ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

Niagara Sanitation Company
(Nash Road Landfill)

Site No. 932054

Town of Wheatfield

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

By:

ENGINEERING-SCIENCE

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

NIAGARA SANITATION COMPANY
(NASH ROAD LANDFILL)
NYS SITE NUMBER. 932054
TOWN OF WHEATFIELD
NIAGARA COUNTY

Prepared for:

DIVISION OF HAZARDOUS WASTE REMEDIATION
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 WOLF ROAD
ALBANY, NEW YORK 12233-0001

Prepared by:

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SEPTEMBER 1989

STATE OF NEW YORK
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064133
LICENSED PROFESSIONAL ENGINEER

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SECTION I

EXECUTIVE SUMMARY

SITE BACKGROUND

The Nash Road Landfill site was operated by the Niagara Sanitation Company between 1964 and 1968, as a landfill for the disposal of municipal and industrial wastes. Shortly before the site was closed in 1968, material from a sewer excavation near the Love Canal in Niagara Falls, NY was disposed at the site. The present owner for the site is the Town of Wheatfield.

The Nash Road site is located approximately three miles north of Tonawanda, New York, adjacent to Nash Road, in the Town of Wheatfield, Niagara County, New York. The site, which is mostly surrounded by suburban residential development, is shown on the U.S.G.S. Tonawanda East, N.Y. 7 1/2 minute quadrangle map (Figure I-1). Features of the site are shown on the Site Plan (Figure I-2).

A site inspection report of the Nash Road Landfill by the Niagara County Department of Health (Hopkins, 1981) stated that the site was poorly covered and that refuse was visible at the surface. Stained and discolored soil was observed at numerous locations. The investigation concluded that there was a potential for migration of contaminants off-site. A residential area is located south of the site along Forbes Road. A Phase II investigation of the entire site was conducted during 1985 by Engineering-Science and Dames and Moore. However, concerns regarding a portion of the site which was believed to have received fill from the Love Canal sewer excavation prompted a second study of the site, specifically focusing on that area.

The site was a swampy area before landfill activities occurred. Since landfilling, portions of the property are covered with surface water at certain times of the year, particularly in the spring. Access to the site is not restricted and presently it is used as a jogging area, dirt bike track and general play area.

PHASE II INVESTIGATION

Seven groundwater monitoring wells were installed, in addition to the seven existing wells installed during the previous Phase II study. Groundwater sampling and analysis and air monitoring were conducted to define the presence of hazardous substances in a portion of the Nash Road Landfill site.

SITE ASSESSMENT

The geologic stratigraphy of the site can be summarized as approximately 70 feet of lacustrine deposits and glacial till which overlie bedrock. The aquifer of concern occurs within the layers of sand interbedded with the lacustrine clays beneath the site. These sands are believed to create paths favorable for groundwater movement from the landfill to nearby ponds and surface water drainages. Shallow wells or sump pumps in the area may draw water from these sand beds, whereas the lacustrine clays probably restrict downward movement. The depth to water in monitoring wells at the site is between 3 and 20 feet below the surface. Shallow groundwater probably moves eastward toward Sawyer Creek. The hydraulic conductivities and hydraulic gradients are relatively low, so the direction of shallow groundwater movement has been inferred primarily from topographic evidence, since the area is relatively flat and surface drainage is not well developed.

A true upgradient well could not be readily identified because of the extensive landfill activity which has occurred at the site. In order to provide comparisons of groundwater quality, the analytical results were reviewed to identify the wells having the lowest concentrations of organic and metal constituents. For purposes of this report, these wells were considered to represent background water quality. These background wells are located on the west side of the reported trench location where Love Canal wastes were disposed. The background wells are screened in the upper and lower sand lenses found beneath the site.

Seven monitoring wells were sampled at the Nash Road Landfill site and were analyzed for Hazardous Substance List (HSL) organic compounds, HSL metals, total organic hologens (TOX), and dioxin (TCDD). Eighteen HSL organic compounds were detected in the groundwater samples. Ten compounds were present downgradient at concentrations which were more than three times the concentrations found in the background wells, indicating releases of those compounds potentially attributable to the site. The concentrations for eight organic compounds exceeded the applicable Class GA groundwater standards or guidance values. Twenty-one HSL metals were detected in the groundwater samples. Seventeen metals were present in downgradient wells at concentrations which were more than three times the concentrations found in the background wells, indicating releases of those metals potentially attributable to the site. The concentrations of seven metals in one or more wells exceeded the applicable Class GA groundwater standards or guidance values.

Air quality monitoring with a Photovac TIP II indicated no readings above background in the breathing zone. However, readings up to 75 ppm were recorded in well headspaces during drilling and sampling activities for OW-11. Those readings were generally confirmed by the concentrations of volatile organic compounds detected in the groundwater sample from OW-11.

The groundwater results indicate that releases of organic compounds and metals are occurring, and may be attributed to the Nash Road site. The shallow groundwater zone is contaminated not only in the vicinity of the Love Canal wastes, but on the west side of the site as well. With the exception of one organic compound, groundwater in the deeper zone does not appear to have been adversely affected by the site. The detection of a high concentration of benzoic acid in the shallow groundwater is consistent with a previous analysis of the material excavated from Love Canal.

HAZARD 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 the site. As stated in 40 CFR Subpart H Section 300.81, the HRS was developed for evaluating the relative potential of uncontrolled hazardous 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 from direct contact with hazardous substances at the facility (i.e., no migration need be involved).

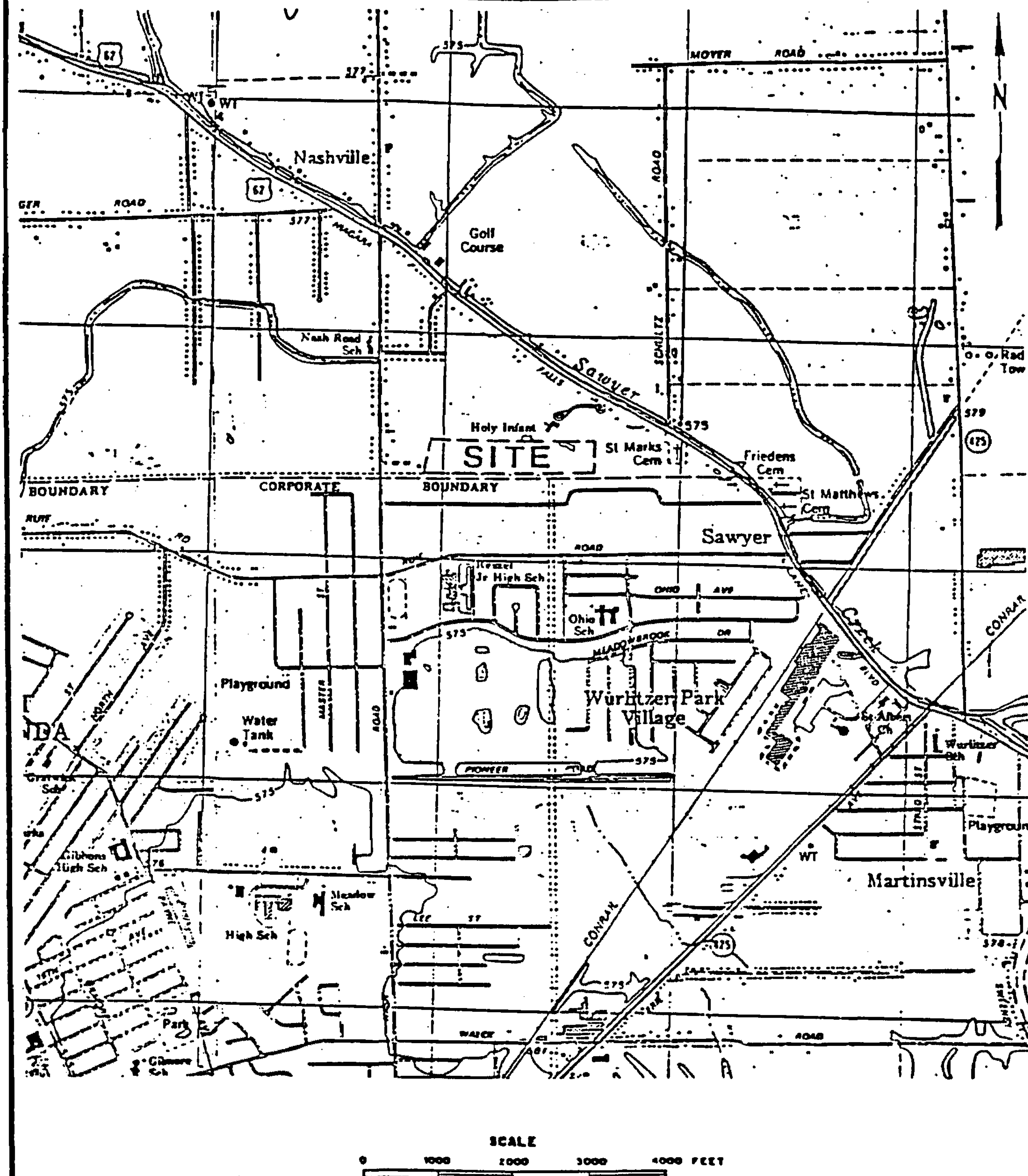
Based on the results of this and previous studies, the HRS scores for the Nash Road Landfill site have been calculated as follows:

S_M = 19.10	S_{GW} = 31.40
S_{FE} = 0.0	S_{SW} = 10.26
S_{DC} = 37.50	S_A = 0.0

RECOMMENDATIONS

The shallow groundwater at the site contains significant contamination by toxic organic compounds and metals. Since: 1) there is a potential for these contaminants to migrate off the site, and; 2) the area of greatest contamination is fairly small, remediation should be considered. The existing information on the site, including that contained within this report, is sufficient to plan at least some of the remedial alternatives.

Additional work should be performed to determine the potential for off-site migration and whether or not it is presently occurring. This work could involve a soil vapor survey and off-site wells to determine the extent of off-site migration. The minimum remediation which should be considered includes capping of the site, seeding the cover, and constructing a fence to limit public access to the site. The available data suggests that lacustrine clay layers found beneath the site may be inhibiting contamination of the regional aquifer which underlies the site. Any further investigations or remedial activities must maintain the integrity of this barrier, and should consider means of determining whether the disposal trenches have breached this layer.



SITE COORDINATES: 43°04' 10.0" N. LAT
78°51' 33.8" W. LONG

REFERENCE: U.S.G.S. 7.5' TOPOGRAPHIC MAP
TONAWANDA EAST, NY (1980) AND
TONAWANDA WEST, NY (1980) QUADRANGLES

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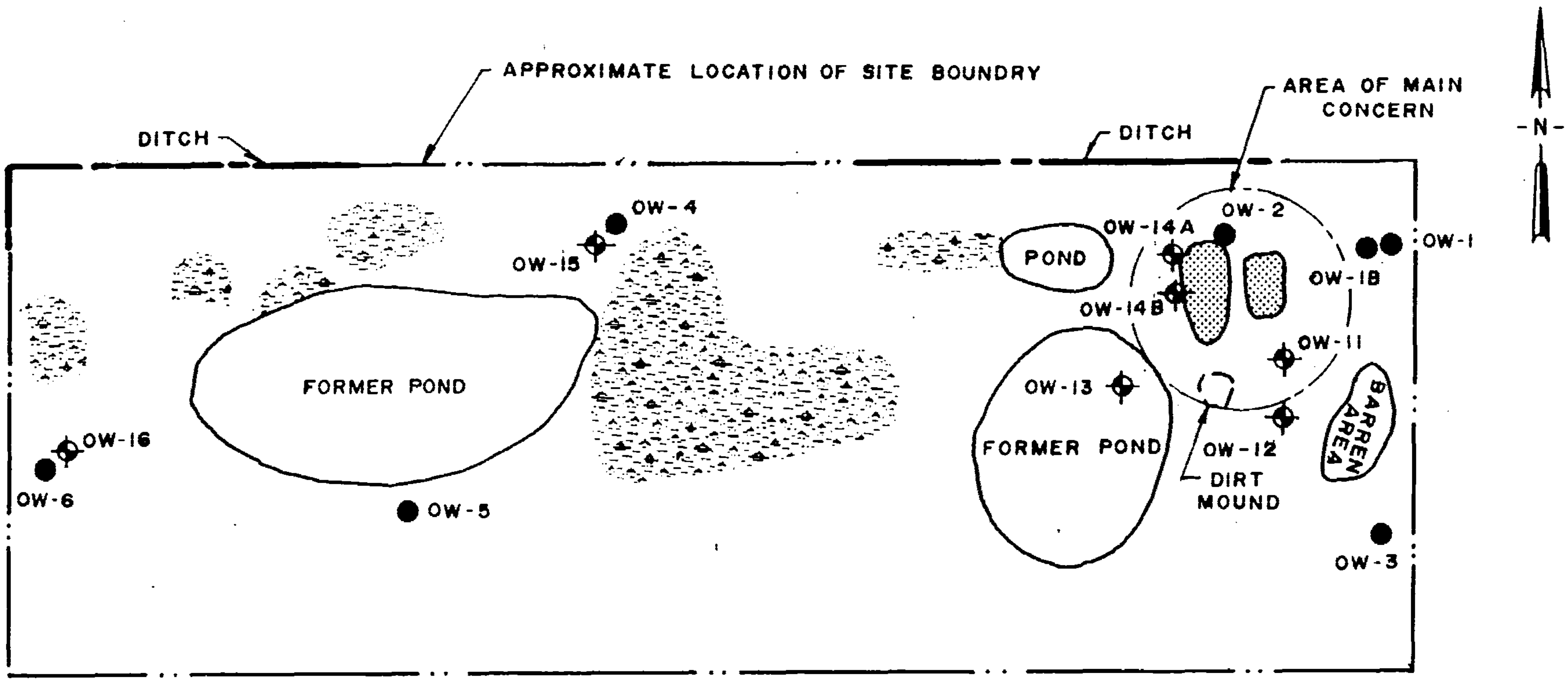
OF ENVIRONMENTAL CONSERVATION
PHASE II REPORT

SITE LOCATION MAP
NASH ROAD

FIGURE I-1



EXPLANATION

PONDED WATER OVER AREAS BELIEVED TO CONTAIN LOVE CANAL WASTES.

EXISTING MONITORING WELL

NEW PHASE II WELL (INSTALLED 1987-1988)

0 200 400 FEET

APPROXIMATE SCALE

ENGINEERING-SCIENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PHASE II REPORT

SITE PLAN
NASH ROAD

FIGURE I-2

SECTION II

PURPOSE

The objective of a Phase II investigation is to determine if hazardous wastes have been disposed of in the site, if contaminants exist in the various mediums (air, groundwater, surface water or soils) and whether or not threats to human health or the environment exist. Information gathered relative to the above will allow the Department to reclassify the site or if warranted delist it.

This particular study is to expand upon the original Phase II report, the results of which, were inconclusive.

SECTION III

SCOPE OF WORK

INTRODUCTION

Field work for this Phase II investigation at the Nash Road Landfill began in December 1987 and was completed in November 1988. The Phase II Work Plan dated April 28, 1986 was 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 three monitoring well installations. In a November 13, 1987 letter (NYSDEC, 1987) to Engineering-Science, the NYSDEC stated four more monitoring wells would be installed, bringing the total to seven. The ground penetrating radar geophysical survey was deleted by the NYSDEC, due to the presence of ponded water in the intended study area. The NYSDEC decided that no waste material from the trench would be sampled, due to the potentially toxic nature of the waste.

PHASE II SITE INVESTIGATION

The scope of the Phase II investigation is summarized in Table III-1 and is described below. All field work was performed or supervised by qualified Engineering-Science (ES) staff in accordance with a NYSDEC-approved project Quality Assurance/ Quality Control Plan and a site-specific Health and Safety Plan. Field procedures for the monitoring well installations are presented in Appendix A.

MONITORING WELL INSTALLATIONS

Seven groundwater monitoring wells were installed by Rochester Drilling Co. Inc. around the perimeter of the site between December 8 - December 11, 1987 and between January 26 - February 8, 1988 (Figure III-1). Wells were installed at locations believed to be upgradient and downgradient of the suspected disposal trench area. Details regarding the locations of the monitoring wells with respect to their position in relation to the landfill, and descriptions of the soil in which the wells are screened are presented in Section IV. The well location data are summarized in Table III-2.

The wells were drilled and constructed in accordance with NYSDEC guidelines. Field procedures for the monitoring well installations are presented in Appendix A. Soil samples were generally collected continuously in the shallow wells. In the deeper wells, samples were collected at intervals of five feet until drilling approached the depth where the lower sand lens was expected to be found, and continuous sampling was resumed. Selected samples were analyzed for grain-size characteristics. Boring logs, well schematics and grain-size analyses results are included in Appendix B.

Groundwater Sampling and Analysis

Groundwater samples were collected from each of the seven Phase II overburden monitoring wells on February 17 - 18, and March 1, 1988. These samples were analyzed for HSL volatiles, semivolatiles, metals and total organic halogens (TOX) by Nanco Labs, Inc. Dioxin analyses were performed by Enseco under a subcontract with Nanco Labs. In addition, two trip blanks and field blanks (OW-14C, OW-12A) were analyzed for HSL volatiles. On November 11, 1988, well OW-11 was resampled by ES and analyzed for HSL semivolatiles by York Laboratories. Analyses and reporting were performed utilizing applicable NYSDEC CLP methods dated June, 1986 and amendments dated November, 1987. Field procedures for the groundwater sampling are presented in Appendix A. Analytical results are discussed in Section IV and listed in Appendix C.

