50:163 mg(Hg)/kg	JPETAB 105,336,52
ivn-mus LD50:1410 mg/kg	JPETAB 99,149,50
ivn-cat LDLo:250 mg/kg	JPETAB 99,149,50
ivn-rbt LDLo:177 mg/kg	JPETAB 99,149,50

Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**.

THR: A hmn CNS. HIGH scu, ivn. MOD ivn. See also mercury compounds.

Disaster Hazard: When heated to decomp it emits tox fumes of Hg.

MERCUROUS CHLORIDE

CAS RN: 7546307 NIOSH #: OV 8750000

mf: Cl_2Hg_2; mw: 472.09

White, odorless, tasteless, heavy powder or crystals. Sunlight causes it to decomp into mercuric chloride and metallic Hg. Insol in H_2O, alc and ether. Protect from light. Subl @ 400°; d: 7.150.

SYNS:

MERCURY(I) CHLORIDE
C.I. 77764
CALOMEL
CALOMELANO (ITALIAN)
CHLORURE MERCUREUX (FRENCH)
CLORURO MERCUROSO (ITALIAN)
KALOMEL (GERMAN)
MERCUROCHLORIDE (DUTCH)
MERCURY MONOCHLORIDE
MERCURY PROTOCHLORIDE
MILD MERCURY CHLORIDE
QUECKSILBER(I)-CHLORID (GERMAN)
SUBCHLORIDE OF MERCURY

ATA: 3	CODEN:
	MUREAV 77,109,80
ng/kg	WRPCA2 9,119,70

iew: SDGTB3 1(2),177,71; RREVAH ZTAP 3,91,69. Occupational Exposure to rcury recm std: Air: TWA 0.05 mg(Hg)/ Reported in EPA TSCA Inventory, 1980. ata. HIGH orl. See also mercury com-

Hazard: When heated to decomp it emits very tox fumes of Cl^- and Hg.

Human Tox: Excessive doses may cause Hg poisoning.

Antidote: BAL (Dimercaprol). If laxation from oral mercurous chloride should not occur, saline laxative must be administered to prevent possibility of Hg poisoning.

Med Incomp: Bromides, iodides, alkali chlorides, sulfates, sulfites, carbonates, hydroxides, lime water, acacia, ammonia, golden antimony sulfide, cocaine, cyanides, copper salts, hydrogen peroxide, iodine, iodoform, Pb salts, silver salts, soap, sulfides.

✓ MERCURY

CAS RN: 7439976 NIOSH #: OV 4550000

af: Hg; aw: 200.59

Silvery liquid, metallic element. mp: −38.89°, bp: 356.9°, d: 13.546, vap. press: 1 mm @ 126.2°. vap press: @ 25° = 2 × 10^{-3} mm.

SYNS:

COLLOIDAL MERCURY
KWIK (DUTCH)
MERCURE (FRENCH)
MERCURIO (ITALIAN)
MERCURY, METALLIC (DOT)
NCI-C60399
QUECKSILBER (GERMAN)
QUICK SILVER
RTEC (POLISH)

TOXICITY DATA: 3	CODEN:
ihl-rat TCLo:890 ng/m3/24H (16W male)	GISAAA 45(3),72,80
ihl-rat TCLo:7440 ng/m3/24H (16W male)	GISAAA 45(3),72,80
ipr-rat TDLo:400 mg/kg/14D-I:ETA	ZEKBAI 61,511,57
ihl-wmn TCLo:150 ug/m3/46D:GIT	AEHLAU 33,186,78
ihl-wmn TCLo:150 ug/m3/46D:CNS	AEHLAU 33,186,78
ihl-rbt LCLo:29 mg/m3/30H	AMIHBC 7,19,53

TLV: Air: 0.05 mg(Hg)/m3 (skin) DTLVS* 4,254,80. *Toxicology Review:* AJOGAH 126(3),390,76; JTEHD6 2(3),491,77; TRBMAV 33(1),85,75; PHJOAV 213(5781),159,74; JDSCAE 58(12),1767,75; CPEDAM 13,783,74; QURBAW 7(1),75,74; AEMBAP 48,463,74; JAVMA4 164(3),277,74; 31ZNAA 2,365,73; AEMBAP 40,239,73; CTOXAO 5(2),151,72; BIOGAL 41(7),208,75; ADTEAS 5,51,72; RREVAH 42,103,72; FOREAE 7,313,42; NISIA9 27(9),942,74; MIBUBI 9(4),321,75; STEVA8 2(4),341,74; ENVRAL 13,36,77; 85CVA2 5,63,70; JOCMA7 2,337,60; PEXTAR 12,102,69; PDTNBH 6,204,77.

OSHA Standard: Air: CL 1 mg/10m3 (SCP-N) FEREAC 39,23540,74. DOT: ORM-B, Label: None FEREAC 41,57018,76. Occupational Exposure to Inorganic Mercury recm std: Air: TWA 0.05 mg(Hg)/m3 NTIS**. "NIOSH Manual of Analytical Methods" VOL 1

SYNS:

COLLOIDAL MANGANESE
MANGAN (POLISH)

TOXICITY DATA: 3	CODEN:
ihl-man TCLo:2300 ug/m3	AIHAAP 27,454,66
mrc-smc 8 mmol/L/18H	MUREAV 42,343,77
ims-rat TDLo:400 mg/kg/1Y-I:ETA	NCIUS* PH 43-64-886,SEPT,71

TLV: Air: 5 mg(Mn)/m3 (dust) DTLVS* 4,250,80. *Toxicology Review:* TRBMAV 33(1),85,75; ACLSCP 4, 487,74; ADTEAS 5,51,72; FOREAE 7,313,42; KOTTAM 11(11),1300,75; 85DHAX Mn,1,73; PEXTAR 12,102,69. OSHA Standard: Air: CL 5 mg/m3 (SCP-A) FEREAC 39,23540,74. "NIOSH Manual of Analytical Methods" VOL 2 S5, VOL 5 173#. Reported in EPA TSCA Inventory, 1980.

Human Tox: Occurs by inhal of the dust or fumes. Symptoms: languor, sleepiness, weakness, emotional disturbances, spastic gait, paralysis.

THR: MUT data. An exper ETA. See also manganese compounds.

Fire Hazard: Mod, in the form of dust or powder, when exposed to flame.

Spontaneous Heating: No.

Explosion Hazard: Mod, in the form of dust, when exposed to flame. See also powdered metals. Violent reaction with (Al + air), Cl_2, F_2, H_2O_2, HNO_3, NO_2, P, SO_2.

Disaster Hazard: Mod dangerous; will react with water or steam to produce hydrogen; can react with oxidizing materials.

To Fight Fire: Special dry chemical.

For further information see Vol. 1, No. 2 of *DPIM Report.*

MANGANESE ACETATE

CAS RN: 638380 NIOSH #: AI 5770000
mf: $C_4H_6O_4 \cdot Mn$; mw: 173.04

Pale red crystals, very sol in water and alc.

SYNS:

ACETIC ACID MANGANESE(II) SALT (2:1)
DIACETYLMANGANESE
MANGANESE(2+) ACETATE
MANGANESE(II) ACETATE
MANGANESE DIACETATE
MANGANOUS ACETATE
OCTAN MANGANATY (CZECH)

TOXICITY DATA: 2	CODEN:
orl-rat LD50:2940 mg/kg	MarJV# 29MAR77

Reported in EPA TSCA Inventory, 1980. EPA TSCA 8(a) Preliminary Assessment Information Proposed Rule FERREAC 45,13646,80.

THR: MOD orl. See also manganese.

Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

MANGANESE ACETATE TETRAHYDRATE

CAS RN: 6156-78-1 NIOSH #: AI 5775000
mf: $C_4H_6O_4 \cdot Mn \cdot 4H_2O$; mw: 245.12

Pale red, transparent monoclinic crystals. d: 1.59. Sol in water.

SYNS:

MANGANESE DIACETATE TETRAHYDRATE
MANGANOUS ACETATE TETRAHYDRATE

TOXICITY DATA: 2	CODEN:
orl-rat LD50:3730 mg/kg	AIHAAP 30,470,69

THR: MOD orl. See also manganese compounds.

Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

MANGANESE ACETYLACETONATE

CAS RN: 14024589 NIOSH #: OO 9350000
mf: $C_{10}H_{14}O_4Mn$; mw: 253.18

SYN: MANGANOUS ACETYLACETONATE

TOXICITY DATA: 3	CODEN:
ims-rat TDLo:1200 mg/kg/26W-I:NEO	JNCIAM 60,1171,78
ims-rat TD:1350 mg/kg/21W-I:ETA	NCIUS* PH-43-64-886,SEPT,71

Reported in EPA TSCA Inventory, 1980.

THR: An exper NEO, ETA.

Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

MANGANESE (II)-o-BENZYL BENZOATE COMPOUND WITH NICOTINE TRIHYDRATE

CAS RN: 64092-22-4 NIOSH #: OO 9288500
mf: $C_{48}H_{46}MnN_4O_6 \cdot 3H_2O$; mw: 883.98

TOXICITY DATA: 3	CODEN:
orl-rat LDLo:300 mg/kg	NCNSA6 5,22,53
ipr-rat LDLo:300 mg/kg	NCNSA6 5,22,53

THR: HIGH orl, ipr. See also nicotine, manganese compounds.

Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

MANGANESE(II) CHLORIDE (1:2)

CAS RN: 7773015 NIOSH #: OO 9625000
mf: Cl_2Mn; mw: 125.84

Cubic, deliquesc, pink crystals. mp: 650°, bp: 1190°, d: 2.977 @ 25°.

SYNS:

MANGANESE DICHLORIDE
MANGANOUS CHLORIDE

TOXICITY DATA: 3	CODEN:
mmo-esc 400 mg/L	ABBIA4 76,78,58
cyt-mus:mmr 1 mmol/L/48H	MUREAV 67,221,79
otr-ham:emb 130 umol/L	CNREA8 39,193,79
dnd-ham:emb 130 umol/L	CNREA8 39,193,79
msc-ham:lng 1 mmol/L	MUREAV 68,259,79
mmo-omi 24000 ppm	APMBAY 6,45,58
dnd-omi 4 mmol/L	SCIEAS 198,513,77
dnd-mam:lym 5 mmol/L	SCIEAS 198,513,77
orl-mus LD50:1715 mg/kg	TOLED5 7,221,81
ipr-mus TDLo:2080 mg/kg/26W-I:CARC	FEPRA7 23,393,64
scu-mus TDLo:2080 mg/kg/26W-I:CARC	FEPRA7 23,393,64
ims-rat LD50:700 mg/kg	RPTOAN 38,221,75
ipr-mus LD50:121 mg/kg	AEPPAE 244,17,62

ivn-mus LD50:32 mg/kg
unk-mus LDLo:8 mg/kg
unk-dog LDLo:6500 ug/kg
scu-rbt LDLo:6 mg/kg
unk-rbt LDLo:6500 ug/kg
unk-pgn LDLo:80 mg/kg
scu-frg LDLo:95 mg/kg

Occupational Exposure to Nitrile 8 mg/m3 NTIS**. Reported in 1980.
THR: HIGH orl, ipr, ivn. See also nitriles. An eye irr. A combustible material.
To Fight Fire: Water, fog, spray, foam.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x and CN^-.
Incomp: Self-explodes; bases.

MALTOSE

CAS RN: 69794 NIOSH #: OO 5250000
mf: $C_{12}H_{22}O_{11}$; mw: 342.31

Colorless needles; d: 1.540 @ 17°; mp: decomp; very sol in water; very slightly sol in cold alc; insol in ether.

SYNS:
4-(ALPHA-D-GLUCOPYRANOSIDO)-ALPHA-GLUCOPYRANOSE
4-(ALPHA-D-GLUCOSIDO)-D-GLUCOSE
MALTOBIOSE
D-MALTOSE
MALT SUGAR
ALPHA-MALT SUGAR

TOXICITY DATA: 3	CODEN:
scu-mus TDLo:1750 mg/kg/50W-C:ETA	GANNA2 48,556,57

Reported in EPA TSCA Inventory, 1980.
THR: An exper ETA.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

MALVIDOL

NIOSH #: LK 9840000
mf: $C_{17}H_{15}O_7$; mw: 331.32

SYN: 3′,5′-DIMETHOXY-3,4′,5,7-TETRAHYDROXYFLAVYLIUM ACID ANION

TOXICITY DATA: 3-2	CODEN:
ipr-rat LD50:2350 mg/kg	CHTPBA 2,33,67
ivn-rat LD50:240 mg/kg	CHTPBA 2,33,67
ipr-mus LD50:4110 mg/kg	CHTPBA 2,33,67
ivn-mus LD50:840 mg/kg	CHTPBA 2,33,67

THR: HIGH ivn. MOD ipr, ivn.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

MANDELIC ACID

CAS RN: 90642 NIOSH #: OO 6300000
mf: $C_8H_8O_3$; mw: 152.16

Large white crystals or powder, faint odor. bp: decomp. d: 1.30, mp: 117°-119°. Sol in water, alc and ether. Darkens and decomp on prolonged exposure to light.

SYNS:
AMYGDALIC ACID
AMYGDALINIC ACID
ALPHA-HYDROXY-ALPHA-TOLUIC ACID
ALPHA-HYDROXYPHENYLACETIC ACID
PARAMANDELIC ACID
PHENYLGLYCOLIC ACID
PHENYLHYDROXYACETIC ACID
RACEMIC MANDELIC ACID

TOXICITY DATA: 3-2	CODEN:
orl-rat LDLo:3000 mg/kg	AIPTAK 64,79,40
ims-rat LD50:300 mg/kg	EMSUA8 4,223,46
orl-rbt LDLo:2000 mg/kg	AIPTAK 64,79,40

Reported in EPA TSCA Inventory, 1980.
THR: HIGH ims and MOD oral. Continued absorption can cause kidney irr. Used medicinally. Ingestion of large doses causes nausea, diarrhea and possibly kidney damage.

MANDELIC ACID NITRILE

CAS RN: 532285 NIOSH #: OO 8400000
mf: C_8H_7NO; mw: 133.16

Yellow viscous liquid. mp: −10°; bp: 170° decomp; d: 1.124.

SYNS:
AMYGDALONITRILE
BENZALDEHYDE CYANOHYDRIN
BENZALDEHYDKYANHYDRIN (CZECH)
NITRIL KYSELINY MANDLOVE (CZECH)

TOXICITY DATA: 3	CODEN:
eye-rbt 250 ug/24H SEV	28ZPAK -,161,72
mmo-sat 225 nmol/plate	SCIEAS 198,625,77
mma-sat 225 nmol/plate	SCIEAS 198,625,77
scu-mus LDLo:23 mg/kg	AIPTAK 12,447,04
orl-rat LD50:116 mg/kg	28ZPAK -,161,72
ivn-mus LD50:5600 ug/kg	CSLNX* NX#07767
scu-rbt LDLo:6 mg/kg	AIPTAK 5,161,1899
scu-frg LDLo:600 ug/kg	AIPTAK 5,161,1899

Reported in EPA TSCA Inventory, 1980.
THR: MUT data. An eye irr. HIGH scu, orl, ivn. See also nitriles.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x and CN^-.

beta-MANDELOYLOXY-beta-PHENYLETHYL DIMETHYLAMINE

CAS RN: 67465387 NIOSH #: OO 7395000
mf: $C_{18}H_{21}NO_3$; mw: 299.40

TOXICITY DATA: 3-2	CODEN:
scu-mus LDLo:808 mg/kg	AIPTAK 47,96,34
ivn-rbt LDLo:30 mg/kg	AIPTAK 47,96,34

THR: HIGH ivn; MOD scu.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

MANGANESE

CAS RN: 7439965 NIOSH #: OO 9275000
af: Mn; aw: 54.94

Reddish-grey or silvery, brittle, metallic element. mp: 1260°, bp: 1900°, d: 7.20, vap. press: 1 mm @ 1292°.

TOXICITY DATA: 3	CODEN:
orl-rat TDLo:790 mg/kg (MGN)	AEHLAU 23,102,71
orl-rat TDLo:1140 mg/kg (14D pre-21D post)	PHMCAA 20,201,78
orl-mus TDLo:1120 mg/kg (MGN)	AEHLAU 23,102,71
orl-mus TDLo:6300 mg/kg (1-21D preg)	EXPEAM 31,1312,75
orl-mus TDLo:12600 mg/kg (1-21D preg)	EXPEAM 31,1312,75
orl-mus TDLo:4800 mg/kg (1-16D preg)	BECTA6 18,271,77
ivn-ham TDLo:50 mg/kg/(8D preg):TER	EXPEAM 25,56,69
orl-dom TDLo:662 mg/kg (1-21W preg)	TXAPA9 25,466,73
ivn-ham TDLo:50 mg/kg/(8D preg):TER	EXPEAM 25,56,69
orl-wmn TDLo:450 mg/kg/6Y:CNS	JAMAAP 237,2627,77
ipr-rat LDLo:1000 mg/kg	EQSSDX 1,1,75
orl-pgn LDLo:160 mg/kg	HBAMAK 4,1289,35

Carcinogenic Determination: Indefinite IARC** 23, 325,80.

TLV: AIR: 0.15 mg/m3 DTLVS* 4,243,80; *Toxicology Review:* TRBMAV 33(1),85,75; PGMJAO 51(601),783,75; JDSCAE 58(12),1767,75; IRXPAT 12,1,73; CTPHBG 55,147,71; CTOXAO 6(3),377,73; QURBAW 7(1),75,74; RREVAH 54,55,75; JAVMA4 164(3),277,74; AEMBAP 40,239,73; CTOXAO 5(2),151,72; FOREAE 7,313,42; KOTTAM 11(11),1300,75; GEIGAI 20(3),291,73; STEVA8 2(4),341,74; CLCHAU 19,361,73; AJMEAZ 38,409,65; 85DHAX PB,254,72; PDTNBH 6,204,77; AMTODM 3,209,77. OSHA Standard: Air: TWA 200 ug/m3 (SCP-O) FEREAC 39,23540,74. Occupational Exposure to Inorganic Lead recm std: Air: TWA 0.10 mg(Pb)/m3 NTIS**. "NIOSH Manual of Analytical Methods" VOL 1 102,191,195,200,208,214,262, VOL 3 S341. Reported in EPA TSCA Inventory, 1980.

THR: See lead compounds. A hmn CNS. HIGH orl; MOD irr. A common air contaminant. It is a ± CAR of the lungs and kidney and an exper TER.

Fire Hazard: Mod, in the form of dust when exposed to heat or flame. See also powdered metals.

Explosion Hazard: Mod, in the form of dust when exposed to heat or flame.

Incomp: NH_4NO_3, ClF_3, H_2O_2, NaN_3, Na_2C_2, Zr. disodium acetylide; oxidants.

Disaster Hazard: Dangerous; when heated, emits highly tox fumes; can react vigorously with oxidizing materials.

For further information see Vol. 1, No. 1 of *DPIM Report.*

LEAD ACETATE

CAS RN: 301042 NIOSH #: AI 5250000

mf: $C_4H_6O_4 \cdot Pb$; mw: 325.29

Trihydrate, colorless crystals or white granules or powder. Slightly acetic odor; slowly effloresces; d: 2.55; mp: 75° when rapidly heated. Decomp above 200°; very sol in glycerol. Keep well closed.

SYNS:

ACETIC ACID LEAD (2+) SALT	LEAD DIBASIC ACETATE
ACETATE DE PLOMB (FRENCH)	NORMAL LEAD ACETATE
BLEIACETAT (GERMAN)	PLUMBOUS ACETATE
LEAD (2+) ACETATE	SALT OF SATURN
LEAD(II) ACETATE	SUGAR OF LEAD
LEAD DIACETATE	

TOXICITY DATA: 3	CODEN:
dns-rat-ipr 50 ug/kg	PSEBAA 143,446,73
spm-mus-par 1 gm/kg	ARTODN 46,159,80
orl-rat TDLo:7854 mg/kg (6-16D preg)	FCTXAV 13,629,75
orl-rat TDLo:1800 mg/kg (1-22D preg/14D post)	TOLED5 7,373,80
orl-rat TDLo:113 gm/kg (70D pre-21D post)	PBBHAU 8,347,78
orl-mus TDLo:3150 mg/kg (1-21D preg)	CRSBAW 170,1319,76
orl-mus TDLo:4800 mg/kg (1-8D preg)	CRSBAW 172,1037,78
orl-mus TDLo:9 gm/kg (7-21D preg)	CRSBAW 170,1319,76
ipr-mus TDLo:35 mg/kg (8D preg)	BIMDB3 30,223,79
ivn-ham TDLo:50 mg/kg/(8D preg):TER	EXMPA6 7,208,67
ivn-ham TDLo:50 mg/kg (8D preg)	EXPEAM 25,56,69
ipr-pgn LDLo:150 mg/kg	ARTODN 46,265,80
cyt-hmn:lym 1 mmol/L/24H	TXCYAC 10,67,78
cyt-mus-orl 16800 mg/kg/4W	JTEHD6 2,619,77
cyt-mky-orl 5760 mg/kg/64W	MUREAV 45,77,77
ipr-mus TDLo:15 mg/kg/(8D preg):TER	BIMDB3 30,223,79
ivn-ham TDLo:50 mg/kg/(8D preg):TER	EXMPA6 7,208,67
orl-rat TDLo:250 gm/kg/47W-C:ETA	BJCAAI 16,283,62
ipr-rat LDLo:204 mg/kg	JPETAB 38,161,30
ipr-mus LD50:120 mg/kg	COREAF 256,1043,63
orl-dog LDLo:300 mg/kg	HBAMAK 4,1289,35
scu-dog LDLo:80 mg/kg	HBAMAK 4,1289,35
ivn-dog LDLo:300 mg/kg	EQSSDX 1,1,75
scu-cat LDLo:100 mg/kg	HBAMAK 4,1289,35
scu-rbt LDLo:300 mg/kg	HBAMAK 4,1289,35
ivn-rbt LDLo:50 mg/kg	EQSSDX 1,1,75
scu-frg LDLo:1600 mg/kg	HBAMAK 4,1289,35

Carcinogenic Determination: Animal Positive IARC** 23,325,80; Human Suspected IARC** 23,325,80. *Toxicology Review:* ADTEAS 5,51,72; ENVRAL 13,36,77; 85DHAX Pb,256,72. OSHA Standard: Air: TWA 200 ug(Pb)/m3 (SCP-O) FEREAC 29,23540,74. Occupational Exposure to Inorganic Lead recm std: Air: TWA 0.10 mg(Pb)/m3 NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: MUT data. An exper + CARC, TER, ETA. A susp hmn CARC; HIGH ipr, orl, scu, ivn. See also lead compounds. A poison. An insecticide.

Disaster Hazard: When heated to decomp it emits tox fumes of Pb.

Incomp: $KBrO_3$; acids, sol sulfates, citrates, tartrates, chlorides, carbonates, alkalies, tannin phosphates, resorcinol, salicylic acid, phenol, chloral hydrate, sulfites, vegetable infusions, tinctures.

For further information see Vol. 1, No. 4 of *DPIM Report.*

LEAD ACETATE, BASIC

CAS RN: 1335326 NIOSH #: OF 8750000

mf: $C_4H_{10}O_8Pb_3$; mw: 807.71

SYNS:

1-DODECANETHIOL	M-LAUR'
M-DODECYL MERCAPTAN	1-MERC/
1-DODECYL MERCAPTAN	NCI-C60!

TOXICITY DATA:	CC
cyt-rat-ihl 5020 ug/m3/16W	BZ

Reported in EPA TSCA Inventory,
THR: See mercaptans. MUT data.
Fire Hazard: Low.
To Fight Fire: Alcohol foam.
Disaster Hazard: When heated to decomp it emits tox fumes of SO_x.

LAURYLPYRIDINIUM LAURYLXANTHATE

CAS RN: 14917965 NIOSH #: UU 5775000
mf: $C_{17}H_{30}N \cdot C_{13}H_{25}OS_2$; mw: 509.98

TOXICITY DATA: 2	CODEN:
skn-rbt 500 mg/24H MOD	28ZPAK -,174,72
eye-rbt 20 mg/24H SEV	28ZPAK -,174,72
orl-rat LD50:802 mg/kg	28ZPAK -,174,72

THR: MOD orl. A skn, eye irr.
Disaster Hazard: When heated to decomp it emits very tox fumes of NO_x and SO_x.

LAURYL SULFATE, SODIUM SALT, CONDENSED WITH 3 MOLES OF ETHYLENE OXIDE

NIOSH #: OF 5725000

SYNS:

SODIUM SALT OF SULFATED BROAD-CUT COCONUT ETHOXY(3EO) ALCOHOL	SODIUM SALT OF SULFATED ETHOXYLATE OF BROAD-CUT LAURYL ALCOHOL

TOXICITY DATA: 2	CODEN:
skn-rbt 10 mg MLD	JSCCA5 22,411,71
skn-rbt 230 mg/5W open MLD	JSCCA5 22,411,71
skn-gpg 115 mg/5W open MLD	JSCCA5 22,411,71

THR: A skn irr.
Disaster Hazard: When heated to decomp it emits tox fumes of SO_x.

LAVANDIN OIL

CAS RN: 8022159 NIOSH #: OF 6097500

Main constituent is Linalool; found in plant Lavanoula Hybrida Reverchon; prepared by steam distillation of the flowering stalks of the plant.

SYN: OIL OF LAVANDIN

TOXICITY DATA: 2	CODEN:
skn-rbt 500 mg/24H MLD	FCTXAV 14,443,76

Reported in EPA TSCA Inventory, 1980.
THR: A skn irr.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

LAVATAR

NIOSH #: OF 6097840

Coal tar distillates in a shampoo base.

TOXICITY DATA:	CODEN:
mma-sat 25 ug/plate	TOLED5 3,325,79

THR: MUT data.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

LAVENDER ABSOLUTE

NIOSH #: OF 6100000

Found in the flowers of Lavandula Officinalis chaix. The main constituent is Linalyl Acetate; prepared from alcoholic extract of a residue, which is extracted from plant material using an organic solvent; a dark green liquid.

TOXICITY DATA: 1	CODEN:
skn-rbt 500 mg/24H MLD	FCTXAV 14,443,76
orl-rat LD50:4250 mg/kg	FCTXAV 14(5),443,76

THR: LOW orl; A skn irr.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

LAVENDER OIL

CAS RN: 8000280 NIOSH #: OF 6110000

Main constituent is linalyl acetate. Found in the plant Lavandulaofficinalif choix (Fam. Labiate). Prepared by steam distillation of the flowering stalks of the plant.

SYNS:

LAVENDEL OEL (GERMAN)	OIL OF LAVENDER

TOXICITY DATA: 1	CODEN:
skn-rbt 500 mg/24H MLD	FCTXAV 14,443,76
orl-rat LD50:9040 mg/kg	PHARAT 14,435,59

Reported in EPA TSCA Inventory, 1980.
THR: LOW orl. A skn irr.
Disaster Hazard: When heated to decomp it emits acrid smoke and fumes.

LD-813

CAS RN: 64083052 NIOSH #: OF 6730000

Commercial mixture of aromatic amines containing approx. 40% MOCA

TOXICITY DATA: 3	CODEN:
orl-rat TDLo:37 gm/kg/2Y-C:CARC	TXAPA9 31,159,75

THR: An exper CARC. See also aromatic amines.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

√ LEAD

CAS RN: 7439921 NIOSH #: OF 7525000
mf: Pb; mw: 207.19

Bluish-gray, soft metal. mp: 327.43°, bp: 1740°, d: 11.34 @ 20°/4°. vap. press: 1 mm @ 973°.

SYNS:

C.I. 77575	LEAD S2
LEAD FLAKE	OLOW (POLISH)

mes, water or steam, they will produce toxic and lam vapors.

CYANIDOL

NIOSH #: LK 9820000
mf: $C_{15}H_{11}O_6$; mw: 287.26

SYN: 3,3',4',5,7-PENTAHYDROXYFLAVYLIUM ACID ANION

TOXICITY DATA: 3-2	CODEN:
rat LD50:2350 mg/kg	CHTPBA 2,33,67
rat LD50:240 mg/kg	CHTPBA 2,33,67
mus LD50:4110 mg/kg	CHTPBA 2,33,67
mus LD50:840 mg/kg	CHTPBA 2,33,67

THR: HIGH ivn. MOD ivn, ipr.
Disaster Hazard: When heated to decomp it emits acrid smoke and irr fumes.

CYANINE DYE 715

CAS RN: 548845 NIOSH #: VC 3542500
mf: $C_{26}H_{28}N_3 \cdot Cl$; mw: 418.02

SYN: 6-DIMETHYLAMINO-2-(2-(2,5-DIMETHYL-1-PHENYL)3-PYRROLYL)VINYL)-1-METHYLQUINOLINIUM), CHLORIDE

TOXICITY DATA: 3	CODEN:
orl-rat LD50:161 mg/kg	JPETAB 107,315,53
orl-mus LD50:7900 ug/kg	JPETAB 107,315,53

THR: HIGH orl.
Disaster Hazard: When heated to decomp it emits very tox fumes of NO_x and Cl^-.

2-CYANOACETAMIDE

CAS RN: 107915 NIOSH #: AB 5950000
mf: $C_3H_4N_2O$; mw: 84.09

White powder; mp: 119°; bp: decomp.

SYNS:

CYANACETAMIDE	MALONAMONITRILE
CYANOACETAMIDE	NITRILOMALONAMIDE
CYANOIMINOACETIC ACID	USAF KF-14
MALONAMIDE NITRILE	

TOXICITY DATA: 2	CODEN:
orl-mus LD50:1680 mg/kg	KHZDAN 9,50,66
ipr-mus LD50:750 mg/kg	NTIS** AD691-490

Reported in EPA TSCA Inventory, 1980.
THR: MOD orl, ipr. See also nitriles.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x and CN^-.

CYANOACETIC ACID

CAS RN: 372098 NIOSH #: AG 3675000
mf: $C_3H_3NO_2$; mw: 85.07

Solid; mp: 66°; bp: 108° @ 15 mm.

SYNS:

ACIDE CYANACETIQUE (FRENCH)	MONOCYANOACETIC ACID
CYANESSIGSAEURE (GERMAN)	USAF KF-17
MALONIC MONONITRILE	

TOXICITY DATA: 3-2	CODEN:
orl-rat LD50:1500 mg/kg	LONZA# 12JAN81
ipr-mus LD50:200 mg/kg	NTIS** AD691-490
scu-rbt LDLo:2000 mg/kg	AIPTAK 5,161,1899
scu-frg LDLo:2000 mg/kg	AIPTAK 5,161,1899

Reported in EPA TSCA Inventory, 1980. EPA TSCA 8(a) Preliminary Assessment Information Proposed Rule FERREAC 45,13646,80.
THR: HIGH ipr; MOD orl, scu. See also nitriles. Reacts violently with furfuryl alcohol.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x and CN^-.

N-CYANOACETYL ETHYL CARBAMATE

CAS RN: 6629045 NIOSH #: EZ 3480000
mf: $C_6H_8N_2O_3$; mw: 156.16

TOXICITY DATA: 3	CODEN:
ipr-mus TDLo:2400 mg/kg/4W-I:NEO	CNREA8 29,2184,69

THR: An exper NEO. See also carbamates and cyanides.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

1-CYANO-3-tert-AMYLGUANIDINE

CAS RN: 1113106 NIOSH #: MF 0175000
mf: $C_7H_{14}N_4$; mw: 154.25

SYNS:

1-CYANO-3,6-PENTYLGUANIDINE	GUANCIDINE

TOXICITY DATA: 3-2	CODEN:
orl-rat LD50:300 mg/kg	JPETAB 161,88,68
ipr-rat LD50:313 mg/kg	JPETAB 161,88,68
orl-mus LD50:1400 mg/kg	JPETAB 161,88,68
ipr-mus LD50:322 mg/kg	JPETAB 161,88,68

THR: HIGH orl, ipr. MOD orl.
Disaster Hazard: When heated to decomp it emits very tox fumes of NO_x and CN^-.

p-CYANOBENZALDEHYDE

CAS RN: 105077 NIOSH #: CU 5250000
mf: C_8H_5NO; mw: 131.14

SYNS:

4-CYANOBENZALDEHYDE	4-FORMYLBENZONITRILE
P-CYANOBENZENECARBOXALDEHYDE	TEREPHTHALALDEHYDONITRILE
P-FORMYLBENZONITRILE	USAF KF-1

TOXICITY DATA: 3	CODEN:
ipr-mus LD50:100 mg/kg	NTIS** AD277-689

Reported in EPA TSCA Inventory, 1980.
THR: HIGH ipr. See also nitriles and aldehydes.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

10-CYANO-1,2-BENZANTHRACENE

CAS RN: 7476086 NIOSH #: CW 1050000
mf: $C_{19}H_{11}N$; mw: 253.31

SYNS:
CYANSAN

TOXICITY DATA: 3
orl-hmn TDLo:5400 mg/kg/ 24W:EYE
ims-rat LD50:310 mg/kg
orl-mus LDLo:4 mg/kg

Reported in EPA TSCA In'
THR: Toxic to eye in hmn ee also cyanates.
Disaster Hazard: When heated to decomp it emits very tox fumes of CN^- and Na_2O.

CYANIDE

CAS RN: 57125 NIOSH #: GS 7175000
mf: CN^-; mw: 26.02

SYN: CYANURE (FRENCH)

TOXICITY DATA: 3 CODEN:
ipr-mus LD50:3 mg/kg NATUAS 228,1315,70

TLV: Air: 5 mg/m3 DTLVS* 4,109,80. *Toxicology Review:* CLCHAU 19,361,73. "NIOSH Manual of Analytical Methods" VOL 1 116, VOL 3 S250. Reported in EPA TSCA Inventory, 1980.

THR: Cyanide directly stimulates the chemoreceptors of the carotid and aortic bodies with a resultant hyperpnea. Cardiac irregularities are often noted, but the heart invariably outlasts the respirations. Death is due to respiratory arrest of central origin. It can occur within seconds or minutes of the inhalation of high concentrations of hydrogen cyanide gas. Because of slower absorption, death may be more delayed after the ingestion of cyanide salts, but the critical events still occur within the first hour.