Air Survey

A Photovac Total Ionizables Present (TIP-II) was used to test 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 (4 to 5 feet above ground) was monitored during drilling and sampling activities. Soil samples were checked for volatile organic compounds immediately after collection and the headspace in each monitoring well was measured at the time of sampling as a preliminary means of identifying the presence of volatile organic compounds.

TABLE III-1

SUMMARY OF PHASE II TASKS
NASH ROAD LANDFILL

Tasks	Description of Task
Prepare and Update Work Plan	Reviewed the Information in the previous Phase II report and supplemental data, conducted a site visit, examined aerial photography, and prepared the Phase II work plan.
Conduct Records Search / Data Compilation	Reviewed previous Phase II information.
Site Reconnaissance	Checked locations and conditions of existing wells, examined terrain for accessibility by drill rigs, examined suitability for geophysical surveys, and determined appropriate locations of sampling points.
Geophysical Survey	The ground penetrating radar survey was not performed.
Conduct Boring / Install Monitoring Wells	Installed seven wells. The boring depths ranged from 5 - 45 feet. Wells were constructed of 2-inch PVC pipe.
Soil samples from borings	Soil samples were collected continuously or at 5-ft. intervals, depending on the proximity to a sand lens. Performed grain-size analyses, on selected soil samples as specified in the text.
Perform Sampling and Analysis	
Groundwater samples	Seven groundwater samples were collected and analyzed for HSL metals and organics, dioxin, and TOX.

TABLE III-1, Continued

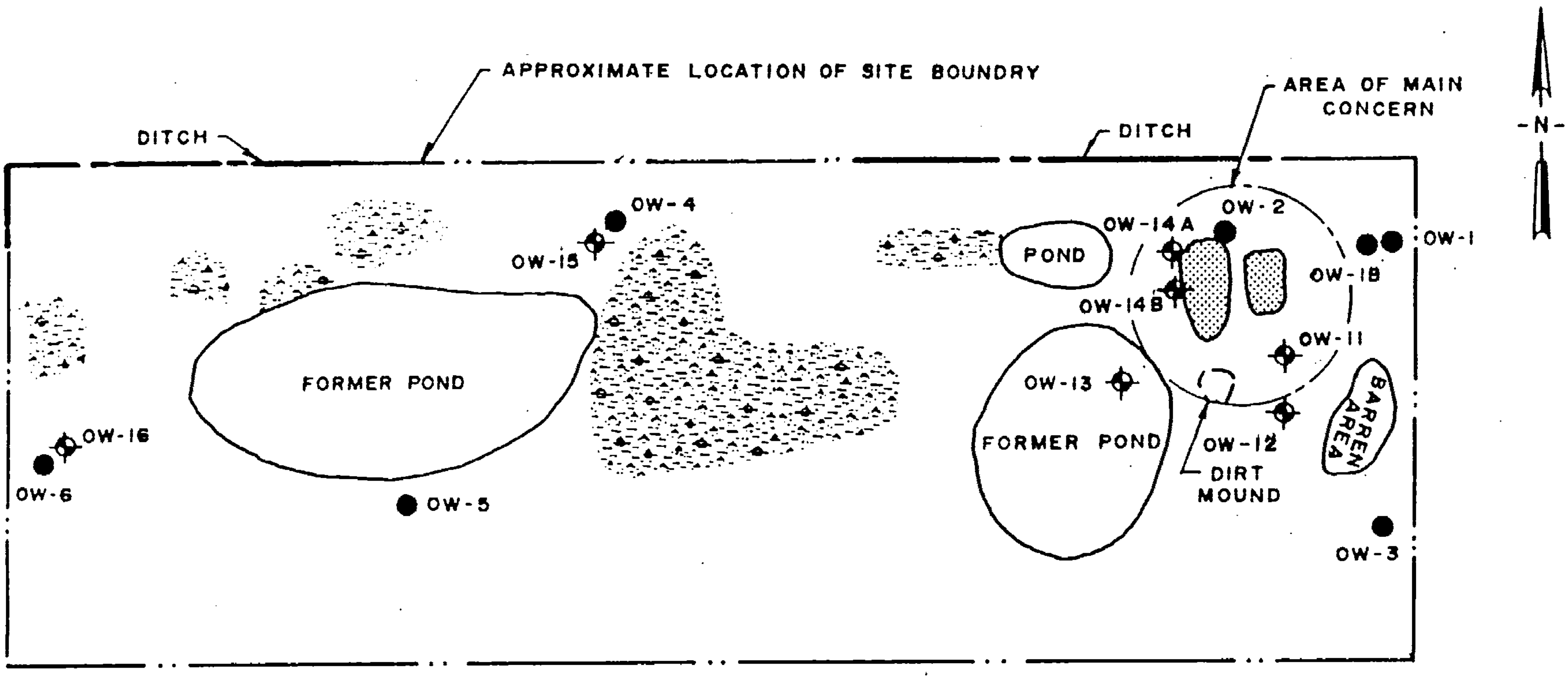
SUMMARY OF PHASE II TASKS
NASH ROAD LANDFILL

Tasks	Description of Task
Air monitoring	Using the Photovac Tip II, the presence of volatile organic compounds was monitored during on-site activities.
Conduct Site Assessment	A preliminary site contamination assessment was conducted to complete the final HRS and HRS documentation records.
Report Preparation	Prepared draft and final reports containing significant Phase II information, additional field data, final HRS and HRS documentation records, and site assessments.
Project Management	Project coordination, administration and reporting.

TABLE III-2
SUMMARY OF MONITORING WELLS
NASH ROAD LANDFILL

Well ID	Relative Location	Drilled Depth (feet)	SCREEN INTERVAL Depth below surface Top (feet)	Bottom (feet)
OW-11	downgradient	12.00	7.0	9.0
OW-12	downgradient	34.00	29.5	32.5
OW-13	downgradient	6.00	3.0	5.0
OW-14A	background	40.00	33.5	36.5
OW-14B	background	10.00	3.0	7.0
OW-15	downgradient	45.00	40.0	45.0
OW-16	downgradient	10.00	5.0	10.0

Note: This summary includes only those wells installed during this Phase II investigation. A description of all wells at the Nash Road Landfill is included in Table IV-2 of this report.



EXPLANATION

PONDED WATER OVER AREAS BELIEVED TO CONTAIN LOVE CANAL WASTES.

EXISTING MONITORING WELL

NEW PHASE II WELL (INSTALLED 1987-1988)

0 200 400 FEET

APPROXIMATE SCALE

ENGINEERING-SCIENCE

NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION
PHASE II REPORT

SITE PLAN
NASH ROAD

FIGURE III-1

SECTION IV

SITE ASSESSMENT

SITE HISTORY

The Nash Road site is an inactive landfill located on Nash Road in the Town of Wheatfield, Niagara County, New York, adjacent to the North Tonawanda City boundary (Figure IV-1). The site is rectangular, totaling approximately 25 acres, surrounded by a suburban residential area. The site, which is partly overgrown with trees and marsh vegetation, is apparently used by local residents for recreational activities including jogging and dirt bike riding.

From 1964 to 1968 the Niagara Sanitation Company operated the Nash Road site as a landfill receiving municipal and industrial wastes including caustic materials and sludges. In June 1968, shortly before the site was closed, 1600 cubic yards of contaminated fill debris from a sewer excavation near the Love Canal in Niagara Falls, NY was disposed in a trench at the site (NYSDOT, 1978). The trench reportedly was 100 feet by 30 feet by 27 feet deep and is believed to be located beneath ponded areas as shown on Figure IV-2. The debris was placed in the bottom 15 feet, and 12 feet of clean fill was placed on top. The current owner of the property is the Town of Wheatfield. The site is shown on the U.S.G.S. Tonawanda East, NY 7-1/2 minute quadrangle map (Figure IV-1). The site features are shown in Figure IV-2.

REGIONAL SETTING

Regional Geology

The Nash Road Landfill is located in the Erie-Ontario Lowland region (Muller, 1965) of New York State which can be characterized as the areas of low relief that border Lakes Erie and Ontario. The lowland region extends to the Onondaga Limestone escarpment, located about eight miles south of the site and northward to Lake Ontario. The region was submerged in a shallow sea during the Silurian and Devonian Epochs which deposited a thick sequence of shales, limestones and dolomites. Subsequently, portions of this sequence, rocks deposited during the Mississippian and Pennsylvanian ages, were eroded. Shales of the Salina Group and Lockport Dolomite, both of lower Silurian age, are the uppermost bedrock units in the area surrounding the Nash Road Landfill (Rickard and Fisher, 1970).

The area has been repeatedly covered by a series of continental ice sheets. The topography and surficial geology of the lowland region were formed by glacial action. The glaciers deposited layers of glacial till, which consists of unsorted and unstratified rock and soil materials. Till deposits were found in the subsurface of the Nash Road Landfill site when the groundwater monitoring wells were drilled.

The melting of the glaciers approximately 12,000 years ago produced large volumes of meltwater. This water subsequently re-shaped channels and reworked the till deposits, creating thick accumulations of stratified, clastic sediments. The meltwaters also formed glacial lakes along the front of the ice margin as the ice retreated from the region. Lake Tonawanda was one of the largest of these lakes. It was an elongate lake which occupied an east-west trending basin that existed in this area. Sediments deposited in the lake consist of interlayered silt, sand and clay. Parts of this sequence are "...very regularly bedded with cyclic alternation of clay and silt laminae; moderately permeable along bedding surfaces...." (Muller, 1977). Lacustrine sediments were found in the subsurface of the Nash Road Landfill site when the groundwater monitoring wells were drilled.

Clastic deposits in this region, particularly beds and lenses of sand, frequently act as shallow aquifers, as is the case at the Nash Road site. The lacustrine clays and tills often inhibit groundwater movement between these shallow aquifers due to their low permeability. At the Nash Road site, fine-grained sediments, such as silts, clays and till, frequently contain interbedded sand layers which facilitate lateral groundwater movement through otherwise low permeability materials.

Regional Hydrology

The site is a part of the Lake Erie and Niagara River drainage basin. Sawyer Creek, which flows within 1000 feet of the northeast corner of the site, is listed as a Class D waterway (6NYCRR Vol. E). The main use for Class D streams is secondary contact recreation. Sawyer Creek flows into Bull Creek about 1.1 miles southeast of the site. Bull Creek flows into Tonawanda Creek, which flows westerly into the Niagara River. The Niagara River drains to Lake Ontario, and ultimately to the Atlantic Ocean via the St. Lawrence River.

SITE GEOGRAPHY

Site Topography

The site is an inactive landfill located in the Town of Wheatfield, Niagara County. The site is a rectangular area, twenty five acres in size, partially overgrown with trees and marsh vegetation, and surrounded by a suburban residential area. Dirt roads provide access to and within the site.

The site is bordered to the north by Holy Infant Church, to the east by a cemetery, to the south by a right-of-way and a residential area, and to the west by Nash Road and houses. The site is on the northern corporate boundary of the City of North Tonawanda which had a population of 35,760 in 1980 (Rand McNally, 1981).

The landfill is visible to many of the residential neighbors south of the site. It is apparently used by nearby residents as a jogging area, dirt bike track, and general play area. Access to the site is unrestricted. The National Fuel Gas Corporation has a small facility adjacent to the western border of the site, and a gas pipeline, a salt-brine pipeline, and above-ground electrical lines pass along the southern site boundary.

Before landfilling began, the site probably was a flat, swampy area at about 575 feet above mean sea level (Figure IV-1). Landfilling of wastes and excavation of a disposal trench has resulted in irregular ground surface topography. Relief on-site is less than 10 feet.

Soils

This discussion is based on well borings conducted on-site and information from the Niagara County Soil Survey (USDA, 1972). The soils mapped for the site include the Canandaigua silt loam and the Raynham silt loam. The Raynham soils are somewhat poorly drained, medium textured silt loam occurring on slopes ranging from 0 - 6%. The permeability is estimated at 1×10^{-3} to 4×10^{-4} cm/sec (USDA, 1972). The Canandaigua silt loam is a very poorly drained, medium to moderately fine textured soil. These soils are level or depressional and occupy areas where water remains ponded or runs off very slowly. The permeability is estimated at 4×10^{-3} to 4×10^{-4} cm/sec (USDA, 1972). The Raynham silt loam soil formed from calcareous silty sediments deposited by glacial Lake Tonawanda. The Canandaigua silt loam soil formed in lacustrine deposits of silt, very fine sand and clay.

SITE HYDROGEOLOGY

This discussion of the Nash Road site hydrogeology is based on the most recent Phase II investigation, which included seven monitoring well installations (Figure IV-2). Boring logs and well schematics are presented in Appendix B of this report. Additional information was provided by an earlier Phase II report (Engineering-Science, 1985) and by published reports concerning the geology of New York State, as cited throughout the text.

Geology

As part of this Phase II site investigation, seven monitoring wells were installed to supplement the seven existing monitoring wells. Wells drilled for the earlier study monitored groundwaters beneath the entire site. The additional wells were installed to provide supplemental data in the portion of the property believed to have received fill from the Love Canal area. The locations of all monitoring wells are shown in Figure IV-2. Boring logs, grain-size characteristics of samples taken from the borings, and well schematics are included in Appendix B of this report. The grain-size characteristics are summarized in Table IV-1. Geologic data, well construction data and water level data from the groundwater monitoring wells are summarized in Tables IV-2 and IV-3.

The following paragraphs describe the rock and soil materials beneath the site. There are four stratigraphic units beneath the site which can be summarized as:

- fill or topsoil mixed with soil at the surface;
- glacial/lacustrine deposits which include an upper sand lens; brown/gray silty clay gray/red clay; and a lower sand lens;
- glacial till;
- dolostone bedrock.

The thickness of the unconsolidated deposits, which include the glacial till, lacustrine sediments, and fill is about 65-70 feet. A generalized stratigraphic column containing descriptions of the subsurface geology is presented in Figure IV-3. The location of a geologic cross section is shown in Figure IV-4. The relationships between the various units is shown on the geologic cross section (Figure IV-5). The following paragraphs describe the origin and nature of soils and rocks found at the site, beginning with the bedrock.

The top of bedrock varies from 65 feet to 71 feet below ground surface; bedrock outcrops are not visible for examination at the surface in the site vicinity. The 1985 Phase II investigation (ES, .1985) identified bedrock as "dolostone", the Lockport Dolomite of middle Silurian age. However, published geology maps of the area (Rickard and Fisher, 1970) show the bedrock at the site as the Salina Group of upper Silurian age. An EPA site report (EPA, 1985) stated that bedrock at the site is the Camillus Shale, a member of the Salina Group. None of the wells drilled as part of the Phase II investigations conducted at this site have actually cored into bedrock for positive identification.

It is possible that the Salina Group in this area has been thinned or completely removed by erosion or glacial action. Conversely, the dolostone reported in the 1985 Phase II investigation (ES, 1985) may be part of the Salina Group. Rickard and Fisher (1970) include dolostone in their brief description of this unit. In any case, the Lockport Dolomite is an important aquifer in this region, and is known to be present beneath the entire area (Johnston, 1964). The uncertainty in identifying the uppermost bedrock unit beneath site cannot be resolved from the available data, however this uncertainty will not affect the conclusions presented in this or previous studies.

The unit overlying bedrock is a dense reddish brown to gray glacial till composed of silt, sand, clay, and angular pebbles. The till averages 30 feet in thickness. In the two till samples analyzed, the grain-size characteristics were very similar containing 50 percent silt and clay and about 15 to 20 percent gravel (Table IV-1).

The till unit is overlain by glacial/lacustrine sediments, at the bottom of which is a lower sand lens. This lower sand lens is approximately 5 feet thick in the vicinity of OW-4, OW-14, and OW-15, and appears to become thinner to the south, east and west. The lower sand lens was absent in the easternmost well (OW-1B). The lower sand lens is overlain by red and gray layered clay, which is moist and highly plastic. The top of the clay is roughly 10 feet below ground surface and the unit is approximately 30 feet thick. The clay grades upward into a stiffer, drier brown-gray silty-clay, which is approximately 3 - 7 feet thick. Very fine sand beds about one inch thick are also present. This unit may be the regularly bedded cyclic laminae of clay and silt described by Muller (1977) as being typical of the lacustrine sediments deposited in Lake Tonawanda. The lower portion of this lacustrine unit may be slightly higher in clay content, but in general, the grain-size characteristics of the unit are uniform (Table IV-1). A medium to coarse, well sorted, orange-brown upper sand lens overlies the clay. This upper sand lens is approximately 5 feet thick in the eastern part of the site (Wells OW-13 and 14-B), but is apparently discontinuous and was not found in wells OW-1 and OW-3. The upper sand lens is variable in composition, being chiefly composed of gravel, sand or silt, depending on the location (Table IV-1).

Much of the surface layer on site has been disturbed by landfill activities. The composition of the surface layer is a mixture which varies from organic topsoil to fill/waste material to disturbed silt and clay. The fill thickness found in the monitoring well borings varied from two to eight feet, but is likely to be thicker in disposal trenches where up to 12 feet of soil fill were reportedly placed (NYSDOT, 1978).

Groundwater Hydrology

This Phase II investigation of the Nash Road Landfill included installation of seven groundwater monitoring wells, five of which are near the trenches suspected of containing contaminated debris the from Love Canal area. Existing wells from the previous Phase II investigation were inspected and evaluated for use in this study. Monitoring well specifications are shown on Table IV-2. Water level elevation data are presented in Table IV-3 and Figures IV-6 to IV-9.