Two other sources of cyanide have been responsible for human poisoning. One of these is amygdalin, a cyanogenic glycoside found in apricot, peach, and similar fruit pits and in sweet almonds. Amygdalin is a chemical combination of glucose, benzaldehyde, and cyanide from which the latter can be released by the action of β-glucosidase or emulsin. Although these enzymes are not found in mammalian tissues, the human intestinal microflora appears to possess these or similar enzymes capable of effecting cyanide release resulting in human poisoning. For this reason amygdalin may be as much as 40 times more toxic by the oral route as compared with intravenous injection. Amygdalin is the major ingredient of Laetrile, and this alleged anticancer drug has also been responsible for human cyanide poisoning. An ethical drug that may also cause cyanide poisoning in overdose is the potent vascular smooth muscle relaxant sodium nitroprusside. Although nitroprusside is related chemically to ferricyanide, unlike the latter it penetrates into erythrocytes and reacts with hemoglobin to release its cyanide (Smith and Kruszyna, 1974). Fortunately, the therapeutic margin for nitroprusside appears to be quite large.

Cyanide is commonly found in certain rat and pest poisons, silver and metal polishes, photographic solutions, and fumigating products. Compounds such as potassium cyanide can also be readily purchased from chemical stores. Cyanide is readily absorbed from all routes, including the skin, mu mem, and by inhal, although alkali salts of cyanide are toxic only when ingested. Death may occur with ingestion of even small amounts of sodium or potassium cyanide and can occur within minutes or hours depending on route of exposure. Inhalation of toxic fumes represents a potentially rapidly fatal type of exposure. Sodium nitroprusside (Smith and Kruszyna, 1974) and apricot seeds (Sayre and Kaymakcalan, 1964) have also caused cyanide poisoning. A blood cyanide level of greater than 0.2 μg/ml is considered toxic. Lethal cases have usually had levels above 1 μg/ml. Clinically, cyanide poisoning is reported to produce a bitter, almond odor on the breath of the patient; however, only a small proportion of the population is genetically able to discern this characteristic odor. Typically, cyanide has a bitter, burning taste, and following poisoning, symptoms of salivation, nausea without vomiting, anxiety, confusion, vertigo, giddiness, lower jaw stiffness, convulsions, opisthotonos, paralysis, coma, cardiac arrhythmias, and transient respiratory stimulation followed by respiratory failure may occur. Bradycardia is a common finding, but in most cases heartbeat usually outlasts respiration (Wexler et al., 1947). A prolonged expiratory phase is considered to be characteristic of cyanide poisoning.* The volatile cyanides resemble hydrocyanic acid physiologically, inhibiting tissue oxidation and causing death through asphyxia. Cyanogen is probably as toxic as hydrocyanic acid; the nitriles are generally considered somewhat less toxic, probably because of their lower volatility. The non-volatile cyanide salts appear to be relatively non-toxic systemically, so long as they are not ingested and care is taken to prevent the formation of hydrocyanic acid. Workers, such as electroplaters and picklers, who are daily exposed to cyanide solutions may develop a "cyanide" rash, characterized by itching, and by macular, papular, and vesicular eruptions. Frequently there is secondary infection. Exposure to small amounts of cyanide compounds over long periods of time is reported to cause loss of appetite, headache, weakness, nausea, dizziness, and symptoms of irr of the upper respiratory tract and eyes. See also specific compounds.

Fire Hazard: Mod, by chemical reaction with heat, moisture, acid. Many cyanides evolve hydrocyanic acid rather easily. This is a flam gas and is highly toxic. Carbon dioxide from the air is sufficiently acidic to liberate hydrocyanic acid from cyanide solutions. See also hydrocyanic acid.

Explosion Hazard: See hydrocyanic acid. Explodes if melted with nitrite or chlorate @ about 450°. Violent reaction with F_2, Mg, nitrates, HNO_3, nitrites.

Disaster Hazard: Dangerous; on contact with acid, acid

* Casarett and Doull's, "Toxicology, the basic Science of Poisons" 2nd ed. Doull, Klaassen and Amdur (eds). Macmillan Pub. Co. Inc. New York, N.Y.

CHR CMPS

SYNS:

ACETIC ACID, CHROMIUM(2+) SALT	CHROMIUM(II) ACETATE
CHROMIUM(2+) ACETATE	CHROMIUM DIACETATE
	CHROMOUS ACETATE

TOXICITY DATA: 1	CODEN:
orl-rat LD50:11260 mg/kg	AIHAAP 30,470,69

Reported in EPA TSCA Inventory, 1980.
THR: LOW orl. See also chromium compounds.
Disaster Hazard: When heated to decomp it emits acrid smoke and irr fumes.

CHROMIUM(III) CHLORIDE

CAS RN: 10025737 NIOSH #: GB 5425000
mf: Cl_3Cr; mw: 158.36

Bp: 1300° (subl).

SYNS:

CHROMIC CHLORIDE	C.I. 77295
CHROMIUM CHLORIDE, ANHYDROUS	PURATRONIC CHROMIUM CHLORIDE
CHROMIUM CHLORIDE	TRICHLOROCHROMIUM
CHROMIUM TRICHLORIDE	

MUTAGEN DATA: 3	CODEN:
dnd-esc 5 mmol/L	CNREA8 40,2455,80
cyt-hmn:fbr 100 umol/L	CARYAB 32,379,79
cyt-ham:ovr 50 ug/L	CARYAB 32,379,79

REPRODUCTIVE EFFECTS DATA:	
itt-rat TDLo:12668 ug/kg (1D male)	JRPFA4 7,21,64
ipr-mus TDLo:44600 ug/kg (8D preg)	JTSCDR 2,1,76
ipr-mus TDLo:30 mg/kg (8D preg)	JTSCDR 2,1,76
ipr-mus TDLo:59500 ug/kg (9D preg)	JTSCDR 2,1,76
scu-mus TDLo:450 mg/kg (1-17D preg)	TJADAB 12,198,75
scu-mus TDLo:12668 ug/kg (30D male)	JRPFA4 7,21,64

TOXICITY DATA:	CODEN:
orl-rat LD50:1870 mg/kg	AIHAAP 30,470,69
ipr-mus LD50:140 mg/kg	COREAF 256,1043,63
ivn-mus LDLo:400 mg/kg	AQMOAC #70-15,1970
ivn-rbt LDLo:288 mg/kg	EQSSDX 1,1,75
skn-gpg LDLo:202 mg/kg	AEHLAU 11,201,65
ipr-gpg LDLo:200 mg/kg	AEHLAU 11,201,65

Toxicology Review: 85DHAX Cr,22,74. Reported in EPA TSCA Inventory, 1980. Meets Criteria for Proposed OSHA Medical Records Rule FEREAC 47,30420,82.
THR: HIGH dermal; MOD orl. Violent reaction with Li, nitrogen.
Disaster Hazard: When heated to decomp it emits tox fumes of Cl^-.

CHROMIUM COMPOUNDS

Chromic acid and its salts have a corrosive action on the skin and mu mem. The lesions are confined to the exposed parts, affecting chiefly the skin of the hands and forearms and the mu mem of the nasal septum. The characteristic lesion is a deep, penetrating ulcer, which, for the most part, does not tend to suppurate, and which is slow in healing.

Small ulcers, about the size of a matchhead or end of a lead pencil may be found, chiefly around the base of the nails, on the knuckles, dorsum of the hands and forearms. These ulcers tend to be clean, and progress slowly. They are frequently painless, even though quite deep. They heal slowly, and leave scars. On the mu mem of the nasal septum the ulcers are usually accompanied by purulent discharge and crusting. If exposure continues, perforation of the nasal septum may result, but produces no deformity of the nose. Chromate salts are exper and hmn CARC of the lungs, nasal cavity and paranasal sinus, also exper CARC of the stomach and larynx. Hexavalent compounds are said to be more toxic than the trivalent. Eczematous dermatitis due to trivalent chromium compounds has been reported.

CHROMIUM DIACETATE

CAS RN: 628524 NIOSH #: AG 3000000
mf: $C_4H_6CrO_4$; mw: 170.09

SYNS:

ACETIC ACID, CHROMIUM (2+) SALT (8CI,9CI)	CHROMIUM (2+) ACETATE
CHROMIUM ACETATE HYDRATE	CHROMIUM (II) ACETATE
	CHROMOUS ACETATE

TOXICITY DATA: 1	CODEN:
orl-rat LD50:11260 mg/kg	AIHAAP 30,470,69

THR: LOW orl. See also chromium compounds.
Disaster Hazard: Ignites spont in air.

CHROMIUM(VI) OXIDE (1:3)

CAS RN: 1333820 NIOSH #: GB 6650000
mf: CrO_3; mw: 100.00

Red rhomb, deliq cryst.; d: 2.70; mp: 196°; bp: decomp sol = 61.7 g/100 cc @ 0°; 67.45 g/100 cc @ 100°.

SYNS:

ANHYDRIDE CHROMIQUE (FRENCH)	CHROMIUM TRIOXIDE
ANIDRIDE CROMICA (ITALIAN)	CHROMIUM (6+) TRIOXID
CHROME (TRIOXYDE DE) (FRENCH)	CHROMSAEUREANHYDRID (GERMAN)
CHROMIC ACID; CHROMIC (VI) ACID	CHROMTRIOXID (GERMAN)
CHROMIC ACID, SOLID; CHROMIC ACID, SOLID (DOT)	CHROOMTRIOXYDE (DUTCH)
CHROMIC ANHYDRIDE	CHROOMZUURANHYDRIDE (DUTCH)
CHROMIC ANHYDRIDE (DOT)	CHROMO (TRIOSSIDO DI) (ITALIAN)
CHROMIC TRIOXIDE; CHROMIC TRIOXIDE (DOT)	MONOCHROMIUM OXIDE)
CHROMIUM OXIDE; CHROMIUM (VI) OXIDE	MONOCHROMIUM TRIOXIDE
	PURATRONIC CHROMIUM TRIOXIDE

TOXICITY DATA:	CODEN:
mmo-sat 1 mmol/L	TOLED5 8,195,81
mma-sat 10 ug/plate	AEMIDF 33,805,77
dnd-esc 5 mmol/L	CNREA8 40,2455,80
mrc-bsc 16 mmol/L	MUREAV 58,175,78
cyt-mus:maml umol/L/48H	MUREAV 67,221,79
cyt-ham:emb 3500 ug/L/24H	MUREAV 46,87,77
cyt-ham:ovr 250 ug/L	TXCYAC 17,219,80
sce-ham:ovr 250 ug/L	TXCYAC 17,219,80
ivn-ham TDLo:5 mg/kg (8D preg)	ENVRAL 16,101,78
ivn-ham TDLo:7500 ug/kg (8D preg)	ENVRAL 16,101,78
ivn-ham TDLo:7500 ug/kg (8D preg)	TJADAB 9,A17,74
ihl-ham TCLo:110 ug/m³:CAR	AGGHAR 13,528,55
imp-rat TDLo:125 mg/kg:CAR	AIHAAP 20,274,59
scu-dog LDLo:330 mg/kg	27ZWAY 3,3,1521

CHROMIUM

CHROMIC ACID (MIXTURE)

N

mf: CrO_3; mw: 100.01

mp: 196°; d: 2.70; dark red cry $Cr_2O_3 + O_2$; a powerful oxidizer.

SYNS:
CHROMIUM TRIOXIDE CHR

TOXICITY DATA:
DOT: Oxidizer, Label: Oxidizer FEREAC 41,57018,76. Occupational Exposure to Cr(VI) recm std: Air: TWA 25 ug(Cr(VI))/m3;CL 50 ug/m3/15M NTIS**.

THR: A poison. See also chromium compounds and chromates. A powerful irr of skn, eyes and mu mem; can cause a dermatitis, bronchoasthma, "chrome holes," damage to the eyes.

Disaster Hazard: May explode in a fire.

Incomp: Acetic acid; acetic anhydride; tetrahydronaphthalene; acetone; alcohols; alkali metals; ammonia; arsenic; bromine penta fluoride; butyric acid; n,n-dimethylformamide; hydrogen sulfide; peroxyformic acid; phosphorus; potassium hexacyanoferrate; pyridine; selenium; sodium; sulfur.

CHROMIC ACID (SOLUTION)

NIOSH #: GB 2670000

SYN: CHROMIC ACID SOLUTION (DOT)

TOXICITY DATA: 3 CODEN:
DOT: Corrosive Material, Label: Corrosive FEREAC 41,57018,76. Occupational Exposure to Cr(VI) recm std: Air: TWA 25 ug(Cr(VI))/m3;CL 50 ug/m3/15M NTIS**.

THR: See chromic acid, dry. See also chromium compounds.

CHROMIC CHLORIDE STEARATE

CAS RN: 15242963 NIOSH #: GB 7280000
mf: $C_{18}H_{36}Cl_4Cr_2O_3$; mw: 546.34

SYNS:
TETRACHLORO-MU-HYDROXY-(MU-OCTADECANOATO-O:O')DI-CHROMIUM
TETRACHLORO-MU-HYDROXY-(MU-STEARATO)DI-CHROMIUM
NCI-C60800
STEARATO-CHROMIC CHLORIDE COMPLEX

TOXICITY DATA: 3 CODEN:
ivn-mus LD50:180 mg/kg CSLNX* NX#03305

Reported in EPA TSCA Inventory, 1980.

THR: HIGH ivn. See also chromium compounds.

Disaster Hazard: When heated to decomp it emits tox fumes of Cl^-.

CHROMIC CHROMATE

CAS RN: 24613896 NIOSH #: GB 2850000
mf: $Cr_3O_{12}\cdot 2Cr$; mw: 452.00

SYNS:
CHROMIC ACID, CHROMIUM (3+) SALT (3:2)
CHROMIUM CHROMATE

TOXICITY DATA: 3 CODEN:
imp-rat TDLo:112 mg/kg:NEO AIHAAP 20,274,59

Carcinogenic Determination: Animal Positive IARC** 2,100,73. Occupational Exposure to Chromium(VI) recm std: Air: CL 1 ug(Cr(VI))/m3 NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: An exper NEO, CARC. See also chromium compounds. Very powerful oxidizer.

CHROMITE (MINERAL)

CAS RN: 1308312 NIOSH #: GB 4000000
mf: Cr_2FeO_4; mw: 223.85

SYNS:
CHROME ORE
CHROMITE ORE
IRON CHROMITE

TOXICITY DATA: 3 CODEN:
Carcinogenic Determination: Indefinite IARC** 23,205,80.

THR: See also chromium compounds and iron. An exper ± CARC.

CHROMIUM

CAS RN: 7440473 NIOSH #: GB 4200000
Af: Cr; Aw: 52.0

SYN: CHROME

TOXICITY DATA: CODEN:
ivn-rat TDLo:2160 ug/kg/6W-I TFX:ETA JNCIAM 16,447,55
imp-rat TDLo:1200 ug/kg/6W-I TFX:ETA JNCIAM 16,447,55
imp-rbt TDLo:75 mg/kg:ETA ZEKBAI 52,425,42

Carcinogenic Determination: Animal Suspected IARC** 2,100,73; Animal Indefinite IARC** 23,205,80. TLV-TWA 500 ug/m3 DTLVS* 4,98,80. *Toxicology Review:* 85CVA2 5,63,70; KOTTAM 11(11),1300,75; FOREAE 7,313,42; MIBUBI 9(4),321,75; FCTXAV 9,105,71; PEXTAR 12,102,69; 85DHAX Cr,22,74; BNYMAM 54,413,78; NTIS** Conf-691001. OSHA Standard: Air: TWA 1 mg/m3 (SCP-0) FEREAC 39,23540,74. "NIOSH Manual of Analytical Methods" VOL 1 152,182, VOL 3; S323,352, VOL 5 173#. NIOSH Current Intelligence Bulletin 4, 1975. Reported in EPA TSCA Inventory, 1980. Proposed OSHA Medical Records Rules FEREAC 47,30420,82.

THR: An exper ETA, CARC.

Disaster Hazard: Powder will explode spont in air.

Incomp: Oxidants.

For further information see Vol. 3, No. 3 of *DPIM Report.*

CHROMIUM ACETATE HYDRATE

CAS RN: 628524 NIOSH #: AG 3000000
mf: $C_4H_6CrO_4\cdot H_2O$; mw: 188.12

Red crystals.

as chlorates, bromates, iodates, peroxides, perchlorates, nitrates, nitrites, oxides, performates, persulfates, halogens, NO_x, melted sulfates, SO_2, (trichloroethylene + HCl), (Na_2O_2 + CO_2), SCl_2, $COCl_2$, PCl_3, AgCl, O_2 compressed or liquid, (Pd + Δ), NOCl, (Nb oxide + S), chloro and/or fluoro methanes and ethanes, ICl, (Mn + air), CH_3Br, CH_3Cl, (fluoro-chloro lubricants + pressure), (Mg + $KClO_4$), propylene dichloride, Na_2C_2, Na_2CO_3, NaOH.

To Fight Fire: Special mixtures of dry chemical.

Incomp: Halocarbons, mercury (amalgam), Cl_2, I, (Fe + SiO_2 + Al), (Al foil + Hg), (Al + $BaNO_3$ + KNO_3 + S + organic matter) can explode.

For further information see Vol. 1, No. 4 of *DPIM Report.*

ALUMINUM AMMONIUM SULFATE

mf: $Al_2(SO_4)_3(NH_4)_2SO_4 \cdot 24H_2O$; mw: 906

Colorless crystals, odorless, sol in water, glycerine; insol in alc. d: 1.645; mp: 94.5°; bp: loses 20 H_2O @ 120°.

THR: A mild astringent used as a general-purpose food additive. Irr if inhal or ingested. See also aluminum compounds and sulfates.

Disaster Hazard: Dangerous; see sulfates.

ALUMINUM BOROHYDRIDE

mf: AlB_3H_{12}; mw: 71.53

Liquid. bp: 44.5°; mp: −64.5°; vap. press: 400 mm @ 28.1°.

SYN: ALUMINUM TETRAHYDROBORATE

THR: Unknown. See also hydrides and boron compounds.

Fire Hazard: Dangerous by spont chemical reaction; ignites spont in air, particularly in moist air.

Explosive Hazard: Explodes in O_2 at temperatures as low as 20°. An explosive range of 5% to 90%.

Incomp: Water, steam, oxidizing materials, acid or acid fumes.

Disaster Hazard: Mod dangerous; will react with water or steam to produce heat, H_2 or tox fumes.

To Fight Fire: CO_2, dry chemical.

ALUMINUM BROMIDE

CAS RN: 7727153 NIOSH #: BD 0350000
mf: $AlBr_3$; mw: 266.71

White to yellow-red lumps. mp: 97.5°; bp: 263.3° @ 748 mm; d: 3.2; vap. press: 1 mm @ 81.3°.

SYNS:

ALUMINUM BROMIDE (ANHYDROUS)	ALUMINUM TRIBROMIDE
	TRIBROMOALUMINUM

TOXICITY DATA: CODEN:

DOT: Corrosive Material, Label: Corrosive FEREAC 41,57018,76.

Reported in EPA TSCA Inventory, 1980.

THR: A tox, corrosive material. See also bromides. Mixtures with Na or K explode violently upon impact.

Disaster Hazard: When heated to decomp it emits tox fumes of Br^-.

Incomp: Do not add H_2O to anhyd material. Hydrolysis can be violent.

ALUMINUM BROMIDE HYDROXIDE

CAS RN: 12794922 NIOSH #: BD 0360000

SYNS:

ALUMINUM BROMHYDROXIDE	ALUMINUM HYDROXYBROMIDE
ALUMINUM BROMOHYDROL	

TOXICITY DATA:	CODEN:
skn-hmn 90 mg/3D-I MLD	85DKA8 -,127,77

THR: A hmn skn irr. See also bromides.

Disaster Hazard: When heated to decomp it emits tox fumes of Br^-.

ALUMINUM CARBIDE

mf: Al_4C_3; mw: 143.91

Yellow crystal or powder, hygroscopic. mp: 2100°; bp: decomp @ 2200°; d: 2.36.

THR: Decomp by water. Incandesces in contact with $KMnO_4$ or PbO_2. Dust can cause pulmonary irr. See also aluminum compounds.

ALUMINUM CHLORATE

mf: $Al(ClO_3)_3$; mw: 277.4

Colorless, deliquescent crystals. mp: decomp.

THR: Unknown. See chlorates.

Fire Hazard: Mod, by spont chemical reaction; a powerful oxidizer; may ignite upon contact with combustibles.

Explosion Hazard: Mod, when shocked, exposed to heat or by spont chemical reaction with reducing agents. When contaminated, may become sensitized.

Disaster Hazard: Dangerous; shock or heat will explode it. See chlorides and chlorates.

Incomp: Evaporation, emits ClO_2.

ALUMINUM CHLORIDE

CAS RN: 7446700 NIOSH #: BD 0525000
mf: $AlCl_3$; mw: 133.33

White hex deliquescent crystals. d: 2.44; mp: 194° @ 5.2 atm; bp: subl @ 181°; vap. press: 1 mm @ 100.0°. Violently sol in water, sol in alc and ether.

SYNS:

ALLUMINIO(CLORURO DI) (ITALIAN)	ALUMINUM TRICHLORIDE
ALUMINIUMCHLORID (GERMAN)	CHLORURE D'ALUMINIUM (FRENCH)
ALUMINUM CHLORIDE (1:3)	TRICHLOROALUMINUM

TOXICITY DATA: 2	CODEN:
orl-mus TDLo:425 mg/kg (MGN)	BJIMAG 23,305,66
orl-mus LD50:770 mg/kg	TJADAB 9,A14,74
cyt-mus-ipr 100 mmol/L	NULSAK 15,180,72
orl-rat LD50:3700 mg/kg	12VXA5 8,43,68
orl-mus LD50:3805 mg/kg	BJIMAG 23,305,66

TOXICITY DATA: 2
orl-rat LD50:550 mg/kg
ihl-rat LCLo:8000 ppm/4H

THR: MOD via oral and inhal rc
Fire Hazard: Dangerous; see ethei
To Fight Fire: Water may be ineffec dry chemical, mist.
Disaster Hazard: When heated to (irr fumes. Becomes shock and he

ALMOND OIL

Fixed, non-drying oil; oily liquid. Composition: oleic, linoleic, myristic, palmitic acids. d: 0.910-0.915 @ 25°/25°.

SYNS:
ALMOND OIL EXPRESSED   ALMOND OIL SWEET

THR: A weak sensitizer. Contact dermatitis may result from local contact.
Fire Hazard: Slight, when exposed to heat or flame.
To Fight Fire: Use alcohol foam, dry chemical, water, mist.

ALMOND OIL, BITTER

Composition: Chief known constituents are benzaldehyde, hydrocyanic acid, benzaldehyde cyanhydrin. bp: 179°; d: 1.045-1.070 @ 15°

THR: Unknown. Depends upon purity of sample. An allergen. Can be quite toxic if it has not been separated from its hydrogen cyanide. Weak sensitizer; may cause contact dermatitis.
Fire Hazard: Slight, when exposed to heat or flame.
Disaster Hazard: Dangerous; see cyanides.

ALPRENOL HYDROCHLORIDE

CAS RN: 13707885   NIOSH #: UA 5425000
mf: $C_{15}H_{23}NO_2 \cdot ClH$; mw: 285.85

SYNS:
1-(o-ALLYLPHENOXY)-3-(ISOPROPYLAMINO)-2-PROPANOL HYDROCHLORIDE   OXPRENOLOL

TOXICITY DATA: 3	CODEN:
ipr-mus LD50:103 mg/kg	APTOA6 27,453,69
orl-man TDLo:571 ug/kg BLD	KIZSB8 6(4),209,75
orl-mus LD50:184 mg/kg	AIPTAK 202,79,73

THR: Causes BLD in man. HIGH orl.
Disaster Hazard: When heated to decomp it emits very tox fumes of HCl and NO_x.

ALPRENOLOL

CAS RN: 13655522   NIOSH #: UA 5350000
mf: $C_{15}H_{23}NO_2$; mw: 249.39

SYNS:
1-(o-ALLYLPHENOXY)-3-(ISOPROPYLAMINO)-2-PROPANOL   ALFEPROL (RUSSIAN)

TOXICITY DATA: 3	CODEN:
ivn-mus LD50:20 mg/kg	ARZNAD 27,1022,77
orl-mam LD50:184 mg/kg	PCJOAU 8,137,74
ipr-mam LD50:102 mg/kg	PCJOAU 8,137,74

THR: HIGH ivn, orl, ipr.
Disaster Hazard: When heated to decomp it emits tox fumes of NO_x.

ALTERNARIOL-9-METHYL ETHER

CAS RN: 23452053   NIOSH #: HP 8755000
mf: $C_{15}H_{12}O_5$; mw: 272.27

SYNS:
ALTERNARIOL MONOMETHYL ETHER   3,7-DIHYDROXY-9-METHOXY-1-METHYL-6H-DIBENZO(B,D)PYRAN-6-ONE

TOXICITY DATA: 3	CODEN:
mmo-sat 500 ug/plate	MUREAV 78,33,80
ipr-ham TDLo:200 mg/kg	TOXID9 1,35,81

THR: MUT data. HIGH ipr. An exper TER.
Disaster Hazard: When heated to decomp it emits smoke and acrid fumes.

ALUMINON

CAS RN: 569584   NIOSH #: GU 4800000
mf: $C_{22}H_{23}N_3O_9$; mw: 473.48

SYNS:
AMMONIUM AURINTRICARBOXYLATE   AURINTRICARBOXYLIC ACID AMMONIUM SALT

TOXICITY DATA: 3	CODEN:
ivn-mus LD50:4 mg/kg	12VXA5 8,42,68

Reported in EPA TSCA Inventory, 1980.
THR: HIGH ivn.
Disaster Hazard: When heated to decomp it emits tox fumes such as NO_x.

ALUMINUM

CAS RN: 7429905   NIOSH #: BD 03300000
mf: Al; mw: 26.98

A silvery ductile metal. mp: 660°, bp: 2450°, d: 2.702, vap. press 1 mm @ 1284°. Sol in HCl, H_2SO_4 and alkalies.

SYNS:
ALAUN (GERMAN)   ALUMINUM, METALLIC, POWDER (DOT)
ALUMINA FIBRE   ALUMINUM POWDER
ALUMINIUM FLAKE   C.I. 77000
ALUMINUM DEHYDRATED

TOXICITY DATA: CODEN:
Toxicology Review: FOREAE 7,313,42; PEXTAR 12,102,69; AMTODM 3,209,77. DOT: Flammable Solid, Label: Flammable Solid FEREAC 41,57018,76. "NIOSH Manual of Analytical Methods" VOL 5 173#. Reported in EPA TSCA Inventory, 1980.
THR: Aluminum is not generally regarded as an industrial poison. Inhal of finely divided aluminum powder has been reported as a cause of pulmonary fibrosis. May be implicated in Alzheimers disease.
Fire Hazard of Dust: Mod, when exposed to heat or flame or by chemical reaction.
Spontaneous Heating: No.
Explosion Hazard of Dust: Mod, when exposed to heat or flame or on contact with powerful oxidizers such

REFERENCE 14

15506

Nussbaumer & Clarke, Inc.
Consulting Engineers Surveyors
310 Delaware Avenue Buffalo, New York 14202
(716) 853-7582

DANIEL J. HURLEY, Chairman
VITO J. CARUSO, President
RICHARD E. VANDERBROOK, Vice-President
WALTER E. ROEDER, Secretary-Treasurer

SIEGFRIED BARBASCH, Chief Engineer
RAYMOND D. SULLIVAN, Controller

OSWEGO OFFICE
P.O. Box 162
Oswego, N.Y. 13126
(315) 342-3010

WASTE WATER TREATMENT
WATER SUPPLY
SOLID WASTE DISPOSAL
SEWERS
LAND SURVEYING
DRAINAGE-FLOOD CONTROL
ARCHITECTURAL SERVICES
ENERGY MANAGEMENT

November 19, 1980

Re: City of Lackawanna, New York
Sewage Treatment Plant
EPA/DEC #C-36-852-02
NCI File No. 79-122

Mr. Robert Mitrey, P.E.
New York State Department of
Environmental Conservation
600 Delaware Avenue
Buffalo, New York 14202

CITY OF
LACKAWANNA

Dear Mr. Mitrey:

On behalf of Mr. C. J. Klemp of the Frank L. Ciminelli Construction Company, Inc., and myself, I would like to take this opportunity to thank you and your staff for meeting with us on November 14, 1980 to discuss the disposal of digested sludge at the Lackawanna Landfill Site on Ridge Road.

The following plan of action is provided for your review and comment:

The contents of the digester (58,000 c.f. capacity) are to be dewatered by the "Mobile LRS Process" to a minimum of 20% TSS. The liquid fraction will be returned to the head of the primary settling tanks at a rate not to interfere with their proper operation. Assuming that the average conncentration of the digester contents is 10% TSS, the volume of sludge cake will be 58,000 c.f. x 10%/20% = 29,000 c.f. The dewatering operation should begin in January 1981 and has a duration of fifteen (15) working days on a 24 hr/day, 7 day/week basis.

The sludge will be disposed of at the Lackawanna Landfill Site on Abbott Road. The sludge disposal site shall not be within the wetland boundary, to be determined by the New York State Department of Environmental Conservation (see enclosed letter of November 17,1980). An area of about .83 acres will be surrounded by a five foot high earthen berm. Assuming a one foot free board, the effective volume would be about 145,000 c.f. The berm will act to reduce the flow of storm runoff from the landfilled sludge to the ponds and wetlands. A six foot deep test pit dug at this site on July 9, 1980 did not indicate the presence of ground water.

The maximum ratio of sludge cake to total landfilled material will be 20%; the other 80% will be excavated material from the sewage treatment plant construction site. The total volume of landfilled material is estimated to be 29,000 c.f. x $\frac{100\%}{20\%}$ = 145,000 c.f.

The sludge will be trucked from the treatment plant to the landfill site by Niagara Sanitation Company, Inc., or Williams Trucking.

Should you have any questions or comments concerning this matter, please do not hestiate to contact me.

Yours truly,

NUSSBAUMER & CLARKE, INC.

Steve Weisberger, P.E.

mp

Encl.

c: Mr. Michael Snider/encl.
Mr. Donald Campbell/encl.
Mr. C. J. Klemp
Mr. Alex Petroski/encl.
Mr. Thaddeus J. Pieczonka/encl.
Mr. Paul Pieczonka/encl.
Mr. Anthony Collareno/encl.
Mr. Joseph Cardinale/encl.

REFERENCE 15

LACKAWANNA STP

DAILY INSPECTION REPORT

DATE 4 / 3 / 81 PAGE 1 OF 1
DAY M. T. W. Th. (F) S.

NUSSBAUMER & CLARKE INC.
MASTER EVENT LOG SHEET

REPORT NO. 200 A
N. & C. JOB NO. 79-122

CONTRACT NO.

TEMPERATURE RANGE 60 TO 73

SITE CONDITIONS-DRY X MUDDY__DUSTY__OTHER

WEATHER-CLEAR X CLOUDY__RAIN__SNOW__WINDY X OTHER

CONTRACT DRAWING NO. AND/OR
SPECIFICATION PAGE REFERENCE

CONTRACTOR F.L. CIMINELLI CONSTR CO

WORK PERFORMED TWO (2) LOADS OF SLUDGE FROM THE LACKAWANNA SEWAGE TREATMENT PLANT WERE DISPOSED OF AT THE ABBOTT ROAD SANITARY LANDFILL TODAY.

THIS COMPLETES THE SLUDGE DISPOSAL OPERATION AT THE LANDFILL SITE.

THE TOTAL NUMBER OF CONTAINERS OF SLUDGE DISPOSED OF AT THE LANDFILL IS 136.

AFTER TODAY'S LOADS OF SLUDGE WERE MIXED WITH DIRT, THE OPEN END OF THE BERMED AREA WAS CLOSED IN WITH DIRT SO THAT THE SLUDGE MIXTURE IS FULLY CONTAINED WITHIN THE BERMED AREA.

WORK FORCE

1 OPERATOR

1 - TRUCK DRIVER

DELIVERIES—

VISITORS NONE

SIGNATURE & TITLE [illegible]

NC-9-1

DISTRIBUTION—ORIGINAL AND YELLOW TO RESIDENT, PINK TO INSPECTOR

NUSSBAUMER & CLARKE INC. BUFFALO, NEW YORK

PROJECT: LACKAWANNA STP J.O. NUMBER 79-122 DATE 4/3/81

NAME: SLUDGE DISPOSAL @ ABBOTT RD LANDFILL SITE SHEET ____ OF ____

LOAD NO.	CONTAINER NO	ARRIVAL TIME	REMARKS
1	18-15 LX	7:30 AM	
2	35-15 LX	8:30 AM	FINAL CONTAINER OF SLUDGE DISPOSED OF AT THE LANDFILL.

[signature]

TOTAL NUMBER OF CONTAINER. DISPOSED OF AT THE LANDFILL SITE = 136.

LACKAWANNA STP

DAILY INSPECTION REPORT

DATE 3 / 2 / 81 PAGE 1 OF 1

DAY (M) T. W. Th. F. S.

NUSSBAUMER & CLARKE INC.
MASTER EVENT LOG SHEET

REPORT NO. 176 A

CONTRACT NO. 14A

N. & C. JOB NO. 79-122

TEMPERATURE RANGE 30 TO 35

SITE CONDITIONS-DRY__ MUDDY__ DUSTY__ OTHER ____

WEATHER-CLEAR __ CLOUDY X RAIN __ SNOW __ WINDY X OTHER __

CONTRACT DRAWING NO. AND/OR
SPECIFICATION PAGE REFERENCE

CONTRACTOR F.L. CIMINELLI CONSTR. CO

WORK PERFORMED CONTR' BEGAN HAULING SLUDGE FROM THE DIGESTER AT THE LACKAWANNA SEWAGE TREATMENT PLANT TO THE ABBOTT ROAD SANITARY LANDFILL TODAY.

FIVE (5) LOADS OF SLUDGE WERE DUMPED AT THE LANDFILL SITE TODAY.

A BULLDOZER WAS USED TO MIX THE SLUDGE WITH CLAY, WHICH WAS PREVIOUSLY STOCKPILED ON THE SITE.

A 4-PARTS CLAY TO 1-PART SLUDGE MIXING RATIO WAS USED.

AT THE END OF ~~THE~~ DAY THE CLAY-SLUDGE MIXTURE WAS COVERED WITH AN ADDITIONAL LAYER OF CLAY.