Figure IV-6 shows groundwater level elevations measured on four different days during 1988 plotted versus the elevation of the mid-point of the well screen. Three distinct groups of water levels are evident on this figure. Examination of the geologic logs (presented in Appendix B) shows that the units in which the wells of each group are screened are similar. All of the water level elevations which plot in the lower left hand corner of Figure IV-6 are from wells screened in glacial till. All of the water level elevations which plot in the upper right portion of Figure IV-6 are from wells screened in the interbedded lacustrine clay and sand deposited in glacial Lake Tonawanda, or in the fill. All of the water level elevations which plot in the lower center portion of Figure IV-6 are from wells screened in the lower sand.

Figure IV-6 suggests that a potential for downward groundwater movement from the surface to the lower water bearing units exists at the site, because water levels in shallow wells are higher than water levels in the deeper wells. However, there is a notable difference between the water level elevations in the lower groups and the water levels in the lacustrine deposits and the fill. This may indicate that the lacustrine clays are an effective barrier to vertical migration, despite the potential for downward movement. The low water levels measured in OW-11 on February 10th and 18th probably are due to slow water level recovery following drilling and development in the lacustrine clay.

Water level data for each of the three groups are shown in Figure IV-7 and VI-9. The data available in each water bearing zone are insufficient, or the water surface indicated by the data is too flat to interpolate water level elevation contour lines.

Water level data shown in Figure IV-7 suggest that water levels in the upper sand and clay are highest in the vicinity of the ponds over the reported disposal trench in the northeastern part of the site. There is insufficient data to draw water level elevation contour lines or to determine the relationship between groundwater and the ponds. It appears the groundwater is flowing eastward toward Sawyer Creek. The fact that the area was swampy before development suggests that local groundwater discharged to the swamp under natural conditions, and discharged from the area by evaporation or by surface water runoff to Sawyer Creek when the swamps were full. The persistence of the ponds, even during dry seasons, supports the suggestion that shallow groundwater flows to the ponds and discharged by evaporation and surface runoff when the ponds are full. It is unlikely, given the climate of the area, that the swamps could evaporate all of the inflow, suggesting that pathways for lateral movement of groundwater to Sawyer Creek must exist.

Water level data shown in Figure IV-8 suggest that water levels in the lower sand unit typically are five feet lower than water levels in the overlying unit. The water levels for the lower sand unit wells are virtually identical and cannot be contoured. Water level data shown in Figure IV-9 suggest that water levels in the till unit typically are eight feet lower than water levels in the upper sand and clay. The water levels for the till wells are virtually identical and cannot be contoured.

In situ permeability (slug) tests performed as part of the previous Phase II investigation estimated the horizontal hydraulic conductivity of the upper sand lens to be about 6.75×10^{-4} cm/sec. The horizontal hydraulic conductivity of the glacial till ranged from 7.5×10^{-4} to 7.88×10^{-7} cm/sec. Those estimates are based on slug tests in wells drilled to the top of bedrock. The results determined from those tests could have been influenced by the presence of fractures in the upper portion of the bedrock.

Despite the number of wells drilled at the Nash Road Landfill, some features of the hydrologic system must be inferred. In addition, assessment of the groundwater migration pathways is difficult, given the flat groundwater gradients on-site. Due to the absence of a discernible groundwater flow gradient beneath the site, a true upgradient well could not be readily identified. In order to provide comparisons of groundwater quality an upgradient well must be identified. To accomplish this, the analytical results were reviewed to identify the wells that had the lowest concentrations of organic and metal constituents, and in effect, represent background water quality. Based on the review of the analytical results, wells OW-14A and OW-14B were selected as most representative of background groundwater quality for the lower and upper zones, respectively. The selection of OW-14B as a background location for the upper zone is consistent with the easterly flow gradient indicated by the water levels on Figure IV-7. The easterly flow is consistent with the site location in relation to Sawyer Creek as well. The site is west of Sawyer

Creek, and if shallow groundwater is hydraulically connected to Sawyer Creek, an easterly flow direction on-site is plausible.

The water level data shows that there is a potential for vertical downward movement of groundwater from the landfill to the bedrock. None of the wells on-site penetrate a sufficient thickness of bedrock to reliably indicate the head distributions in those units. Regional studies (Johnston, 1964) suggest that in the Lockport Dolomite, which underlies the site, water moves southwesterly and discharges to the Niagara River. Thus, the potential for groundwater from the landfill to move into a regionally significant aquifer appears to exist. However, that potential is thought to be very limited for the following reasons. The nature of the sediments on-site suggests that the hydraulic conductivity across the bedding planes (vertical) will be orders of magnitude lower than the horizontal hydraulic conductivity. The Lake Tonawanda sediments present on-site are relatively flat-lying and likely to be laterally extensive. The sand layers within the clay create flow paths in which groundwater may move easily along the beds. Movement between the sand layers will be retarded by the low permeability of the clay. Observations made during drilling at the site, and the nature of the environments in which the sand lenses were deposited, suggest that the lateral extent of the clays typically will be greater than the lateral extent of the sands. The permeability of the till, which is under the lake sediments, is also relatively low. Observations of the till thickness beneath the site suggest that it is relatively evenly distributed and would retard the vertical movement of groundwater.

In summary, despite the potential for vertical movement, the hydraulic conditions suggest that groundwater is flowing from the site eastward to Sawyer Creek.

Surface Water Hydrology

Prior to its development, the Nash Road site was a low-lying swampy area. Natural ponds occurred within the property. Sawyer Creek, which is less than one-quarter mile northeast of the site, drains the area. Sawyer Creek flows to the southeast and joins Bull Creek and Tonawanda Creek about two miles southeast of the site. Sawyer Creek is classified by the NYSDEC as a Class D waterway (6NYCRR Vol E.). The water levels in the ponds on-site fluctuate seasonally. In the spring, approximately one-third of the site may be under water, but in late summer, only the disposal trench and connected ponds are filled with water. The northern margin of the site is bounded by a ditch, which contains surface water in the spring. The large ponds and the disposal trench drain into this ditch, which drains toward Sawyer Creek.

SITE CONTAMINATION ASSESSMENT

Potential contamination of the environment within the site boundary was evaluated by a review of the character and quantity of hazardous wastes suspected to be present at the site, chemical analyses of the groundwater, and air quality monitoring with a Photovac photoionization detector.

Waste Characterization

The Nash Road Landfill site was operated by the Niagara Sanitation Company between 1964 and 1968. Municipal and industrial wastes, including caustic materials and sludges have been disposed at the site. Shortly before the site was closed in 1968, approximately 1600 cubic yards of waste material from a sewer excavation near the Love Canal was disposed in a trench at this site (NYSDOT, 1978). Analysis of the material at that time by the Hooker Chemical Company detected chlorotoluenes, benzoyl chloride and benzoic acid (Olotka, 1968).

Two large ponds now exist over the trench where sludges were reportedly dumped. The trench was reportedly 100 feet by 30 feet across and 27 feet deep (EPA, 1985). Clean fill 12 feet deep was reportedly placed over the waste material (NYSDOT, 1978). Based on nearby borings conducted during the Phase II investigations, there may be up to 10 feet of undisturbed clay beneath the trench. A liner or leachate collection system was not installed at the time of waste disposal.

The following subsection summarizes the results of the 1988 Phase II investigation sampling and tasks. Since the water table on-site appears to be relatively flat, making the groundwater flow pattern uncertain, the background wells referred to below were identified by the low levels of contaminants detected.

The analytical results have been compared to applicable New York State standards or guidance values. Standards and guidance values are provided for the applicable groundwater classifications. Standards that have been promulgated for groundwater appear in 6 NYCRR Part 703. These regulations also provide authority for the use of guidance values when a standard does not exist for a given water classification.

Due to the extent of landfill activity which has occurred on the site, a true upgradient well could not be readily identified. In order to provide comparisons of groundwater quality, the analytical results were reviewed to identify the wells having the lowest concentrations of organic and metal constituents, ostensibly reflecting background water quality. Based on the review of the analytical results, wells OW-14A and OW-14B were selected as most representative of background groundwater quality. In both these wells, no organic compounds were found to exceed the applicable standards or guidance values. The concentrations of iron, lead and manganese exceeded the applicable standards and guidance values in all wells, and the concentrations of magnesium exceeded the applicable guidance value in all wells except for the background well OW-14B. The remaining groundwater sample results have been compared to the results of wells OW-14A (for deep wells) and OW-14B (for shallow wells). Concentrations of hazardous substances in excess of three times the concentrations in OW-14A and OW-14B are considered to indicate releases to the groundwater potentially attributable to the site.

The value of three times 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 observed releases under each pathway, as discussed in the following subsections.

The analytical data were also reviewed and validated for data usability. Included in the evaluation was a review of the results of "blank" sample analyses. In cases where blank (method, trip, or field) contamination was detected, the individual constituent concentrations were judged as follows: 1) If the sample value was less than 10 times the highest blank value, the sample value was rejected (flagged "R"); 2) If the sample value was between 10 and 20 times the highest blank value, the sample was considered an estimate (flagged "X"); 3) If the sample value was greater than 20 times the highest blank value, it was accepted (unflagged). 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.

Groundwater Contamination Assessment

Groundwater samples were collected from the seven new Phase II monitoring wells in February 1988, and analyzed for HSL organic compounds, HSL metals, TCDD (2,3,7,8-tetrachlorodibenzo-1,4-dioxin), and TOX. Well OW-11 was sampled and analyzed for semivolatile organic compounds in November 1988.

Eighteen HSL organic compounds were detected in the groundwater samples (Table IV-4). In the shallow wells, ten compounds were detected in one or more samples at concentrations which were at least three times the concentrations detected in OW-14B, the background sample. These compounds were: methylene chloride, acetone, 1,1,1-trichloroethane, benzene, toluene, chlorobenzene, ethylbenzene, xylenes, benzyl alcohol, and benzoic acid. These results indicate releases of organic compounds to the shallow groundwater which are potentially attributable to the site. Most of the observed releases occurred in OW-11, which was the most highly contaminated well. The other releases occurred in OW-16. The concentrations of nine organic compounds in OW-11 or OW-16 exceeded the applicable groundwater standards or guidance values. In the deep wells, the concentrations of bis(2-ethylhexyl)phthalate in OW-12 and OW-15 were at least three times the concentrations detected in OW-14A, the background sample. Class GA standards or guidance values were not exceeded in the deep wells.

Twenty-one HSL metals were detected in the groundwater samples (Table IV-5). In the shallow wells, the concentrations of seventeen metals in one or more samples were at least three times the concentrations detected in the background well. These metals were: aluminum, antimony, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, and zinc. The concentrations of seven metals exceeded the applicable Class GA groundwater standards or guidance values in one or more wells. As was the case for the organic compounds, most of the observed releases of metals occurred in wells OW-11 and OW-16. However, OW-13 also exhibited observed releases of ten metals.

In the deep wells, releases of metals were not observed; the concentrations for most metals were very similar in all three samples. The concentrations of six metals exceeded the applicable standards or guidance values in one or more deep wells. In each case, the standard or guidance values were also exceeded in OW-14A, the background well.

In summary, the groundwater results indicate that releases of organic compounds and metals are occurring, and may be attributed to the Nash Road site. These results are in contrast with the groundwater results for the 1985 Phase II investigation which detected only 1,1,1-trichloroethane at less than 3.8 ug/l in well OW-1B. This well was not resampled during the 1988-1989 Phase II investigation. (See Summary of 1985 Phase II groundwater results in Appendix C.) The shallow groundwater zone is contaminated not only in the vicinity of the Love Canal wastes, but on the west side of the site, also. With the exception of one organic compound, groundwater in the deeper zone does not appear to have been adversely affected by the site. This may reflect the effectiveness of the clay as a barrier to downward migration and the lack of hydraulic connection between the upper and lower sand lenses.

When analyzed by the Hooker Chemical Company more than 20 years ago, material excavated from the Love Canal area was found to contain a high concentration of benzoic acid (Olotka, 1968). Likewise, a high concentration of benzoic acid was detected in the shallow groundwater at the Nash Road site. Other contaminants detected in the shallow groundwater on-site were not detected in the original analysis (by Hooker) of the excavated material. The nature and quality of the original analysis was not determined.

The analytical results for OW-16 indicate that the western portion of the site may be a source for shallow groundwater contamination as well. The results for all of the shallow wells indicate that some form of remediation is necessary at the site. With the exception of eight residences, the entire vicinity within a 3-mile radius of the site is served by public water supplies having sources in the Niagara River. Therefore, the public health threat from drinking the contaminated groundwater on-site is virtually nonexistent.

Additional work should be performed to determine more definitively the hydrology of the shallow groundwater zone and whether off-site migration is occurring. One method of assessing potential off-site migration would be a soil vapor survey conducted within and around the perimeter of the site to identify potential volatile organic compounds in the shallow groundwater. If off-site migration is detected, additional shallow wells and sampling may be necessary to confirm the extent and level of off-site contamination.

Regardless of whether the potential for off-site migration exists, remediation of the site should be performed. At a minimum this should include capping the site, seeding the cover and constructing a fence to limit public access to the site. Although surface water sampling was conducted in 1983 as part of the original Phase II investigation (refer to Appendix C for a summary of those results), it may be prudent to resample the pond water to determine whether a direct contact threat is posed by contaminated surface water. This is especially important since it is obvious that many people access the site on vehicles and on foot.

TABLE IV-1
SOIL GRAIN-SIZE CHARACTERISTICS
NASH ROAD LANDFILL

Boring Number	Depth (feet)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Unified Soil Classification	Stratigraphic unit
OW-1	2-4	0.0	18.0	59.0	23.0	ML	brown/gray silty clay
OW-1B	50-51.5	10.0	30.0		60.0 *	ML	glacial till
OW-4	12-13	0.0	0.0	14.0	86.0	CL	brown/gray silty clay
	30-32	0.0	0.0	24.0	76.0	CL	gray/red clay
	44.6-45.0	0.0	65.0		35.0 *	SP	lower sand lens
OW-5	5-7	0.0	84.0		16.0 *	SW	upper sand lens
OW-6	60-60.5	15.0	19.0		66.0 *	ML	glacial till
OW-11	2-4	14.8	20.8	66.8	4.6	ML	fill
OW-12	5-7	0.3	6.7	69.8	23.2	ML	brown/gray silty clay
	20-22	0.0	0.9	15.1	84.0	CL	gray/red clay
	30-32	10.2	32.5		57.3 *	ML	lower sand lens
OW-13	2-4	0.3	87.6		12.1 *	SM	upper sand lens
	4-6	0.1	4.8		95.1 *	ML	brown/gray silty clay
OW-14A	25-27	0.0	0.3	13.7	86.0	CL	gray/red clay
	36-38	15.3	34.7	11.4	39.1	CL	glacial till
OW-14B	4-6	0.0	74.4	23.2	2.4	SM	upper sand lens
OW-15	15-17	0.0	0.6	16.4	83.0	CL	gray/red clay
	42-44	18.3	30.4	39.2	12.1	ML	glacial till
OW-16	2-4	0.1	66.9	26.2	6.8	SM	brown/gray silty clay
	6-8	26.9	26.6	25.3	21.2	GM	upper sand lens

* Percentage of clay and silt combined.

TABLE IV-2
MONITORING WELL DATA
NASH ROAD LANDFILL

Well ID	Ground Surface Elevation (feet)	Top of Bedrock Depth (feet)	Top of Bedrock Elevation (feet)	Top of Screen Depth (feet)	Top of Screen Elevation (feet)	Bottom of Screen Depth (feet)	Bottom of Screen Elevation (feet)	Bottom of Hole Depth (feet)	Bottom of Hole Elevation (feet)	Stratigraphic Unit Monitored
OW-1	98.6			4.0	94.6	9.0	89.6	10.0	88.6	brown/gray silty clay
OW-1B	98.6	68.6	30.0	58.1	40.5	68.1	30.5	68.6	30.0	glacial till
OW-2	97.5			9.0	88.5	14.0	83.5	14.0	83.5	brown/gray silty clay
OW-3	99.0	68.7	30.3	45.0	54.0	55.0	44.0	68.7	30.3	glacial till
OW-4	98.4	70.3	28.1	60.1	38.3	70.1	28.3	70.3	28.1	glacial till
OW-5	100.8	69.8	31.0	60.0	40.8	70.0	30.8	70.0	30.8	glacial till
OW-6	101.0	66.0	35.0	56.0	45.0	66.0	35.0	66.0	35.0	glacial till
OW-11	97.8			7.0	90.8	9.0	88.8	12.0	85.8	upper sand lens
OW-12	98.5			29.5	69.0	32.5	66.0	34.0	64.5	lower sand lens
OW-13	97.4			3.0	94.4	5.0	92.4	6.0	91.4	upper sand lens
OW-14A	97.8			33.5	64.3	36.5	61.3	40.0	57.8	lower sand lens
OW-14B	98.4			3.0	95.4	7.0	91.4	10.0	88.4	upper sand lens
OW-15	99.4			40.0	59.4	45.0	54.4	45.0	54.4	lower sand lens
OW-16	100.8			5.0	95.8	10.0	90.8	10.0	90.8	fill

NOTE: All elevations are in feet relative to an assumed datum.

TABLE IV-3
WATER LEVEL DATA
NASH ROAD LANDFILL **

Well ID	Elevation of Measuring Point	Date: Feb 10, 88		Date: Feb 18, 88		Date: Jun 20, 88		Date: Oct 12, 88	
		Depth (feet)	Elevation (feet)	Depth (feet)	Elevation (feet)	Depth (feet)	Elevation (feet)	Depth (feet)	Elevation (feet)
OW-1	100.3					5.3	95.0		
OW-1B	100.3					14.1	86.2		
OW-2	99.3					3.9	95.4		
OW-3	101.3					15.0	86.3	14.4	86.9
OW-4	100.6					14.5	86.1		
OW-5	101.2					15.1	86.1	15.1	86.1
OW-6	103.6					17.3	86.3	17.7	85.9
OW-11	100.4	8.3	92.1	8.5	92.0	4.6	95.8	4.5	95.9
OW-12	101.1			16.9	84.3	11.5	89.6		
OW-13	100.4			2.8	97.6				
OW-14A	101.2			15.5	85.8	11.3	89.9	11.7	89.5
OW-14B	100.6	3.2	97.4	3.2	97.4	4.2	96.4		
OW-15	100.8	10.8	90.0	10.8	90.0	11.4	89.4	11.8	89.0
OW-16	103.3			4.8	98.5	6.3	97.0	8.7	94.6

**NOTES:

1) All elevations are in feet relative to an assumed datum.
2) Depth is measured from ground surface.
3) Wells OW-11, OW-12 and OW-14A may not have been completely recovered from drilling and development when measured during February, 1988.

TABLE IV-4
GROUNDWATER RESULTS
HSL ORGANIC COMPOUNDS (ug/L)
NASH ROAD LANDFILL

			Sample Location (h)						
			Shallow Wells				Deep Wells		
COMPOUND (a)	NYS STANDARDS/ GUIDANCE VALUES (b)		OW-14B (c)	OW-11	OW-13	OW-16	OW-14A (c)	OW-12	OW-15
Methylene chloride	50	G	R	240.0 J(f)	R	R	---	R	R
Acetone			---	2300.0 (f)	R	24.0	---	---	---
2-Butanone			---	---	---	9.8 JX	---	---	---
1,1,1-Trichloroethane	50	G	---	67.0 J(f)	---	R	---	---	R
Benzene	ND	(d)	---	4500.0 (f)	---	12.0	---	---	---
4-Methyl-2-Pentanone			---	---	---	R	---	---	---
Tetrachloroethene	0.7	G	120 JX	---	---	67.0 JX	---	110.0 JX	---
Toluene	50	G	---	14000.0 (f)	---	5.2	---	---	---
Chlorobenzene	20	G	---	590.0 (f)	---	25.0	---	---	---
Ethylbenzene	50	G	---	---	---	55.0	---	---	---
Total xylenes	50	G	---	---	---	30.0	---	---	---
Benzyl Alcohol			---	770000.0 (g)	---	---	---	---	---
4-Methylphenol	1	(e)	---	---	---	25.0	---	---	---
2,4-Dimethylphenol	1	(e)	---	---	---	19.0	---	---	---
Benzoic Acid			---	2100000.0 B(g)	---	26.0 J	---	---	---
Naphthalene	10	G	---	---	---	8.3 J	---	---	---
2-Methylnaphthalene			---	---	---	---	20.0	---	---
bis(2-Ethylhexyl)Phthalate	4200		720.0 BX	---	R	R	R	1600.0 B	790.0 BX

FOOTNOTES:

(a) Only HSL organic compounds that were detected are presented.
(b) Referenced from; "Ambient Water Quality Standards and Guidance Values" for Class GA drinking supply waters, 6 NYCRR Part 703, NYSDEC, 9/1/78, as amended through 4/1/87. The value presented is the standard except where noted by "G", in which case it is the guidance value. All units are ug/L.
(c) Background location.
(d) ND = not detectable; i.e., the standard is the lower limit of detectability as defined by the NYSDEC.
(e) Standard for total phenolic compounds.
(f) Concentration/dilution factor = 75.
(g) Dilution factor = 5,000.
(h) Samples collected by Engineering Science on February 17-18, 1988, and November 17, 1988.

DATA QUALIFIERS:

B: This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/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 that the compound was analyzed for but not detected. Refer to Appendix C for detection limit.
R: Data validation recommends this value be rejected.

TABLE IV-5
GROUNDWATER RESULTS
HSL METALS (ug/L)
NASH ROAD LANDFILL

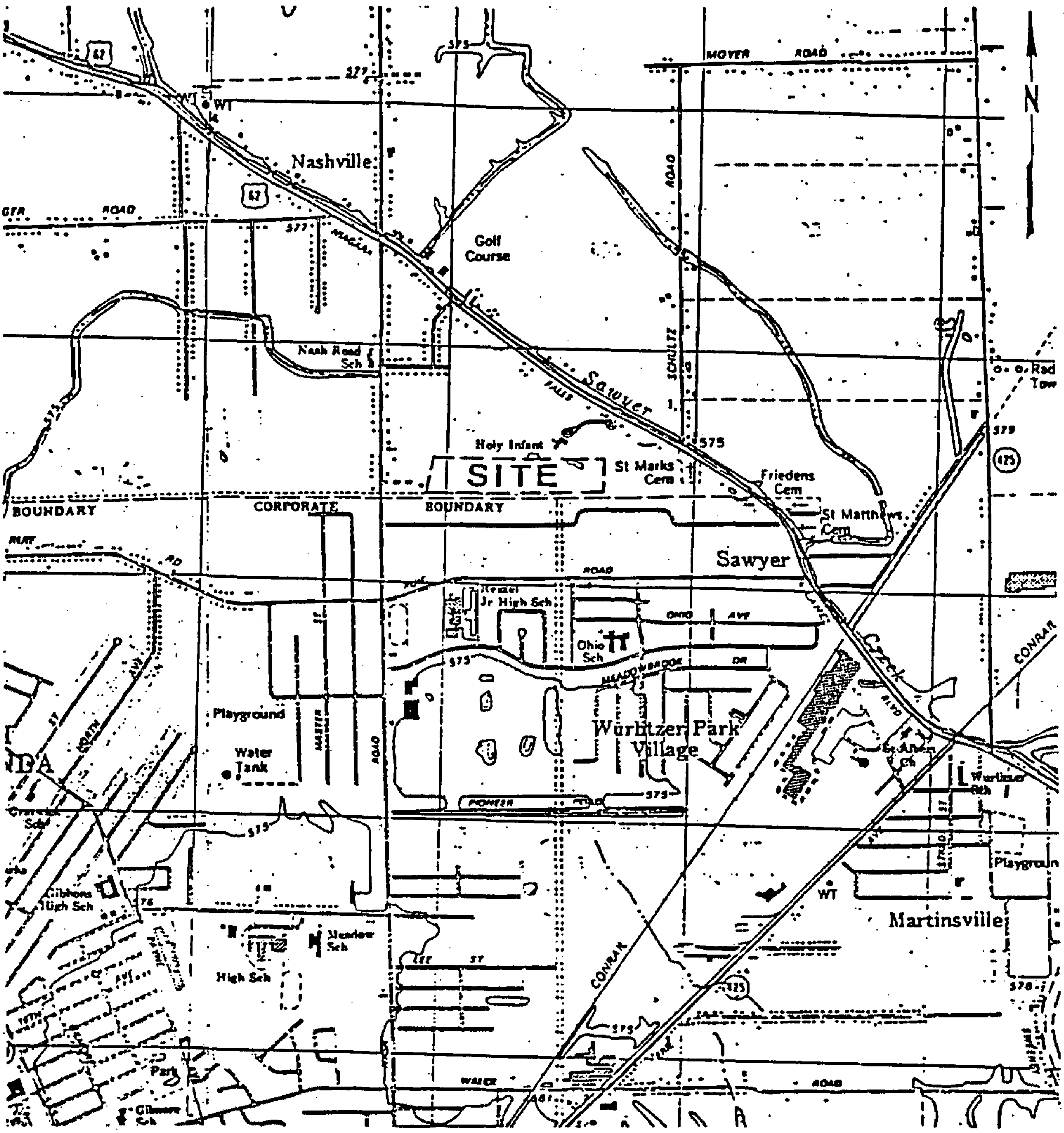
		Sample Location (h)						
	NYS STANDARDS AND GUIDANCE	Shallow Wells				Deep Wells		
METAL (a)	VALUES (b)	OW-14B (c)	OW-11	OW-13	OW-16	OW-14A (c)	OW-12	OW-15
Aluminum		4900.0 X	10200.0 X	4550.0 X	37300.0 X	70300.0 X	50400.0 X	79800.0 X
Antimony	3 G	---	---	311.0 X	150.0	[53.0]	---	120.0
Arsenic	25	6.3	---	10.4	11.4	---	13.5	---
Barium	1000	[76.0]	550.0	295.0	740.0	800.0	550.0	710.0
Beryllium	3 G	---	---	---	[4.0]	6.0	[4.0]	7.0
Cadmium	10	---	---	7.0 X	---	---	---	---
Calcium		100000.0	2380000.0 (e)	299000.0	183000.0	890000.0	290000.0	430000.0
Chromium		---	15.0	32.0	90.0	130.0	79.0	120.0
Cobalt		---	[34.0]	68.0	50.0	65.0	[43.0]	81.0
Copper	1000	[24.0] X	120.0 X	2270.0 X	160.0 X	180.0 X	130.0 X	190.0 X
Iron	300	9800.0 X	34500.0 X	34100.0	131000.0 X	131000.0 X	80800.0 X	144000.0 X
Lead	25	28.4 (d)	180.0 (f)	81.6 X	600.0 (g)	140.0 (f)	92.6 (d)	130.0 (f)
Magnesium	35000 G	33300.0 X	398000.0 X	72100.0	165000.0 X	181000.0 X	93200.0 X	134000.0 X
Manganese	300	1200.0 X	12100.0 X	2350.0	1600.0 X	4500.0 X	2500.0 X	3900.0 X
Mercury	2	---	0.3	0.2	0.8	---	---	0.3
Nickel	13.4 Z	---	180.0	250.0 X	110.0	140.0	89.0	150.0
Potassium		---	25100.0	18500.0	141000.0	168000.0	14900.0	19800.0
Silver	50	---	31.0	46.0 X	---	---	---	---
Sodium		21900.0 X	165000.0 X	68200.0	361000.0 X	97600.0 X	55000.0 X	64500.0 X
Vanadium		---	---	---	66.0	130.0	81.0	130.0
Zinc	5000	140.0 X	540.0 X	R	1800.0 X	580.0 X	330.0 X	570.0 X
TOX		33.0	NS	59.0	888.0	8.0	53.0	34.0

FOOTNOTES:

(a) Only HSL metals that were detected are presented. If the result is a value greater than or equal to the instrument detection limit but less than the contract-required detection limit, the value is reported in brackets (i.e.; [10]).
(b) Referenced from; "Ambient Water Quality Standards and Guidance Values" for Class GA drinking supply waters, 6 NYCRR Part 703, NYSDEC, 9/1/78, as amended through 4/1/87. The value presented is the standard except where noted by "G", in which case it is the guidance value. For nickel (flagged "Z") the value presented is the ambient water quality criterion for human health, from; "Quality Criteria for Water, 1986", USEPA, 5/1/87. All units are ug/L.
(c) Background location.
(d) Dilution factor = 2.
(e) Dilution factor = 50.
(f) Dilution factor = 10.
(g) Dilution factor = 100.
(h) Samples collected by Engineering Science on February 17-18, 1988.

DATA QUALIFIERS:

---: Indicates that the metal was analyzed for but not detected. Refer to Appendix C for detection limit.
R: Data validation recommends this value be rejected.
X: Data validation recommends this value be considered an estimate.
NS: No sample



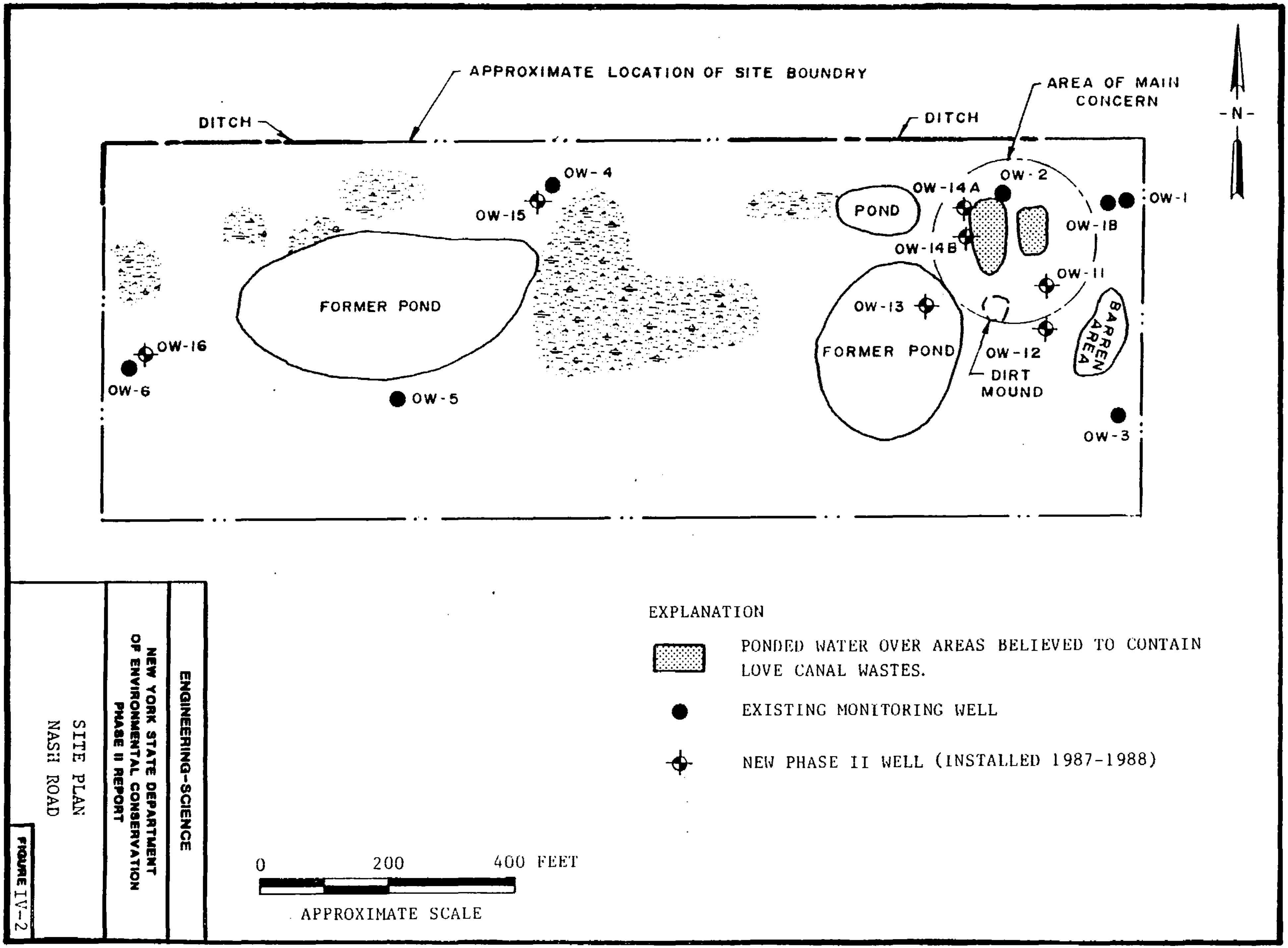
SCALE

0 1000 2000 3000 4000 FEET

SITE COORDINATES: 43°04' 10.0" N. LAT
78°51' 33.8" W. LONG

REFERENCE: U.S.G.S. 7.5' TOPOGRAPHIC MAP
TONAWANDA EAST, NY (1980) AND
TONAWANDA WEST, NY (1980) QUADRANGLES

ENGINEERING-SCIENCE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PHASE II REPORT
SITE LOCATION MAP NASH ROAD
FIGURE IV-1


APPROXIMATE LOCATION OF SITE BOUNDRY
DITCH
DITCH
AREA OF MAIN CONCERN
-N-
OW-4
OW-15
OW-2
OW-14A
OW-1
POND
OW-1B
OW-14B
OW-11
FORMER POND
OW-13
BARREN AREA
FORMER POND
OW-12
DIRT MOUND
OW-16
OW-6
OW-5
OW-3
EXPLANATION
PONDED WATER OVER AREAS BELIEVED TO CONTAIN LOVE CANAL WASTES.
EXISTING MONITORING WELL
NEW PHASE II WELL (INSTALLED 1987-1988)
0
200
400 FEET
APPROXIMATE SCALE
ENGINEERING-SCIENCE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PHASE II REPORT
SITE PLAN
NASH ROAD
FIGURE IV-2

UNIT	PATTERN ON GEOLOGIC CROSS SECTION	APPROXIMATE THICKNESS IN FEET	DESCRIPTION
FILL		0-16	MIX OF FINE SAND, CLAY AND FILL MATERIAL (GLASS/REFUSE, ETC.)
GLACIAL/ LACUSTRINE DEPOSITS		0-8	UPPER SAND LENS - FINE ORANGE/BROWN SAND WITH CLAY TO A MEDIUM TO COARSE ORANGE BROWN WELL, SORTED SAND
		3-7	BROWN/GRAY SILTY CLAY, SOME FINE SAND
		17-32	GRAY/RED CLAY, LAYERED, MOIST, SMOOTH, HIGHLY PLASTIC
		3-6	LOWER SAND LENS- RED/BROWN FINE TO MEDIUM SAND AND ROUND GRAVEL, TRACE DENSE CLAY
GLACIAL TILL		22-42	RED/BROWN VERY DENSE SILT, SAND WITH ANGULAR TO SUB-ANGULAR PEBBLES
BEDROCK-LOCKPORT DOLOMITE		200+	HARD, DENSE FINE GRAINED DOLOMITIC LIMESTONE