WORK FORCE

1- TRUCK DRIVER

1- OPERATOR

DELIVERIES—

VI[illegible]RS DON CAMPBELL - [illegible] E.P. @ 3:00 PM

SIGNATURE & TITLE Kevin J [illegible]

NUSSBAUMER & CLARKE INC. BUFFALO, NEW YORK

PROJECT: LACKAWANNA STP J.O. NUMBER 79-122 DATE 3/2/81

NAME: SLUDGE DISPOSAL @ ABBOTT RD LANDFILL SITE SHEET 1 OF 1

LOAD NO.	CONTAINER NO	ARRIVAL TIME	REMARKS
1	100-15LX	9:25 AM	
2	105-15LX	11:20 AM	
3	53-15LX	12:55 PM	
4	18-15LX	1:50 PM	
5	35-15LX	2:50 PM	
			TOTAL TO DATE = 5
			[illegible]

REFERENCE 16

GROUND-WATER RESOURCES OF THE ERIE-NIAGARA BASIN, NEW YORK

Prepared for the
Erie-Niagara Basin Regional Water Resources
Planning Board

by

A. M. La Sala, Jr.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
in cooperation with
THE NEW YORK STATE CONSERVATION DEPARTMENT
DIVISION OF WATER RESOURCES

STATE OF NEW YORK
CONSERVATION DEPARTMENT
WATER RESOURCES COMMISSION

Basin Planning Report ENB-3
1968

MOREAU

Table 6.--Records of selected wells in the Erie-Niagara basin

Well number: See "Well-Numbering and Location System" in text for explanation.

Year completed: a - about
b - before

Type of well: Drl - drilled
Drv - driven

Depth of well: All depths below land surface.
a - about
r - reported
all others measured

Diameter of well: Diameters of dug wells are approximate.
Where two or more sizes of casings were used, they are shown in descending order.

Depth to bedrock: All depths below land surface
a - about
m - measured
all others reported

Water-bearing material: Gravel, sand, silt, and till - glacial deposits of Pleistocene age.
Camillus Shale - Camillus Shale of Silurian age.
Limestone - limestone unit consisting of the Onondaga Limestone of Devonian age and the Bertie Limestone and Akron Dolomite of Silurian age.
Lockport Dolomite - Lockport Dolomite of Silurian age.
Shale - Hamilton Group and Conneaut Group of Chadwick (1934) and intervening units, all of Devonian age.

Altitude above sea level: Estimated from topographic maps to nearest 5 feet.

Water level: All water levels are below land surface except those preceded by a (+) sign, which are above land surface.
a - about
p - pumping effect is probable
Flow - water flows above land surface but static head could not be measured.
r - reported
all others measured by U.S.G.S. personnel

Method of lift: AL - air lift
Dw - deep well cylinder pump
Jet - deep well jet pump
Sub - submersible pump
Sw - shallow-well pump
Tur - turbine pump

Type of power is indicated as -- I - internal combustion engine
M - manual
all others are electrically powered

Estimated pumpage: Average daily pumpage supplied by owner, tenant, or operator, or computed on basis of per capita consumption of 50 gpd per person or 20 gpd per milk cow.

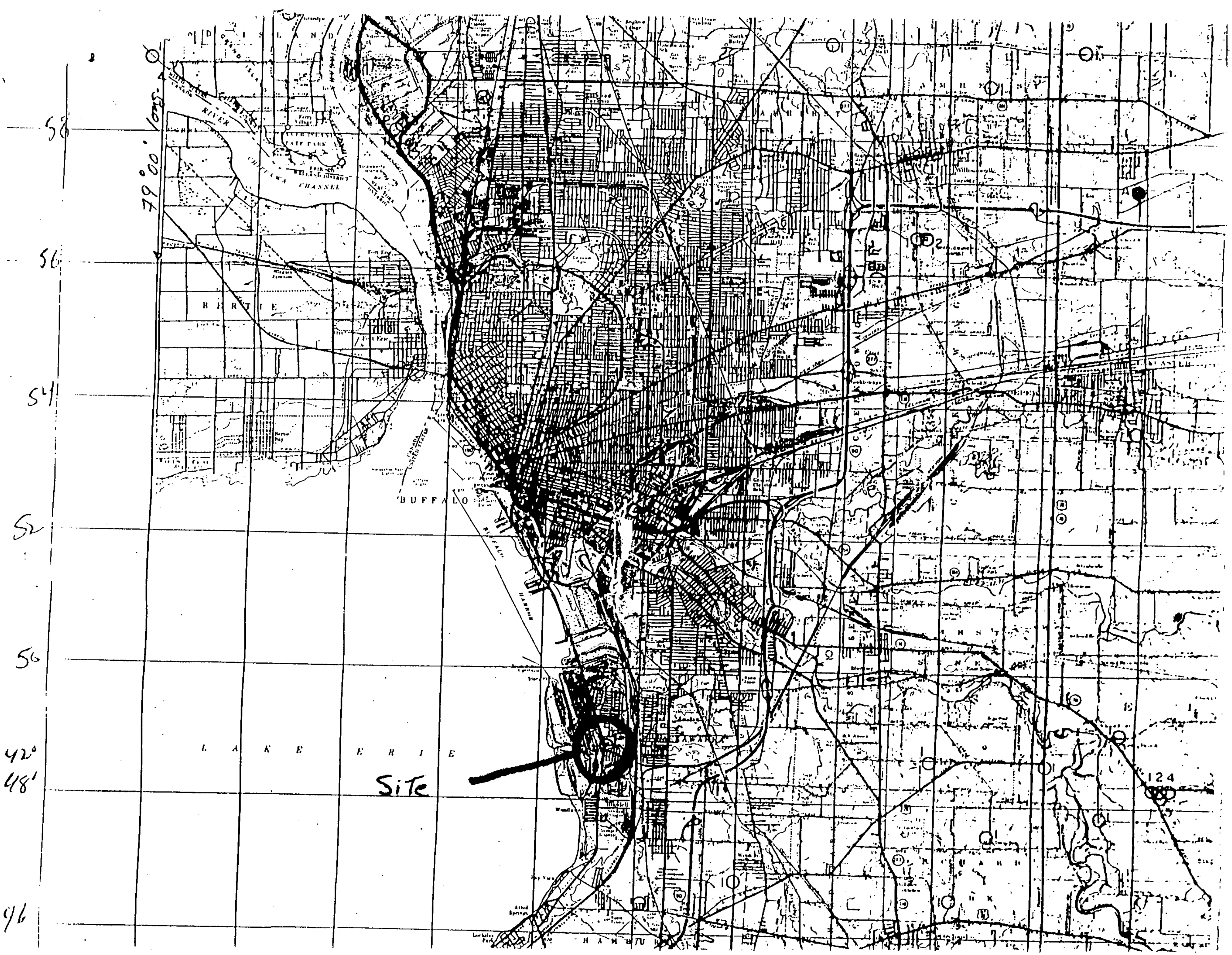
Use:

A - abandoned	In - institutional
Ag - agricultural	Ir - irrigation only
C - commercial	PS - public supply
D - domestic	T - test
F - dairy farm	U - unused
GT - gas test	X - destroyed
I - industrial	

Remarks: anal - chemical analysis in this report
dd - drawdown
est - estimated
gas - flammable gas issues from well
gpd - gallons per day
gpm - gallons per minute
H_2S - hydrogen sulfide gas present in ground water
iron - water has noticeable iron content
LS - land surface
OW - observation well, series of water-level measurements available
r - reported
swl - static water level
temp - temperature, in degrees Fahrenheit, measured by U.S.G.S. on same day water level was measured unless otherwise noted

Table 6.--Records of selected wells in the Erie-Niagara basin (Continued)

Well number	County	Owner	Year completed	Type of well	Depth of well (feet)	Diameter (inches)	Depth to bedrock (feet)	Water-bearing material	Altitude above sea level (feet)	Water level: Below land surface (feet)	Water level: Date	Method of lift	Estimated pumpage or flow (gallons per day)	Use	Remarks
246-836-4	Erie	Village of East Aurora	1961	Drl	r122	12	--	Sand and gravel	895	r7	5-16-61	Tur	250,000	PS	Iron; screen, 12-inch diameter, 6-gage slot, 107-122 ft; gravel packed; pumping rate 490 gpm.
246-843-1	do.	L. Godfrey	1950	Drl	45.3	6	a40	do.	830	17.9	7-26-63	Jet	100	D	H_2S; gas; clay overlies water-bearing gravel (r).
246-848-1	do.	C. Stocking	1953	Drl	27.8	6	a7	Shale	715	5.3	7-27-63	Jet	--	Ir	H_2S; used for lawn sprinkling only.
246-849-1	do.	G. Bapst	1955	Drl	39.1	7	a5	do.	685	9.2	7-27-63	Jet	250	D	Anal.
247-823-1	Wyoming	P. Heeter	1957	Drl	36.6	6	--	Sand and gravel	1,160	15.6	8- 9-63	Jet	300	D	Do.
247-833-1	Erie	T. Siclari	1958	Drl	28.0	6	a16	Shale	945	6.5	8- 1-63	Sw	--	U	Iron; H_2S; unused because water quality is poor.
247-836-1	do.	A. Schuster	1961	Drl	46.1	6	a30	do.	860	15.8	7-30-63	Sw	250	D	Iron; H_2S; yield 10 gpm (r).
247-838-1	do.	D. Engel	1956	Drl	33.4	6	a12	do.	960	6.6	7-30-63	Sw	150	D	Anal; H_2S.
247-840-1	do.	A. Malovich	1959	Drl	40.4	8	a30	do.	890	21.1	7-26-63	Sw	200	D	Anal; Iron; blasting charge fired in well to improve yield.
247-842-1	do.	J. Smith	1959	Drl	51.5	7	--	Sand	830	9.4	7-26-63	Jet	250	D	Anal; Iron; H_2S.
248-818-1	Wyoming	O. Block	a1940	Drl	r140	6	--	Shale	1,045	Flow	--	Sw	1,400	D	Anal; gas; Iron; temp 51.2, 8-12-63; flows about 1 gpm, 2.6 ft below LS; occasionally water level has fallen below end of drop pipe, 25 ft below surface while pumping.
248-825-1	do.	N. Fox	1963	Drl	r112	8	12	do.	1,115	28.8	8- 2-63	Sub	150	D	Anal; yield 1 gpm (r); water-bearing zone at 34 ft; no lower water-bearing zones.
248-828-1	do.	W. Deazley	1957	Drl	r112	8	8	do.	1,210	20.3	8- 2-63	Jet	300	D	Anal; yield 1 gpm (r); water-bearing zone at 30 ft; attempted to increase yield by blasting at three different depths; occasionally is pumped dry.
248-829-1	Erie	O. Whitman	1958	Drl	36.4	6	a28	do.	1,150	12.5	8- 2-63	Jet	50	D	Anal; H_2S; yield 2.5 gpm (r).
248-833-1	do.	R. Gilbert	1957	Drl	35.9	6	33	Sand and gravel; shale	970	11.4	8- 1-63	Sw	400	D	Anal; Iron; H_2S.
248-838-1	do.	H. Gaczewski	1954	Drl	58.9	6	2	Shale	925	21.5	7-30-63	Jet	500	D	Anal; gas.
248-839-1	do.	Moog Servocontrols, Inc.	1957	Drl	85.7	8	--	do.	905	p40.4	9-23-63	Sub	--	I	Anal; H_2S.
-2	do.	do.	1957	Drl	24.7	12	--	do.	905	p14.4	9-23-63	Sub	--	I	Do.
-3	do.	do.	1958	Drl	76.8	10	--	do.	910	p26.9	9-23-63	Sub	--	I	H_2S.
-4	do.	do.	1962	Drl	r225	18	a10	do.	910	--	--	--	--	T	Yield 10 gpm (r).
248-841-1	do.	R. Struck	1960	Drl	43.8	6	a40	do.	770	17.9	7-26-63	Sw	200	D	Anal; Iron; H_2S; gas; yield 3 gpm (r).
248-844-1	do.	O. Eaton	1959	Drl	19.7	6	a15	do.	740	8.5	7-26-63	Sw	250	D	Anal; H_2S; yield 5 gpm (r); blasting charge was fired in well to increase yield.
248-850-1	do.	Spring Perch Co., Inc.	1936	Drl	r40	5	--	do.	580	p21.0	3-20-63	Jet	10,000	I	Anal; H_2S; yield 29 gpm; another similar well is also in use.
249-809-1	Wyoming	H. Meader	--	Dug	13.8	24	--	Sand and gravel	1,205	9.1	6- 9-64	Sw	150	D	
249-810-1	do.	C. Bailey	1963	Drl	54.4	6	--	do.	1,190	21.6	6-10-64	Jet	100	D	
-2	do.	W. Dersam	--	Dug	10.5	36	--	Till	1,180	4.6	6-10-64	Sw	--	A	
249-818-1	do.	G. Knobloch	--	Drl	58.6	4	a10	Shale	1,075	23.5	8-12-63	Jet	100	D	Anal; yield 3 gpm (est).
249-823-1	do.	L. Green	1963	Drl	81.5	8	19	do.	1,260	13.3	8- 9-63	Jet	400	D	Anal; yield 1.5 gpm (r).



79°00' long
58
56
54
52
50
42°
48'
46
BERTIE
NIAGARA
CHIPPAWA CHANNEL
RIVER
BUFFALO
BUFFALO HARBOR
LAKE ERIE
Site
124

REFERENCE 17

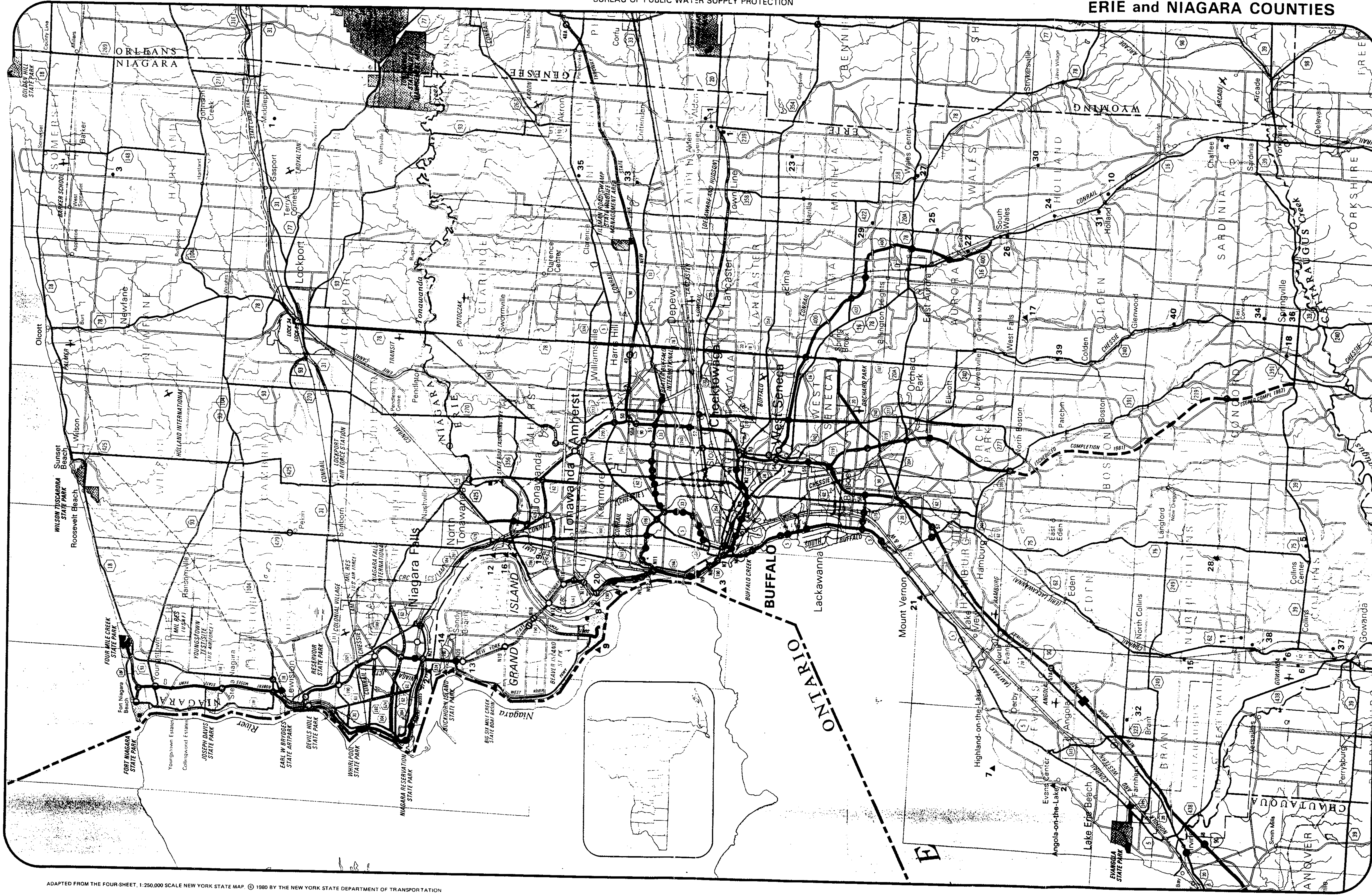
New York State Atlas of Community Water System Sources 1982

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF PUBLIC WATER SUPPLY PROTECTION

LOCATION OF COMMUNITY WATER SYSTEM SOURCES-1982

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF PUBLIC WATER SUPPLY PROTECTION

ERIE and NIAGARA COUNTIES



REFERENCE 18

TABLE IV-7
LACKAWANNA CITY LANDFILL
SURFACE WATER SAMPLE RESULTS
TCL ORGANIC COMPOUNDS (UG/L) / TAL METALS (UG/L)

COMPOUND	(1) NYS STANDARDS CLASS D (UG/L)	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6
METHYLENE CHLORIDE		-	-	5 R	-	6 R	6 R
BIS(2 ETHYLHEXYL)PHTHALATE		-	-	-	22	-	-
ALUMINUM		227	170 B	252	68,200	1,550	216
ANTIMONY		-	-	-	146	-	-
ARSENIC		-	-	-	19.0	-	-
BARIUM		60.8 B	58.4 B	51.0 B	8,180	375	71.1 B
BERYLLIUM		-	-	-	3.4 B	-	-
CADMIUM		-	-	-	6.6	-	-
CALCIUM		68,000	89,000	86,900	338,000	93,400	71,500
CHROMIUM (total)		-	-	-	123	13.0	-
COBALT		-	-	-	71.2	-	-
COPPER		4.6 B	9.3 B	-	337	20.8 B	-
IRON	300	1,090	3,580	1,010	1,380,000	9,510	1,240
LEAD		5.0	13.3 *	5.8	760	64.0	NR
MAGNESIUM		17,100	20,600	19,200	60,300	13,900	17,700
MANGANESE		250	495	178	41,700	1,370	263
MERCURY		-	-	-	0.57	-	-
NICKEL		-	-	-	192	-	-
POTASSIUM		4,030 B	4,370 B	4,400 B	13,000	10,600	4,090 B
SILVER		5.5 B	-	-	46.2	5.4 B	-
SODIUM		209,000	244,000	239,000	208,000	1,210,000	220,000
VANADIUM		4.9 B	5.6 B	4.4 B	214	6.7 B	-
ZINC		20.5	27.2	16.1 B	3,180	107	19.3 B
CYANIDE		-	-	-	15.4	58.2	-

NOTES:

Sample SW-6 is a duplicate of SW-1.

Semivolatile and pesticide/PCB analyses for all samples missed holding time by one day.

NR = Not run due to analytical problems.

REFERENCE 19

NAME OF SITE: Lackawanna 915094

LOCATION: Abbot Road, Erie County

CURRENT OWNER: City of Lackawanna

HISTORY

The Lackawanna site is now inactive. In the past, the City of Lackawanna disposed of incinerator residue, digested sludge, and rubbish. According to past reports, this site experienced periodic cover problems.

INVESTIGATION

The Lackawanna Abbott Road Landfill has a large ponding area immediately to the east which drains along its northern boundary. A drainage ditch believed to drain the landfills western boundary is also shown on the enclosed site location map. All four sites, as indicated on the sketch, were sampled for water for heavy metals, TOC & THO with soil samples analyzed for heavy metals, and THO. Sites 1 and 3 were observed leachate breakouts, Site 2 was augered to a depth of 4 to 5 feet, and Site 4 was the downstream reference sample.

SOIL AND GEOLOGICAL INFORMATION

Unclassified city land, as its name implies, includes nonagricultural areas within the limits of the numerous towns and cities in the county. Almost 55 square miles of land in the county are accounted for in this classification. The soils at this site are classified under this heading.

The rock at this site is classified in the Hamilton Group formed in the Middle Devonian Period and the Paleozoic Era. The group specifically consists of Skaneateles and Marcellus Formations - shale, thin limestone. The Skaneateles Formation consists of gray limestone overlain by fissile gray to black shale.

SAMPLE ANALYSES

Sample 1 (soils) exhibited high concentrations for both lead and zinc. The water analyses conducted on all four sites, showed low concentrations for all parameters tested.

DISCUSSION OF RESULTS

This site appeared to be properly covered. Sample 3 was a leachate breakout sample which did not show any abnormally high concentrations for metals, THO, and [illegible].

RECOMMENDATIONS

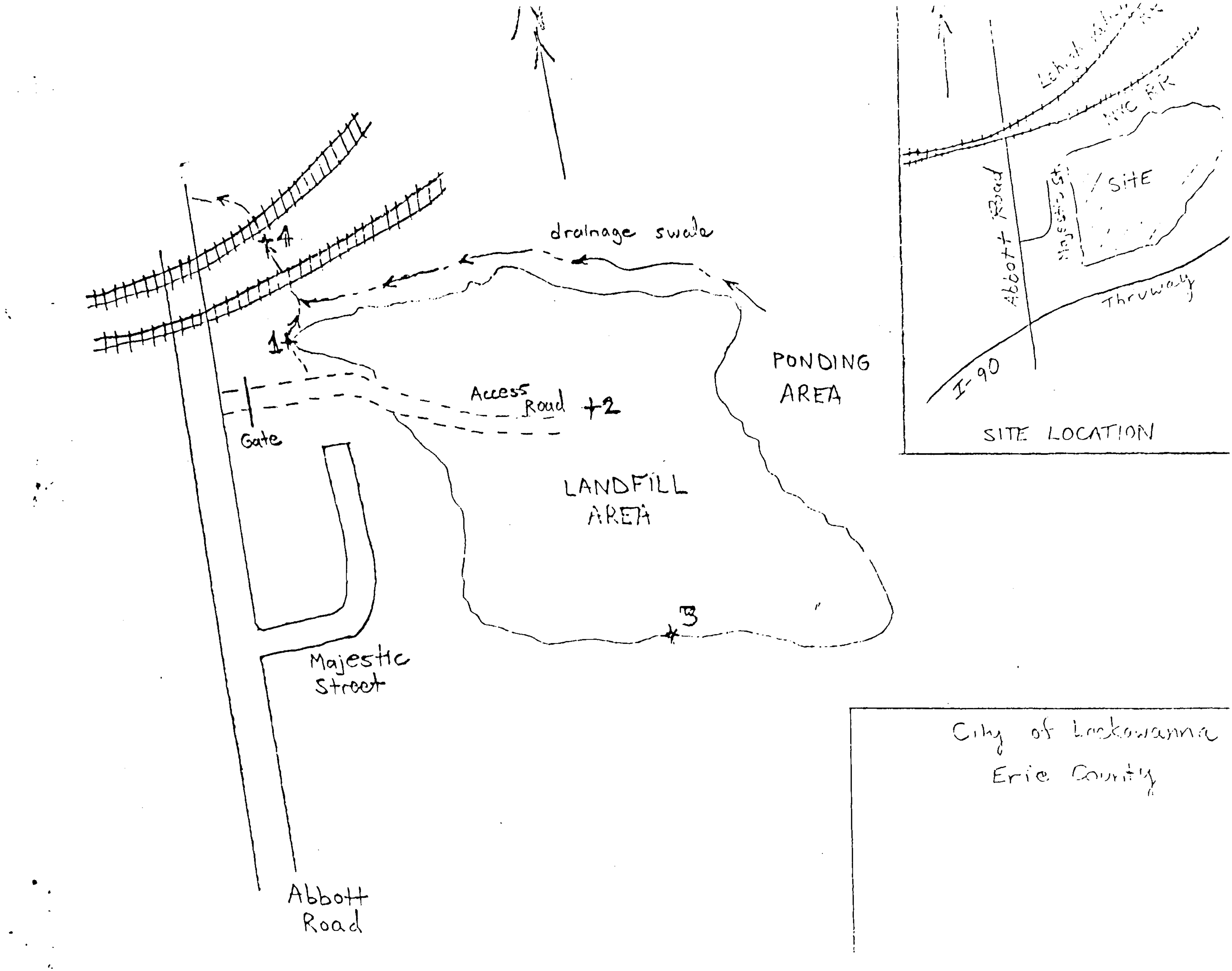
No further investigation.

LACKAWANNA LANDFILL - Soil Analyses (3/31/82)

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (Station #) (1)	(2)	(3)	(4)
Arsenic As	ug/g dry	5.5	4.8	3.9	8.6
Beryllium	ug/g dry	<1	<1	1.8	<0.6
Cadmium Cd	ug/g dry	1.5	<0.9	<0.5	<0.4
Chromium Cr	ug/g dry	44	44	29	44
Copper Cu	ug/g dry	66	35	34	15
Lead Pb	ug/g dry	250	83	50	9.0
Mercury Hg	ug/g dry	<0.07	<0.1	0.89	0.10
Nickel Ni	ug/g dry	18	4.4	15	24
Selenium Se	ug/g dry	0.79	0.62	0.41	<0.2
– Silver	ug/g dry	<1	<1	<0.9	<0.6
– Thallium	ug/g dry	<10	<20	<9	<6
– Antimony	ug/g dry	<30	<40	<30	<20
Zinc Zn	ug/g dry	730	420	170	100
Dry Weight	%	42	29	54	63
Halogenated Organic Scan	ug/g dry as Cl_2 Lindane Standard	0.61	0.50	0.26	0.88

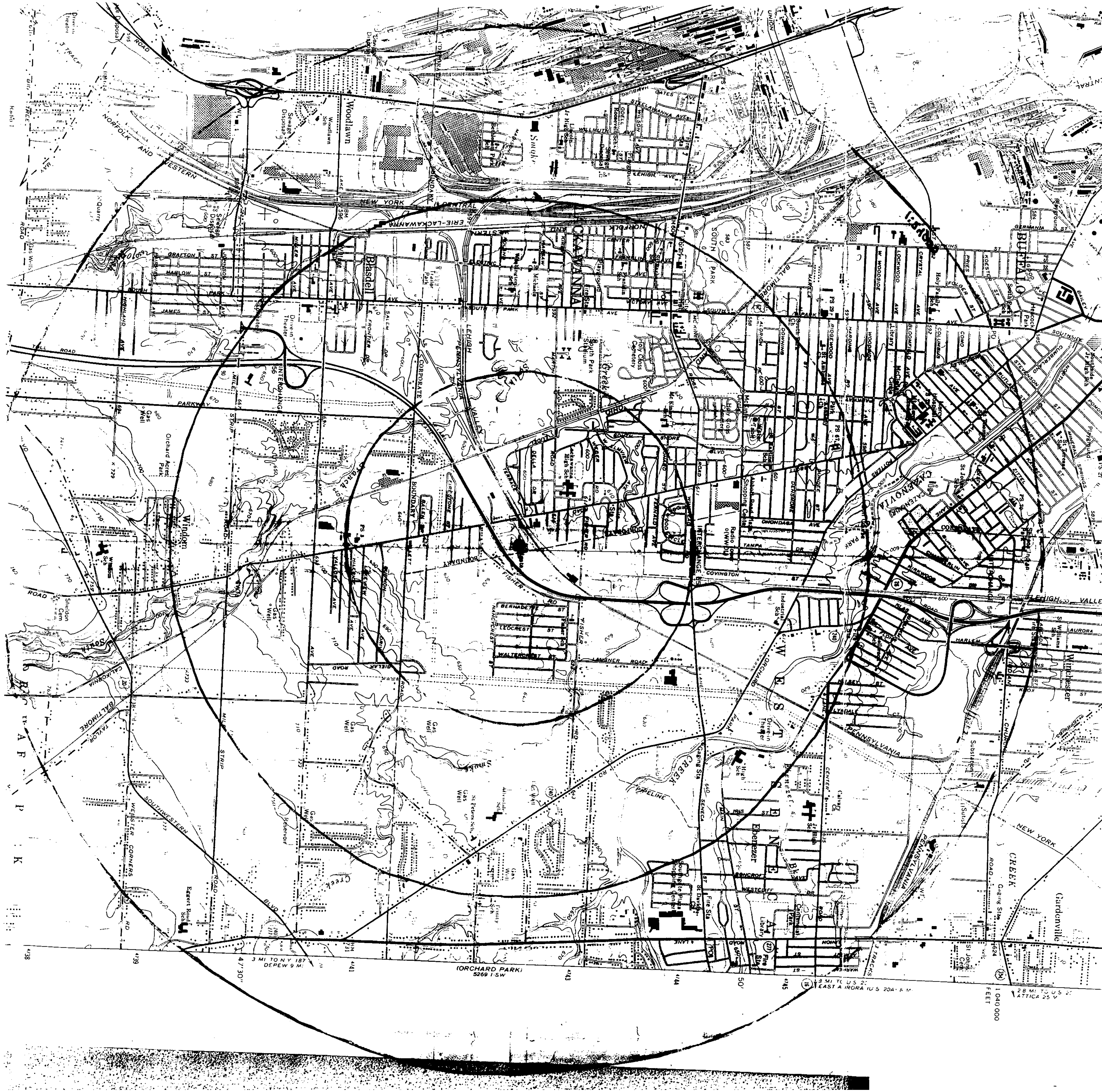
LACKAWANNA LANDFILL - Water Analyses (3/31/82)

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (Station #) (1)	(2)	(3)	(4)
Arsenic	ug/l	13	<6	<6	<6
Beryllium	mg/l	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/l	<0.006	<0.006	<0.006	<0.006
Chromium	mg/l	0.012	0.012	<0.004	0.005
Copper	mg/l	<0.005	<0.005	0.006	0.034
Lead	mg/l	<0.05	<0.05	<0.05	<0.05
Mercury	ug/l	<0.5	<0.5	<0.05	<0.05
Nickel	mg/l	<0.03	<0.03	<0.03	<0.03
Selenium	ug/l	<3	<3	<3	<3
Silver	mg/l	<0.01	0.02	<0.01	<0.01
Thallium	mg/l	<0.1	<0.1	<0.1	<0.1
Antimony	mg/l	<0.3	<0.3	<0.3	<0.3
Zinc	mg/l	0.13	0.054	0.12	0.090
TOC	mg/l	7	4	13	5
THO	ug/l as Cl_2 Lindane Standard	0.23	0.13	0.28	0.26


drainage swale
+4
1+
Access Road
+2
Gate
PONDING AREA
LANDFILL AREA
3
Majestic Street
Abbott Road
Abbott Road
Majestic St.
SITE
Thruway
I-90
SITE LOCATION
City of Lackawanna
Erie County

REFERENCE 20

Lackawanna City Landfill



REFERENCE 21

COUNTY OF ERIE
DEPARTMENT OF ENVIRONMENT & PLANNING
DIVISION OF ENVIRONMENTAL CONTROL

MEMORANDUM

TO Robert Mitrey, NYSDEC DATE August 4, 1980

FROM Cameron O'Connor

SUBJECT City of Lackawanna Disposal Area
Abbott Road 15S06

In response to your July 17, 1980 request, the writer performed a July 22, 1980 field inspection of the above site to determine the extent of freshwater wetlands in the area.

Mr. Ciminelli of Ciminelli Construction Company, Inc. was to accompany the writer during the inspection however was unable to keep the appointment.

The wetland appears to be approximately 10+ acres in size consisting of mostly cattails and open water with a few willows (see site sketch). The wetland recieves water from two streams which enter on the west and east side of the wetland and numerous drainage pathways from the Thruway. Numerous ducks were observed using the pond on the day of the inspection.

The landfill operation has disturbed several upland areas adjacent to the wetland and has started encroaching into the open water pond.

Sludge incinerator ash, and earth have been bull dozed into the pond on its western edge. This area of the wetland is essentially destroyed.

As indicated in the site sketch there is upland terrion located on the southern portion of the property.

As the result of the inspection it is the writer's opinion that the following action should be taken:

1) The Division of Regulatory Affairs should be contacted so that a Request for a Freshwater Wetland Determination can be made to Fish and Wildlife. The Fish and Wildlife people would be able to make a far more accurate determination of the wetlands biogiography, acreage and the wetland/upland boundaries.

Cameron O'Connor

-continued-

2) If it is determined that the wetland can be used as a landfill, the concerns (i.e. 5 foot separation from groundwater, drainage etc.) mentioned in this Department's July 3, 1980 memorandum should be addressed by the landfill operator prior to further disposal into the wetland area.

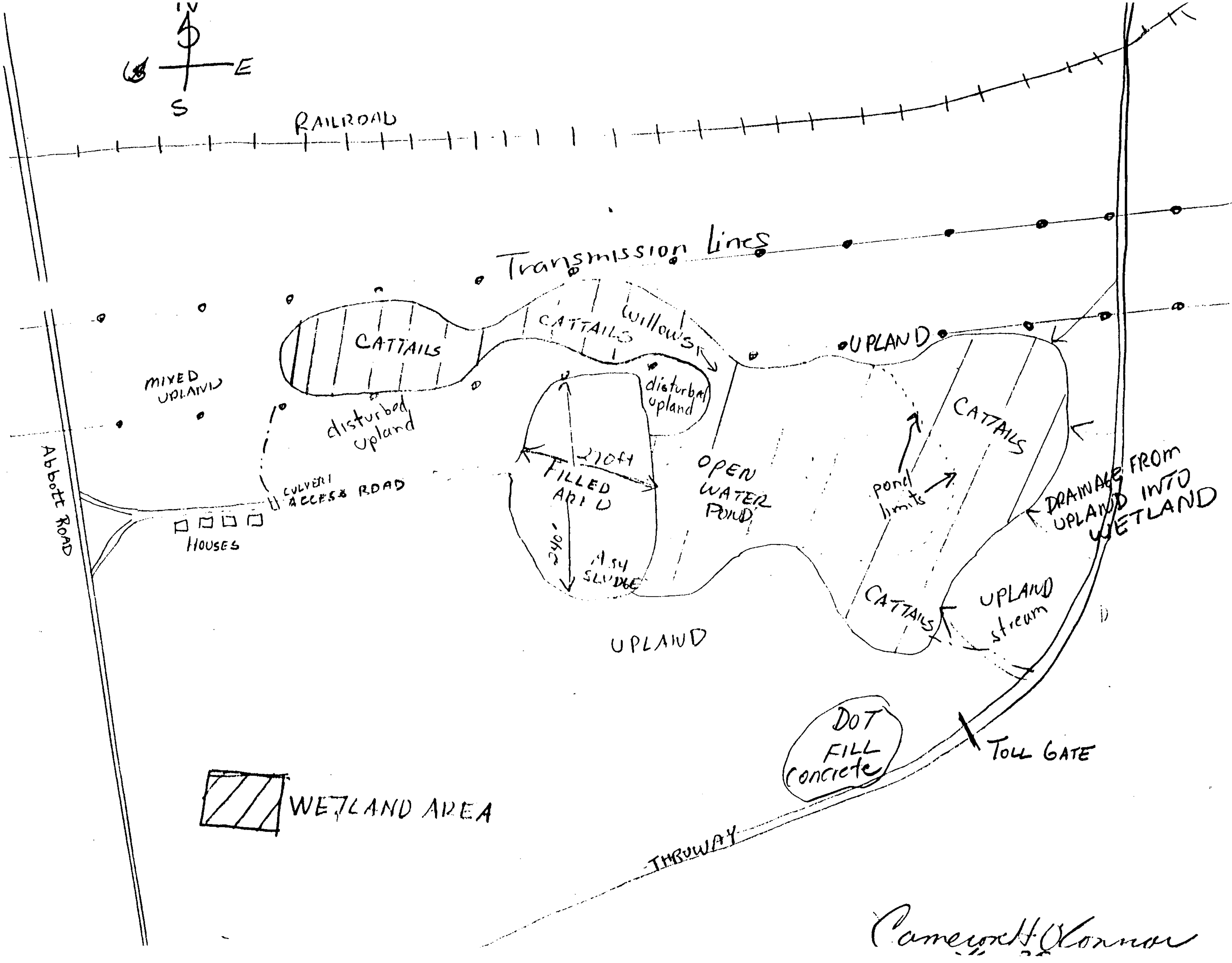
A change in direction of the filling operation to the upland areas would be the most desirable coarse of action.

Please note (site sketch) that the Thruway Authority is also dumping concrete adjacent to the wetland.

If you have any questions, call at 846-6148.

COC:ao
Attach.

cc: D. Campbell


N
W
E
S
RAILROAD
Transmission Lines
CATTAILS
CATTAILS
willows
UPLAND
MIXED UPLAND
disturbed upland
disturbed upland
Abbott ROAD
CULVERT
ACCESS ROAD
HOUSES
220ft
FILLED AREA
240'
Ash SLUDGE
OPEN WATER POND
pond limits
CATTAILS
DRAINAGE FROM UPLAND INTO WETLAND
CATTAILS
UPLAND stream
UPLAND
DOT FILL Concrete
TOLL GATE
THRUWAY
WETLAND AREA
Cameron H. O'Connor

REFERENCE 22

XCHL

New York State Department of Environmental Conservation
600 Delaware Avenue, Buffalo, New York 14202

Robert F. Flacke
Commissioner

July 24, 1981

827-6426

1550

Mr. Anthony Collareno
Chief Engineer
Department of Public Works
Lackawanna City Hall
Ridge Road
Lackawanna, New York 14218

RE: Landfill

Dear Mr. Collareno:

On July 23, 1981 Mr. Kevin Hintz of this office made an inspection of your landfill off of Abbott Road. The purpose of the inspection was twofold. First, determine if the site has been properly closed. Secondly, to determine the present conditions as this landfill is identified as a site that may have received hazardous waste in the past.

As a result of the inspection, the following violations were noted:

1) UNCOVERED WASTE - Final cover is needed on those areas adjacent to access road where incinerator residue has been filled.

This condition is in direct violation of Section 360.8(b)(1)(viii)(c) of Part 360.

Closure, including placement of final cover over those areas of previously filled incinerator residue.

2) IMPROPER GRADES AND SLOPES - The fill area to the rear of the property is extremely rough and uneven. Water is pooling and ponding in spots. Side slopes on the recent fill area and the fill area north of the access are excessive.

This condition is in direct violation of Section 360.8(b)(1)(viii) of Part 360.

All areas shall be properly graded and sloped so as to eliminate pooling and ponding of water and to minimize infiltration. Side slopes shall not exceed the maximum allowable slope of 1 (vertical) on 3 (horizontal).

3) VEGETATION – The vegetation on site is the result of natural seeding and consists entirely of weeds. Some areas lack a final cover vegetation.

This condition is in direct violation of Section 360.8(b)(1)(ix) of Part 360.

All areas shall be seeded with a proper cover vegetation once the site has been graded and final cover applied.

4) ACCESS CONTROL – The cable gate along Abbott Road was open. As a reslit a couple boards of demolition debris have been dumped on site. Indiscriminate dumping will continue until access is limited.

This condition is in direct violation of Section 360.8(a)(6) of Part 360.

The gate should be locked at all times to prevent unauthorized entry.

5) PERMIT – Your permit to operate expired 6/1/81. A letter was forwarded to you on 6/25/81, advising you of the expiration and need for closure. To date closure has not been started.

This condition is in direct violation of Section 360.8(a)(20) of Part 360.

As per the 6/25/81 letter, proper and complete closure of the site must be finished by September 25, 1981.

If you have any questions, please contact this office at 716/842-3837.

Very truly yours,

John S. Tygert

John S. Tygert, P.E.
Senior Sanitary Engineer

KRH:cag

Attachment
cc: ECDEP

Called Mr Colmeno 8/5/81

They will reapply for new permit for sludge only.

REFERENCE 23

STATE OF NEW YORK

OFFICIAL COMPILATION

OF

CODES, RULES AND REGULATIONS

MARIO M. CUOMO
Governor

GAIL S. SHAFFER
Secretary of State

Published by
DEPARTMENT OF STATE
162 Washington Avenue
Albany, New York 12231

1/83

ARTICLE 8

Lake Erie — Niagara River Drainage Basin Series

TABLE I (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
226	E-2-1 portion as described	South Branch	Enters Smoke Creek from southeast 1.5 miles above mouth. Mouth to Green Lake, item no. 227.	6,7	C	C
227		Green Lake	Located on South Branch just west of S. Buffalo Street, Orchard Park.	7	B	B
228	E-2-1 portion as described	South Branch	From Green Lake, item no. 227, to source.	7,11	B	B
229	E-2-1-1,2,4	Tributaries of South Branch	Enter South Branch between mouth and Green Lake, item No. 227	6,10	D	D
229.1	E-2-1-3	Trib. of South Branch	Mouth to source	6,10, 11	C	C
229.2	E-2-1-3-1,2,3	Subtribs. of South Branch		6,10	D	D
230	E-2-1-5	Tributary of South Branch	Enters South Branch from south approximately 0.5 mile above Ellicott.	11	B	B
231	E-2-2 portion as described	Tributary of Smoke Creek	Enters Smoke Creek from south approximately 0.7 mile due north of Webster Corner. Mouth to outlet of P 80 easterly of Freeman Ponds. Near junction of S. Freeman Road and E. Quaker Street, Orchard Park.	7	D	D

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
219	E-1-55-2	Tributary of Beaver Meadow Creek	Enters Beaver Meadow Creek from south approximately 4.6 miles above mouth.	12	C	C(T)
220	E-1-56,57 and 58 and tribs. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River from east and west between Beaver Meadow Creek, item no. 219, and Plato Creek, item no. 221.	12	D	D
221	E-1-59 and tribs. as shown on reference map	Plato Creek	Enters Buffalo River from south approximately 0.9 mile above Java Village.	12	D	D
222	E-1-60,61,62,63, 64,65,66,67 and 68 and tribs. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River from east and west between Plato Creek, item no. 221, and trib. 69, item no. 223.	12	D	D
223	E-1-69 and tribs. as shown on reference map	Tributary of Buffalo River	Enters Buffalo River from east approximately 0.2 mile below Sardinia-Holland town line.	12	C	C(T)
224	E-1-70	Tributary of Buffalo River	Enters Buffalo River from east approximately 1.0 mile above Erie-Wyoming county line.	12	D	D
225	E-2	Smoke Creek	Enters Lake Erie from east approximately 0.6 mile north of City of Lakawanna-Hamburg town line.	6,7,11	D	D

REFERENCE 24

NEW YORK WATER CLASSIFICATIONS AND QUALITY STANDARDS

(Official Codes, Rules, and Regulations of the State of New York, Chapter X — Division of Water Resources, Article 2, Parts 700 through 704; Adopted April 28, 1972; Amended February 21, 1974; September 20, 1974; Part 703 Amended August 2, 1978; Effective September 1, 1978)

CONTENTS

PART 700

TESTS OR ANALYTICAL DETERMINATIONS

Section 700.1 Collection of samples. In making any tests or analytical determinations to determine compliance or noncompliance of sewage, industrial wastes or other waste discharges with established standards, samples shall be collected in such manner and at such locations as are approved by the commissioner. In approving such locations the commissioner shall be guided by the fact that (a) there must be prompt mixing of the discharge with the receiving waters; (b) that the mixing will not interfere with biological communities to a degree which is damaging to the ecosystem; (c) that the mixing will not diminish other beneficial uses disproportionately.

700.2 Tests or analytical determinations. Tests or analytical determinations to determine compliance or noncompliance with standards shall be made in accordance with the latest edition of (a) *Standard Methods for the Examination of Water and Wastewater* prepared by American Public Health Association (APHA), American Water Works Association (AWWA) and Water Pollution Control Federation (WPCF); (b) *Methods for Chemical Analysis of Water and Wastes* prepared by Environmental Protection Agency (EPA); (c) *Water Standards of the American Society for Testing and Materials* (ASTM); or (d) by other methods approved by the commissioner and the administrator as giving results equal to or superior to methods listed in any of the other documents.

PART 701

CLASSIFICATIONS AND STANDARDS OF QUALITY AND PURITY

(April 28, 1972; Amended February 21, 1974; September 20, 1974)

Section 701.1 Definitions. The terms, words or phrases used in Parts 700, 701, 702 and 704 shall have the following meaning:

(a) *Commissioner* shall mean the Commissioner of the Department of Environmental Conservation.

(b) *Administrator* shall mean the Administrator of the United States Environmental Protection Agency.

(c) *Best usage of waters* as specified for each class shall be those uses as determined by the commissioner and the administrator in accordance with the considerations prescribed by the Environmental Conservation Law and Public Law 92-500.

(d) *Approved treatment* as applied to water supplies shall mean treatment accepted as satisfactory by the authorities responsible for exercising supervision over the sanitary quality of water supplies.

(e) *Source of water supply for drinking, culinary or food processing purposes* shall mean any source, either public or private, the waters from which are used for domestic consumption or used in connection with the processing of milk, beverages or foods. (When water is taken for public drinking, culinary or food processing purposes, refer to New York State Department of Health regulations 10 NYCRR 170.)

(f) *Primary contact recreation* shall mean recreational activities where the human body may come in direct contact with raw water to the point of complete body submergence. Such uses include swimming, diving, water skiing, skin diving and surfing.

(g) *Secondary contact recreation* shall mean recreational activities where contact with the water is minimal and where ingestion of the water is not probable. Such uses include but are not limited to fishing and boating.

(h) *Saline surface waters* shall mean all waters which are so designated by the commissioner.

(i) *International boundary waters* shall mean those waters to which the water quality standards developed and adopted pursuant to the Boundary Water Treaty of 1909 and the Great Lakes Quality Agreement of 1972 apply.

(j) *Sewage, industrial waste and other wastes* shall have the meanings given in section 17-0105 of the Environmental Conservation Law.

(k) *Estuary* shall mean the tidal portion of a river or stream.

(l) A *thermal discharge* is one which results or would result in a temperature change of the receiving water.

(m) *Heat of artificial origin* shall mean all heat from other than natural sources including but not limited to, cumulative effects of multiple and proximate thermal discharges.

CLASS C

Best usage of waters. Suitable for fishing and all other uses except as a source of water supply for drinking, culinary or food processing purposes and primary contact recreation.

Quality Standards for Class C Waters

Item: 1. Coliform.

Specifications: The monthly geometric mean total coliform value for 100 ml of sample shall not exceed 10,000 and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 2,000 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.

Item: 2. pH.

Specifications: Shall be between 6.5 and 8.5.

Item: 3. Total dissolved solids.

Specifications: None at concentrations which will be detrimental to the growth and propagation of aquatic life. Waters having present levels less than 500 milligrams per liter shall be kept below this limit.

Item: 4. Dissolved oxygen.

Specifications: For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/1 from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/1. At no time shall the DO concentration be less than 5.0 mg/1. For nontrout waters, the minimum daily average shall not be less than 5.0 mg/1. At no time shall the DO concentration be less than 4.0 mg/1.

Note 1: Refer to note 1 under Class AA which is also applicable to Class C standards.

CLASS D

Best usage of waters. These waters are suitable for secondary contact recreation, but due to such natural conditions as intermittency of flow, water conditions not conducive to propagation of game fishery or stream bed conditions, the waters will not support the propagation of fish.

Conditions related to best usage of waters. The waters must be suitable for fish survival.

Quality Standards for Class D Waters

Item: 1. pH.

Specifications: Shall be between 6.0 and 9.5.

Item: 2. Dissolved oxygen.

Specifications: Shall not be less than three milligrams per liter at any time.

Note 1: Refer to note 1 under Class AA which is also applicable to Class D standards.

701.5 Classes and standards for saline surface waters. The following items and specifications shall be the standards applicable to all New York Saline Surfaces Waters which are assigned the classification of SA, SB, SC or SD, in addition to the specific standards which are found in this Part under the heading of each such classification.

Quality Standards for Saline Surface Waters

Items: 1. Garbage, cinders, ashes, oils, sludge or other refuse.

Specifications: None in any waters of the marine district as defined by Environmental Conservation Law (§17-0105).

Item: 2. pH.

Specifications: The normal range shall not be extended by more than 0.1 pH unit.

Item: 3. Turbidity.

Specifications: No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.

Item: 4. Color.

Specifications: None from man-made sources that will be detrimental to anticipated best usage of waters.

Item: 5. Suspended, colloidal or settleable solids

Specifications: None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to each class.

Items: 6. Oil and floating substances.

Specifications: No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.

Item: 7. Thermal discharges.

Specifications: (See Part 704 of this Title.)

CLASS SA

Best usage of waters. The waters shall be suitable for shellfishing for market purposes and primary and secondary contact recreation.

Quality Standards for Class SA Waters

Item: 1. Coliform.

Specifications: The median MPN value in any series of samples representative of waters in the shellfish growing area shall not be in excess of 70 per 100 ml.

Item: 2. Dissolved oxygen.

Specifications: Shall not be less than 5.0 mg/1 at any time.

Items: 3. Toxic wastes and deleterious substances.

Specifications: None in amounts that will interfere with use for primary contact recreation or that will be injurous to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS SB

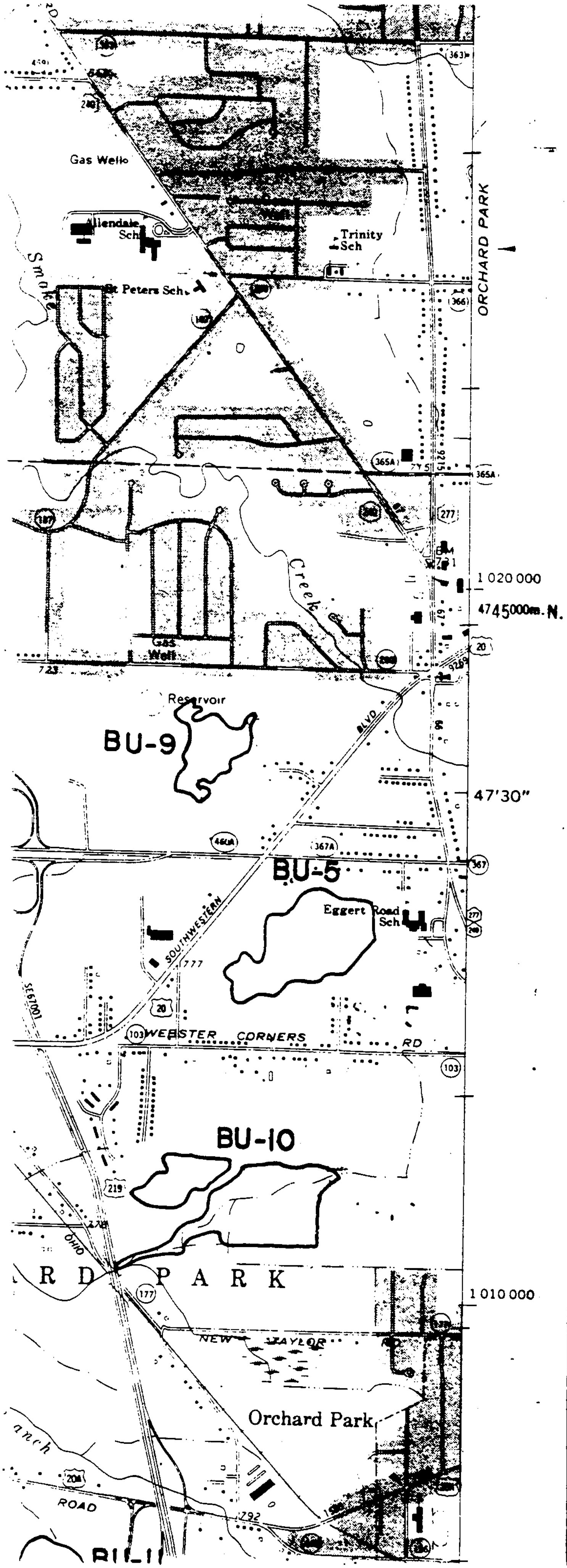
Best usage of waters. The waters shall be suitable for primary and secondary contact recreation and any other use except for the taking of shellfish for market purposes.

Quality Standards for Class SB Waters

Item: 1. Coliform

Specifications: The monthly median coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.

REFERENCE 25



New York State Freshwater Wetlands Map

Erie County

Map 12 of 31

This map was promulgated, pursuant to Article 24 of the Environmental Conservation Law (The Freshwater Wetlands Act) on [redacted] by the Commissioner of New York State Department of Environmental Conservation.

LEGEND:

- (boundary symbol) Approximate wetland boundary
- U Upland inclusion
- AA-00 Wetland identification code

NOTES:

This map indicates the approximate location of the actual boundaries of wetlands regulated according to the Freshwater Wetlands Act.

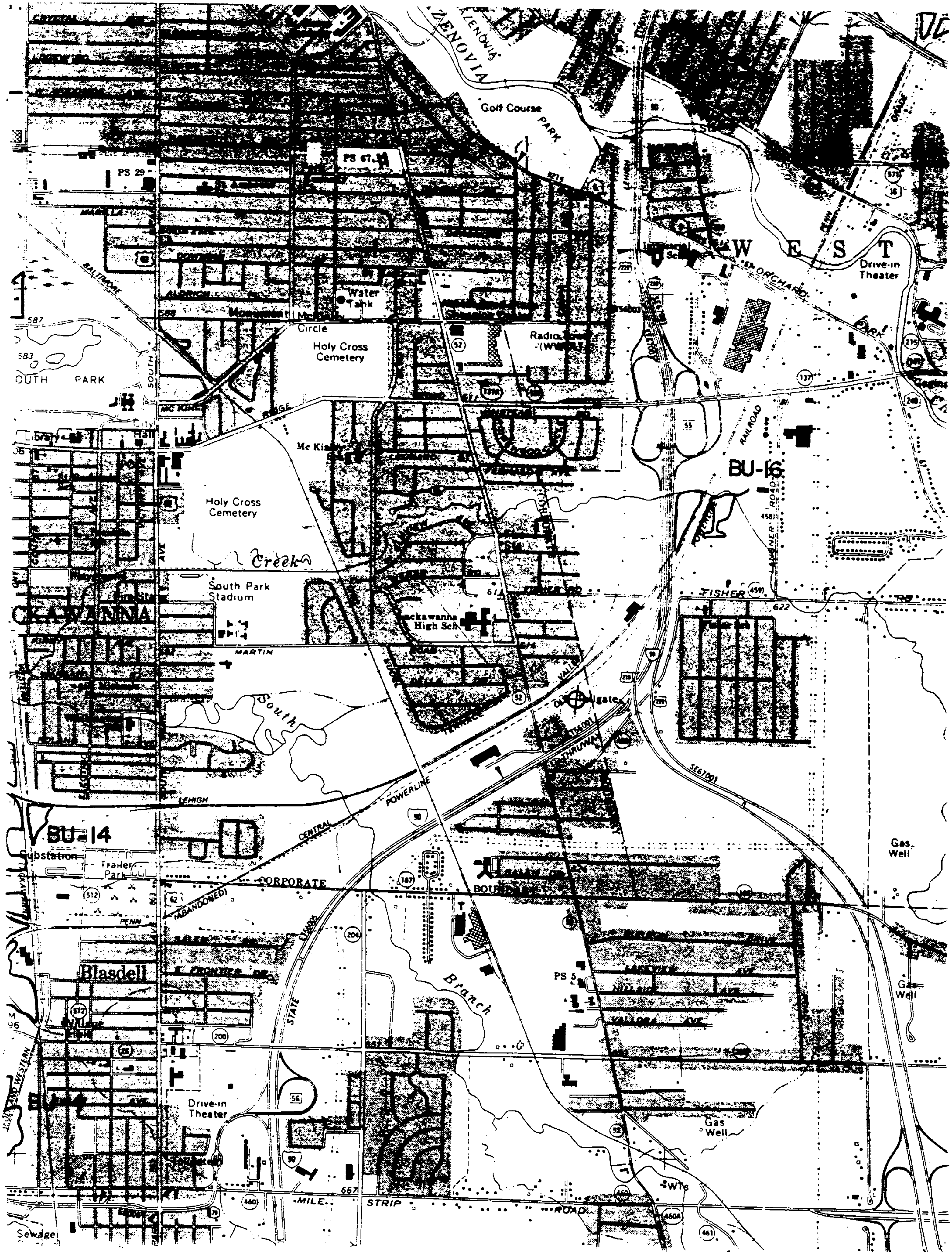
Map information other than the wetland boundaries was prepared by the New York State Department of Transportation and the United States Geological Survey. The locational information provided on the map is for reference only. Marsh symbols do not necessarily indicate the location of a regulated wetland.

Adjacent areas of the regulated wetlands are those areas within 100 feet of the boundary of the wetland. These areas are subject to regulation pursuant to the Freshwater Wetlands Act but are not delineated on this map. An adjacent area may be extended by special order of the Commissioner of the New York State Department of Environmental Conservation or the local regulatory authority.

Copies of Freshwater Wetlands Maps are available from the regional offices of the Department of Environmental Conservation. Maps are available for inspection at these offices and local government clerk's offices.

REVISIONS

Date	Wetland #	Description of change



Golf Course
PARK
PS 29
PS 67
Water Tank
Circle
Holy Cross Cemetery
Radio Tower
W E S T
Drive-in Theater
SOUTH PARK
City Hall
Library
Mc Kinley
BU-16
Holy Cross Cemetery
Creek
South Park Stadium
LACKAWANNA
Lackawanna High Sch
MARTIN
FISHER RD
South
POWERLINE
LEHIGH
BU-14
Substation
Trailer Park
CENTRAL
CORPORATE
BOUNDARY
(ABANDONED)
PENN
Gas Well
Blasdell
Branch
PS 5
STATE
Drive-in Theater
Gas Well
MILE STRIP ROAD
Sewage

REFERENCE 26

New York State Department of Environmental Conservation
Information Services
Wildlife Resources Center
Delmar, N.Y. 12054

Thomas C. Jorling
Commissioner

August 31, 1989

Randy W. Youngman
Engineering - Science, Inc.
290 Elwood Davis Road
Liverpool, New York 13088

Dear Mr. Youngman:

We have reviewed the Significant Habitat Unit and the NY Natural Heritage Program files with respect to your request for information concerning Phase II investigations of potentially hazardous waste disposal sites in New York State.

Enclosed you will find computer printouts covering the areas you requested to be reviewed by our staff. The information contained in this report is confidential and may not be released to the public without permission from the Significant Habitat Unit.

Our files are continually growing as new habitats and occurrences of rare species and communities are discovered. In most cases, site-specific or comprehensive surveys for plant and animal occurrences have not been conducted. For these reasons, we can only provide data which have been assembled from our files. We cannot provide a definitive statement on the presence or absence of species, habitats or natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

This response applies only to known occurrences of rare animals, plants and natural communities and/or significant wildlife habitats. You should contact our regional office(s), Division of Regulatory Affairs, at the address(es) enclosed for information regarding any regulated areas or permits that may be required (e.g., regulated wetlands) under State law.

If this project is still active one year from now we recommend that you contact us again so that we may update this response.

If we can be of further assistance please do not hesitate to contact us.

Sincerely,

Burrell Buffington

Burrell Buffington
Significant Habitat Unit

Encs.
cc: Regions

New York Heritage Program is supported in
part by The Nature Conservancy

USERS GUIDE NUMBER 1
FOR USE WITH NY NATURAL HERITAGE PROGRAM AND SIGNIFICANT HABITAT UNIT REPORTS

CONFIDENTIAL STATEMENT: The information provided in these reports is for your in-house use only. It is of a sensitive nature and may not be released to the general public or be incorporated in any public document without prior written permission.

NATURAL HERITAGE REPORTS: Explanation of codes and column headings:

CO. - First 4 letters of the county name.

TOWN NAME - First 4 letters of the township name.

USGS 7 1/2 ' TOPOGRAPHIC MAP NAME: Name of U.S. Geological Survey map (1:24,000 scale).

LATITUDE - Latitude of the location of the element. Composed of degrees, minutes and seconds; for example, 42 degrees, 30 minutes and 33 seconds. The latitude & longitude coordinate gives the centrum of the occurrence only; the outer boundary of the occurrence is often much larger. Important: latitude/longitude must be used with Precision (see below). For example, the location of an occurrence with M (minute) Precision may not be is not precisely known at this time and is thought to occur somewhere within a 1.5 mile radius of the given latitude/longitude.

LONGITUDE - Longitude of the location of the element. See LATITUDE above.

SIZE IN ACRES - size approximate acres occupied by the element.

TYPE (of element) - A or I = animal, C = community, I = invertebrate, P = plant, O = other

PRECISION - The locational precision of a mapped occurrence. Must use also use YEAR LAST OBSERVED (see below).
- S - SECOND. Location precisely mappable - within 3-second radius of latitude & longitude given.
- M - MINUTE. Location within 1-minute radius (1.5 mi.) of latitude & longitude given.
- G - GENERAL. Location mappable only to 5-mile radius of latitude & longitude given.

YEAR LAST OBSERVED - Year the element was last observed at this site.

ELEMENT OCCURRENCE RANK: The Element Occurrence Rank is a comparative evaluation summarizing several factors. These are: 1) quality, the representativeness of the occurrence (maturity, size, numbers, etc.). 2) condition, how much has the site and the element occurrence itself been damaged or altered from its optimal condition and character. 3) viability, the long-term prospects for continued existence of this occurrence. 4) defensibility, the extent to which the occurrence can be protected from extrinsic human factors that might otherwise degrade or destroy it.

- A-D: Extant: A - Excellent B - Good C - Marginal D - Poor
- E : Extant but with insufficient data to assign a rank of A-D
- F : Failed to find. Did not locate, habitat still extant,further field work is justified.
- H : Historical. Historical occurrence without any recent field information.
- X : Extirpated. Field/other data indicates element/habitat destroyed so it can no longer exist at site.

NYS LEGAL STATUS - protected status of the plant, animal and natural community.

ANIMALS - Categories of Endangered and Threatened species are defined in New York State Environmental Conservation Law section 11-0535. Endangered, Threatened, and Special Concern species are listed in regulation 6NYCRR 182.5.

E = Endangered Species: any species which meet one of the following criteria:
1) Any native species in imminent danger of extirpation or extinction in New York.
2) Any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T = Threatened Species: any species which meet one of the following criteria:
1) Any native species likely to become an endangered species within the foreseeable future in New York.
2) Any species listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of the Federal Regulations 50 CFR 17.11.

SC = Special Concern Species: those species which are not yet recognized as endangered or threatened, but for which documented concern exists for their continued welfare in New York. Unlike the first two categories, species of special concern receive no additional legal protection under Environmental Conservation Law section 11-0535 (Endangered and Threatened Species).

P = Protected Wildlife (defined in Environmental Conservation Law section 11-0103): wild game, protected wild birds, and endangered species of wildlife.

U = Unprotected (defined in Environmental Conservation Law section 11-0103): the species may be taken at any time without limit; however a licence to take may be required.

G = Game (defined in Environmental Conservation Law section 11- 0103): any of a variety of big game or small game species as stated in the Environmental Conservation Law; many normally have an open season for at least part of the year, and are protected at other times.

continued on next page

PLANTS - The following catagories are defined in regulation 6NYCRR part 193.3 (amendment pending) and apply to New York State Environmental Conservation Law section 9-1503.

E = Endangered Species: listed species are those with
1) 5 or fewer extant sites, or
2) fewer than 1,000 individuals, or
3) restricted to fewer than 4 U.S.G.S. 7 1/2 minute topographical maps, or
4) species listed as endangered by the U.S. Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T = Threatened: listed species are those with
1) 6 to fewer than 20 extant sites, or
2) 1,000 to fewer than 3,000 individuals, or
3) restricted to not less than 4 or more than 7 U.S.G.S. 7 and 1/2 minute topographical maps, or
4) listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

R = Rare: listed species have
1) 20 to 35 extant sites, or
2) 3,000 to 5,000 individuals statewide.

V = Exploitably vulnerable: listed species are likely to become threatened in the near future throughout all or a significant portion of their range within the state if causal factors continue unchecked. (The attached list does not contain a complete listed of the species in this category.

HERITAGE STATE RANK: The Heritage State Rank which reflects the rarity within New York State.
S1 - Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.
S2 - Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.
S3 - Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.
S4 - Apparently secure in New York State.
S5 - Demonstrably secure in New York State.
SH - Historically known from New York State, but not seen in the past 15 years.
SX - Apparently extirpated from New York State.
SE - Exotic, not native to New York State.
SR - State report only, no verified specimens known from New York State.
SU - Status unknown.
TAXON RANK: The T-ranks are defined the same way the Global ranks are but the T-rank only refers to the rarity of the subspecific taxon of the species as a whole.
Q - indicates a question exists whether or not the taxon is a good taxonomic entity.
? - indicates a question exists about the rank.

SIGNIFICANT HABITAT UNIT REPORTS: Key to Symbols:
SW - Significant for Wildlife
SP - Significant for Plants
SB - Significant for Wildlife and Plants
PW - Potentially Significant for Wildlife
PP - Potentially Significant for Plants
PB - Potentially Significant for Both Wildlife and Plants
DA - Deer Winter Concentration Area - Aerial Survey
DC - Deer Winter Concentration Area
OT - Other - (e.g. Unique Geological Feature)

USERS GUIDE NUMBER 2
FOR USE WITH NY NATURAL HERITAGE PROGRAM AND SIGNIFICANT HABITAT UNIT REPORTS

CONFIDENTIAL STATEMENT: The information provided in these reports is for your in-house use only. It is of a sensitive nature and may not be released to the general public or be incorporated in any public document without prior written permission.

NATURAL HERITAGE REPORTS: Explanation of codes and column headings:

CO. - First 4 letters of the county name.

TOWN NAME - First 4 letters of the town name.

USGS 7 1/2' TOPOGRAPHIC MAP: Name of US Geological Survey map (1:24,000 scale).

LAT. - Latitude of the location of the element. Composed of degrees, minutes and seconds; for example, 42 degrees, 30 minutes and 33 seconds. The latitude & longitude coordinate gives the centrum of the occurrence only; the outer boundary of the occurrence is often much larger. Important: latitude/longitude must be used with Precision (see below). For example, the location of an occurrence with M (minute) Precision is not precisely known at this time and is thought to occur somewhere within a 1.5 mile radius of the given latitude/longitude.

LONG. - Longitude of the location of the element. See LATITUDE above.

SIZE IN ACRES - approximate acres occupied by the element.

SCIENTIFIC NAME - Scientific name of the rare plant or animal or the name of the community.

COMMON NAME - common name of the rare plant or animal.

TYPE (of element) - A or I = animal, C = community, I = invertebrate, P = plants, O = other

PRECISION: Indicates the locational PRECISION of a mapped occurrence.
S - SECONDS. Location known precisely - within a 3-second radius of the latitude & longitude given.
M - MINUTE. Location within 1-minute radius (1.5 mi.) of the latitude & longitude given.

YEAR LAST OBS. - Year the element was last observed at this site.

ELEMENT OCCURRENCE RANK - A comparative evaluation summarizing several factors: 1) quality, the representativeness of the occurrence (maturity, size, numbers, etc.). 2) condition, how much has the site and the element occurrence itself been damaged or altered from its optimal condition and character. 3) viability, the long-term prospects for continued existence of this occurrence. 4) defensibility, the extent to which the occurrence can be protected from extrinsic human factors that might otherwise degrade or destroy it.

A-D: Extant: A - Excellent B - Good C - Marginal D - Poor
E : Extant but with insufficient data to assign a rank of A-D
F : Failed to find. Did not locate species, habitat still extant, further field work is justified.
H : Historical. Historical occurrence without any recent field information.
X : Extirpated. Field/other data indicates element/habitat destroyed so it can no longer exist at site.

NYS LEGAL STATUS - protected status of the plant, animal or natural community.

ANIMALS: Categories of Endangered and Threatened species are defined in New York State Environmental Conservation Law section 11-0535. Endangered, Threatened, and Special Concern species are listed in regulation 6NYCRR 182.5.

E = Endangered Species: any species which meet one of the following criteria:
1) Any native species in imminent danger of extirpation or extinction in New York.
2) Any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T = Threatened Species: any species which meet one of the following criteria:
1) Any native species likely to become an endangered species within the foreseeable future in New York.
2) Any species listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of the Federal Regulations 50 CFR 17.11.

SC = Special Concern Species: those species which are not yet recognized as endangered or threatened, but for which documented concern exists for their continued welfare in New York. Unlike the first two categories, species of special concern receive no additional legal protection under Environmental Conservation Law section 11-0535 (Endangered and Threatened Species).

P = Protected Wildlife (defined in Environmental Conservation Law section 11-0103): wild game, protected wild birds, and endangered species of wildlife.