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STRATIGRAPHIC COLUMN
NASH ROAD

FIGURE IV-3

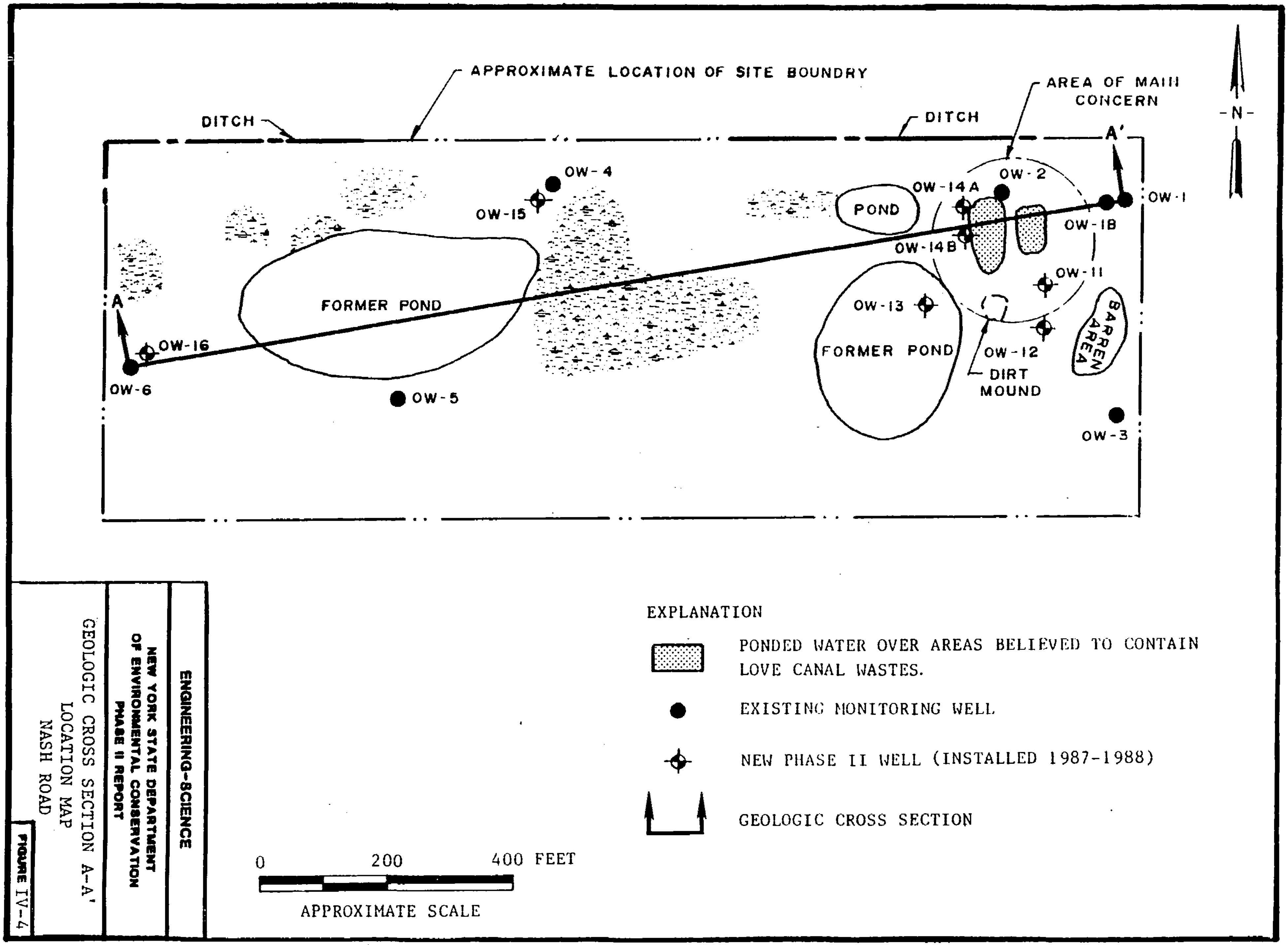
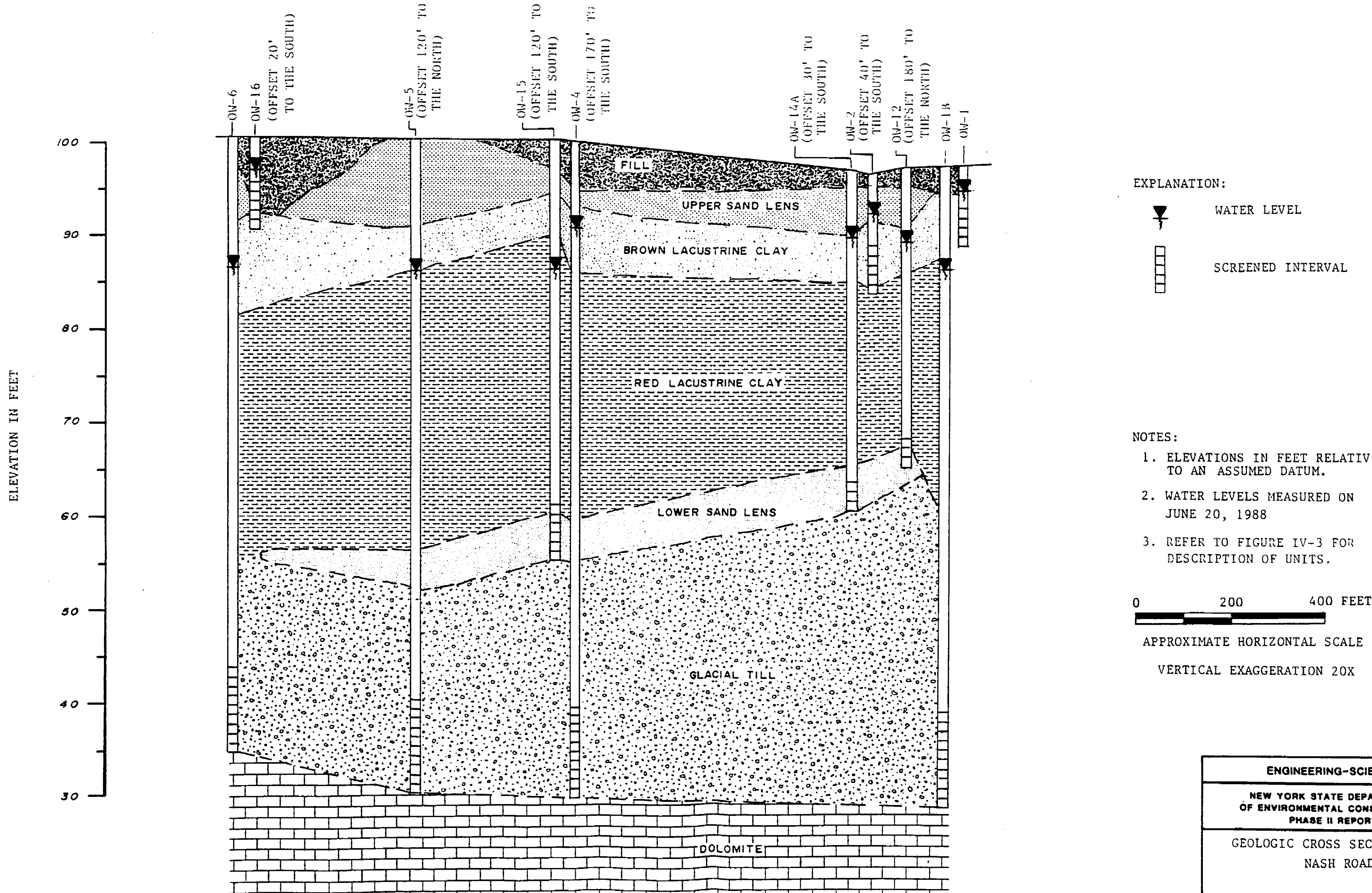


FIGURE IV-4

GEOLOGIC CROSS SECTION A-A'
LOCATION MAP
NASH ROAD



NOTES:

1. ELEVATIONS IN FEET RELATIVE TO AN ASSUMED DATUM.
2. WATER LEVELS MEASURED ON JUNE 20, 1988
3. REFER TO FIGURE IV-3 FOR DESCRIPTION OF UNITS.

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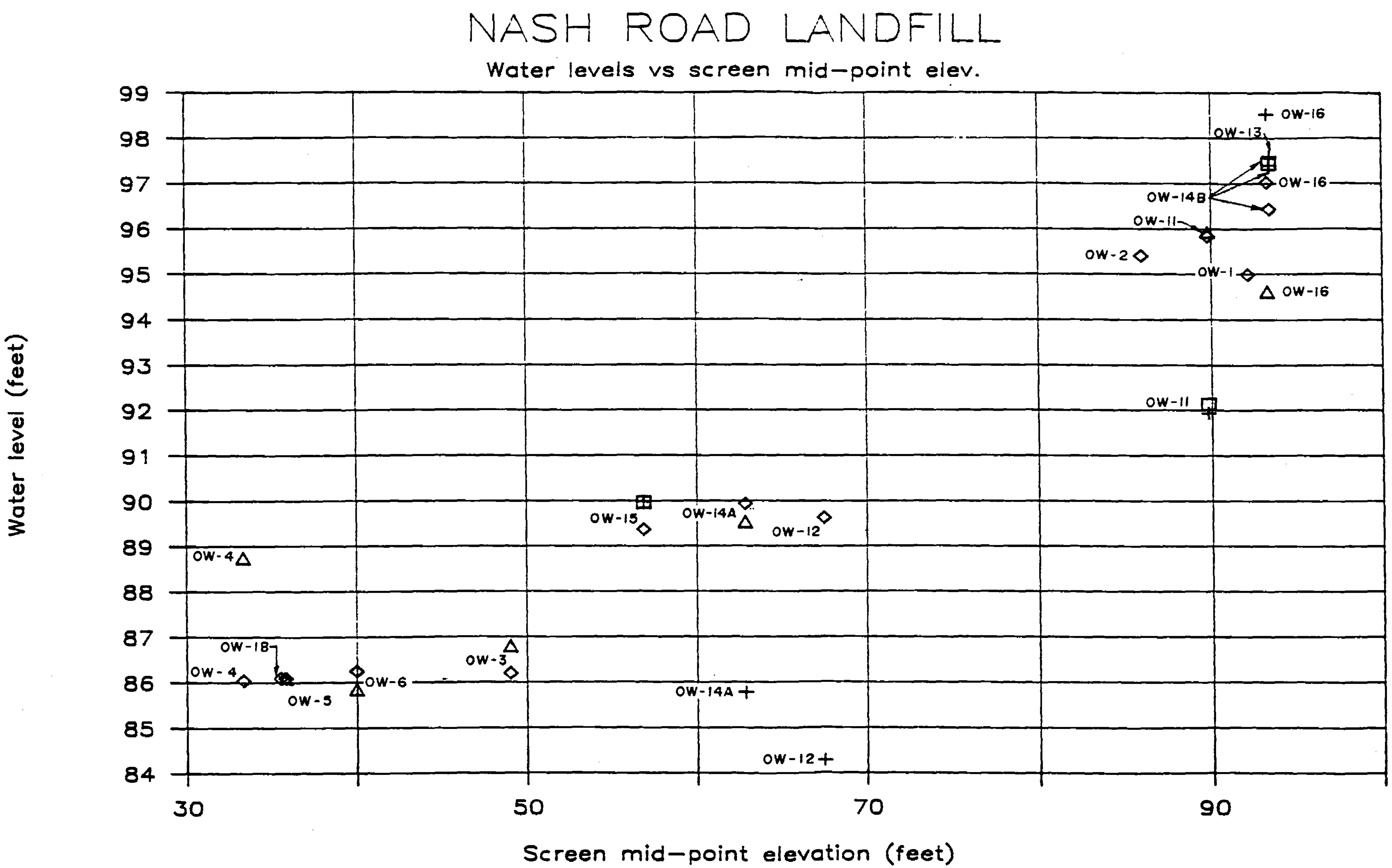
GEOLOGIC CROSS SECTION A-A'
NASH ROAD

FIGURE IV-5



EXPLANATION

- □ FEBRUARY 10, 1988
- + FEBRUARY 18, 1988
- ◇ JUNE 20, 1988
- △ OCTOBER 12, 1988

NOTE

1. ELEVATIONS IN FEET RELATIVE TO AN ASSUMED DATUM.

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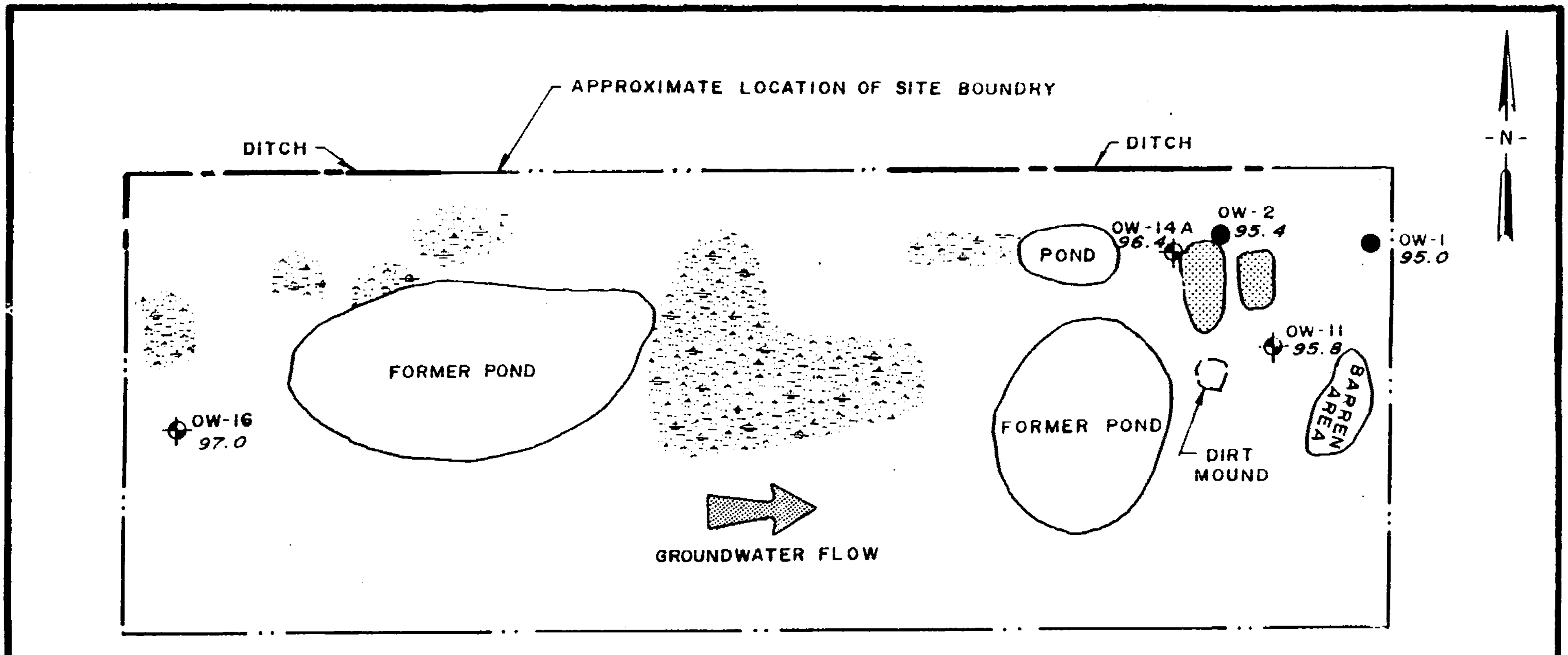
PLOT OF WATER LEVEL DATA
NASH ROAD

FIGURE IV-6



NOTES:

1. ELEVATIONS IN FEET RELATIVE TO AN ASSUMED DATUM.
2. WATER LEVELS MEASURED ON JUNE 20, 1988

EXPLANATION

PONDED WATER OVER AREAS BELIEVED TO CONTAIN LOVE CANAL WASTES.