U = Unprotected (defined in Environmental Conservation Law section 11-0103): the species may be taken at any time without limit; however a licence to take may be required.

G = Game (defined in Environmental Conservation Law section 11-0103): any of a variety of big game or small game species as stated in the Environmental Conservation Law; many normally have an open season for at least part of the year, and are protected at other times.

PLANTS: The following catagories are defined in regulation 6NYCRR part 193.3 (amendment pending) and apply to New York State Environmental Conservation Law section 9-1503.

E = Endangered Species: listed species are those with 1) 5 or fewer extant sites, or 2) fewer than 1,000 individuals, or 3) restricted to fewer than 4 U.S.G.S. 7 1/2 minute topographical maps, or 4) species listed as endangered by the U.S. Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T = Threatened: listed species are those with 1) 6 to fewer than 20 extant sites, or 2) 1,000 to fewer than 3,000 individuals, or 3) restricted to not less than 4 or more than 7 U.S.G.S. 7 and 1/2 minute topographical maps, or 4) listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

R = Rare: listed species have 1) 20 to 35 extant sites, or 2) 3,000 to 5,000 individuals statewide.

V = Exploitably vulnerable: listed species are likely to become threatened in the near future throughout all or a significant portion of their range within the state if causal factors continue unchecked. (The attached list does not contain a complete listed of the species in this category.

HERITAGE GLOBAL RANK: The Heritage Global Rank which reflects the rarity of the element throughout the world.
G1 - Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or very few remaining acres, or miles of stream) or especially vulnerable to extinction because of some factor of its biology.
G2 - Imperiled globally because of rarity (6 - 20 occurrences, or few remaining acres, or miles of stream) or very vulnerable to extinction throughout its range because of other factors.
G3 - Either very rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because of other factors.
G4 - Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5 - Demonstrably secure globally, though it may be quite rare in parts of its range, expecially at the periphery.
GH - Historically known, with the expectation that it might be rediscovered.
GX - Species believed to be extinct.
GU - Status unknown.

HERITAGE STATE RANK: The Heritage State Rank which reflects the rarity within New York State.
S1 - Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.
S2 - Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.
S3 - Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.
S4 - Apparently secure in New York State.
S5 - Demonstrably secure in New York State.
SH - Historically known from New York State, but not seen in the past 15 years.
SX - Apparently extirpated from New York State.
SE - Exotic, not native to New York State.
SR - State report only, no verified specimens known from New York State.
SU - Status unknown.
TAXON RANK: The T-ranks are defined the same way the Global ranks are but the T-rank only refers to the rarity of the subspecific taxon of the species as a whole.
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NEW YORK NATURAL HERITAGE PROGRAM
RARE PLANTS, ANIMALS, AND NATURAL COMMUNITIES
*****CONFIDENTIAL INFORMATION*****
(IR2.frm)

CO.	TOWN NAME	USGS 7 1/2' TOPOGRAPHIC MAP NAME	LAT.	LONG.	SCIENTIFIC NAME	COMMON NAME	A/I=anim C=commun P=plant O=other	PRECISION S=second SC=confirmed M=minute	ELEMENT OCCURR. RANK	DATE LAST OBS.	NHP GLOBAL RANK	NHP STATE RANK	OFFICE USE
ERIE	LACKAWANA	BUFFALO SE			ERIGENIA BULBOSA	HARBINGER-OF-SPRING	P	M	H	1893	G5	S1	4207877 2

REFERENCE 27

CHARACTERISTICS OF THE POPULATION

Number of Inhabitants

Census Designated Counties

NEW YORK

1980 Census of Population

U.S. Department of Commerce
BUREAU OF THE CENSUS

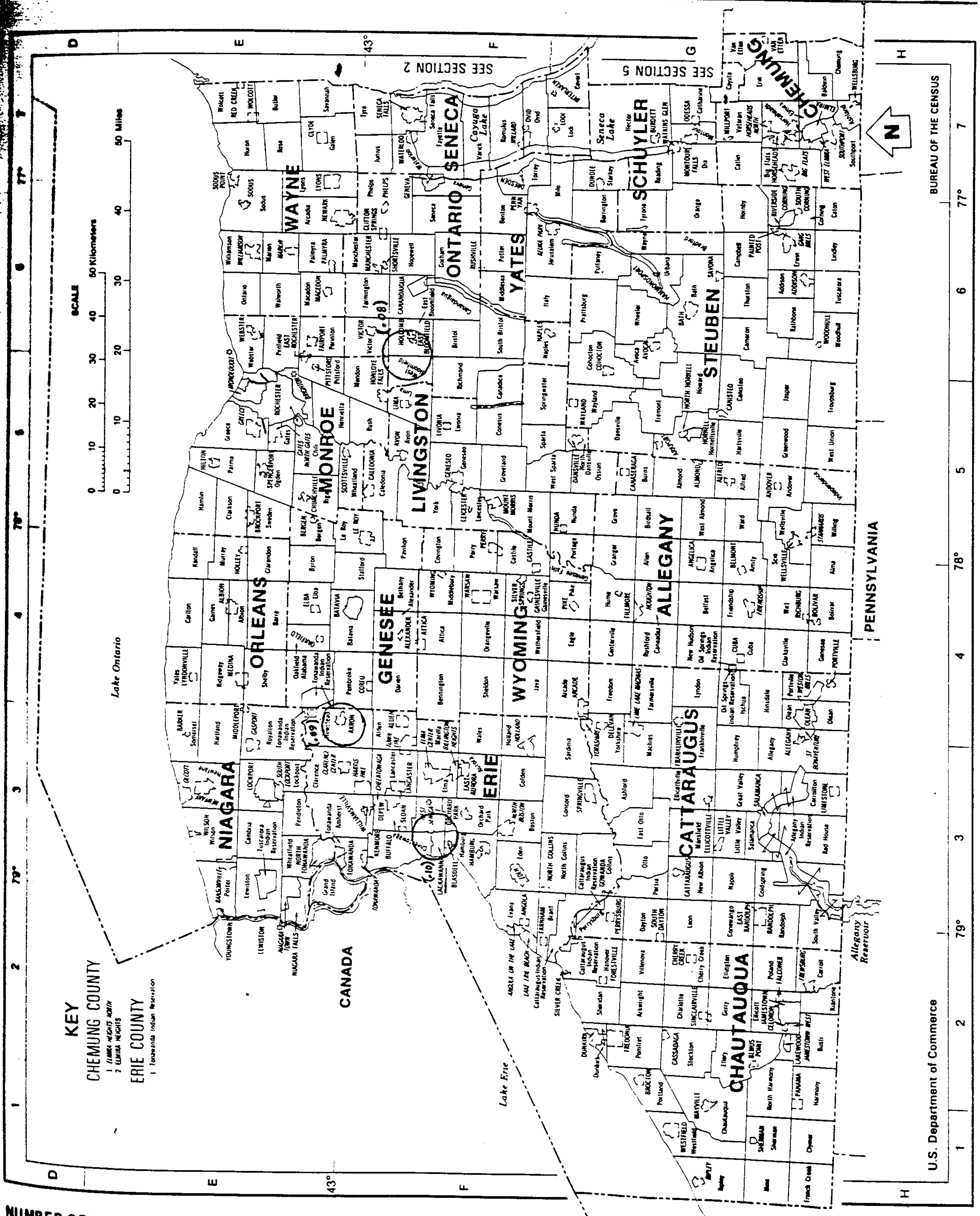
Table 4. **Population of County Subdivisions: 1960 to 1980**—Con.

[Total population of a place in two or more county subdivisions appears in table 5 Counts relate to county subdivisions and places as defined at each censu[s] symbols see introduction]

County Subdivisions	1980	1970	1960
Cortland County—Con			
Virgil town	2 053	1 692	1 420
Willet town	747	621	535
Delaware County[11]	46 824	44 718	43 540
Andes town	1 312	1 193	1 274
Andes village	372	353	399
Bovina town	562	506	594
Colchester town	1 848	1 665	1 920
Davenport town	1 971	1 617	1 261
Delhi town	5 295	4 617	3 398
Delhi village[11]	3 374	3 017	2 307
Deposit town	1 810	1 656	1 560
Deposit village (pt.)	880	942	838
Franklin town	2 431	2 202	2 133
Franklin village	440	552	525
Hamden town	1 276	1 169	1 108
Hancock town	3 497	3 604	3 907
Hancock village	1 526	1 688	1 830
Harpersfield town	1 495	1 423	1 193
Stamford village (pt.)	499	521	428
Kortright town	1 250	1 236	1 073
Masonville town	1 156	1 140	1 030
Meredith town	1 374	1 129	1 112
Middletown town	3 555	3 466	3 310
Fleischmanns village	346	434	450
Margaretville village	755	816	833
Roxbury town	2 291	2 252	2 238
Sidney town	6 856	6 984	7 110
Sidney village[11]	4 861	4 789	5 157
Stamford town	2 038	2 072	2 103
Hobart village	473	531	585
Stamford village (pt.)	741	765	738
Tompkins town	968	905	1 463
Walton town	5 839	5 882	5 753
Walton village	3 329	3 744	3 855
Dutchess County	245 055	222 295	176 008
Amenia town	6 299	7 842	7 546
Amenia (CDP)	1 183	1 157	...
Dover Plains (CDP) (pt.)	511	...	...
Beacon city	12 937	13 255	13 922
Beekman town	7 139	5 701	3 326
Clinton town	3 394	2 604	1 639
Dover town	7 261	8 475	8 776
Dover Plains (CDP) (pt.)	1 183	...	...
East Fishkill town	18 091	11 092	4 778
Hillside Lake (CDP)	1 382	...	...
Hopewell Junction (CDP)	1 754	2 055	...
Sproutville (CDP)	2 303	1 871	...
Fishkill town	15 506	11 935	7 083
Brinckerhoff (CDP)	3 030	2 094	...
Brockway (CDP)	1 301	...	...
Fishkill village	1 555	913	1 033
Glenham (CDP)	2 832	2 720	...
Hyde Park town	20 768	16 910	12 681
Fairview (CDP) (pt.)	1 930	2 077	...
Haviland (CDP)	3 578	3 447	...
Hyde Park (CDP)	2 550	2 805	1 979
La Grange town	12 375	10 902	6 079
Red Oaks Mill (CDP) (pt.)	2 287	1 310	...
Milan town	1 668	1 322	944
North East town	2 877	2 730	2 489
Millerton village	1 013	1 042	1 027
Pawling town	5 795	4 764	3 938
Pawling village	1 996	1 914	1 734
Pine Plains town	2 199	1 792	1 608
Pine Plains (CDP)	1 303	...	...
Pleasant Valley town	6 892	6 021	4 046
Pleasant Valley (CDP)	1 255	1 372	...
Poughkeepsie city	29 757	32 029	38 330
Poughkeepsie town	39 549	41 087	32 164
Arlington (CDP)	11 305	11 203	8 317
Cottam Hill (CDP)	1 380	...	...
Crown Heights (CDP)	3 225	3 292	...
Fairview (CDP) (pt.)	3 922	6 440	8 626
Hillis (CDP)	2 591	2 750	...
Red Oaks Mill (CDP) (pt.)	2 949	2 609	...
Rochdale (CDP)	1 825	1 849	1 800
Spackenkill (CDP)	4 848	2 725	...
Wappingers Falls village (pt.)	955	1 126	1 035
Wappingers Falls North (CDP)	1 799	...	...
Red Hook town	8 351	7 548	6 023
Red Hook village	1 692	1 680	1 719
Tivoli village	711	739	732
Rhinebeck town	7 062	5 658	4 612
Rhinebeck village	2 542	2 336	2 093
Stanford town	3 319	2 479	1 614
Union Vale town	2 658	1 702	1 138
Wappinger town	26 776	22 040	9 577
Myers Corner (CDP)	5 180	2 826	...
New Hackensack (CDP)	1 532	1 111	...
Wappingers Falls village (pt.)	4 155	4 481	3 412
Wappingers Falls East (CDP)	1 818	2 017	...
Washington town	4 382	4 407	3 695
Dover Plains (CDP) (pt.)	59	...	...
Millbrook village	1 343	1 735	1 717

County Subdivisions	1980	1970
Erie County[12]	1 015 472	1 113 491
Alden town	10 093	9 787
Alden village	2 488	2 651
Town Line (CDP) (pt.)	2 720	2 240
Amherst town	108 706	93 929
Williamsville village (pt.)[12]	6 017	6 878
Aurora town	13 872	14 426
Billington Heights (CDP) (pt.)	740	746
East Aurora village[12]	6 803	7 033
Boston town	7 687	7 158
North Boston (CDP)	2 743	1 635
Brant town	2 437	2 67[illegible]
Farnham village	404	54[illegible]
Buffalo city	357 870	462 76[illegible]
Cattaraugus Indian Reservation	1 628	1 10[illegible]
Cheektowaga town	109 442	113 84[illegible]
Cheektowaga (CDP)	92 145	...
Depew village (pt.)[12]	12 768	14 39[illegible]
Sloan village	4 529	5 21[illegible]
Williamsville village (pt.)[12]	–	...
Clarence town	18 146	18 16[illegible]
Clarence Center (CDP)	1 300	1 33[illegible]
Harris Hill (CDP)	5 087	...
Colden town	3 128	3 02[illegible]
Collins town	5 037	6 40[illegible]
Gowanda village (pt.)	849	1 01[illegible]
Concord town	8 171	7 57[illegible]
Springville village	4 285	4 35[illegible]
Eden town	7 327	7 64[illegible]
Eden (CDP)	3 000	2 96[illegible]
Elma town	10 574	10 01[illegible]
Billington Heights (CDP) (pt.)	1 042	5[illegible]
Elma Center (CDP)	2 459	2 78[illegible]
Evans town	17 961	14 5[illegible]
Angola village	2 292	2 6[illegible]
Angola on the Lake (CDP)	1 907	1 5[illegible]
Lake Erie Beach (CDP)	4 625	3 4[illegible]
Grand Island town	16 770	13 9[illegible]
Hamburg town	53 270	47 6[illegible]
Blasdell village	3 288	3 9[illegible]
Hamburg village[12]	10 582	10 2[illegible]
Holland town	3 446	3 1[illegible]
Holland (CDP)	1 347	[illegible]
Lackawanna city	22 701	28 6[illegible]
Lancaster town	30 144	30 [illegible]
Depew village (pt.)	7 051	7 [illegible]
Lancaster village	13 056	13 [illegible]
Town Line (CDP) (pt.)	197	
Marilla town	4 861	3 [illegible]
Newstead town	7 231	6 [illegible]
Akron village[12]	2 971	2 [illegible]
North Collins town	3 791	4 [illegible]
North Collins village	1 496	1 [illegible]
Orchard Park town	24 359	19 [illegible]
Orchard Park village[12]	3 671	3 [illegible]
Sardinia town	2 792	2 [illegible]
Tonawanda city	18 693	21 [illegible]
Tonawanda Indian Reservation	12	
Tonawanda town	91 269	107 [illegible]
Kenmore village	18 474	20 [illegible]
Tonawanda (CDP)	72 795	
Wales town	2 844	2 [illegible]
West Seneca town	51 210	48 [illegible]
West Seneca (CDP)	51 210	
Essex County[13]	36 176	34 [illegible]
Chesterfield town	2 398	2 [illegible]
Keeseville village (pt.)	970	
Crown Point town	1 837	1 [illegible]
Elizabethtown town	1 267	1 [illegible]
Elizabethtown village	659	
Essex town	880	
Jay town	2 221	[illegible]
Keene town	919	
Lewis town	922	
Minerva town	781	
Moriah town	5 139	
Mineville-Witherbee (CDP)	1 925	
Port Henry village	1 450	
Newcomb town	681	
North Elba town	6 597	
Lake Placid village	2 490	
Saranac Lake village (pt.)[13]	1 288	
North Hudson town	179	
St. Armand town	1 064	
Bloomingdale village	608	
Saranac Lake village (pt.)	174	
Schroon town	1 606	
Ticonderoga town	5 436	
Ticonderoga village[13]	2 938	
Westport town	1 439	
Westport village	613	
Willsboro town	1 759	
Wilmington town	1 051	
Franklin County[14]	44 929	
Altamont town	6 318	
Tupper Lake village[14]	4 478	
Bangor town	1 960	

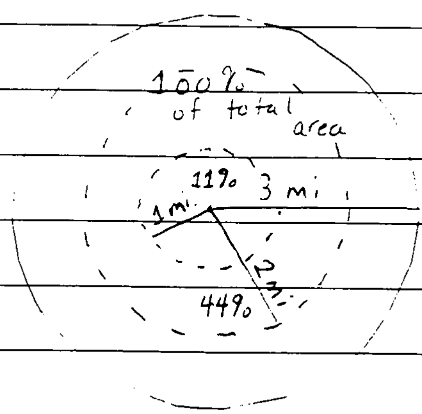
See footnotes at end of table.


KEY
CHEMUNG COUNTY
1 ELMIRA HEIGHTS NORTH
2 ELMIRA HEIGHTS
ERIE COUNTY
1 Tonawanda Indian Reservation
SCALE
0 10 20 30 40 50 Kilometers
0 10 20 30 40 50 Miles
Lake Ontario
Lake Erie
CANADA
PENNSYLVANIA
NIAGARA
ORLEANS
MONROE
WAYNE
GENESEE
LIVINGSTON
ONTARIO
SENECA
ERIE
WYOMING
YATES
SCHUYLER
CHAUTAUQUA
CATTARAUGUS
ALLEGANY
STEUBEN
CHEMUNG
Seneca Lake
Cayuga Lake
Allegany Reservoir
SEE SECTION 2
SEE SECTION 5
N
43°
79°
78°
77°
U.S. Department of Commerce
BUREAU OF THE CENSUS

Lackawanna City Landfill 5Y053.10 Population Estimates

3 mile radius of site	Census Tract	Total Population	Percentage of Area Falling within Range	Estimated Population Within Range
	Buffalo City	357,870	15 %	53,681
	Hamburg Town	53,270	15 %	7,991
	Lackawanna City	22,701	100 %	22,701
	Orchard Park Town	24,359	5 %	1,218
	West Seneca Town	51,210	50 %	25,605
				$\boxed{111,196}$

2 mile radius of site: This site is in a relatively densely populated area and the population appears to be spread fairly evenly over the whole 3 mile radius area. In this case you can get a reasonable estimate for 1 and 2 mile radii using the percentage of total area method illustrated below.



Circle of 2 mile radius = 44% of total area represented by circle of 3 mile radius

estimated population = 111,196 × .44

= $\boxed{48,926}$

1 mile radius of site: Circle of 1 mile radius = 11% of total area represented by circle of 3 mile radius

estimated population = 111,196 × .11 = $\boxed{12,231}$

* Note: if population appears to be unevenly distributed within the 3 mile radius area, you must devise a site specific scheme to estimate populations within 1 and 2 mile radii.

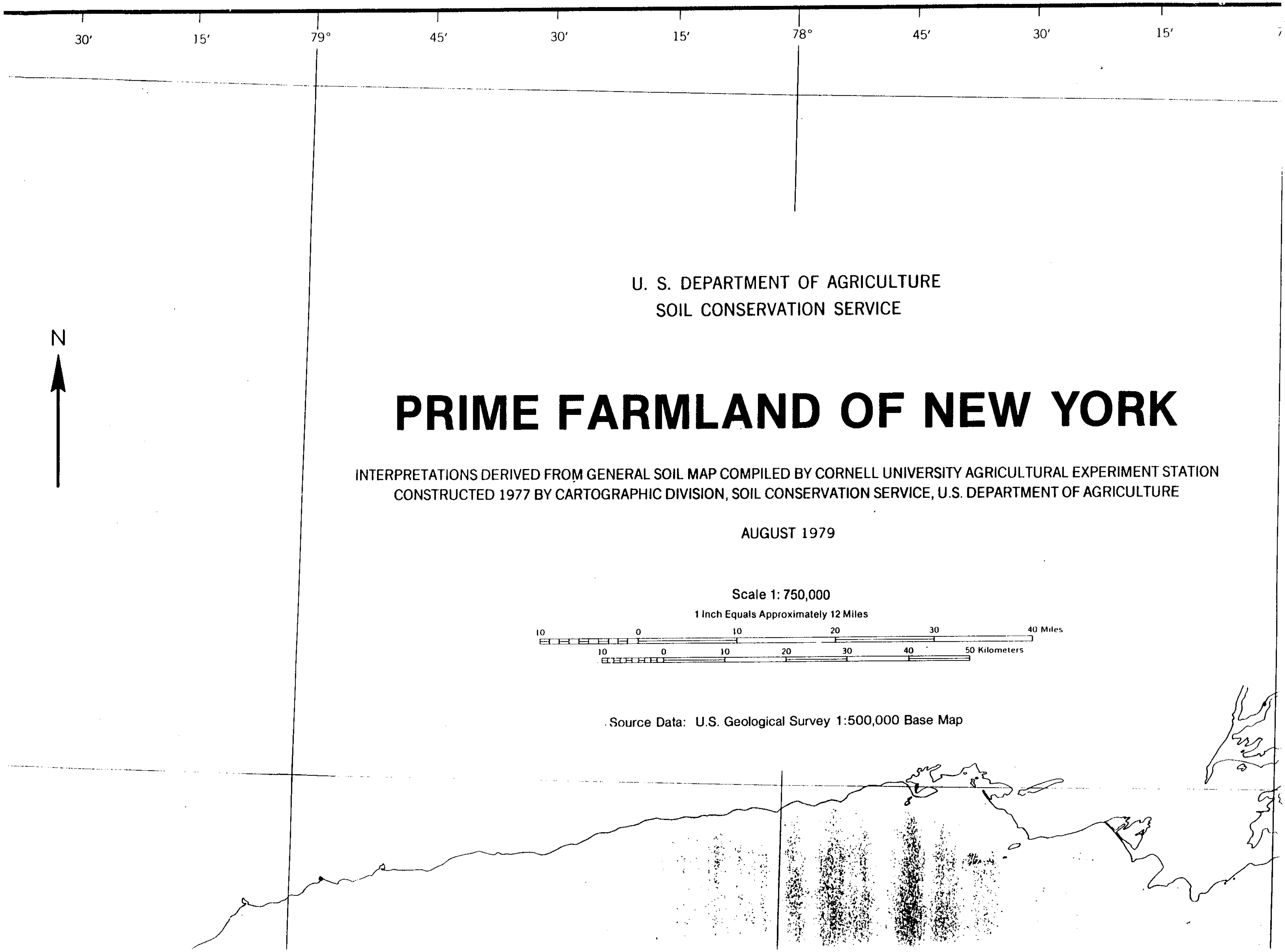
REFERENCE 28

Agricultural Value / Soil Classifications Lackawanna City L.F.

U.S. Dept of Agriculture Soil Conservation Service
1979 Map : Prime Farmland of New York

Lackawanna City Landfill occupies area classified as urban setting and maintains the urban setting classification within the 1 mile radius. Within a two mile radius, there is an area classified as "25% to 75% prime farmland" (probably < 1 mi² is actually in this area). The urban area (1 mi. radius) is composed of unclassified sediments and the outlying area to the east (2 mi. radius) is generally composed of Lake & Marine Sediments.

Detailed Soil Classifications :



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

PRIME FARMLAND OF NEW YORK

INTERPRETATIONS DERIVED FROM GENERAL SOIL MAP COMPILED BY CORNELL UNIVERSITY AGRICULTURAL EXPERIMENT STATION
CONSTRUCTED 1977 BY CARTOGRAPHIC DIVISION, SOIL CONSERVATION SERVICE, U.S. DEPARTMENT OF AGRICULTURE

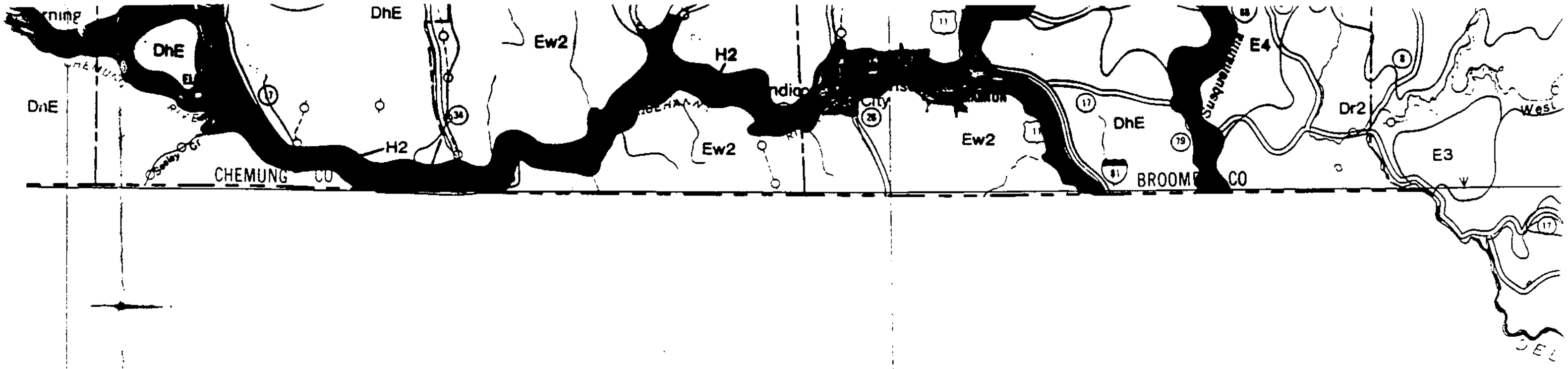
AUGUST 1979

Scale 1: 750,000

1 Inch Equals Approximately 12 Miles

10 0 10 20 30 40 Miles
10 0 10 20 30 40 50 Kilometers

Source Data: U.S. Geological Survey 1:500,000 Base Map



LEGEND

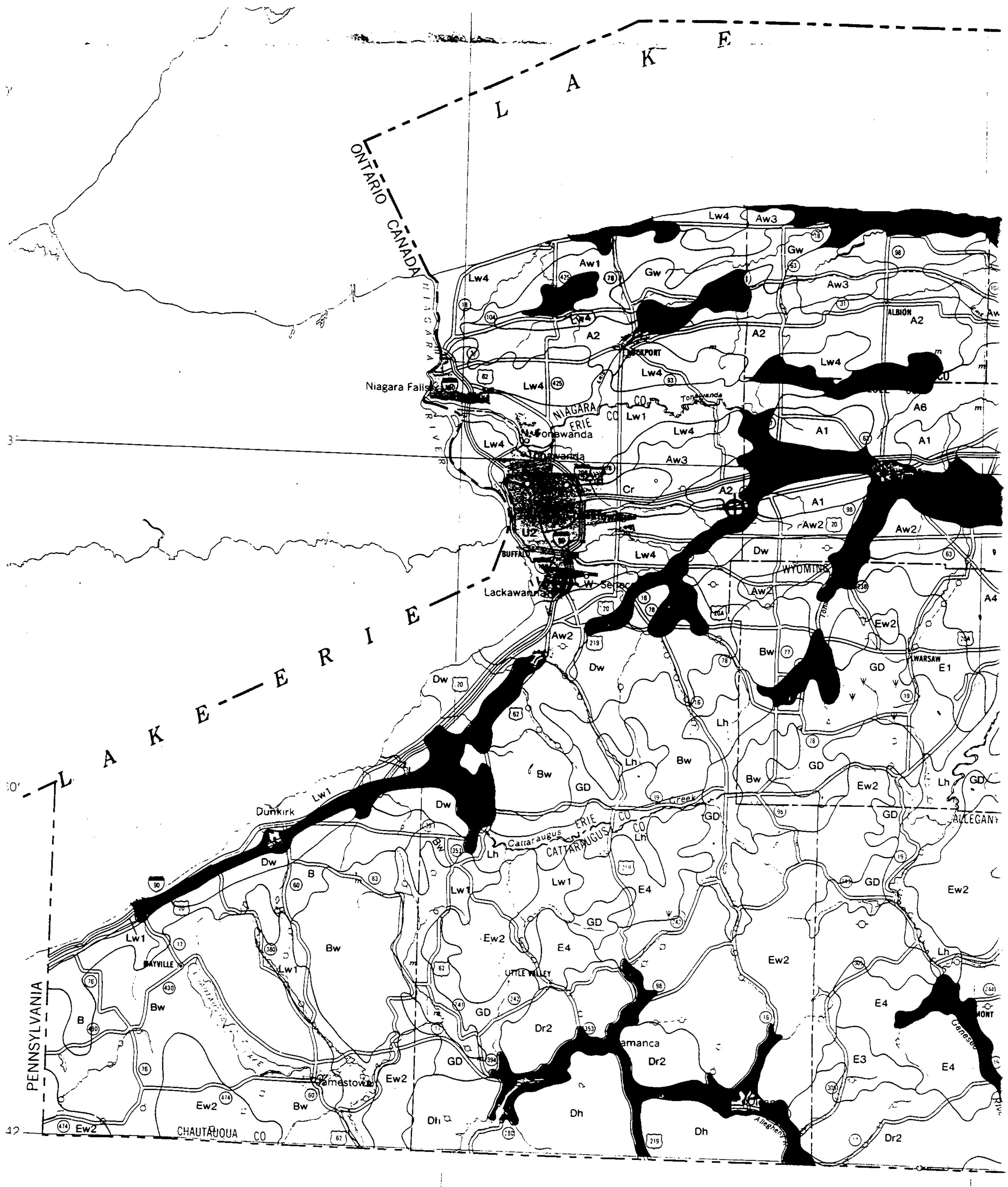
Prime Farmland Defined By USDA - SCS

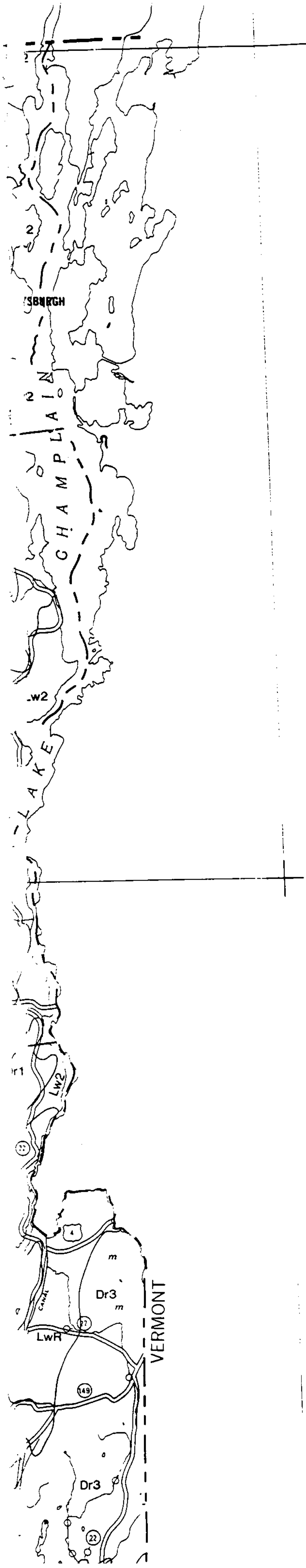
- MORE THAN 75 PERCENT PRIME FARMLAND
- 25 PERCENT TO 75 PERCENT PRIME FARMLAND
- LESS THAN 25 PERCENT PRIME FARMLAND
- URBAN AREAS

SPOT SYMBOLS

- Very stony soils
- Wet soils
- Organic soils
- Sandy soils
- Rock outcrops
- Soils in outwash or alluvium
- Gravelly soils
- Soils on glacial lake beaches

77° 45′ 30′ 15′ 76° 45′ 30′ 15′


LAKE
ONTARIO
CANADA
NIAGARA RIVER
Niagara Falls
LOCKPORT
ALBION
NIAGARA CO
ERIE CO
Tonawanda
BUFFALO
Lackawanna
LAKE ERIE
WYOMING
WARSAW
Dunkirk
Cattaraugus Creek
CATTARAUGUS CO
ALLEGANY
MAYVILLE
LITTLE VALLEY
Jamestown
PENNSYLVANIA
CHAUTAUQUA CO
Lw4
Aw3
Gw
Aw1
A2
A6
A1
Lw1
Cr
U2
Aw2
Dw
A4
Ew2
Bw
GD
E1
Lh
B
E4
Dr2
Dh
E3



LEGEND

Map Symbol	Name

1. Glacial Till

A - Hapludalfs dominant

A1	Cazenovia and Mohawk areas
A2	Hilton areas
[redacted]	Honeoye areas
A4	Lansing areas
[redacted]	Madrid areas
A6	Ontario areas

Aw - Ochraqualfs dominant

Aw1	Appleton areas
Aw2	Burdett and Darien areas
Aw3	Ovid areas

B - Fragiudalfs dominant

B	Langford areas

Bw - Fragiaqualfs dominant

Bw	Erie areas

C - Eutrochrepts dominant

C	Nellis areas
Cr	Farmington areas
CLw1	Hogansburg-Swanton areas
CLw2	Pittsfield-Rhinebeck areas

D - Dystrochrepts dominant

D	Charlton areas
Dh	Muskingum areas
DhE	Lordstown-Mardin areas
Dr1	Hollis areas
Dr2	Lordstown and Oquaga areas
Dr3	Nassau areas
Ds	Charlton, Paxton, and Essex areas, very stony

Dw - Haplaquepts dominant

Dw	Fremont and Hornell areas

E - Fragiochrepts dominant

E1	Bath areas
E2	Ira areas
E3	Lackawanna areas
E4	Mardin areas
E5	Sodus areas
EDr	Bernardston-Nassau areas
EG	Bernardston-Hoosic areas
Es	Lackawanna and Wurtsboro areas, very stony

Ew - Fragiaquepts dominant

Ew1	Mosherville areas
Ew2	Volusia areas

F - Haplorthods, Fragiorthods, or very stony Fragiaquods dominant

H - Hapludalfs dominant

- H1 Arkport areas
- Howard areas
- Palmyra areas

Kd - Haplorthods dominant

- Kd Colton and Adams areas

Kw - Haplaquods dominant

- Kw Naumburg areas

3. Lake and Marine Sediments

L - Hapludalfs or silty Fragiochrepts dominant

- Collamer areas
- L2 Schoharie areas
- LE Williamson-Ira areas
- Lh Hudson areas

Lw - Ochraqualfs or Haplaquepts dominant

- Lw1 Canandaigua areas
- Lw2 Kingsbury areas
- Niagara areas
- Lw4 Odessa and Rhinebeck areas
- Lw5 Swanton-Rhinebeck areas
- LwC Kingsbury-Hogansburg areas
- LwR Kingsbury-Rock outcrop areas

4. Organic Deposits

M - Histosols dominant

- Carlisle and Palms areas

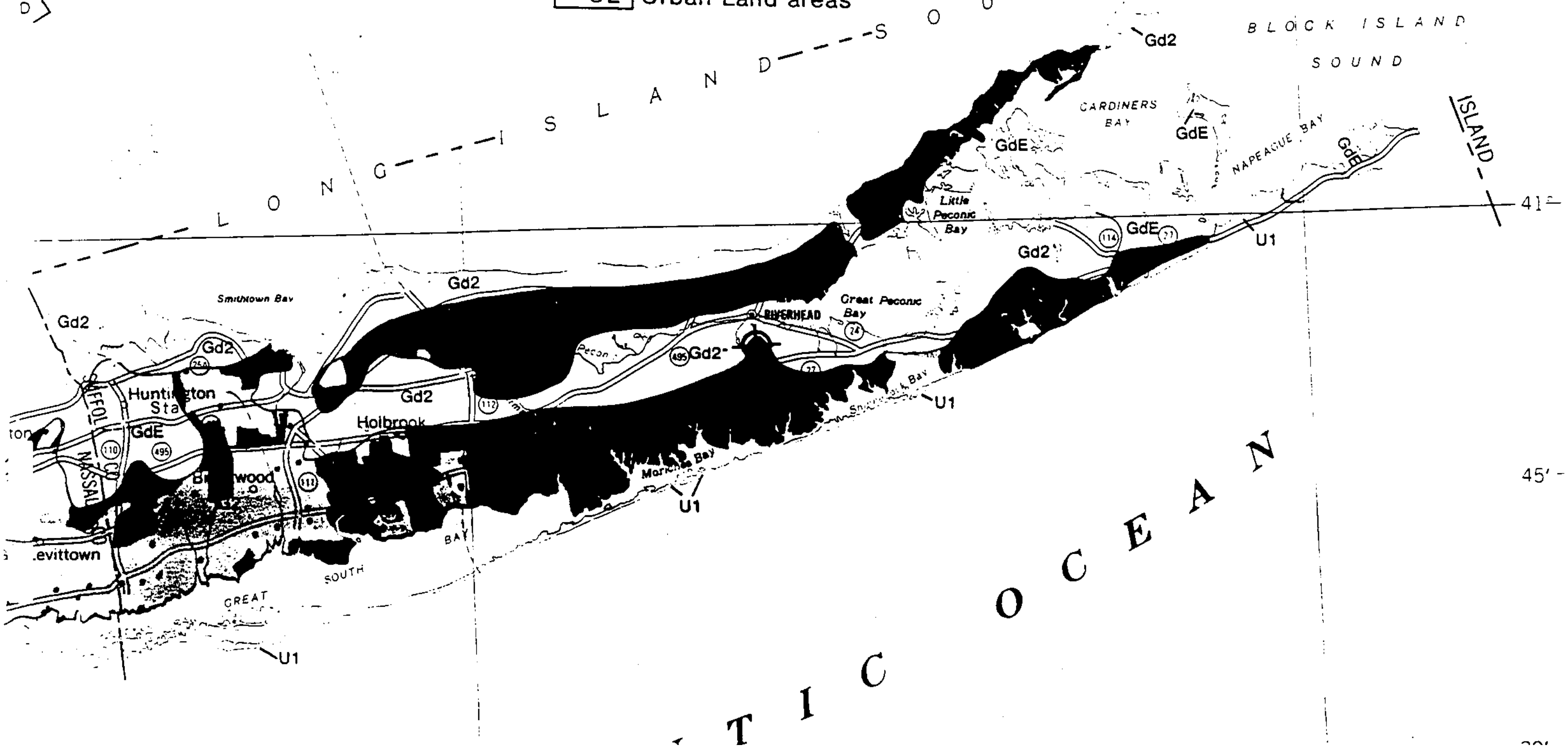
5. Miscellaneous Units

R - Rock outcrop dominant

- R Rock outcrop areas, sloping
- Rh Rock outcrop areas, steep

U - Unclassified soil

- U1 Beach-Tidal marsh areas
- U2 Urban Land areas



REFERENCE 29

NASO-34
(May 1987)

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
TRANSMITTAL STATEMENT

From:
(In reply refer to)
413

National Register of Historic Places
National Park Service, P.O. Box 37127
Department of the Interior
Washington, D.C. 20013-7127

Date 6 June 1988

To:

Engineering Science
290 Elwood Davis
Liverpool, NY 13088

Attn: William Bradford

☐ We are enclosing:

☐ We are sending under separate cover:

NUMBER	ITEM	DESCRIPTION
1	Printout	

COMMENTS

If we can be of further assistance, please call us at 202-343-9559.

NAME AND TITLE	SIGNATURE
Christine Peleszak Andrews	

Chapel Of Our Lady Help Of Christians.
(Maria Hilf Chapel)
RIE Co. 4125 Union Rd.
Reference No. 78001851

Clarence Center
Eshelman, J., and Company Store — Listed 05/06/82
(The Square Deal Store)
6000 Goodrich Rd.
Reference No. 82003356

East Aurora
Fillmore, Millard, House — Listed 05/30/74
24 Shearer Ave.
Reference No. 74001235

Roycroft Campus — Listed 11/08/74
(Roycroft Campus National Historic Landmark)
Main and W. Grove Sts.
Reference No. 74001236

Hamburg Vicinity
Kleis Site — Listed 04/20/79
(NYSDHP Unique Site No. A029-15-0013;U.B. 224,Edn 1-2)
Address Restricted
Reference No. 79001580

Irving
Thomas Indian School — Listed 01/25/73
(Thomas Asylum of Orphan and Destitute Indian Children)
NY 438 on Cattaraugus Reservation
Reference No. 73001188

Kenmore
Eberhardt Mansion — Listed 09/08/83
2746 Delaware Ave.
Reference No. 83001671

North Collins Vicinity
Gamel Hexadecagon Barn — Listed 09/29/84
[Central Plan Dairy Barns of New York TR]
Shirley Rd.
Reference No. 84002386

Orchard Park
Johnson-Jolls Complex — Listed 05/06/80
(Dr. Willard B. Jolls House)
S-4287 S. Buffalo St.
Reference No. 80002611

Rhinebeck
Salisbury Turnpike Bridge — Listed 07/09/87
[Rhinebeck Town MRA]
Old Turnpike Rd.
Reference No. 87001100

West Seneca
Eaton Site — Listed 04/03/79
(NYSDHP Unique Site no. A-029-25-0003;Buffalo E,Buf 2-4 , & U.B. 221)
Address Restricted
Reference No. 79001581

Williamsville
Williamsville Water Mill Complex — Listed 09/22/83
56 and 60 Spring St.
Reference No. 83001675

Essex County
Adirondack State Forest Preserve
Adirondack Forest Preserve — Listed 10/15/66
NE New York State
Reference No. 66000891

Crown Point
Fort St. Frederic — Listed 10/15/66
Jct. of NY 8 and 9N

REFERENCE 30

ES ENGINEERING-SCIENCE

INTERVIEW FORM

Interviewee/Code Mr. Frank Ruby

Title-Position Fire Chief - City of Lackawanna, NY

Address 2990 South Park Avenue

City Lackawanna **State** NY **Zip** 14218

Phone (716) 827-6437

Location **Residence Period** **to**

Interviewer Mr. David Nickerson

Date/Time 11/8/89 / 9:00 a.m.

Subject: Lackawanna City Landfill - history of/potential for fire and explosion

Remarks: I asked Mr. Ruby if he knew of any previous fires at the landfill that may have been associated with materials deposited there. I also asked if he thought that the facility posed a significant fire or explosion threat.

Mr. Ruby replied that he was not aware of any fires at this location and that he would check records for any such incidence occurring in the past.

There may have been fires there that I am not aware of. This is only from memory.

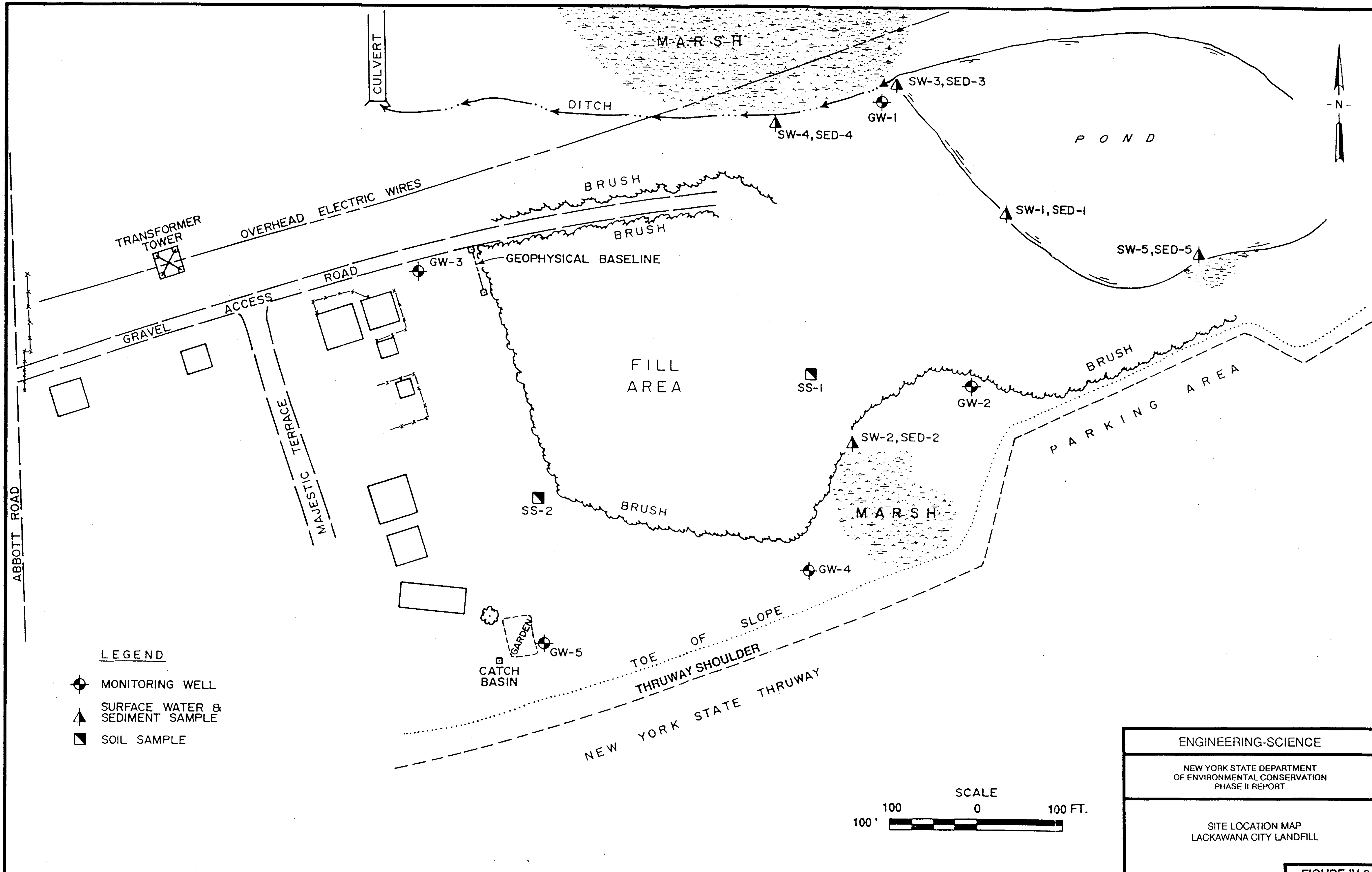
I agree with the above summary of the interview:

Signature: Frank Hruby Acting Fire Chief.

Comments: We have nothing in our files on this site.

REFERENCE 31

REFERENCE 32



ENGINEERING-SCIENCE

NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION
PHASE II REPORT

SITE LOCATION MAP
LACKAWANA CITY LANDFILL

FIGURE IV-2

REFERENCE 33

AREA CODE (716) 835-8282

FRANK L. CIMINELLI
Construction Company, Inc.

35 MANHATTAN AVENUE • BUFFALO, NEW YORK 14215

79-122

November 17, 1980

N.Y.S.D.E.C.
Division of Regulatory Affairs
600 Delaware Avenue
Buffalo, New York 14202

Attention: Mr. Steven J. Doleski

Re: City of Lackawanna
Sewage Treatment Plant Modifications
DEC/EPA C36-852-02

Gentlemen:

This office is in the process of applying for a permit to allow the disposal of treated sludge on the City of Lackawanna landfill site located on Abbott Road. It is our understanding that your Mr. Steven Sanford has inspected the site and found no regulated wetland area due to the small size of the lot.

We respectfully request Mr. Sanford contact the writer to arrange a meeting of interested parties at the landfill site. A crew will be provided by this office to assist in staking out the wetland area. Once a determination has been made of wetland boundries, the intended disposal area can be established. This area would be at an agreed upon distance from the wetland area.

We would appreciate your prompt attention to this matter as an earth berm has to be built to contain the disposal area and, with winter fast approaching, it is desirable to have this operation completed before frost sets in.

Very truly yours,

C. J. Klemp
Project Manager

RECEIVED
NOV 17 1980
NUSSBAUMER & CLARKE

li

c: Weisberger
Selden

REFERENCE 34

Lackawanna

ES

ENGINEERING-SCIENCE, INC.

290 ELWOOD DAVIS ROAD
LIVERPOOL, NEW YORK 13088
(315) 451-9560

November 8, 1989

Mr. John Kociela
Director
Erie County Health Department
95 Franklin, Room 931
Buffalo, NY 14202

Dear Mr. Kociela:

Thank you for your helpful comments regarding the area that we are currently investigating in your county. I have enclosed an interview form which outlines our brief telephone conversation. Please review this form, make any changes or additions that you see fit regarding the substance of our conversation on October 20, 1989, and sign and return it to us at your earliest convenience in the stamped, self-addressed envelope enclosed. Please also indicate in the comments section at the bottom of the interview form whether or not your office has a file on this site and how we can make arrangements to examine the file.

If you have any questions, please call me at (315) 451-9560. Thank you again for your attention in this matter.

Sincerely,

ENGINEERING-SCIENCE, INC.

David A. Nickerson

David A. Nickerson
Geologist

Program files for landfills in Erie County are maintained by the Regional office of DEC JH

MAC/SY053/00032

ES ENGINEERING-SCIENCE

INTERVIEW FORM

Interviewee/Code Mr. John Kociela

Title-Position

Address Erie County Health Deparmtnet - 95 Franklin, Room 931

City Buffalo **State** NY **Zip** 14202

Phone (716) 858-7660 **Residence Period** ______ **to** ______

Location ______ **Interviewer** Mr. David Nickerson

Date/Time 10/20/89 / 9:50 a.m.

Subject: Phone call was made to attempt to confirm any known instances in which contact with a hazardous waste at the Lackawanna City Landfill or the Houdaille Strippit Dump area in Akron has caused injury, illness, or death to humans or domestic or wild animals.

Remarks:

I asked Mr. Kociela and he replied that he is not aware of any such incidences at either of these two locations. Mr. Kociela is the Director of the Erie County Health Department.

I agree with the above summary of the interview:

Signature: J.K.

Comments:

REFERENCE 35

NUSSBAUMER & CLARKE, INC.
310 Delaware Avenue
Buffalo, New York 14202

716 853-7582

LETTER OF TRANSMITTAL

DATE	10-14-80	JOB NO.	79-122
RE:	City of Lackawanna		
	Sewage Treatment Plant		

TO New York State Department of
Environmental Conservation
584 Delaware Avenue
Buffalo, New York 14202

ATTENTION Mr. Robert Mitrey, P.E.

GENTLEMEN:

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via __________ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
1			Analysis of sludge from Lehigh Avenue Sewage Treatment
			Plant West Digester, by Acts Testing Labs.

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Reviewed ☐ Resubmit ______ copies for review

☐ For your use ☐ Reviewed as noted ☐ Submit ______ copies for distribution

☐ As requested ☐ Revise and resubmit ☐ Submit one copy in reproducible form

☐ For review and comment ☐ Not accepted ☐ ______

☐ FOR BIDS DUE ______ 19 ______ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS This report has been revised to accurately describe the location of the sampling.

Please note that sample does not exceed the limits established in Title 40 Code of Federal Regulations, Part 261. Section 261.24, Characteristics of Toxicity. Should you have any questions or comments, please do not hesitate to call.

COPY TO Ken Selden, C.J. Klemp
Paul Pieczonka/encl.

SIGNED: Steve Weisberger
Steve Weisberger, P.E.

If enclosures are not as noted, kindly notify us at once.

REFERENCE 36

ACTS TESTING LABS, INC.

RECEIVED

OCT 14 1980

F. L. CIMINELLI CONST. CO., INC.

Mr. C.J. Klemp
Frank L. Ciminelli Construction Co., Inc.
September 17, 1980
Page Two

All results are reported as milligrams per liter of leachate.

NA = None Applied

EXPERIMENTAL:

The sample was analyzed according to "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods", U.S. Environmental Protection Agency.

The composite sample of sludge was collected on August 22, 1980 from the west digester. Grab samples were obtained from each of the three layers present in the digester, namely, the surface scum layer, the liquid supernatant layer below the scum and the bottom sediment layer. The supernatant liquid was taken from a valve in the recirculation plumbing system. Grabs from the top and bottom layer were collected in glass vessels attached to a depth sampling device. The samples from the three layers were combined proportionately into a final composite sample which was transfered to the laboratory for analysis.

CONCLUSION:

The analytical results of the digester sample do not exceed the limits established in Title 40, Code of Federal Regulations, Part 261, Section 261.24, Characteristics of EP Toxicity.

ACTS TESTING LABS, INC.

Rock Termini

C.R. Termini, Director
Environmental Programs

maf

ACTS TESTING LABS, INC.
3900 Broadway • Buffalo, N. Y. 14227 • (716) 684-3300

TECHNICAL REPORT

September 17, 1980

RECEIVED
SEP 18 1980
F. L. CIMINELLI CONST. CO., INC.

Mr. C.J. Klemp
Frank L. Ciminelli Construction
Company, Inc.

OBJECT:

Collection and EP Toxicity Testing of one sample of digester sludge from the Lackawanna Sewage Treatment Plant at the corner of Lehigh Avenue and South Street.

RESULTS:

Parameter	mg/l	EPA Limit
Arsenic	<0.05	5.0
Barium	<0.1	100.0
Cadmium	<0.01	1.0
Chromium	0.03	5.0
Lead	<0.1	5.0
Mercury	<0.05	0.2
Selenium	<0.05	1.0
Silver	<0.01	5.0
Endrin	<0.0002	0.02
Lindane	<0.0001	0.4
Methoxychlor	<0.0001	10.0
Toxaphene	<0.0001	0.5
2,4-D	<0.01	10.0
2,4,5-TP	<0.01	1.0
Aluminum	<5	NA
Copper	<0.01	NA
Iron	62	NA
Potassium	7.0	NA
Manganese	2.70	NA
Nickel	<0.1	NA
Zinc	0.22	NA

< = Less Than

REFERENCE 37

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE I INVESTIGATION

City of Lackawanna   Site No. 915094
Lackawanna   Erie County

DATE: April 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:

Recra Environmental, Inc.

5.0 PRELIMINARY APPLICATION OF THE HAZARD RANKING SYSTEM

5.1 Narrative

The City of Lackawanna Landfill is located on Abbott Road in Lackawanna, Erie County, New York (Reference 27). The site is approximately 15 acres in size and is owned by the City of Lackawanna.

Between 1961 and 1981 the wastes disposed of in the landfill included incinerator residue, digested sewage sludge and demolition debris (References 4, 8, 12 and 15). Approximately 1300 cubic yards of digested sewage sludge were deposited at the landfill in 1982 (Reference 22).

In 1981, the NYSDEC conducted a site inspection and found several Part 360 violations that included inadequate cover, improper grades and slopes, improper vegetation cover and inadequate access control (Reference 23). On January 24, 1986, Recra personnel inspected the site and found no observable adverse environmental conditions.

The site is located within a few hundred feet of a residential area (Reference 27). The population within three miles of the site is greater than 20,000 (Reference 11). All residents within three miles of the site are serviced by municipal water (Reference 10). There are no barriers to prevent entry to the site (Figure 2).

The water table is reported to be approximately 17 feet below the lowest ground elevation of the landfill (Reference 25). The site is located approximately 0.8 mile south of Smoke Creek and 0.8 northeast of South Branch (Reference 27). There are no protected wetlands or sensitive

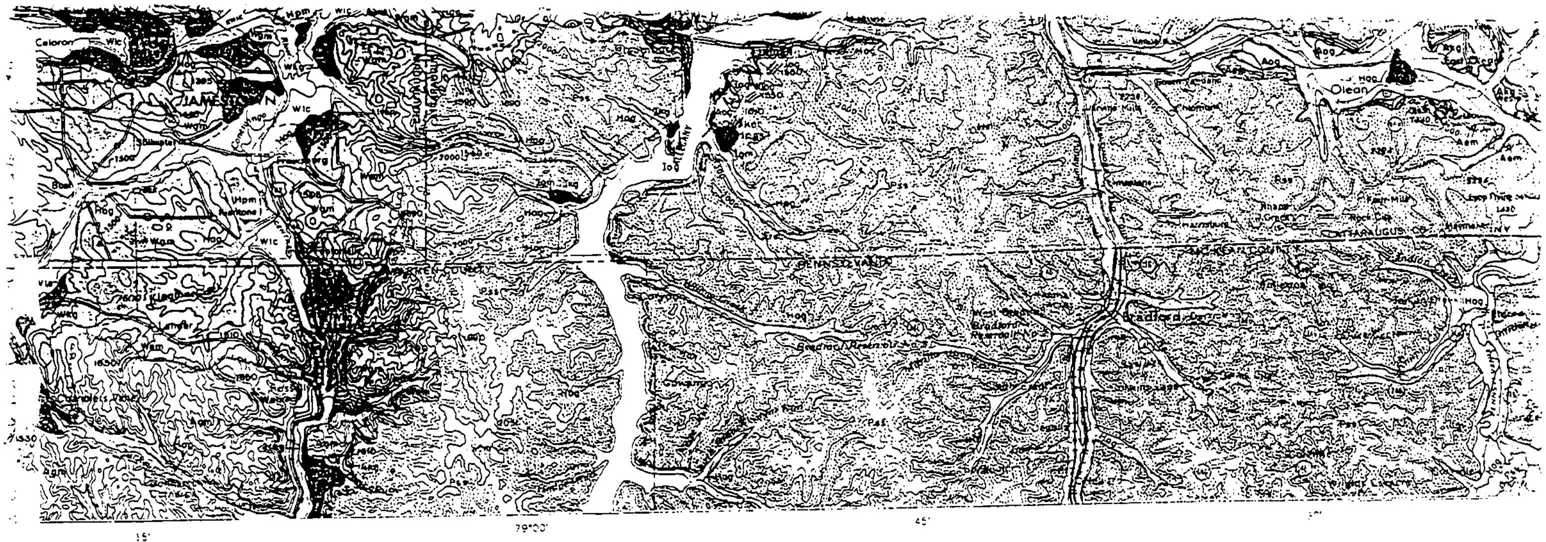
REFERENCE 38

TABLE IV-8
LACKWANNA CITY LANDFILL
SEDIMENT SAMPLE RSULTS
TCL ORGANIC COMPOUNDS (UG/KG)

COMPOUND / ANALYTE	SED-1	SED-2	SED-2-RE	SED-3	SED-4	SED-5	SED-5-RE
METHYLENE CHLORIDE	-	-	7 JR	-	-	-	-
ACETONE	19 X	17 J	37	24	29	240	110
BENZOIC ACID	-	-	NA	2,700 J	-	-	NA
PHENANTHRENE	-	-	NA	-	-	4,200	NA
FLUORANTHENE	580 J	500 J	NA	-	-	9,500	NA
PYRENE	500 J	440 J	NA	-	-	8,400	NA
BENZO(A)ANTHRACENE	-	-	NA	-	-	3,200	NA
CHRYSENE	-	-	NA	-	-	5,200	NA
BIS(2-ETHYLHEXYL)PHTHALATE	-	-	NA	-	-	5,100	NA
BENZO(B)FLUORANTHENE	-	-	NA	-	-	4,600 X	NA
BENZO(K)FLUORANTHENE	-	-	NA	-	-	4,000	NA
BENZO(A)PYRENE	-	-	NA	-	-	4,100	NA
INDENO(1,2,3-CD)PYRENE	-	-	NA	-	-	-	NA
BENZO(G,H,I)PERYLENE	-	-	NA	-	-	2,600 JX	NA
BETA-BHC	120	-	NA	-	-	-	NA

NA = Not analyzed
RE = Reanalysis

REFERENCE 39



QUATERNARY GEOLOGY OF NEW YORK, NIAGARA SHEET

by Ernest H. Muller

Scale 1 250 000

MAP DATA SOURCES

1. Bartolomucci, Henry A., 1968, A sedimentological study of the Niagara Falls Moraine. S.U.N.Y. Buffalo, M.A. thesis, 76p.

2. Blackmon, Paul, 1956, Glacial geology of the East Aurora, New York Quadrangle. Univ. of Buffalo, M.S. thesis.

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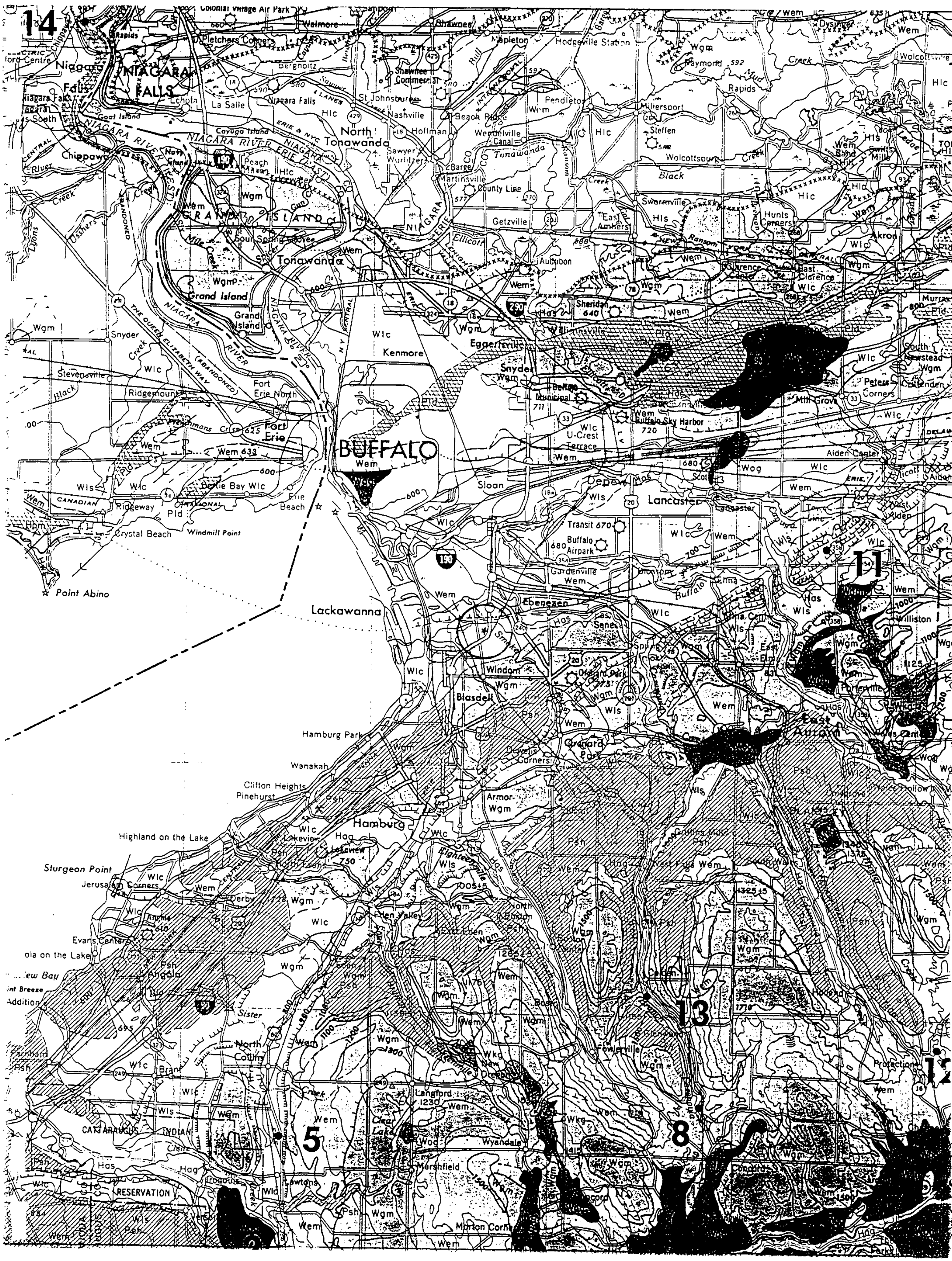

14
NIAGARA FALLS
Niagara Falls
Chippawa
NIAGARA RIVER
Grand Island
North Tonawanda
Tonawanda
Snyder
Stevensville
Ridgemount
Fort Erie
BUFFALO
Kenmore
Eggertsville
Williamsville
Sheridan
Getzville
Pendleton
Millersport
Wolcottsburg
Swormville
Hunts Corners
Akron
Clarence
Clarence Center
South Newstead
Crittenden
Mill Grove
Peters Corners
Alden Center
Alden
Lancaster
Depew
Sloan
Transit
Buffalo Airpark
Gardenville
Ebenezer
Lackawanna
Windom
Blasdell
Orchard Park
Hamburg Park
Wanakah
Clifton Heights
Pinehurst
Hamburg
Lakeview
Highland on the Lake
Sturgeon Point
Jerusalem Corners
Derby
Eden Valley
Evans Center
Angola
North Collins
Brant
Langford
Clear Lake
Wyandale
Marshfield
Lawtons
Morton Corners
Fowlerville
Boston
North Boston
East Aurora
Williston
Porterville
Protection
Holland
Crystal Beach
Ridgeway
Point Abino
Windmill Point
Erie Beach
Bertie Bay
Grand Island
CATTARAUGUS
INDIAN
RESERVATION
11
13
8
5
Wem
Wgm
Wlc
Wls
Pld
Hlc
Hls
Has
Hag
Hog
Psh
Wkg
Wog

UNIVERSITY OF THE STATE OF NEW YORK

EXPLANATION

CENOZOIC — PLEISTOCENE

HOLOCENE

Has — Alluvial sand and silt

Medium to coarse sand with subordinate intercalated silt and gravel, loosely packed and permeable; generally oxidized and noncalcareous; mellow, but commonly with high water table.

Floodplain deposits of streams in mature reaches. Overbank deposition by streams flowing on low gradients and in open valleys.

Hag — Alluvial gravel

Pebble to cobble gravel with subordinate medium to coarse sand, loosely packed and permeable; generally oxidized and noncalcareous; locally bouldery.

Alluvial fan and channel deposits of streams flowing on steep gradients or emanating from narrow valleys into rapidly aggrading reaches.

Hls — Beach sand and gravel

Coarse sand with subordinate medium sand and gravel lenses; cross-bedded; highly permeable, generally well sorted, without significant silt or clay.

Strand and nearshore deposits of large lakes in basins possessing closure independent of the former receding glacier margin, hence persisting after deglaciation. Notable are shore deposits of Lakes Erie and Ontario and former Lake Tonawanda.

Hlc — Lake silt, sand and clay

Silt, fine to medium sand and clay, thin-bedded to massive; in part very regularly bedded with cyclic alternation of clay and silt laminae, moderately permeable along along bedding surfaces.

Offshore deposits of lakes in basins which did not require an impounding ice margin for closure, hence persisted after deglaciation. Notable among filled basins is that of former Lake Tonawanda.

Hws — Wind deposited sand

Fine to medium sand; well sorted; oxidized and noncalcareous; cross-bedded; highly permeable. Closely associated with strand and nearshore deposits of postglacial lakes.

Wind-reworked littoral and beach sand initially deposited in postglacial lake basins.

Hpm — Peat, marl and muck

Bog deposits, dominantly peat and muck with subordinate gyttja; marl is a major component except in the southern tier of counties. Silt and clay are intercalated at base of organic section.

Deposition during late stages of in-filling of pond and lake basins, including numerous kettles and other shallow depressions on glacial drift; also parts of former Lake Tonawanda such as the Oak Orchard and Bergen Swamps.

WISCONSINAN

Woodfordian

Wls — Beach sand and gravel of ice-dammed lakes

Coarse sand with subordinate medium sand and gravel lenses, cross-bedded; well-sorted and without significant silt or clay, highly permeable.

Strand and nearshore deposits in proglacial Lakes Whittlesey and Warren in the Erie Basin and Lake Iroquois in the Ontario Basin.

Includes suitable material for generally small scale sand and gravel production.

Wlc — Lake silt, sand and clay

Silt, fine to medium sand and clay; thin-bedded to massive; regularly bedded, in part with cyclic alternation of clay and silt laminae; moderate bedding plane permeability.

Offshore deposits in basins which required ice marginal impondment for closure; includes primitive lakes in northward-draining troughs as well as ancestral Lakes Whittlesey and Warren in the Erie Basin and Lake Iroquois in the Ontario Basin.

Wem — End moraine

Includes both ablation and lodgment till; till generally rather stony with limited admixture of poorly sorted gravel; carbonate and crystalline clasts generally exceed 20%; thickness and permeability variable but generally greater than in associated ground moraine.

Deposited by melting of ice at edge of ice sheet either at end of an advance or during stillstand at a stable ice border position.

See figure 2 for names of principal moraines and schematic representation of chronology of glacial advance and retreat.

Wgm — Ground moraine

Dominantly lodgment till; silty clay till and sandy till; sparsely to moderately stony; carbonate and crystalline clasts generally exceed 20%; compact and generally very impermeable.

Variably comminuted rock material, transported by and lodged beneath actively flowing ice of the continental ice sheet.

Wkg — Ice-contact stratified drift

Coarse gravel and sand; sorting, poor and variable; ranges from sand to boulder gravel; in some areas with subordinate lenses of unsorted flow till; attitude of beds variable; moderately to highly permeable; carbonate and crystalline clasts comprise more than 20% and commonly dominate coarse fraction; locally indurated by secondary calcium carbonate.