EXISTING MONITORING WELL

NEW PHASE II WELL (INSTALLED 1987-1988)

0 200 400 FEET

APPROXIMATE SCALE

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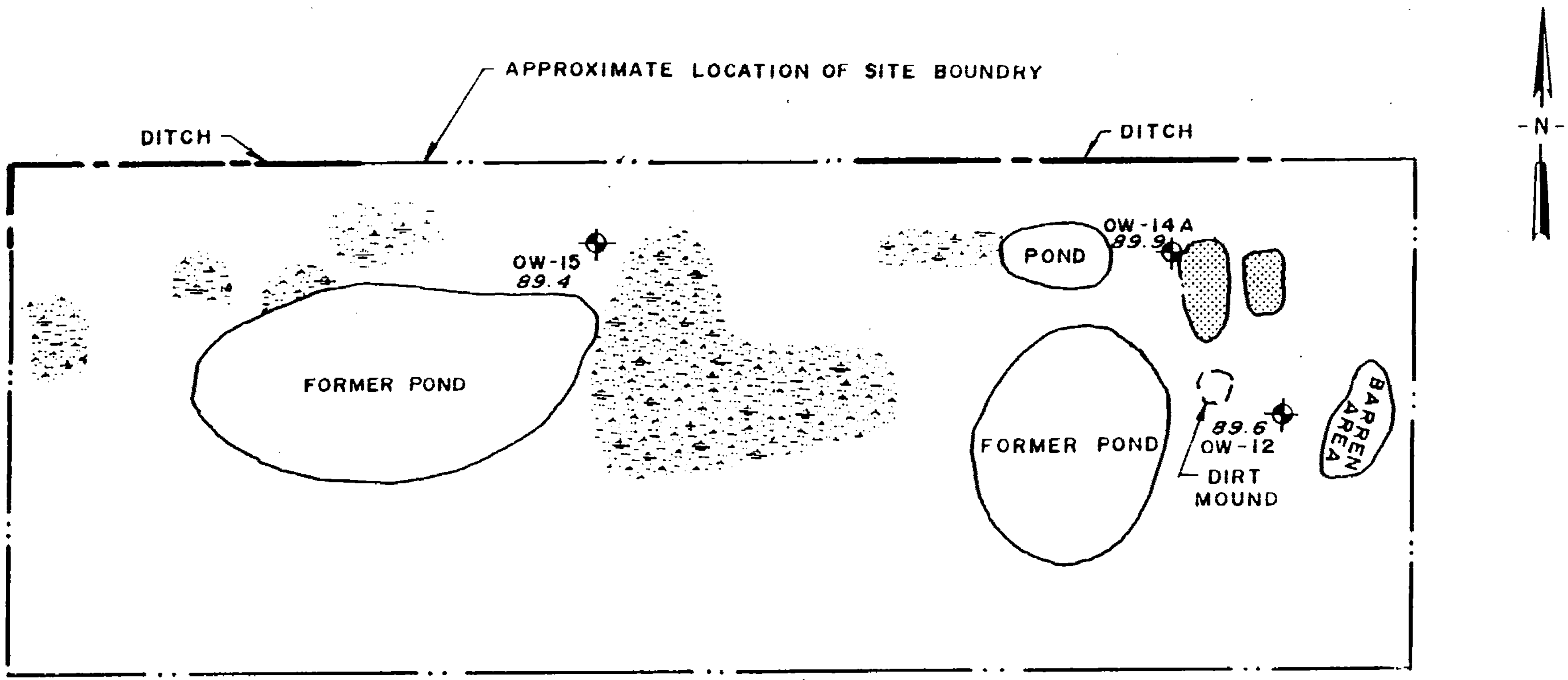
WATER LEVEL ELEVATIONS IN THE UPPER SAND AND CLAY NASH ROAD

FIGURE IV-7



NOTES:

1. ELEVATIONS IN FEET RELATIVE TO AN ASSUMED DATUM.
2. WATER LEVELS MEASURED ON JUNE 20, 1988

EXPLANATION

PONDED WATER OVER AREAS BELIEVED TO CONTAIN LOVE CANAL WASTES.

EXISTING MONITORING WELL

NEW PHASE II WELL (INSTALLED 1987-1988)

0 200 400 FEET

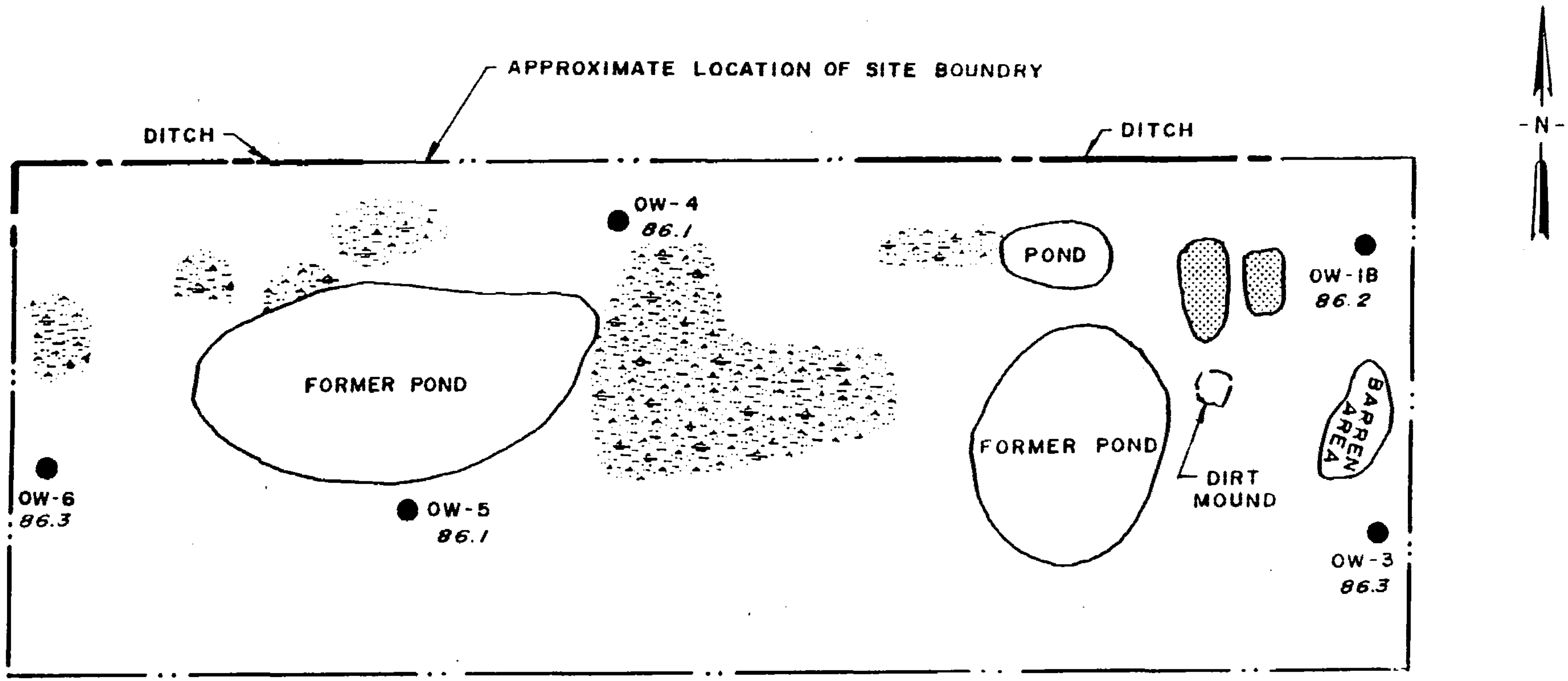
APPROXIMATE SCALE

ENGINEERING-SCIENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PHASE II REPORT

WATER LEVEL ELEVATIONS IN THE LOWER SAND LENS NASH ROAD

FIGURE IV-8



NOTES:

1. ELEVATIONS IN FEET RELATIVE TO AN ASSUMED DATUM.
2. WATER LEVELS MEASURED ON JUNE 20, 1988

0 200 400 FEET

APPROXIMATE SCALE

EXPLANATION:

PONDED WATER OVER AREAS BELIEVED TO CONTAIN LOVE CANAL WASTES.

EXISTING MONITORING WELL.

NEW PHASE II WELL (INSTALLED 1987-1988)

ENGINEERING-SCIENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PHASE II REPORT

WATER LEVEL ELEVATIONS IN THE GLACIAL TILL NASH ROAD

FIGURE IV-9

SECTION V

NARRATIVE

SECTION V

FINAL APPLICATION OF HAZARDOUS RANKING SYSTEM

NARRATIVE SUMMARY

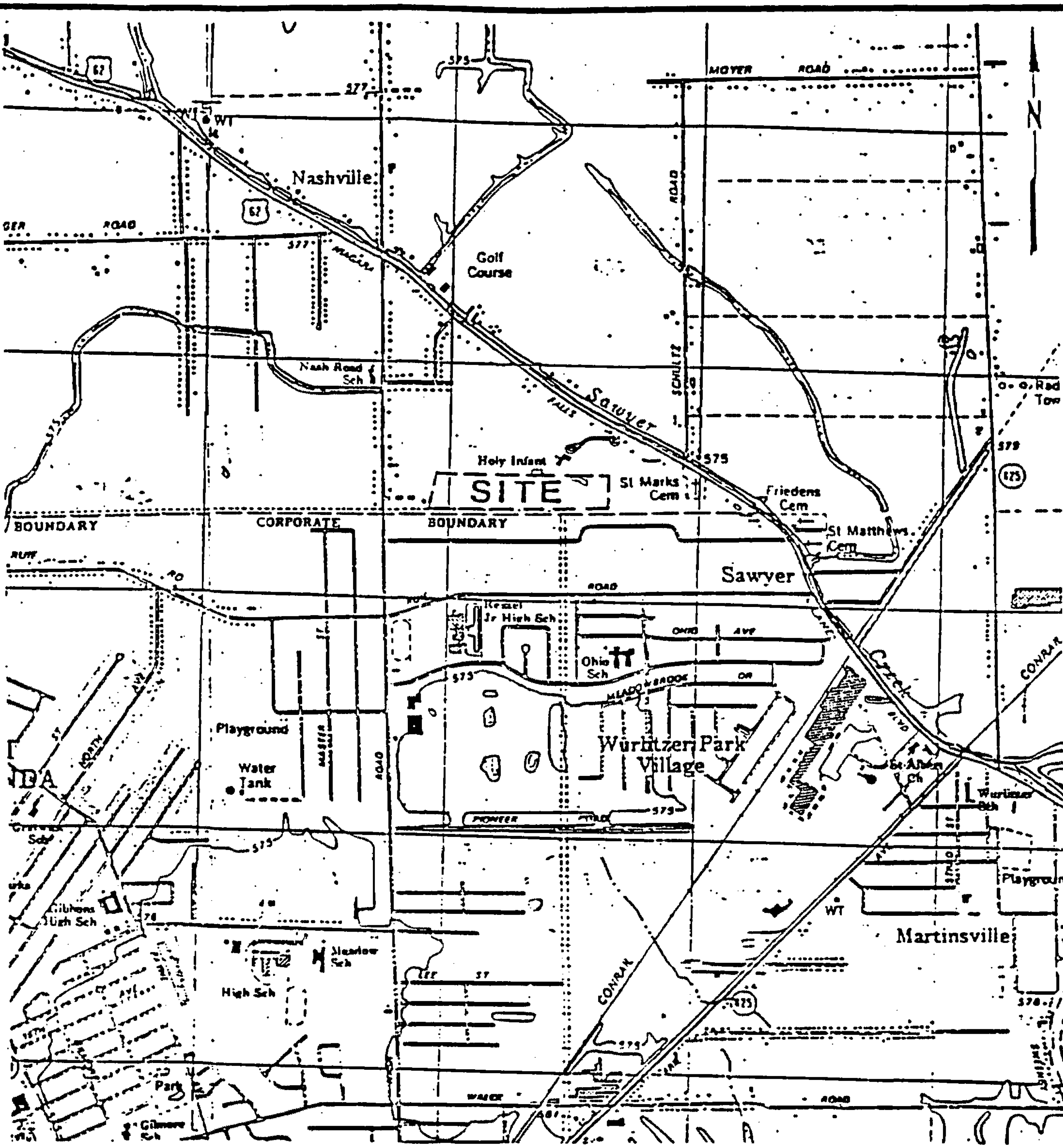
The Nash Road Landfill site is located on Nash Road, in the Town of Wheatfield, Niagara County, New York (Figures V-1 and V-2). The current owner of the 25-acre site is the Town of Wheatfield. From 1964 to 1968 the Niagara Sanitation Company operated the site as a landfill for municipal and industrial wastes including caustic materials and sludges.

In June 1968, shortly before the site was closed, an on-site trench was excavated and filled with contaminated sludges from a sewer excavation project near the Love Canal in Niagara Falls, NY. Two large ponds now exist over the trench where sludges were reportedly dumped.

Based on sampling and analysis conducted in 1988 during this Phase II investigation, an assessment was made of the presence of hazardous substances at the site. A total of 39 HSL organic compounds and metals were detected in the groundwater samples collected at the site. Twenty-seven of these analytes are apparently being released to the shallow groundwater from an on-site source.

The population of North Tonawanda, New York was 35,760 in 1980. The municipal water supply intakes for the City of North Tonawanda and the Town of Wheatfield are in the Niagara River, more than 3 miles away. Eight residences within 3 miles of the site reportedly rely on groundwater for domestic use. There is a 354 acre wetland within a mile of the site. There have been no remedial, cleanup, or enforcement actions undertaken at the site.

LOCATION



SCALE

0 1000 2000 3000 4000 FEET

SITE COORDINATES: 43°04' 10.0" N. LAT
78°51' 33.8" W. LONG

REFERENCE: U.S.G.S. 7.5' TOPOGRAPHIC MAP
TONAWANDA EAST, NY (1980) AND
TONAWANDA WEST, NY (1980) QUADRANGLES

ENGINEERING-SCIENCE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PHASE II REPORT
SITE LOCATION MAP NASH ROAD
FIGURE V-1

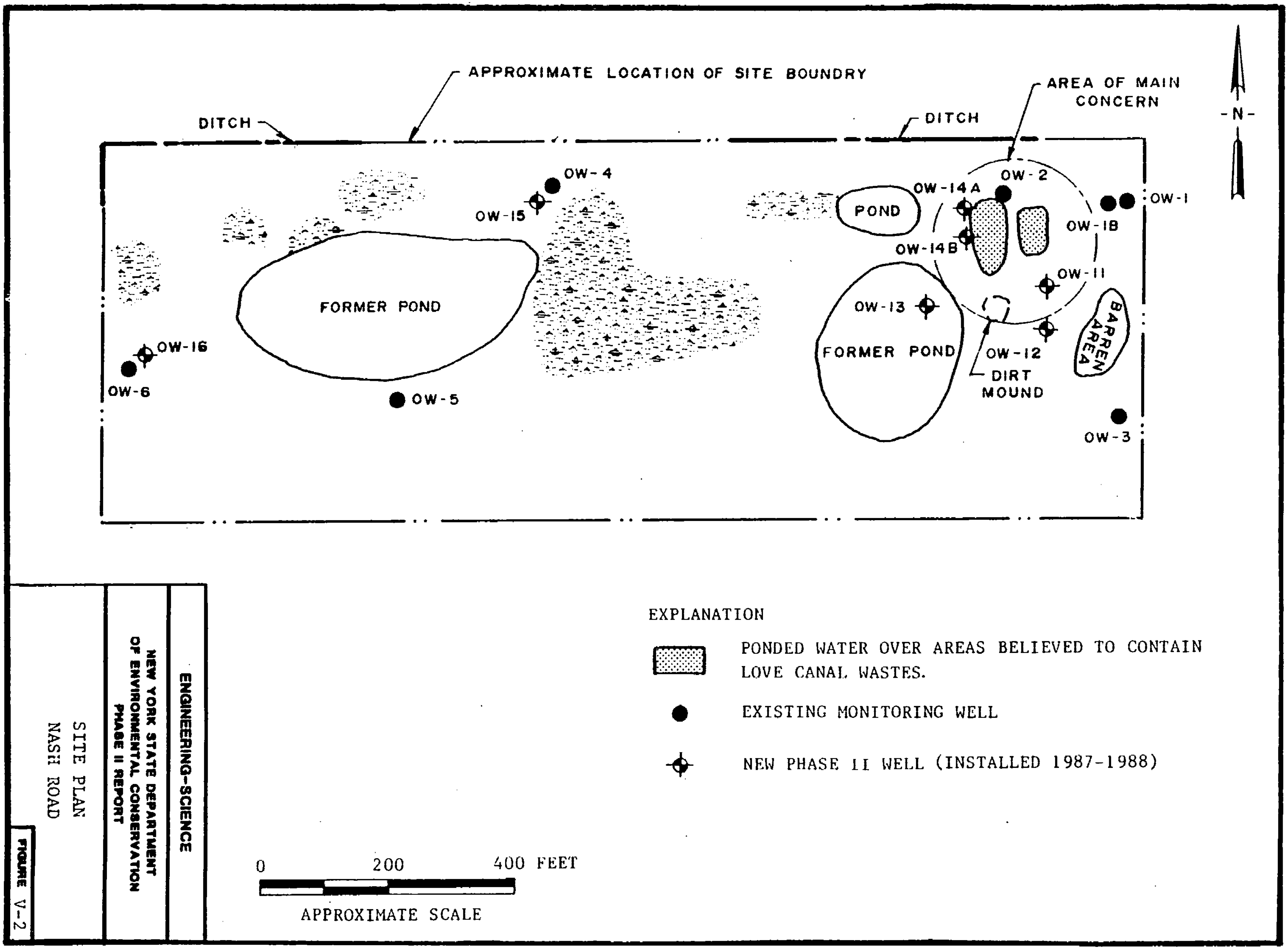


FIGURE V-2

SITE PLAN
NASH ROAD

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PHASE II REPORT

ENGINEERING-SCIENCE

Facility Name: Nash Road Date: May 31, 1988

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	2	3	
Physical State	0 1 2 3	1	3	3	
Total Route Characteristics Score			13	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	7	8	
Total Waste Characteristics Score			25	26	
5 Targets					3.5
Ground Water Use	0 1 2 3	3	6	9	
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	10	40	
Total Targets Score			16	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			18,000	57,330	
7 Divide line 6 by 57,330 and multiply by 100			S_{gw} =	31.40	