Deposition as ablation moraine, mudflow and by saltwater streams distributing drift on stagnant ice to be deposited finally as the buried ice melted. Steep slopes commonly mark former ice-contact surfaces.

Comprises a major gravel source, but requires washing and crushing for many purposes.

Wog — Outwash, terrace and delta gravel

Pebble and cobble gravel with subordinate sand; well sorted; extremely permeable; carbonate and crystalline clasts generally exceed 30% of the coarse fraction; locally cemented by secondary calcium carbonate.

Deposition by strongly aggrading streams flowing from former ice sheets. Coarse alluvium deposited in coalescent aprons near the ice sheet, or as valley trains where streams drained freely from the glacier margin. Commonly persist as stream terraces or terrace remnants. Includes minor lenses of very coarse torrent (hlaup) deposits.

Comprises a major source of relatively clean and uniform gravel.

Altonian

Aem — End moraine

Includes both ablation and lodgment till; silty clay till to sandy till; moderately to abundantly stony with admixture of poorly sorted gravel; sandstone and siltstone channers generally comprise more than 80% of coarse fraction; permeability and thickness variable but generally greater than for associated ground moraine.

Deposited by melting of ice at edge of ice sheet either at end of an advance or during stillstand at a stable ice-border position.

Agm — Ground moraine

Dominantly lodgment till but locally with a veneer of variably washed ablation drift; clay till, silty clay till and sandy till; moderately to abundantly stony; siltstone and sandstone channers comprise more than 80% of coarse fraction; deeply oxidized and essentially noncalcareous; compact and generally impermeable.

Variably comminuted rock material, transported by and lodged beneath actively flowing ice of the continental ice sheet.

Akg — Ice-contact stratified drift

Coarse gravel and sand; sorting poor and variable, ranges from sand to boulder gravel, in some areas with subordinate lenses of unsorted flow till; attitude of beds variable; moderately to highly permeable; siltstone and sandstone generally more than 80% of coarse fraction; generally uncemented.

Deposition as ablation moraine, mudflow and by meltwater streams distributing drift on stagnant ice to be deposited finally as the buried ice melted. Steep slopes commonly mark former ice-contact surfaces.

Comprises a major gravel source but requires washing and crushing for many purposes.

Aog — Outwash, terrace and delta gravel

Pebble and cobble gravel with subordinate sand; well sorted; extremely permeable; carbonate and crystalline clasts generally less than 30% of the coarse fraction; generally uncemented.

Deposition by strongly aggrading streams flowing from former ice sheets. Coarse alluvium deposited in coalescent aprons near the ice sheet, or as valley trains where streams drained freely from the glacier margin. Commonly persist as stream terraces or terrace remnants.

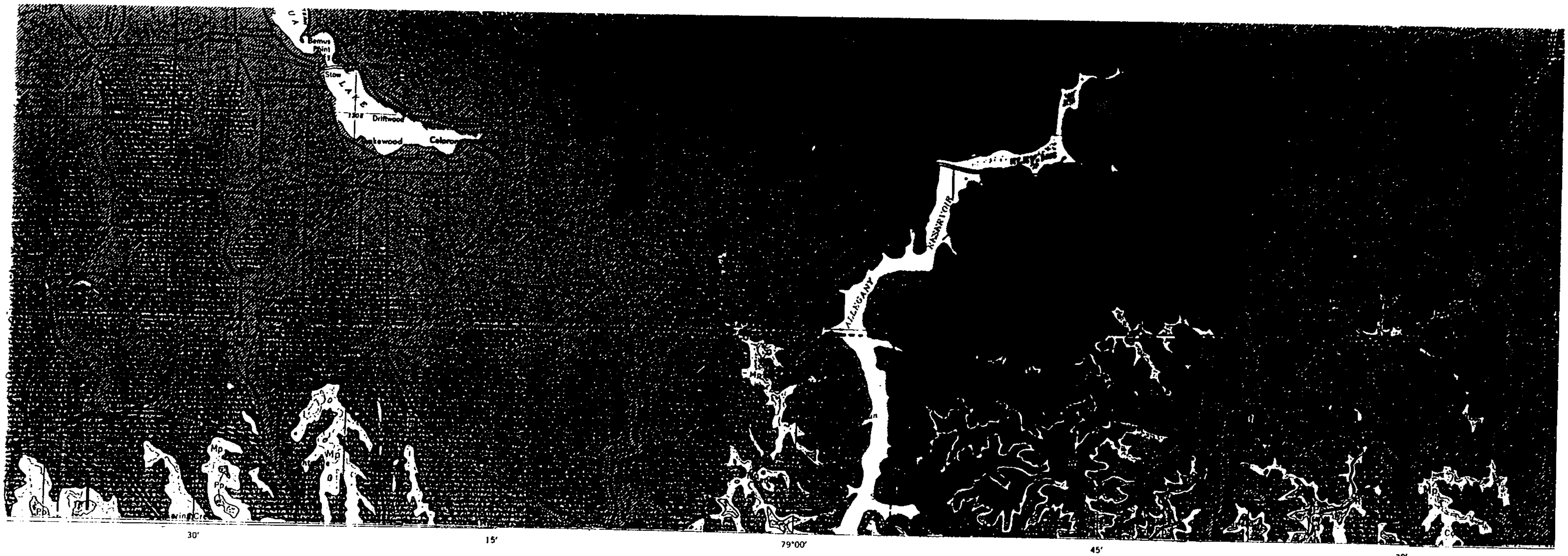
Comprises a major source of relatively clean and uniform gravel.

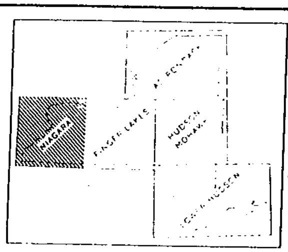
Iem Igm Ikg Iog

A smal
living matte
carbon) whi
5570 ± 130
ing Radioca
affords a b
organism di

SITE	N
1	Otto. Otto
2	Clea Colli
3	Corr Corr
4	Nicl Sard

REFERENCE 40





GEOLOGIC MAP OF NEW YORK

1970

Niagara Sheet

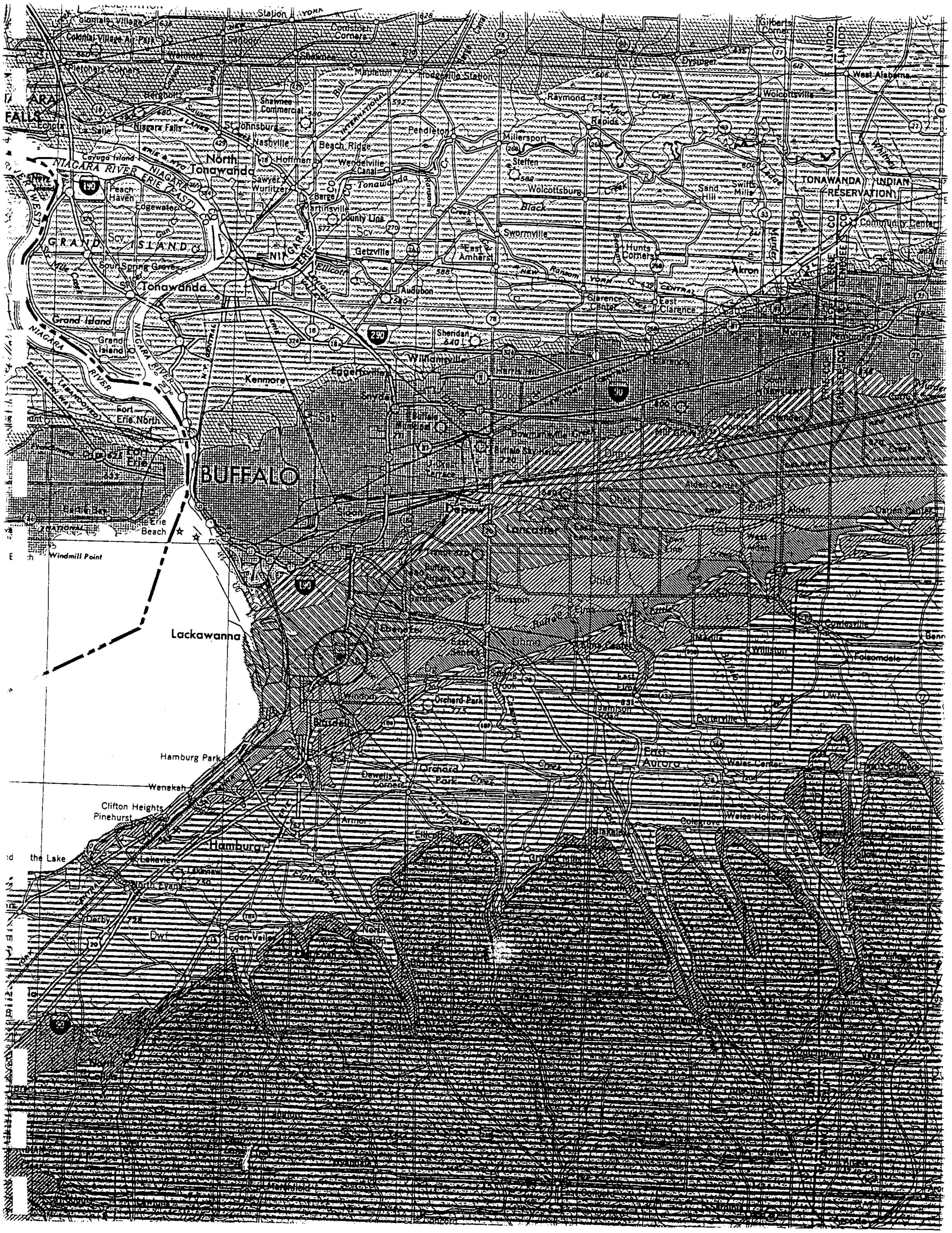
Scale 1:250,000

5 0 5 10 15 Statute Miles 20

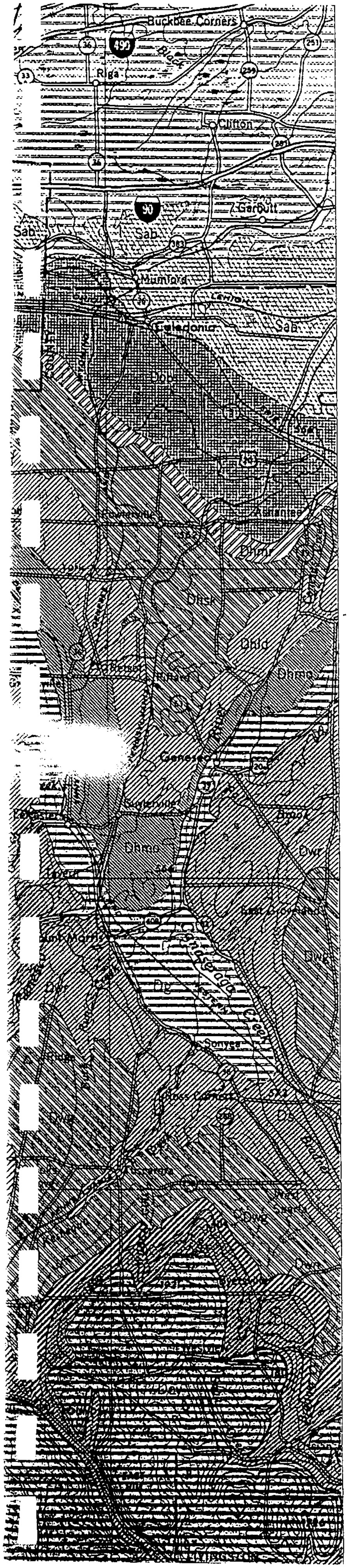
5 0 5 10 15 20 25 Kilometers 30

CONTOUR INTERVAL 100 FEET

L.V. Rickard and D.W. Fisher



BUFFALO
Lackawanna
Hamburg
Tonawanda
North Tonawanda
Kenmore
Grand Island
Fort Erie
Niagara Falls
Lancaster
Depew
Williamsville
Clarence
Akron
Orchard Park
East Aurora
Pendleton
Millersport
Getzville
Swormville
Sheridan
Wolcottsburg
Lakeview
North Evans
Derby
Eden Valley
Hamburg Park
Wanakah
Clifton Heights
Pinehurst
Windmill Point
Erie Beach
Edgewater
Peach Haven
Sour Spring Grove
Sanborn
Wolcottsville
Alden
Darien Center
Corfu
Ebenezer
East Seneca
Porterville
Wales Center
Wales Hollow
Colegrove
Dewells Corners
Armor
TONAWANDA INDIAN RESERVATION
NIAGARA RIVER



PALEOZOIC

Upper Devonian

CANADAWAY GROUP
700-1200 ft. (210-370 m.)

- Dcys — Northeast Shale; Shumla Siltstone.
- Dcyl — Westfield Shale; Laona Siltstone.
- Dcyd — Gowanda, South Wales, and Dunkirk Shales.
- Dcy — Machias Formation—shale, siltstone; Rushford Sandstone; Caneadea, Canisteo, and Hume Shales; Canaseraga Sandstone; South Wales and Dunkirk Shales.

JAVA GROUP
100-200 ft. (30-60 m.)

- Dj — Hanover Shale; Wiscoy Formation—sandstone, shale; Pipe Creek Shale.

WEST FALLS GROUP
400-950 ft. (120-290 m.)

- Dwf — Angola and Rhinestreet Shales.
- Dwn — Nunda Formation—sandstone, shale.
- Dwg — West Hill and Gardeau Formations—shale, siltstone; Roricks Glen Shale; upper Beers Hill Shale; Grimes Siltstone.
- Dwr — lower Beers Hill Shale; Dunn Hill, Millport, and Moreland Shales.

SONYEA GROUP
50-200 ft. (15-60 m.)

- Ds — Cashaqua and Middlesex Shales.

GENESEE GROUP
10-150 ft. (3-45 m.)

- Dg — West River Shale; Genundewa Limestone; Penn Yan and Geneseo Shales; North Evans Limestone.

Middle Devonian

HAMILTON GROUP
200-500 ft. (60-150 m.)

- Dhmo — Moscow Formation—Windom and Kashong Shales, Menteth Limestone Members.
- Dhld — Ludlowville Formation—Deep Run Shale, Tichenor Limestone, Wanakah and Ledyard Shales, Centerfield Limestone Members.
- Dhsk — Skaneateles Formation—Levanna Shale, Stafford Limestone Members.
- Dhmr — Marcellus Formation—Oatka Creek Shale Member.

Lower Devonian

ONONDAGA AND BOIS BLANC LIMESTONES
150 ft. (45 m.)

- Dob — In New York: Onondaga Limestone—Seneca, Morehouse (cherty), and Clarence Limestone Members, Edgecliff cherty Limestone Member, local coral bioherms; Bois Blanc Limestone—sandy, thin, discontinuous.
  In Ontario: Dundee Limestone; Lucas Formation—dolostone, limestone (Anderdon); Amherstburg Formation—limestone, dolostone, sandstone (Sylvania); Bois Blanc Formation—dolostone, limestone, sandstone (Springvale).
- Do — Oriskany Sandstone.

Upper Silurian

AKRON DOLOSTONE AND SALINA GROUP
400-700 ft. (120-210 m.)

- Sab — Akron Dolostone; Bertie Formation—dolostone, shale.
- Scv — Camillus, Syracuse, and Vernon Formations—shale, dolostone, salt, and gypsum.

LOCKPORT GROUP
150-200 ft. (45-60 m.)

- Sl — Guelph, Oak Orchard, Eramosa, and Goat Island Dolostones; Gasport Limestone—local bioherms.

CLINTON GROUP
100-150 ft. (30-45 m.)

- Scl — Decew Dolostone; Rochester Shale; Irondequoit and Merriton Limestones.

REFERENCE 41

$14

RAND McNALLY

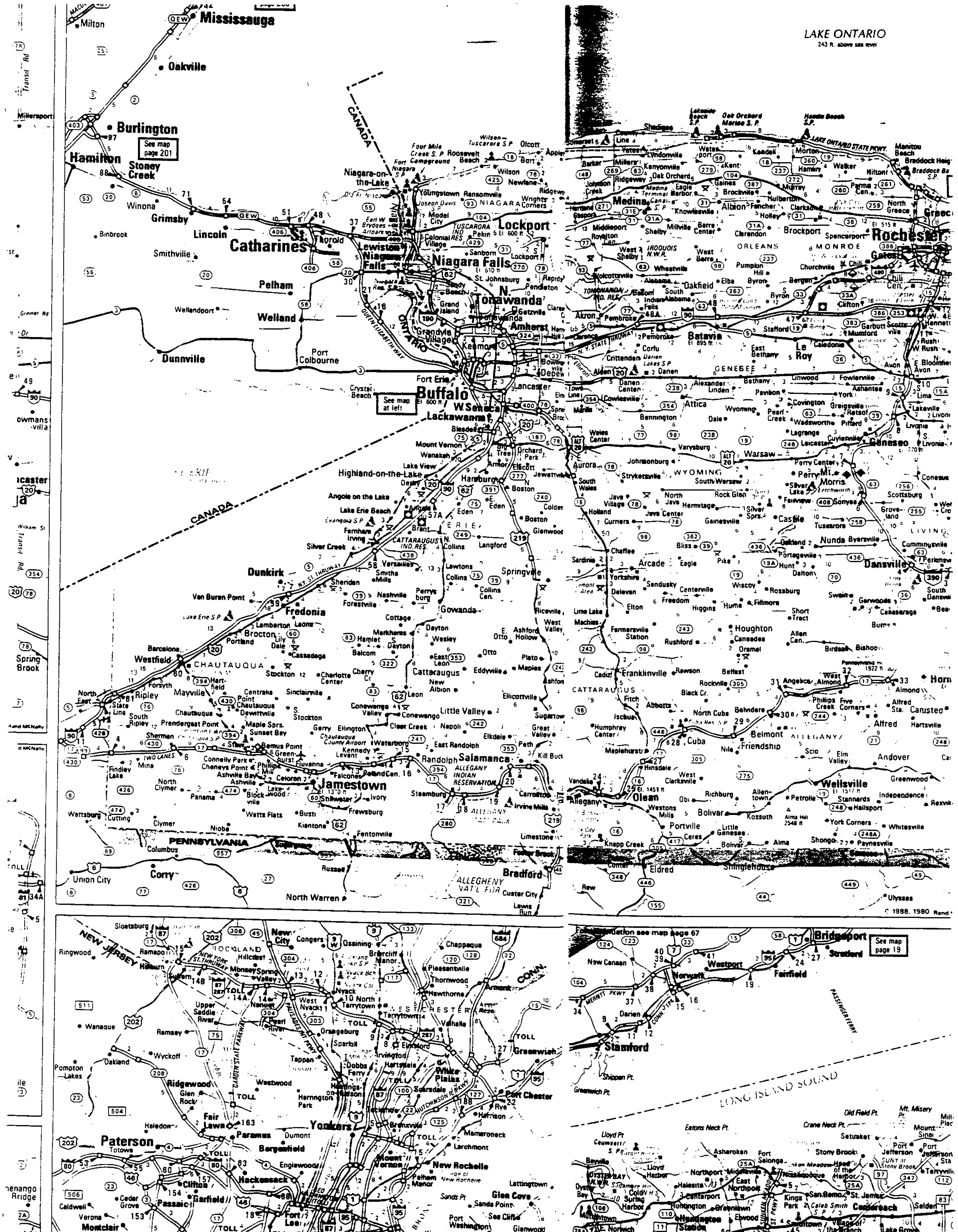
ROAD ATLAS & VACATION GUIDE

SAVE
Valuab
Travele
Discou
Coupo
Insid

1 9 8 9

A Comprehensive Road Atlas for Travelers
- "Getaway Guide" to America's top special events
- State-by-state auto and recreation laws

Plus:
- Exciting regional vacation ideas
- Children's travel activities
- Over 345 large-scale, easy-to-read maps


LAKE ONTARIO
243 ft. above sea level
Mississauga
Milton
Oakville
Burlington
See map page 201
Hamilton
Stoney Creek
Winona
Grimsby
Lincoln
St. Catharines
Thorold
Binbrook
Smithville
Pelham
Welland
Wellandport
Dunnville
Port Colbourne
CANADA
Niagara-on-the-Lake
Youngstown
Lewiston
Niagara Falls
Lockport
N. Tonawanda
Grand Island
Amherst
Kenmore
Fort Erie
Buffalo
See map at left
Crystal Beach
W. Seneca
Lackawanna
Lancaster
Depew
Orchard Park
Hamburg
Eden
Boston
Angola on the Lake
Lake Erie Beach
Silver Creek
Dunkirk
Fredonia
Van Buren Point
Brocton
Portland
Westfield
Barcelona
CHAUTAUQUA
Ripley
Mayville
Jamestown
Lakewood
Falconer
Frewsburg
Cassadaga
Gowanda
Collins
Springville
Salamanca
Randolph
Little Valley
Cattaraugus
Ellicottville
Olean
Allegany
Bradford
Corry
Union City
North Warren
PENNSYLVANIA
ALLEGANY INDIAN RESERVATION
CATTARAUGUS IND. RES.
TONAWANDA IND. RES.
TUSCARORA IND. RES.
ERIE
NIAGARA
ORLEANS
MONROE
GENESEE
WYOMING
LIVINGSTON
CATTARAUGUS
ALLEGANY
Medina
Albion
Brockport
Rochester
Gates
Chili
Batavia
Le Roy
Akron
Attica
Warsaw
Perry
Arcade
Geneseo
Dansville
Avon
Caledonia
Wellsville
Cuba
Belmont
Friendship
Alfred
Andover
Franklinville
Mount Morris
Nunda
Castile
N. Y. STATE THRUWAY
QUEEN ELIZABETH WAY
ONTARIO
© 1988, 1980 Rand
NEW JERSEY
CONN.
NEW YORK
Sloatsburg
Ringwood
Ramapo
Hillburn
Suffern
Monsey
Spring Valley
New City
Congers
Ossining
Chappaqua
Pleasantville
Thornwood
Hawthorne
Armonk
Nyack
West Nyack
Nanuet
Pearl River
Tarrytown
North Tarrytown
Upper Saddle River
Wanaque
Ramsey
Wyckoff
Oakland
Pompton Lakes
Ridgewood
Glen Rock
Fair Lawn
Paterson
Totowa
Paramus
Hackensack
Bergenfield
Englewood
Dumont
Clifton
Passaic
Garfield
Montclair
Verona
Caldwell
Cedar Grove
Fort Lee
Ridgefield
Yonkers
Mount Vernon
New Rochelle
Pelham Manor
White Plains
Scarsdale
Valhalla
Elmsford
Irvington
Dobbs Ferry
Hastings-on-Hudson
Harrison
Rye
Port Chester
Greenwich
Mamaroneck
Larchmont
Glen Cove
Sea Cliff
Port Washington
Sands Point
Lattingtown
Glenwood Landing
WESTCHESTER
ROCKLAND
HUTCHINSON R. PKWY
GARDEN STATE PARKWAY
PALISADES INT. PKWY
N.Y. ST. THRUWAY
TOLL
Bridgeport
See map page 19
Stratford
Fairfield
Westport
Norwalk
New Canaan
Darien
Stamford
Greenwich Pt.
Shippan Pt.
MERRITT PKWY
CONN. TPK
PASSENGER FERRY
LONG ISLAND SOUND
Old Field Pt.
Mt. Misery Pt.
Crane Neck Pt.
Eatons Neck Pt.
Lloyd Pt.
Setauket
Port Jefferson
Stony Brook
Head of the Harbor
Fort Salonga
Asharoken
Northport
East Northport
Lloyd Harbor
Huntington
Halesite
Centerport
Greenlawn
Elwood
Cold Spring Harbor
Oyster Bay
Bayville
Commack
Kings Park
San Remo
Smithtown
Nissequogue
St. James
Centereach
Selden
Huntington Station
E. Norwich
Syosset
Lake Grove
Nesconset
Mount Sinai

REFERENCE 42

WATER QUALITY REGULATIONS
SURFACE WATER AND GROUNDWATER CLASSIFICATIONS AND STANDARDS

New York State
Codes, Rules and Regulations
Title 6, Chapter X
Parts 700-705

New York State Department of Environmental Conservation

(5) Nassau County, including the waters of Long Island Sound between Nassau-Queens and Nassau-Suffolk county lines, and the waters of Atlantic Ocean to the three-mile limit between said county lines;

(6) the area within Suffolk County lying west of a north-south topographical limit line and its extensions, to a point in Long Island Sound at the New York - Connecticut state boundary line due north of Miller Place Beach and to Blue Point on the south mainland, thence southward across Great South Bay to Water Island, thence three miles due south to a point in the Atlantic Ocean at the south state boundary line;

(7) certain tidal waters which are within the Upper East River and Long Island Sound drainage basins within Queens, Bronx and Westchester Counties; and

(8) Jamaica Bay drainage basin within Kings and Queens Counties, and including Rockaway Inlet, east of a north-south line drawn from Light Inlet at the southeasterly tip of Coney Island Peninsula near Manhattan Beach to the westerly shoreline west of lookout tower on Rockaway Point.

(b) Said classes and standards of quality and purity applicable thereto are set forth hereinafter and designated Class I and Class II.

CLASS "I"

Best usage of waters. The waters shall be suitable for secondary contact recreation and any other usage except for primary contact recreation and shellfishing for market purposes.

Quality Standards for Class "I" Waters

Items	*Specifications*
1. Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the marine district as defined by Environmental Conservation Law (§ 17-0105).
2. Coliform.	The monthly geometric mean total coliform value for 100 ml of sample shall not exceed 10,000, and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 2,000 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
3. Dissolved oxygen.	Shall not be less than 4.0 mg/l at any time.
4. pH.	The normal range shall not be extended by more than one-tenth (0.1) pH unit.
5. Turbidity.	No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.
6. Color.	None from man-made sources that will be detrimental to anticipated best usage of waters.

Items	*Specifications*
7. Taste and odor-producing substances, toxic wastes and deleterious substances.	None in amounts that will interfere with use for secondary contact recreation, or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary conditions thereof, or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
8. Suspended, colloidal or settleable solids.	None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to this class.
9. Oil and floating substances.	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
10. Thermal discharges.	(See Part 704 of this Title.)

Historical Note

Sec. amd. filed March 27, 1972; repealed, new filed: April 28, 1972; Feb. 25, 1974; amds. filed: Sept. 20, 1974; Sept. 20, 1985 eff. 30 days after filing.

702.4 Class AA – Special (Upper Hudson River drainage basin).

CLASS AA – SPECIAL

Best usage of waters. Any usage except for disposal of sewage, industrial waste or other waste.

Quality Standards for Class AA – Special Waters (Upper Hudson River drainage basin)

Items	*Specifications*
1. Floating solids, settleable solids, oil, sludge deposits, toxic wastes, deleterious substances, colored or other wastes or heated liquids.	None attributable to sewage, industrial wastes or other wastes.
2. Sewage or waste effluents.	None into waters of this class.

Historical Note

Sec. amd. filed March 27, 1972; repealed, new filed: April 28, 1972; repealed, filed Feb. 25, 1974 eff. 30 days after filing; provided, however, if the application, pursuant to Parts 800 to 941, inclusive, of Title 6, of any provision of Part 701 or 702 shall be found to be invalid, the corresponding provision of Part 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

REFERENCE 43

File

584 Delaware Avenue Buffalo, NY 14202

June 1, 1978

The Honorable Edward Kuwik
Mayor of City of Lackawanna
714 Ridge Road
Lackawanna, NY 14218

Dear Sir:

Enclosed is your Permit to Operate a Solid Waste Management Facility for the City's Municipal Landfill located off Abbott Road in the City of Lackawanna and the Town of West Seneca.

Also be advised that your application for a Variance from 6NYCRR 360.3(d)(ii)&(iii) has been approved.

Very truly yours,

Frank Shattuck, P.E.
Senior Sanitary Engineer

JEB:dd
Enclosure
cc: ECDEP
Nicholas Klanch (Rm. 311, City Hall, City of Lackawanna, NY 14218

REFERENCE 44

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PERMIT

Under the Environmental Conservation Law, Article 27, Title 7, Part 360

FACILITY NO. / Permit No. 2204

EXPIRATION DATE: June 1, 1981

☐ CONSTRUCTION ☐ INITIAL ISSUE ☐ REISSUANCE
☒ OPERATION ☐ RENEWAL ☐ MODIFICATION

PERMIT ISSUED TO	ADDRESS OF PERMITTEE	TELEPHONE NO.
City of Lackawanna	714 Ridge Rd. Lackawanna, NY 14218	826-4555 Ext. 21

LOCATION OF PROJECT Town	County	Environmental Conservation Regional Office
~~West Seneca~~ Lackawanna (C)	Erie	Region 9 - Buffalo

DESCRIPTION OF PROJECT	ON-SITE SUPERVISOR
City of Lackawanna Municipal Landfill	Harold Morgan

GENERAL CONDITIONS

1. The permittee shall file in the office of the Environmental Conservation Region specified above, a notice on intention to commence work at least 48 hours in advance of the time of commencement and shall also notify said office promptly in writing of the completion of the work.
2. The permitted work shall be subject to inspection by an authorized representative of the Department of Environmental Conservation who may order the work suspended if the public interest so requires.
3. As a condition of the issuance of this permit, the applicant has accepted expressly, by the execution of the application, the full legal responsibility for all damages, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and has agreed to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from the said project.
4. All work carried out under this permit shall conform to the approved plans and specifications. Any amendments must be approved by the Department of Environmental Conservation prior to their implementation.
5. The permittee is responsible for obtaining any other permits, approvals, easements and rights-of-way which may be required for this project.
6. By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with Part 360 and the special conditions. Any variances granted by the Department of Environmental Conservation to Part 360 must be in writing and attached hereto.

SPECIAL CONDITIONS

1. Landfill shall be used for disposal of incinerated municipal refuse ash only.
2. A report shall be submitted annually on the anniversary date of the permit, identifying the volume or weight of ash handled and the remaining capacity of landfill. This report shall be submitted to the Region 9 office of the Department of Environmental Conservation and the Erie County Department of Environment and Planning.
3. Field location of site boundaries shall be completed by July 1, 1978.

ISSUE DATE	ISSUING OFFICER	SIGNATURE
[illegible]	Frank Shattuck, P.E.	[illegible]

REFERENCE 45

(1530) Ref 45

Nussbaumer & Clarke, Inc.
Consulting Engineers Surveyors
310 Delaware Avenue Buffalo, New York 14202
(716) 853-7582

DANIEL J. HURLEY, Chairman
VITO J. CARUSO, President
RICHARD E. VANDERBROOK, Vice-President
WALTER E. ROEDER, Secretary-Treasurer

OSWEGO OFFICE
147 W. 1st St.
Oswego, N.Y. 13126
(315) 342-3010

Associates
SIEGFRIED BARBASCH
PAUL J. BECKER
MICHAEL J. MIRANDA
CHARLES R. PETTIT
RAYMOND D. SULLIVAN
JOHN TRIANDA

Ken Selden
824-3722

February 12, 1981

Re: (C) Lackawanna, New York
Sewage Treatment Plant
EPA/DEC #C-36-852-02
NCI File No. 79-122

18152X
105LX
115LX
9315LX
3515LX
5315LC
3015LX
Sludge container #'s

DEPT. OF ENVIRO...
WATER C...

Mr. Robert J. Mitrey, P.E.
New York State Department of
Environmental Conservation
600 Delaware Avenue
Buffalo, New York 14202

Dear Sir:

On behalf of Mr. C. J. Klemp of the Frank L. Ciminelli Construction Co., Inc., Mr. Robert Miles of Niagara Sanitation Co., Inc., Mr. Ken Selden of Nussbaumer & Clarke, Inc., and myself, I would like to take this opportunity to thank you and Mr. Don Campbell of the Erie County Department of Environment and Planning for meeting with us on February 4, 1981 to discuss the disposal of digested sludge at the Lackawanna landfill site off of Abbott Road.

Following our meeting, the Plan of Action has been revised, as follows:

To date, a five foot (5') high earthen berm has been formed around the proposed landfill site to reduce the flow of storm runoff from the landfilled sludge to the ponds and wetlands. The landfill site was not within the wetland boundary, as determined by Mr. Richard Sweeney of your office. A six foot (6') deep test pit dug at this site on July 9, 1980 did not indicate the presence of groundwater. The enclosed area of about 1 acre filled four feet (4') high will contain about 6,500 C.Y. of material.

Approximately 1,000 C.Y. of fill material (excess excavated material from local pump station construction) to be mixed with the sludge in a 4:1 ratio, has been stockpiled at the landfill site. Even at maximum sludge processing rates, this represents more than a one (1) day supply of fill material. The stockpile shall be maintained during the entire landfilling operation. All excess snow has been removed from the site.

Seven (7) sludge containers (15 C.Y. capacity, but to be filled with only 12 C.Y. to prevent spilling) are at the sewage treatment plant for inspection. Each container has a serial number for identification.

During the week of February 16, 1981 the sludge processing operation shall begin. The City of Lackawanna and the New York State Department of Environmental Conservation shall be notified at least 48 hours prior to starting. National Pumping and Dredging Corporation shall pump out the 50' diameter digester and dewater the sludge to a minimum solids content of 20% TSS by the "Mobile LRS Process". Filtrate from the dewatering operation shall be returned to the primary settling tanks at a rate not to interfere with their operation. Assuming that the digester is filled to its 58,000 C.F. capacity with 10% TSS sludge, the volume of sludge cake after dewatering will be about 1,300 C.Y. (58,000 C.F. x 1 C.Y./27 C.F. x 10%/20% x 1.0sg/.83 sg = 1,300±)

The sludge cake will be conveyed to the 15 C.Y. sludge containers. The containers shall then be trucked to the landfill site by Niagara Sanitation Co., Inc. The projected route is Dona Street (Westbound) to Hamburg Turnpike (Route 5, Southbound) to Lake Avenue (Eastbound) to Abbott Road (Northbound). A tarpaulin shall cover all sludge containers during transport.

Dewatering sludge 24 hours a day, 7 days a week at a maximum sludge production rate of 225 C.Y. per day, the operation could be completed in about six (6) days. (1,300 C.Y. x 1 day/225 C.Y. = 6± days) But, normal operational difficulties usually extend a job of this nature to about three (3) weeks.

At the landfill site the sludge and fill shall be mixed at a 4:1 ratio. The required landfill volume would be about 6,500 C.Y. (1,300 C.Y. of sludge + 5,200 C.Y. of fill = 6,500 C.Y.) As the job progresses, the remaining portion of the landfill will be monitored to insure that sufficient volume remains to complete the job. If the site fills up faster than anticipated, the earthen berms will be extended.

Landfilling shall take place Monday through Friday during the hours of 8:00 A.M. to 4:30 P.M. Nussbaumer & Clarke, Inc. shall furnish a construction observer during all landfilling operations.

I trust that this Plan of Action meets all of your requirements for an expeditious approval. As always, should you have any questions or comments, please do not hesitate to contact the undersigned.

Yours truly,

NUSSBAUMER & CLARKE, INC.

Steve A. Weisberger, P.E.

SAW:n

cc: Don Campbell
Thaddeus J. Pieczonka, Sr.
Paul Pieczonka
Tony Collareno
Nick Kliach
Captain Sam Violanti
Alex Petraski
Bob Miles
C.J. Klemp

REFERENCE 46

DISTRICT NO. 5	STATE OF NEW YORK DEPARTMENT OF PUBLIC WORKS	HOLE NO. 1
COUNTY Erie	**SUBSURFACE INFORMATION**	LINE & STA. Y 3429+98
B.S.M. PROJ. NO. 5-124		OFFSET 10' Lt.

NAME ERIE THRUWAY, Sub-Division # 8c, At Fisher Road. NO.

QUAD. LOCATION DATE, START July 22, 1954 GND. ELEV. 617.14

PED. CLASS. DATE, FINISH July 23, 1954 G.W. ELEV. 609.00

CASING O.D. 2 7/8" I.D. 2 3/8"	WEIGHT OF HAMMER 300#	HAMMER FALL
SAMPLER O.D. 2" I.D. 1 3/8"	INSIDE LENGTH OF SAMPLER 14"	CASING 18" SAMPLER 18"

DEPTH BELOW GND. SURF.	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	MECH. ANALYSIS % PASSING SIEVE NO. 4	10	40	200	FIELD IDENTIFICATION OF SOIL & REMARKS
0	3													
	13													
	25													SILT, Some Fine Sand, Trace of clay.
	19							M	Gray Brown					
	17													
	38	136	3											(FIRM)
	71			5										
	68													
	59													El.= 608.14
	58													
10	21	137	2											
	31			2										
	36													
	33													SILT, Some Fine Sand.
	37							M	Gray					
	24	138	0											(SOFT)
	23			0										
	27													
	23													
	28													
20	20	139	0											
	20			0										
	20													
	25													
	23							M	Gray					SAME
	25	140	1											(SOFT)
	28			1										
	23													El.= 589.14
	61													
	58							M	Gray					SILT AND SHALE, Some Sand, Trace of clay.
30	34	141	2											(COMPACT)
	58			4										
	597													El.= 583.89
	191	on 3"												
									CORE DRILLED					SOLID GRAY SHALE BEDROCK
														El.= 578.89
40														

STATE OF NEW YORK
DEPARTMENT OF PUBLIC WORKS
SUBSURFACE INFORMATION

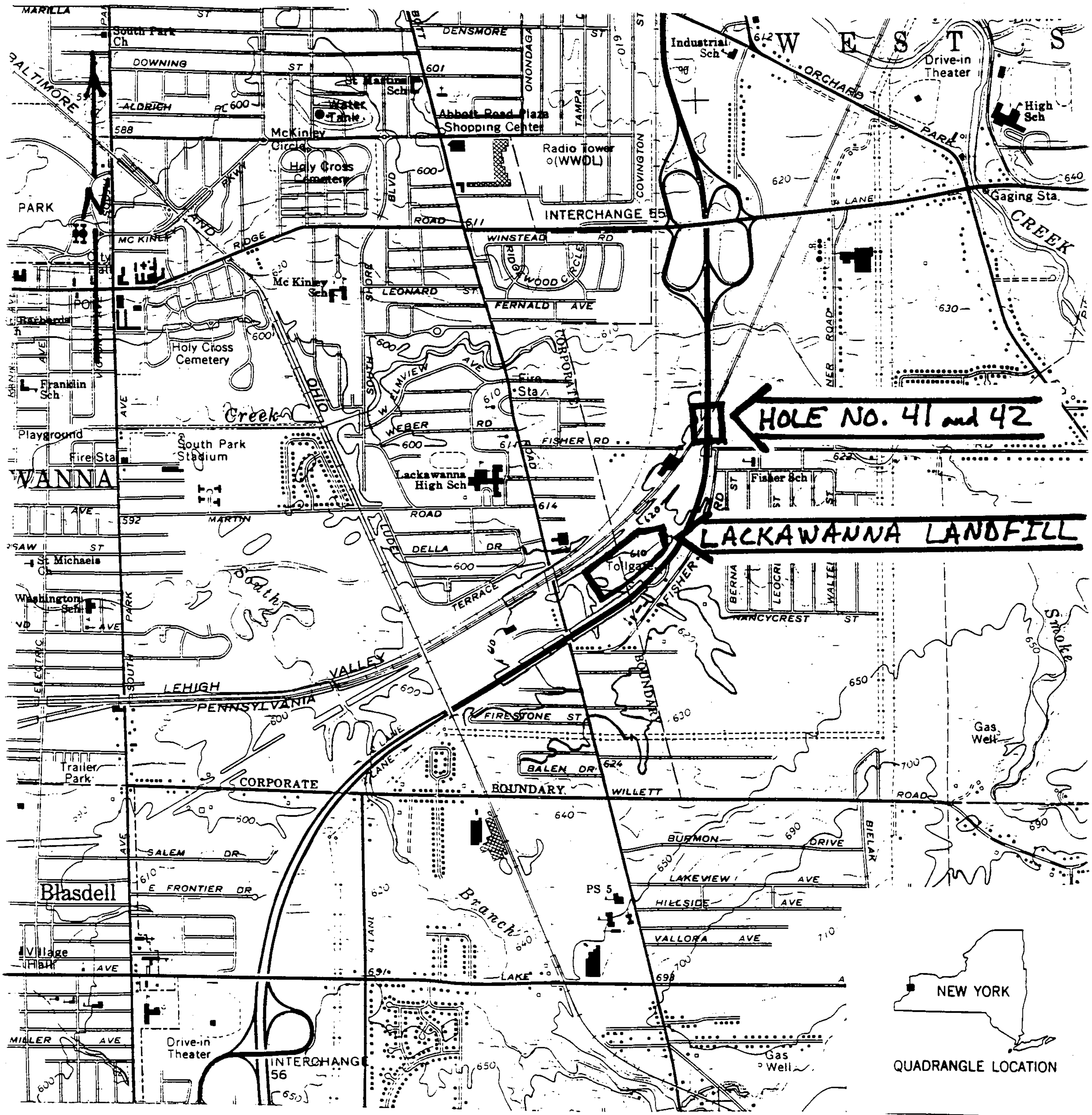
DISTRICT NO. 5
COUNTY Erie
B.S.M. PROJ. NO. 5-124

HOLE NO. 42
LINE & STA. X343+49
OFFSET 10' Lt.

NAME ERIE THRUWAY, Sub-Division #50, At Fisher Road. NO.
QUAD. LOCATION
PED. CLASS.
DATE, START July 19, 1954 GND. ELEV. 617.36
DATE, FINISH July 22, 1954 G.W. ELEV. 615.00

CASING O.D. 2 7/8" I.D. 2 3/8" WEIGHT OF HAMMER 300# HAMMER FALL
SAMPLER O.D. 2" I.D. 1 3/8" INSIDE LENGTH OF SAMPLER 14" CASING 18" SAMPLER 18

DEPTH BELOW GND. SURF.	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	CROSS SECTION	MOISTURE	COLOR	MECH. ANALYSIS % PASSING SIEVE NO. 4	10	40	200	FIELD IDENTIFICATION OF SOIL & REMARKS
0	3													
	13													SAND AND SILT, Trace of clay.
	25							M	Yellow Brown					
	22													
	24													(SOFT - FIRM)
	44	130	2											El. 611.36
	33			4										
	33													
	29													SILT, Some Fine Sand,
	35													Trace of clay.
10	19	131	2					M	Gray					
	32			3										(FIRM - SOFT)
	43													
	60													
	59													
	30	132	3											SAME
	49			7				M	Gray					
	57													(FIRM - SOFT)
	48													
	50													
20	39	133	0											
	42			0										
	42													
	46							M	Gray					SAME
	46													
	46	134	0											(SOFT)
	41			0										
	46													El. 589.36
	56													
	60													
30		135	3											MOIST, GRAY, BROWN
				9				WASHED AHEAD OF CASING WITH A CHISEL POINT CHOPPING BIT						SILT AND SHALE, Some Sand, Trace of clay.
														(VERY HARD, COMPACT)
														El. 579.11
40								CORE DRILLED						CONTINUOUS BROKEN SHALE BEDROCK
														El. 574.11

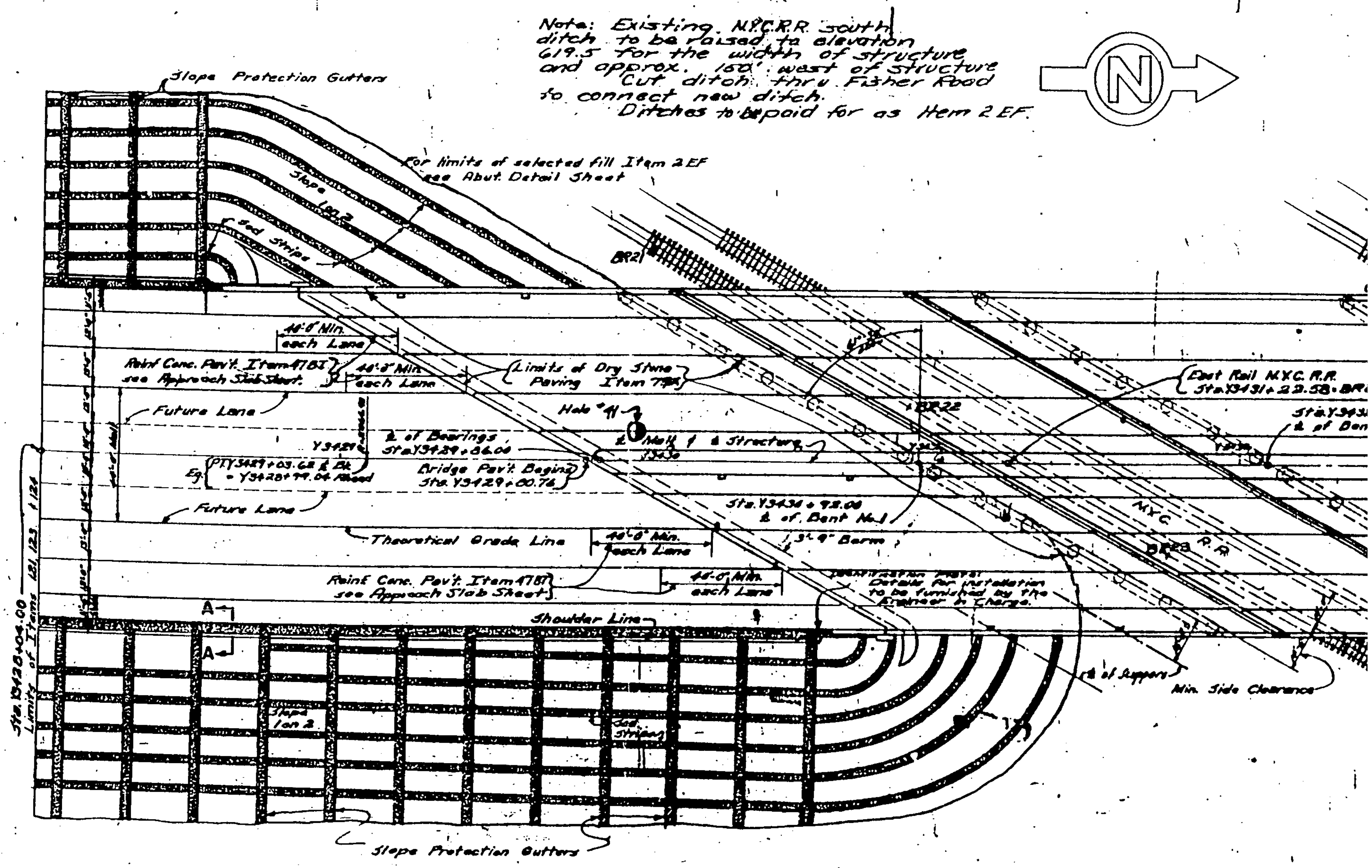


Map Source:
USGS Map BUFFALO SE, N.Y.
7.5 Minute Series (1965)

SCALE IN FEET

2000 0 2000

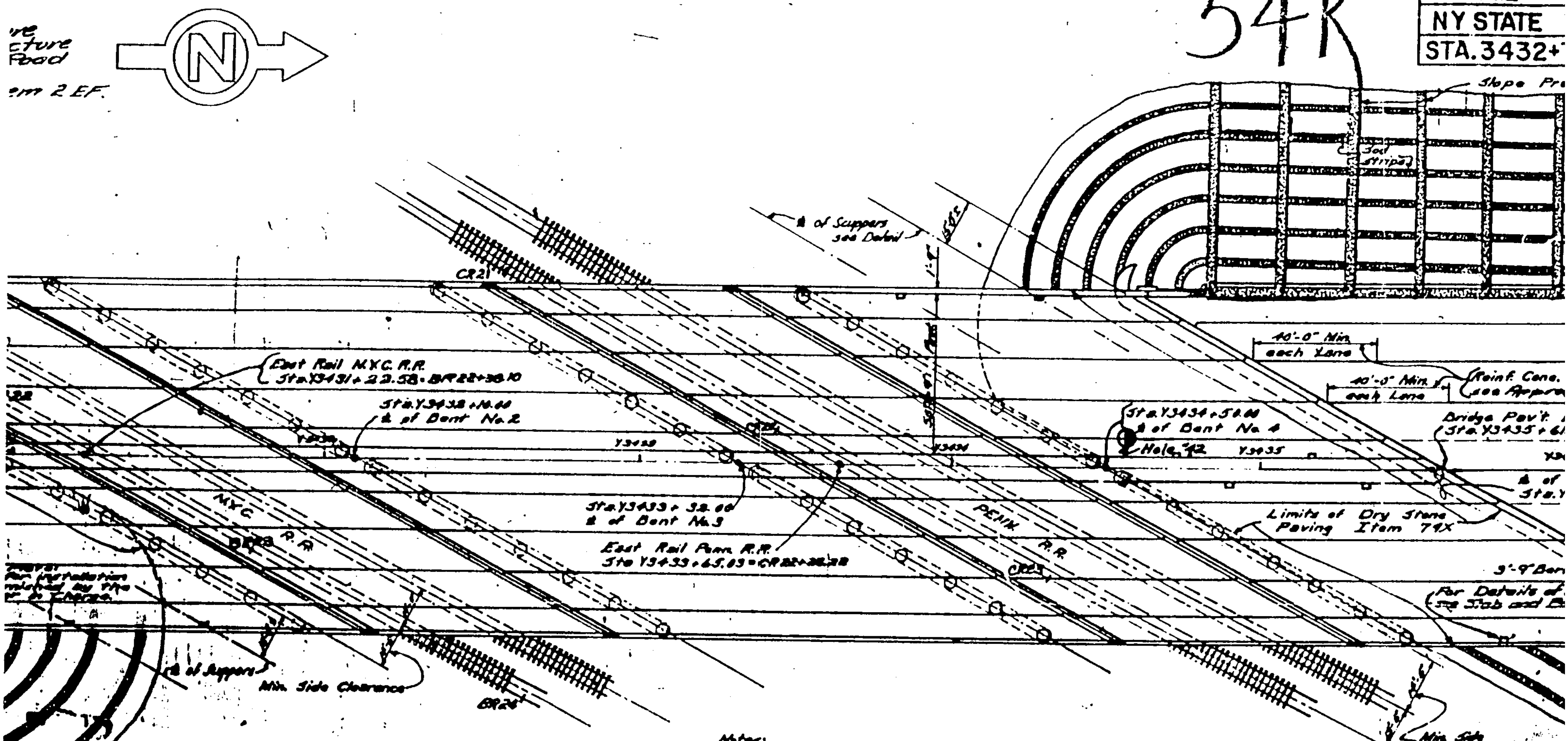
ENGINEERING-SCIENCE
New York State Department of Environmental Conservation Phase II Report
SITE LOCATION Lackawanna Landfill


Note: Existing N.Y.C.R.R. south ditch to be raised to elevation 619.5 for the width of structure and approx. 150' west of structure
Cut ditch thru Fisher Road to connect new ditch.
Ditches to be paid for as Item 2EF.
N
Slope Protection Gutters
For limits of selected fill Item 2EF see Abut. Detail Sheet
Slope 1 on 2
Sod Strips
BR21
BR22
BR23
44'-0" Min. each Lane
Reinf. Conc. Pav't. Item 47BI see Approach Slab Sheet
Limits of Dry Stone Paving Item 79A
Future Lane
Hub #41
℄ of Bearings Sta. Y3429+36.00
℄ Mall & ℄ Structure
Bridge Pav't. Begins Sta. Y3429+60.76
Sta. Y3434+92.00 ℄ of Bent No. 1
3'-9" Berm
Theoretical Grade Line
East Rail N.Y.C. R.R. Sta. Y3431+22.58
N.Y.C. R.R.
Shoulder Line
℄ of Support
Min. Side Clearance
Sta. 13428+04.00 Limits of Items 121, 123, & 124
A
Slope 1 on 2
Sod Strips
Slope Protection Gutters

E.T.56-1 E.T.C.56-2 F.A.E.T

COUNTY
ERIE
NY STATE
STA.3432+

54R



PLAN

Scale: 1" = 30'-0"

Notes:

The Contractors attention is directed to the necessity of recognizing the elevation of ground water so that he will progress his work with full knowledge of water being present. Any costs involved in keeping the site free from water shall be included in the price bid for Item 53.

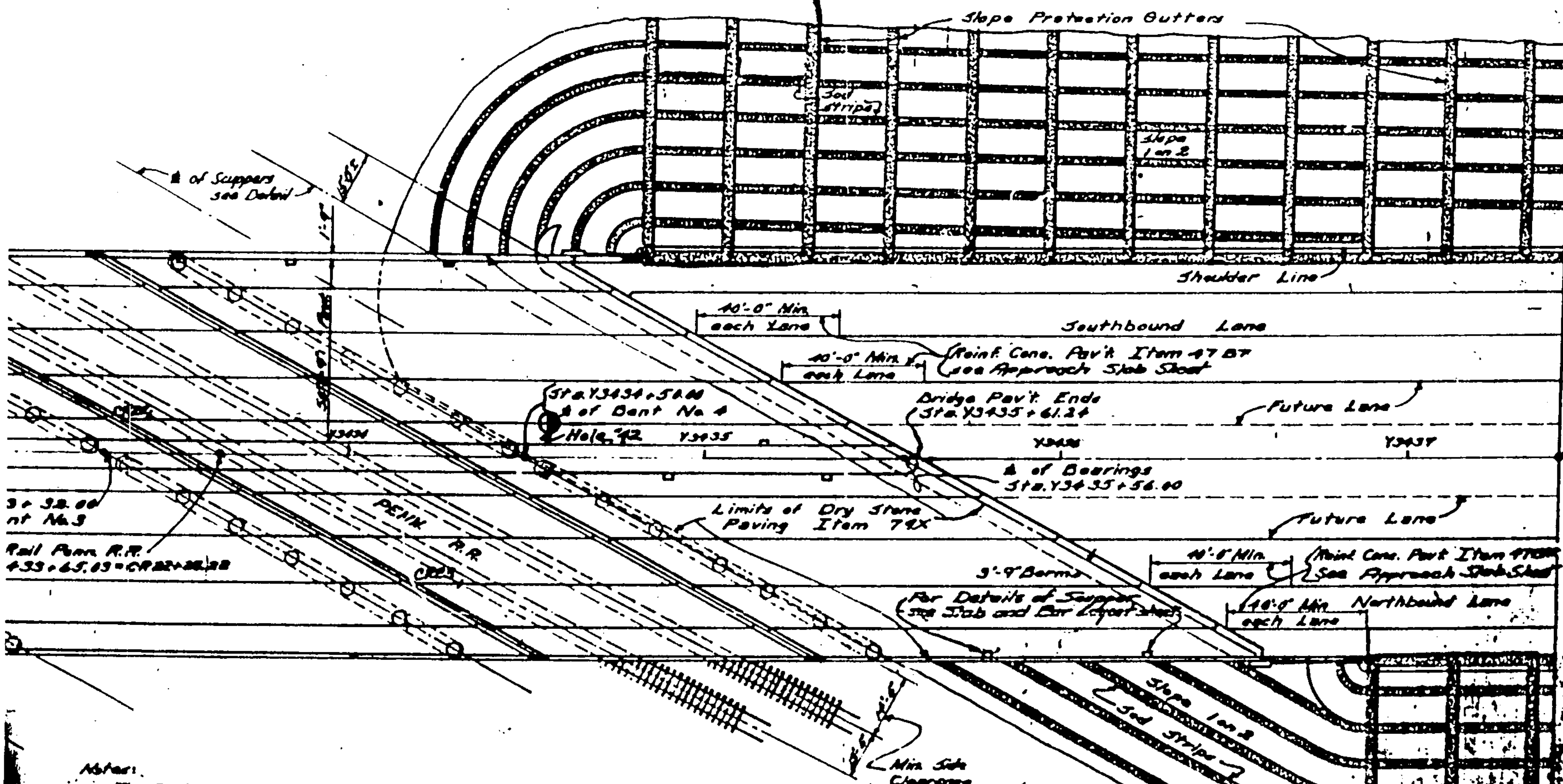
The Contractors attention is directed to the special notes for this structure which appear in the proposal. Particular attention should be given to the foundation note which briefly outlines the anticipated subsurface conditions at the site of the structure and specifies certain requirements relative to construction.

The cost of furnishing and placing water [illegible] will be paid for under [illegible] contract.

E.T.56-1 E.T.C.56-2 F.A.E.T.56-3 F.A.S.T.56-1 S.T.56-2

COUNTY		SHEET NO.	TOTAL SHEETS
ERIE		54	68
NY STATE THRUWAY – ERIE SECTION – SUBDIV. E-8-C			
STA. 3432+70		N.Y.C. & PENN. R.R.	

54R



For limits of selected fill Item 2EF see Abut Detail Sheet

Notes:

The Contractors attention is directed to the necessity of recognizing the elevation of ground water so that he will progress his work with full knowledge of water being present. Any costs involved in keeping the site free from water shall be included in the price bid for Item 55.

The Contractors attention is directed to the special notes for this structure which appear in the proposal. Particular attention should be given to the foundation note which briefly outlines the anticipated subsurface conditions at the site of the structure and specifies certain requirements relative to construction.

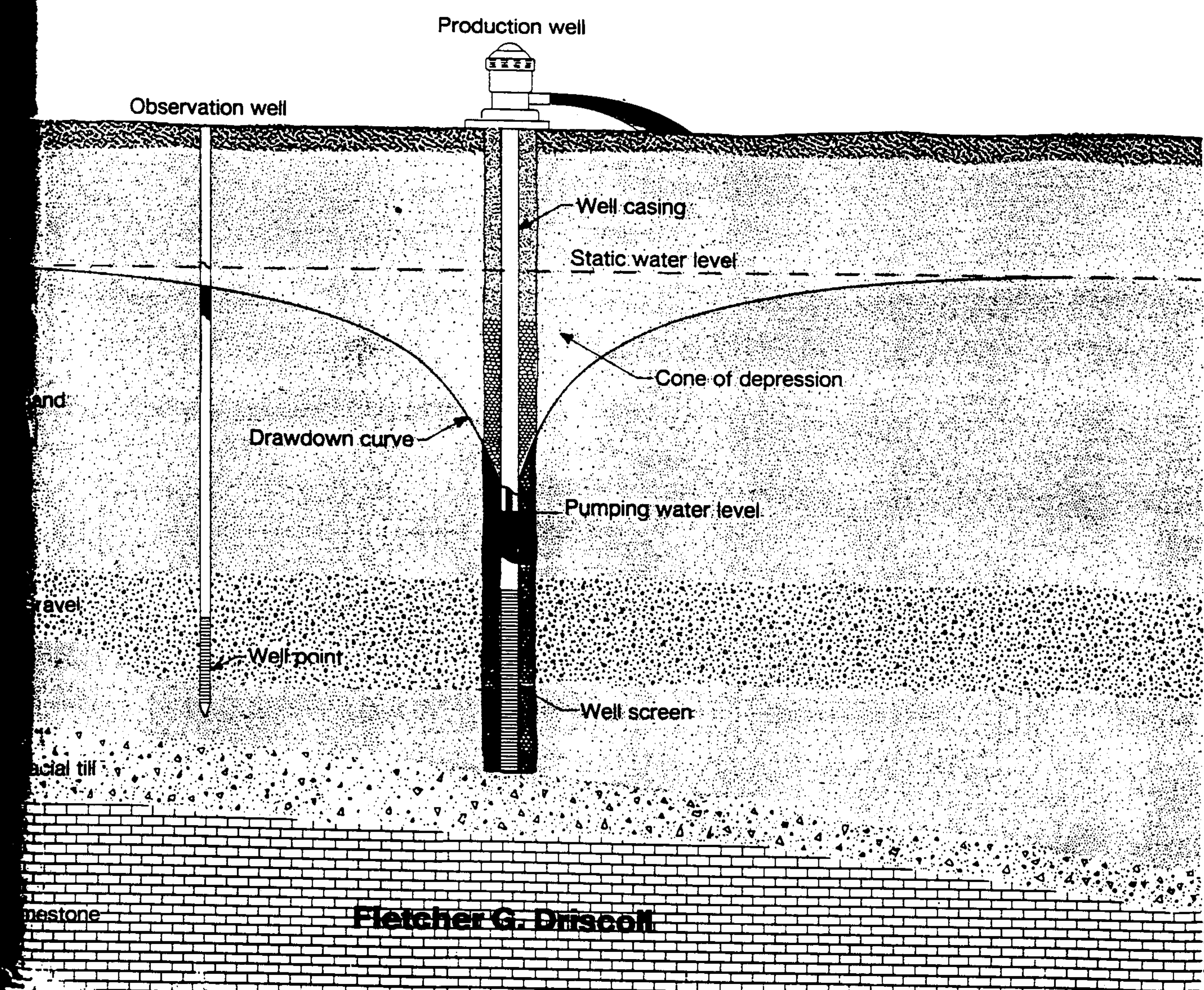
The cost of furnishing and placing water used for sodding and seeding will be paid for under Item 1W and 1WA of the highway portion of this contract.

REFERENCE 47

Groundwater and Wells

Second Edition

A comprehensive study of groundwater and the technologies used to locate, extract, treat, and protect this resource.



Fletcher G. Driscoll

hydraulic gradient. If the hydraulic gradient (head loss per unit length of travel) is doubled, the rate of flow in a given sand is also doubled. Conversely, doubling of the flow rate requires doubling of the hydraulic gradient. These ratios apply only to laminar flow, however. If turbulent flow is present, the flow rate does not change in direct proportion with the hydraulic gradient; doubling of the hydraulic gradient may increase the flow rate by only 1.5 times. The information in this paragraph is vital to understanding water-well hydraulics, which is presented in Chapter 9.

The slope of the water table or potentiometric surface is the hydraulic gradient under which groundwater movement takes place. The total flow through any vertical section of an aquifer can be calculated if we know the thickness of the aquifer, its width, its average hydraulic conductivity, and the hydraulic gradient. The flow, q, through each foot of aquifer width is:

$$q = KbI \tag{5.12}$$

where K is the hydraulic conductivity averaged over the height of the aquifer, b is the aquifer thickness in feet, and I is the hydraulic gradient.

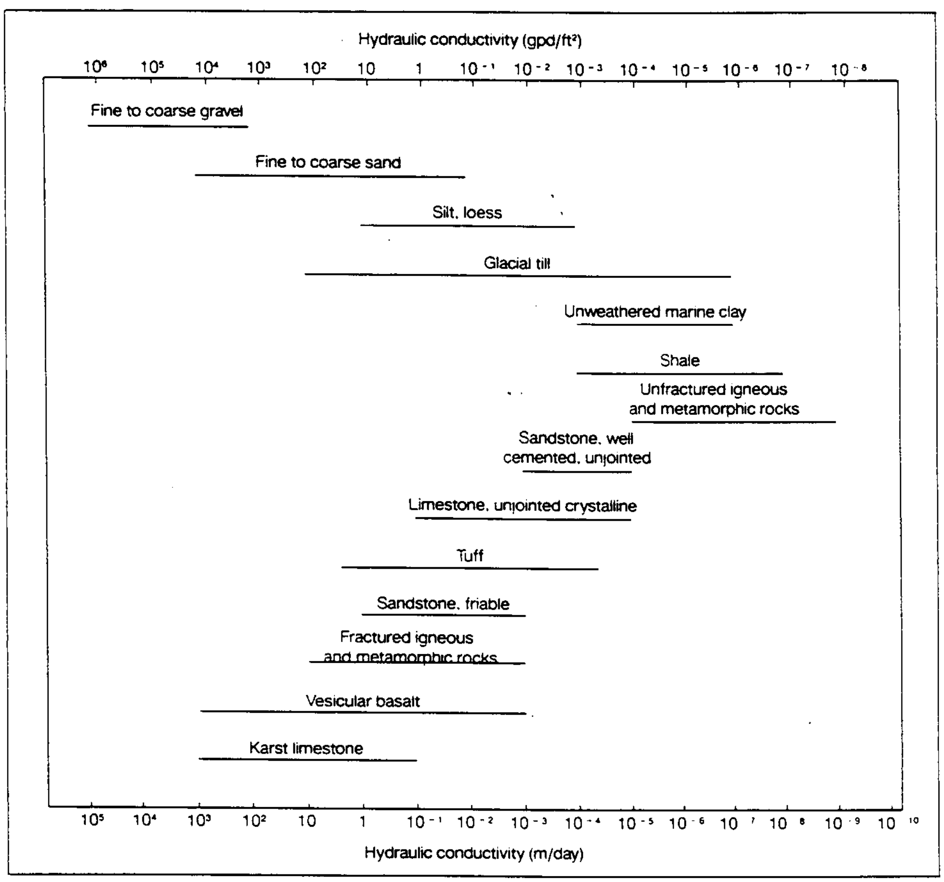


Figure 5.14. Typical K values for consolidated and unconsolidated aquifers. *(After Davis, 1969; Dunn and Leopold, 1978; Freeze and Cherry, 1979).*

REFERENCE 48

New York State Department of Environmental Conservation
600 Delaware Avenue, Buffalo, New York 14202

Robert F. Flacke
Commissioner

February 20, 1981

Mr. Anthony Collareno, Chief Engineer
City of Lackawanna Department of
Public Works
City Hall - Room 311
Ridge Road
Lackawanna, New York 14218

Re: Lackawanna STP Digester Sludge Disposal

Dear Mr. Collareno:

Permission is hereby granted to dispose of the above referenced waste at your permitted sanitary landfill located on Abbott Road in the City of Lackawanna. Only digested sludge from the cleaning digester of the above referenced facility, dewatered to a minimum solids concentration of 20%, may be deposited at the sanitary landfill. This sludge must be depostied only in the 5' high bermed area within the landfill. The sludge must be mixed with clean earthen material in a ratio of one part sludge to four parts earth, immediately upon sludge being deposited at the landfill. All snow must be removed from the depositing area prior to any dumping of sludge on site. Stockpiled earth to be on site prior to any sludge dumping. However, permission is granted to bring in daily the amount of earthen material needed for the next day's operation. In the event that sufficient earthen material is not available, all dumping operations on site are to cease until sufficient material is available on site.

Your contract hauler, Niagara Sanitation - Permit #9A-065, is only to fill the 15 cubic yard containers to approximately 12 cubic yards and to cover each container with a tarpaulin prior to hauling from the STP to the sanitary landfill. The hauling route is west on Dona Street to Route 5, then south to Lake Avenue, east to Abbott Road and north on Abbott to the sanitary landfill. Hauling operations are only permitted from 8:00 a.m. to 4:30 p.m. Monday through Friday.

This approval will be valid only until March 31, 1981, and is specifically for a one-time cleaning of the Lackawanna STP digester.

Nussbaumer and Clarke, Inc., is to furnish an on-site observer during all landfilling operations. If odors or any other problems develop, he is to immediately take corrective action and to notify this office at 716/842-3837.

Sampling may be required at a later date at the discretion of this Department.

Lastly, you are to notify the Erie County Department of Environment and Planning (Mr. Campbell at 716/846-7674) at least 48 hours prior to any dumping of sludge at the site.

Should you have any questions in regards to any of the above conditions, feel free to contact this office at 716/842-3837.

Very truly yours,

Robert J. Mitrey

Robert J. Mitrey, P.E.
Associate Sanitary Engineer

RJM:las

cc: Mr. Weisberger, Nussbaumer & Clarke, Inc.
Mr. Klemp, Frank L. Ciminelli Construction Co., Inc.
Mr. O'Toole, NYSDEC, Albany Central Office
Mr. Hans, NYSDEC, Region 9 Headquarters
Mr. Campbell, Erie County Dept. of Environment and Planning
Mr. Speed, NYSDEC, Region 9 Headquarters
Mr. Pieczonka, Sr., Lackawanna Sewage Treatment Plant

REFERENCE 49

State Department of Environmental Conservation
600 Delaware Avenue Buffalo, NY 14202

RJM

Robert F. Flacke
Commissioner

March 30, 1981

Mr. Steve Weisberger
Nussbaumer & Clarke, Inc.
310 Delaware Avenue
Buffalo, NY 14202

Re: Extension of time - Lackawanna STP Digester Sludge Disposal

Dear Mr. Weisberger:

I am in receipt of your letter dated March 27, 1981, subject as above. You are hereby granted, until April 15, 1981, permission to accept the digester sludge from the Lackawanna Sewage Treatment Plant to the Lackawanna Sanitary Landfill. All other conditions of the February 20, 1981 letter are to be complied with.

In addition be advised that your hauler must also receive permission for this extended period of time.

Should you request any additional information please contact this writer at 842-4311.

Very truly yours,

Robert J. Mitrey, P.E.
Associate Sanitary Engineer

RJM:dd

cc: Mr. Anthony Collareno
Mr. Don Campbell, ECDEP
Mr. Pieczonka