GROUND WATER ROUTE WORK SHEET

Facility Name: Nash Road   Date: May 31, 1988

Surface Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	0	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1	0	3	
1-yr. 24-hr. Rainfall	0 1 2 3	1	2	3	
Distance to Nearest Surface Water	0 1 2 3	2	6	6	
Physical State	0 1 2 3	1	3	3	
Total Route Characteristics Score			11	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	7	8	
Total Waste Characteristics Score			25	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			6,600	64,350	
7 Divide line 6 by 64,350 and multiply by 100			S_{sw} =	10.26	

SURFACE WATER ROUTE WORK SHEET

Facility Name: Nash Road   Date: 5/31/88

Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line 1 is 0, the S_a = 0. Enter on line 5 . If line 1 is 45, then proceed to line 2 .					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1	0	3	
Toxicity	0 1 2 3	3	9	9	
Hazardous Waste	0 1 2 3 4 5 6 7 8	1	7	8	
Total Waste Characteristics Score			16	20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1	18	30	
Distance to Sensitive Environment	0 1 2 3	2	2	6	
Land Use	0 1 2 3	1	3	3	
Total Targets Score			23	39	
4 Multiply 1 x 2 x 3			0	35,100	
5 Divide line 4 by 35,100 and multiply by 100			S_a = 0		

AIR ROUTE WORK SHEET

Facility Name: Nash Road Date: 5/31/88

Fire and Explosion Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Containment	1 3	1	1	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 Waste Characteristics Score			0	20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1	3	5	
Distance to Nearest Building	0 1 2 3	1	1	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	4	5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1	4	5	
Total Targets Score			15	24	
4 Multiply 1 x 2 x 3			0	1,440	
5 Divide line 4 by 1,440 and multiply by 100			S_{FE} = 0		

FIRE AND EXPLOSION WORK SHEET

Facility Name: Nash Road Date: 5/31/88

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
$\boxed{1}$ Observed Incident	0 45	1	0	45	8.1
If line $\boxed{1}$ is 45, proceed to line $\boxed{4}$ If line $\boxed{1}$ is 0, proceed to line $\boxed{2}$					
$\boxed{2}$ Accessibility	0 1 2 3	1	3	3	8.2
$\boxed{3}$ Containment	0 15	1	15		8.3
$\boxed{4}$ Waste Characteristics Toxicity	0 1 2 3	5	15	15	8.4
$\boxed{5}$ Targets					8.5
Population Within 1-Mile Radius	0 1 2 3 4 5	4	12	20	
Distance to a Critical Habitat	0 1 2 3	4	0	12	
Total Targets Score			12	32	
$\boxed{6}$ If line $\boxed{1}$ is 45, multiply $\boxed{1}$ x $\boxed{4}$ x $\boxed{5}$ If line $\boxed{1}$ is 0, multiply $\boxed{2}$ x $\boxed{3}$ x $\boxed{4}$ x $\boxed{5}$			8100	21,600	
$\boxed{7}$ Divide line $\boxed{6}$ by 21,600 and multiply by 100			S_{DC} =	37.50	

DIRECT CONTACT WORK SHEET

Facility Name: Nash Road Date: 5/31/88

Worksheet for Computing S_M

	S	S^2
Groundwater Route Score (S_{gw})	31.40	985.96
Surface Water Route Score (S_{sw})	10.26	105.27
Air Route Score (S_a)	0.00	0.00
$S_{gw}^2 + S_{sw}^2 + S_a^2$		1091.23
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		33.03
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		19.10

WORK SHEET FOR COMPUTING S_M

HRS
DOCUMENTATION
RECORDS

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 and should be a 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: Nash Road Landfill

LOCATION: Town of Wheatfield, Niagara Co., New York

GROUND WATER ROUTE

1. **OBSERVED RELEASE** **Assigned Value = 45**

Contaminants detected (5 maximum):

Benzene, toluene, chlorobenzene, lead, and barium were detected. (Nanco Laboratories, Inc. 1988).

Rationale for attributing the contaminants to the facility:

These contaminants were detected in well OW-11 at concentrations which were greater than three times the background concentrations (OW-14B).

***

2. **ROUTE CHARACTERISTICS**

<u>**Depth to Aquifer of Concern**</u> **Assigned Value = 3**

Name/description of aquifer(s) of concern:

Unconsolidated glacial sediments.

(ES, 1988).

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

1.0 foot in well OW-14B on February 18, 1988.

(ES, 1988).

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

27 feet in the disposal trench.

(NYSDOT, 1978).

<u>**Net Precipitation**</u> **Assigned Value = 2**

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

Mean annual precipitation is 32 inches.

(USDOC, 1979).

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

Mean annual lake evaporation is 27 inches.

(USDOC, 1979).

Net precipitation (subtract the above figures):

Net precipitation is 5 inches (32 - 27 = 5).

Permeability of Unsaturated Zone — **Assigned Value = 2**

Soil type in unsaturated zone:

Canandaigua silt loam and Raynham silt loam.

(USDA, 1972).

Permeability associated with soil type:

4×10^{-4} to 1×10^{-3} cm/sec.

(USDA, 1972).

Physical State — **Assigned Value = 3**

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

Municipal and industrial wastes including solids, liquids, and plating tank sludge.

(Niagara County DOH, 1981).

***

3. CONTAINMENT

Containment — **Assigned Value = 3**

Method(s) of waste or leachate containment evaluated:

Unlined landfill with inadequate cover and no run-on control (score = 3).

(NYSDOT, 1978; ES Field Investigations 1987-1988).

Method with highest score:

The above method of containment can be assigned a score of 3.

4. WASTE CHARACTERISTICS

Toxicity and Persistence — **Assigned Value = 18**

Compound(s) evaluated:

As shown in section 1 of this documentation, lead, barium, benzene, chlorobenzene, and toluene were detected in downgradient samples at concentrations at least 3 times the background concentrations.

(Nanco Laboratories, 1988).

Compound with highest score:

Lead can be assigned a score of 18.

(EPA, 1984).

Hazardous Waste Quantity — **Assigned Value = 7**

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):

The total quantity of hazardous substances at the facility is unknown; however, it is known that 1600 cubic yards of contaminated wastes were disposed at the site. A score of 7 can be assigned for a quantity of 1600 cubic yards of waste.

(NYSDOT, 1978).

Basis of estimating and/or computing waste quantity:

Memorandum specifying amount (NYSDOT, 1978).

5. TARGETS

Ground Water Use — **Assigned Value = 2**

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

Drinking water with municipal water from alternate unthreatened sources presently available.

(Hopkins, 1987; Walck, 1987).

<u>Distance to Nearest Well</u> **Assigned Value = 10**

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

Zastrow residential well at 7116 Nash Road.

(Walck, 1987).

Distance to above well or building:

About 1 mile north of the site.

(Walck, 1987).

Population Served by Ground Water Wells Within a 3-Mile Radius

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

The City of North Tonawanda is on a public water supply (Niagara River). Except for 8 residences, the Town of Wheatfield is on a public water supply (Niagara River). These 8 residences are assumed to be supplied by wells. Furthermore, it is assumed that these wells are screened within the aquifer of concern.

8 residences x 3.8 people per residence = 30 people.

(Hopkins, 1987; Walck, 1987; 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):

None.

(Hopkins, 1987; NYSDOH, 1982).

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

30 people.

SURFACE WATER ROUTE

1. **OBSERVED RELEASE** **Assigned Value = 0**

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

Methylene chloride (11 ug/l), total organic halogens (5-10 ug/l), and toluene (42.7 ug/l) were detected in samples of ponded water on-site. (ES, 1985). These samples were not analyzed for metals.

Rationale for attributing the contaminants to the facility:

These contaminants cannot be attributed to the facility; since surface water samples uphill or upstream of the facility were not taken; background levels are unknown. Furthermore, it is not known whether or not Sawyer Creek, the nearest downslope surface water is directly connected to these surface water bodies, or has been contaminated by the facility.

***

2. **ROUTE CHARACTERISTICS**

Facility Slope and Intervening Terrain **Assigned Value = 0**

Average slope of facility in percent:

0% - 3%.

(USGS, 1980).

Name/description of nearest downslope surface water:

Sawyer Creek.

(USGS, 1980).

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

0-3%.

(USGS, 1980).

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

Yes. Ponds containing surface water are on-site, but are confined to the site.

(ES Field Investigations, 1987-1988).

Is the facility completely surrounded by areas of higher elevation?

No.

(USGS, 1980).

<u>**1-Year 24-Hour Rainfall in Inches**</u> **Assigned Value = 2**

2-2.5 inches.

(USDOC, 1963).

<u>**Distance to Nearest Downslope Surface Water**</u> **Assigned Value = 3**

Sawyer Creek is about 800 feet northeast of the site.

(USGS, 1980).

<u>**Physical State of Waste**</u> **Assigned Value = 3**

Municipal and industrial waste including solids, liquids, and plating tank sludges.

(Niagara County DOH, 1981).

***

3. CONTAINMENT

Containment **Assigned Value = 3**

Method(s) of waste or leachate containment evaluated:

Unlined landfill with inadequate cover and no diversion system (score = 3).

(NYSDOT, 1978).

Method with highest score:

The above method yields a score of 3.

4. WASTE CHARACTERISTICS

Toxicity and Persistence **Assigned Value = 18**

Compound(s) evaluated

Soil samples collected by USGS revealed an elevated concentration of copper in one of 3 samples (EPA, 1985). A sample of waste materials ("organic puddles in the vicinity of the dirt pile") revealed the presence of chlorobenzene, benzoyl chloride, and benzoic acid (Olotka, 1968). One should note that the latter report, made by Hooker Industrial Chemicals Division, does not state which parameters were assayed and states that only one sample was taken.

Compound with highest score:

Copper can be assigned a score of 18.

(EPA, 1984).

Hazardous Waste Quantity **Assigned Value = 7**

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):

The total quantity of hazardous substances at the facility is unknown; however, it is known that 1600 cubic yards of contaminated wastes were disposed at the site. A score of 7 can be assigned for a quantity of 1600 cubic yards of waste.

(NYSDOT, 1978).

Basis of estimating and/or computing waste quantity:

(NYSDOT, 1978).

***

5. TARGETS

Surface Water Use **Assigned Value = 2**

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

Sawyer Creek is a Class D stream; secondary recreational contact only.

(6 NYCRR Volume E, Article B, Part 837, Map 2).

Is there tidal influence?

No. The site is not near the coast.

(USGS, 1980).

Distance to a Sensitive Environment **Assigned Value = 1**

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

Not applicable. The site is not near the coast.

(USGS, 1980).

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

1 mile to a 354-acre wetland north of the site.

(Farquhar, 1987).

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

There are no federally designated critical habitats of endangered species within the State of New York.

(Ozard, 1988).

Population Served by Surface Water **Assigned Value = 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 the specified radii of the site.

(NYSDOH, 1982).

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

There are no water supply intakes within the specified radii of the site.

(NYSDOH, 1982).

Total population served:

There are no water supply intakes within the specified radii of the site. (NYSDOH, 1982).

Name/description of nearest of above water bodies:

There are no water supply intakes within the specified radii of the site. (NYSDOH, 1982).

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

There are no water supply intakes within the specified radii of the site. (NYSDOH, 1982).

AIR ROUTE

1 . . OBSERVED RELEASE **Assigned Value = 0**

Contaminants detected:

Readings above background were not detected in the breathing zone during routine on-site monitoring for organic vapors.

(ES Field Investigations, 1987-1988).

Date and location of detection of contaminants:

Not applicable. No contaminants were detected above background in the breathing zone.

Methods used to detect the contaminants:

Photovac-TIP.

Rationale for attributing the contaminants to the site:

Not applicable.

***

2. WASTE CHARACTERISTICS

<u>**Reactivity and Incompatibility**</u> **Assigned Value = 0**

Most reactive compound:

No reactive compounds with the potential to impact the air pathway are known to exist on site.

(ES Field Investigations, 1987-88).

Most incompatible pair of compounds:

No incompatible pairs of compounds with the potential to impact the air pathway are known to exist on site.

(ES Field Investigations, 1987-88).

<u>Toxicity</u> **Assigned Value = 3**

Most toxic compound:

Hazardous waste with the potential to impact the air pathway is present in the groundwater, elevated Photovac readings were detected in headspace of well OW-11. Benzene was detected in groundwater sample from OW-11.

(Nanco Labs, Inc. 1988).

<u>Hazardous Waste Quantity</u> **Assigned Value = 7**

Total quantity of hazardous waste:

1600 cubic yards.

Basis of estimating and/or computing waste quantity:

(NYSDOT, 1978).

***

3. TARGETS

<u>Population Within 4-Mile Radius</u> **Assigned Value = 18**

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

0 to 4 mi <u>0 to 1 mi</u> **0 to 1/2 mi** **0 to 1/4 mi**

1,800 people.

(Estimated from USGS Topographic Maps; Tonawanda East, NY, 1980 and Tonawanda West, NY, 1980 Quadrangles).

<u>Distance to a Sensitive Environment</u> **Assigned Value = 1**

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

The site is not near the coast.

(USGS, 1980).

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

1 mile to a 354 acre wetland north of the site.

(Farquhar, 1987).

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

There are no federally designated critical habitats or endangered species within the State of New York.

(Ozard, 1988).

<u>Land Use</u> **Assigned Value = 3**

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

Wurlitzer Industrial Park is located 3500 feet southeast of the site.

(USGS, 1980).

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

There is no national or state park, forest, or wildlife reserve within 2 miles of the site.

(USGS, 1980).

Distance to residential area, if 2 miles or less:

500 feet.

(USGS, 1980).

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

0.01 mile (adjacent to a corn field).

(ES Field Investigations, 1987-1988; USDA, 1972, 1984).

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

0.01 mile.

(USDA, 1972, 1984).

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

There is no historic or landmark site within view of the site.

(U.S. Department of Interior, National Park Service, 1983a, 1983b).

FIRE AND EXPLOSION

1. CONTAINMENT **Assigned Value = 1**

Hazardous substances present:

No information which indicates that fire and explosion has occurred (or could occur) at the site was discovered during the Phase II study.

Type of containment, if applicable:

***

2. WASTE CHARACTERISTICS

Direct Evidence **Assigned Value = 0**

Type of instrument and measurements:

No measurements of the potential for fire and explosion were taken on-site.

Ignitability **Assigned Value = 0**

Compound used:

No ignitable compounds in a form with the potential to pose a fire or explosion threat are known to be present on-site.

(ES Field Investigations, 1987-88).

Reactivity **Assigned Value = 0**

Most reactive compound:

No reactive compounds in a form with the potential to pose a fire or explosion threat are known to be present on-site.

(ES Field Investigations, 1987-88).

Incompatibility **Assigned Value = 0**

Most incompatible pair of compounds:

No incompatible compounds are known to exist on-site.

(ES Field Investigations, 1987-88).

Hazardous Waste Quantity — Assigned Value = 0

Total quantity of hazardous substances at the facility:

Hazardous substances in a form with the potential to pose a fire or explosion threat are not known to exist on-site.

(ES Field Investigations, 1987-1988).

Basis of estimating and/or computing waste quantity:

Not applicable; see comment above.

***

3. TARGETS

Distance to Nearest Population — **Assigned Value = 3**

500 feet.

(ES Field Investigations, 1987-88; USGS, 1980).

Distance to Nearest Building — **Assigned Value = 1**

500 feet.

(USGS, 1980).

Distance to Sensitive Environment — **Assigned Value = 0**

Distance to wetlands:

1 mile to 354 acre wetland north of the site.

(Farquhar, 1987).

Distance to critical habitat:

There are no federally designated critical habitats of endangered species within the State of New York.

(Ozard, 1988).

Land Use — **Assigned Value = 3**

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

3500 feet

(USGS, 1980).

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

There is no national or state park, forest, or wildlife reserve within 2 miles of the site.

(USGS, 1980).

Distance to residential area, if 2 miles or less:

500 feet.

(USGS, 1980).

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

0.01 mile.

(ES Field Investigation, 1987-88; USDA, 1972, 1984).

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

0.01 mile.

(ES Field Investigations, 1987-88; USDA, 1972,1984).

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

There is no historic or landmark site within view of the site.

(U.S. Department of Interior National Park Service, 1983a, 1983b).

Population Within 2-Mile Radius **Assigned Value = 4**

6,100 people

(USGS, 1980).

Buildings Within 2-Mile Radius **Assigned Value = 4**

1620 buildings

(USGS, 1980).

DIRECT CONTACT

1. OBSERVED INCIDENT **Assigned Value = 0**

Date, location, and pertinent details of incident:

Based on information revealed during the Phase II Study, there is not a confirmed instance in which contact with hazardous substances at the site has caused injury, illness, or death to humans or animals.

(Phase II Record Search, 1987-88).

***

2. ACCESSIBILITY **Assigned Value = 3**

Describe type of barrier(s):

There are no barriers. The site is easily accessed.

(ES Field Investigations, 1987-88).

***

3. CONTAINMENT **Assigned Value = 15**

Type of containment, if applicable:

Wastes were disposed in unlined trenches and covered with excavated soil. Landfill cover is inadequate and wastes protrude through the cover in some areas.

(ES Field Investigations, 1987-88).

***

4. WASTE CHARACTERISTICS

Toxicity **Assigned Value = 3**

Compounds evaluated:

Soil samples collected by USGS revealed an elevated concentration of copper in one of 3 samples (EPA, 1985). A sample of waste materials ("organic puddles in the vicinity of the dirt pile") revealed the presence of chlorobenzene, benzoyl chloride, and benzoic acid (Olotka, 1968). One should note that the latter report, made by Hooker Industrial Chemicals Division, does not state which parameters were assayed and states that only one sample was taken.

Compound with highest score:

Copper can be assigned a score of 3.

(EPA, 1984).

5. TARGETS

<u>Population within one-mile radius</u> **Assigned Value = 3**

1,800 people.

(USGS, 1980).

Distance to critical habitat (of endangered species) **Assigned Value = 0**

There are no federally designated critical habitats of endangered species within the State of New York.

(Ozard, 1988).

EPA 2070-13

Site Inspection Report

NASH ROAD

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	0000514380

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Nash Road Landfill	Nash Road

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Town of Wheatfield	NY	14150	Niagara	63	36

09 COORDINATES: LATITUDE 43° 04' 10 .0" LONGITUDE 78° 51' 33 .8"

10 TYPE OF OWNERSHIP (Check one): ☐ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY XX E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION: 4 / 28/ 83* (MONTH DAY YEAR)

02 SITE STATUS: ☐ ACTIVE ☒ INACTIVE

03 YEARS OF OPERATION: 1964 (BEGINNING YEAR) | 1968 (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR Engineering-Science (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ______ (Name of firm)

☐ E. STATE ☒ F. STATE CONTRACTOR Dames & Moore (Name of firm) ☐ G. OTHER ______ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
John Kubarewicz	Chemical Engineer	Engineering Science	(703) 591-7575
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO.**
Art Seaner	Geologist	Dames & Moore	(319) 638-2572
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
Ed Greinert	City Supervisor	Wheatfield	( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	15:00	sunny

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
George Moreau	Engineering-Science	(315) 451-9560

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
George Moreau		ES	315-451-9560	12 /28 / 88 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

* Revised 12/28/88

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	0000514380

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [X] A. SOLID
- [ ] B. POWDER, FINES
- [X] C. SLUDGE
- [ ] D. OTHER ______ (Specify)
- [ ] E. SLURRY
- [X] F. LIQUID
- [ ] G. GAS

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

TONS ______
CUBIC YARDS 1600
NO. OF DRUMS ______

03 WASTE CHARACTERISTICS (Check all that apply)

- [X] A. TOXIC
- [X] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [ ] D. PERSISTENT
- [ ] E. SOLUBLE
- [ ] F. INFECTIOUS
- [X] 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			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS	900 cy		chemical waste/love canal
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			lead, chromium, plating sludge

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
OCC	benzene	71-43-2	water sample	4500	mg/L
OCC	chlorobenzene	108-90-7	water sample	590	mg/L
OCC	toluene	108-88-3	water sample	14,000	mg/L
OCC	acetone	67-64-1	water sample	2,300	mg/L
MES	lead	7439-92-1	landfill	67-20,000	ppb
MES	mercury	7439-97-6	landfill	0.5	ppb

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	mercury	7439-97-6	FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

1) Investigation of Selected Inactive Toxic Landfills in conjunctionwith the Niagara River Study," Aug. 1981, (U.S.G.S.)
2) Memo to Hennesey NYSDOT, 8/9/78
3) Letter to Caine NYSDOT from Hooker, 5/9/68

EPA FORM 2070-13 (7-81)

4) Nanco Laboratories, Inc., 1988

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	0000514380

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION — 02 ☒ OBSERVED (DATE: 3/88) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 84 — 04 NARRATIVE DESCRIPTION

Benzene (4500 mg/L), chlorobenzene (590 mg/L), toluene (14,000 mg/L), acetone (2300 mg/L), and lead (180 mg/L) were all detected downgradient.

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

Water and soils "rusty" in appearance-methylene chloride, total organic halogens, and toluene detected.

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

None detected

01 ☒ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☒ OBSERVED (DATE: 7/84) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

A small fire of unknown origin was seen.

01 ☒ E. DIRECT CONTACT — 02 ☒ OBSERVED (DATE: 7/84) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 100 — 04 NARRATIVE DESCRIPTION

Site used by local residents as play area.

01 ☒ F. CONTAMINATION OF SOIL — 02 ☒ OBSERVED (DATE: 7/84) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: (Acres) — 04 NARRATIVE DESCRIPTION

Soil samples found to have metal and organic contamination.

01 ☒ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE:) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 84 — 04 NARRATIVE DESCRIPTION

Some local residents are believed to draw water from the contaminated aquifer.

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

no

01 ☒ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE:) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 100 — 04 NARRATIVE DESCRIPTION

no known injuries

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	000514380

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

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

none observed

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

none observed

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

none observed

01 XX M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ☒ OBSERVED (DATE: 4/28/83) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ 04 NARRATIVE DESCRIPTION

pools of orange tinted standing water observed; rubbish protruding through cover.

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

no

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

no

01 XX P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☒ OBSERVED (DATE: 6/11/81) — ☐ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Niagara Co. DOH observed evidence of dumping after site closed.

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

III. TOTAL POPULATION POTENTIALLY AFFECTED: 200

IV. COMMENTS

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

1) Niagara County DOH 1981
2) U.S.G.S. Study, 1982/83
3) Site visits during Phase II investigations

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4) Nanco Laboratories, Inc., 1988

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	00514380

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	not applicable			
☐ 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)

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☒ H. OTHER none (Specify)

05 OTHER

- ☐ A. BUILDINGS ON SITE

06 AREA OF SITE

7 (Acres)

07 COMMENTS

Poorly closed; tires, metal, other rubbish visible

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.

1) Poorly closed; tires, metal, other rubbish visible.
2) Disposal trench for Love Canal waste excavated in soft, layered clay.
No engineered barriers installed.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☒ YES ☐ NO

02 COMMENTS

Unfenced, easy access

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

1) Site inspection, summer 1983
2) Memo to Hennesey NYSOT, 8/9/84

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	0000514380

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. more than 3 (mi)

B. 0.2 (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 84

03 DISTANCE TO NEAREST DRINKING WATER WELL 0.2 (mi)

04 DEPTH TO GROUNDWATER 4 (ft)

05 DIRECTION OF GROUNDWATER FLOW East

06 DEPTH TO AQUIFER OF CONCERN 4 (ft)

07 POTENTIAL YIELD OF AQUIFER (gpd)

08 SOLE SOURCE AQUIFER ☐ YES ☒ NO

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

Several residences along Nash Road have groundwater wells. Screened interval is not known. Closest well to the site is about one mile away.

10 RECHARGE AREA ☐ YES ☐ NO COMMENTS

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
Sawyer Creek	☐	0.25 (mi)
Bull Creek	☐	1.1 (mi)
Tonawanda Creek	☐	2.3 (mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE A. 1800 NO. OF PERSONS

TWO (2) MILES OF SITE B. 6,100 NO. OF PERSONS

THREE (3) MILES OF SITE C. 12,000 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 350 ft. (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE 1620

04 DISTANCE TO NEAREST OFF-SITE BUILDING 350 ft. (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 suburban housing development.

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	00514380

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
about 70 (ft)	unknown (ft)	5.6-7.3

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
32-27 = 5 (in)	2.1 (in)	about 0 %	about E	1.0 %

09 FLOOD POTENTIAL

SITE IS IN 7,500 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. .57 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

none within 1 mile (mi)

ENDANGERED SPECIES: ______

DEC
ion 9
h&
dlife
Farquhar

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AG LAND
A. 0.01 (mi)	B. 0.01 (mi)	C. 0.01 (mi)	D. 0.01 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site is located in a flat, poorly drained area. Prior to dumping, site was a swamp, with drainage to the North.

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

1) U.S.G.S. Study
2) DEC site Dossier
3) Phase II Investigation
4) Letter from J. Ozard (NYSDEC Wildlife Resources Center) to M. Anatra (7/21/87)

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	C000514380

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	8/9	CompuChem/Nanco Laboratories, Inc.	1984/1988
SURFACE WATER	5	ES Laboratory	presently available
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER sediment	3	Compu Chem	8/84

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Downhole gamma logging	Performed in wells to define soil stratigraphy
Geophysical survey	Performed to locate disposal trench boundaries
Permeability testing	Performed in wells to evaluate rate of contaminant movement

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF Dames & Moore office
(Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS Dames & Moore office

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Soil samples were collected during the drilling of the seven sampling wells. Grain size analyses of selected samples were performed in the laborotory.

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

1) Phase II investigation
2) Nanco Laboratories, 1988

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	0000514380

II. CURRENT OWNER(S)			PARENT COMPANY (If applicable)		
01 NAME: Town of Wheatfield (Ed Greinert: Supervisor)		02 D+B NUMBER	08 NAME		09 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.): Town Hall		04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)		11 SIC CODE
05 CITY: Wheatfield	06 STATE: NY	07 ZIP CODE: 14787	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	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
01 NAME		02 D+B NUMBER	01 NAME		02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

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

Niagara County Tax Records

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

EPA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	0000514380

II. CURRENT OPERATOR *(Provide if different from owner)* | **OPERATOR'S PARENT COMPANY** *(If applicable)*

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
none			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER

III. PREVIOUS OPERATOR(S) *(List most recent first; provide only if different from owner)* | **PREVIOUS OPERATORS' PARENT COMPANIES** *(If applicable)*

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
Niagara Sanitation Co.			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
N. Tonawanda	NY				

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
1964-1968	

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

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

Niagara County Department of Health, 1981

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	0000514380

II. ON-SITE GENERATOR

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	

III. OFF-SITE GENERATOR(S)

01 NAME	Hooker Chemical	Niagara Falls Air Force Bae	Bell Aerospace	Carborundum
02 D+B NUMBER				
03 STREET ADDRESS (P.O. Box, RFD #, etc.)				Buffalo Ave.
04 SIC CODE				
05 CITY	Niagara Falls	Niagara Falls		Niagara Falls
06 STATE	NY	NY		NY
07 ZIP CODE				

IV. TRANSPORTER(S)

01 NAME	Niagara Sanitation Co.			
02 D+B NUMBER				
03 STREET ADDRESS (P.O. Box, RFD #, etc.)				
04 SIC CODE				
05 CITY	N. Tonawanda			
06 STATE	NY			
07 ZIP CODE				

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

Other off-site generator: Frontier Chemical

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	0000514380

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
nc

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
nc

01 ☐ D. SPILLED MATERIAL REMOVED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
nc

01 ☐ E. CONTAMINATED SOIL REMOVED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ F. WASTE REPACKAGED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ G. WASTE DISPOSED ELSEWHERE 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ H. ON SITE BURIAL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ I. IN SITU CHEMICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ J. IN SITU BIOLOGICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ K. IN SITU PHYSICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ L. ENCAPSULATION 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ M. EMERGENCY WASTE TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ N. CUTOFF WALLS 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ P. CUTOFF TRENCHES/SUMP 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ Q. SUBSURFACE CUTOFF WALL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	0000514380

II PAST RESPONSE ACTIVITIES *(Continued)*

01 ☐ R. BARRIER WALLS CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ S. CAPPING/COVERING 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
ncomplete cover of waste (trash)

01 ☐ T. BULK TANKAGE REPAIRED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ U. GROUT CURTAIN CONSTRUCTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ V. BOTTOM SEALED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ W. GAS CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ X. FIRE CONTROL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ Y. LEACHATE TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ Z. AREA EVACUATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ 1. ACCESS TO SITE RESTRICTED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

01 ☐ 2. POPULATION RELOCATED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
no

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)*

Site visits during Phase II investigation

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 11 - ENFORCEMENT INFORMATION	I. IDENTIFICATION 01 STATE: NY 02 SITE NUMBER: 00005 4380

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☒ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

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

Letter from Vance Bryant (NYSDEC Div. Env. Enforcement) to M. Anatra (ES) 7/7/87

EPA FORM 2070-13 (7-81)

HRS DOCUMENTATION REFERENCES*

NASH ROAD LANDFILL

1. Nanco Laboratories, Inc.; 1988. Analytical Data.

2. ES, 1988. Phase II boring logs for Nash Road site, Tables, IV-2 and IV-3.

3. NYSDOT, 1978. Memorandum from D. H. Ketchum to W. C. Hennessy. August 9, 1978.

4. USDOC, 1979. Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Ashville, NC, 1979.

5. USDA, 1972. United States Department of Agriculture (USDA), 1972. Soil Survey of Niagara County, New York. Prepared by United States Department of Agriculture Soil Conservation Service in cooperation with Cornell University Agricultural Experiment Station. October, 1972.

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7. EPA, 1984. Uncontrolled Hazardous Waste Site Ranking System: A Users Manual (HW-10). United States Environmental Protection Agency.

8. Hopkins, M., 1987. Communication from Mike Hopkins of Niagara County Health Department to Elizabeth Dobson of Engineering-Science regarding groundwater use in the vicinity of Nash Road site dated October 21, 1987.

9. Walck, Norman A., 1987. Records from the Town of Wheatfield Water District. Correspondence dated October 28, 1987. Follow-up correspondence with Mike Hopkins, NCHD dated January 3, 1989.

10. NYSDOH, 1982. New York State Atlas of Community Water System Sources, 1982. New York State Dept. of Health, Division of Environmental Protection, Bureau of Public Water Supply Protection.

11. ES, 1985. Engineering Investigations at Inactive Hazardous Waste Sites: Phase II Investigation. Nash Road Landfill. Volumes I and II. Prepared for New York State Department of Environmental Conservation by Engineering-Science. July, 1985.

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*All these references were used for HRS Documentation, while some of them were also used as General References.

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19. USDA, 1984. New York Prime Farmland Mapping Units. May, 1984.

20. U.S. Department of Interior, National Park Service, 1983a. National Register of Historic Places: Annual Listing of Properties. January 1979 through December, 1982. July, 1983.

21. U.S. Department of Interior, National Park Service, 1983b. National Registry of Natural Landmarks. Federal Register. March 1, 1983.

GENERAL REFERENCES**

22. Hopkins,, M.E., 1981. Niagara Sanitation Company (DEC #932054) site inspection report, Niagara County Department of Health, 7p.

23. Johnston, R.H., 1964. Ground Water in the Niagara Falls Area, New York, State of New York Conservation Department, Water Resources Commission Bulletin GW-53, 93p.

24. Muller, E.H., 1965. Bibliography of New York Quaternary Geology, New York State Museum and Science Service Bulletin Number 398.

25. Muller, E.H., 1977. Quaternary Geology of New York, Niagara Sheet, New York State Museum and Science Service, Map and Chart Series Number 28, Scale 1:250,000.

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28. Rickard, L.V., and D.W. Fisher, 1970. Geologic Map of New York, Niagara Sheet, New York State Museum and Science service, Map and Chart series Number 15, Scale 1:250,000.

29. USDA, 1972; Soil Survey of Niagara County, New York, U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C., 199 p.

**These references were not used for HRS Documentation. See also "HRS REFERENCES" above.

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER
GW-11.19 2/18

SY012.19/NASH RD

Laboratory Name:NANCO LABORATORY INC.
Lab File ID No: H0213
Sample Matrix: WATER
Data Release Authorized By: R.J. Klunoch

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/19/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/23/88
Date Analyzed: 02/23/88
Conc/Dil Factor: 75 pH: 6.3
Percent Moisture: N/A

		ug/l or ug/Kg (Circle One)
-3	Chloromethane	750.0 U
-9	Bromomethane	750.0 U
-4	Vinyl Chloride	750.0 U
-3	Chloroethane	750.0 U
-2	Methylene Chloride	240.0 J
-1	Acetone	2300.0
-0	Carbon Disulfide	375.0 U
-4	1,1-Dichloroethene	375.0 U
-3	1,1-Dichloroethane	375.0 U
0-5	Trans-1,2-Dichloroethene	375.0 U
-3	Chloroform	375.0 U
6-2	1,2-Dichloroethane	375.0 U
-3	2-Butanone	750.0 U
-6	1,1,1-Trichloroethane	67.0 J
-5	Carbon Tetrachloride	375.0 U
5-4	Vinyl Acetate	750.0 U
-4	Bromodichloromethane	375.0 U

CAS Number		ug/l or ug/Kg (Circle One)
79-34-5	1,1,2,2-Tetrachloroethane	375.0 U
78-87-5	1,2-Dichloropropane	375.0 U
10061-02-6	Trans-1,3-Dichloropropene	375.0 U
79-01-6	Trichloroethene	375.0 U
124-48-1	Dibromochloromethane	375.0 U
79-00-5	1,1,2-Trichloroethane	375.0 U
71-43-2	Benzene	4500.0
10061-01-5	cis-1,3-Dichloropropene	375.0 U
110-75-8	2-Chloroethylvinylether	750.0 U
75-25-2	Bromoform	375.0 U
591-78-6	2-Hexanone	750.0 U
108-10-1	4-Methyl-2-Pentanone	750.0 U
127-18-4	Tetrachloroethene	375.0 U
108-88-3	Toluene	14000.0
108-90-7	Chlorobenzene	590.0
100-41-4	Ethylbenzene	375.0 U
100-42-5	Styrene	375.0 U
	Total Xylenes	375.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

result is a value greater than or equal to the detection report the value.

tes compound was analyzed for but not detected. Report nimum detection limit for the sample with the U(e.g.10U on necessary concentration dilution actions. (This is not rily the instrument detection limit.) The footnote should -Compound was analyzed for but not detected.The number is nimum attainable detection limit for the sample.

tes an estimated value.This flag is used either when ting a concentration for tentatively identified compounds 1 1 response is assumed or when the mass spectral data tes the presence of a compound that meets the identification ia but the result is less than the specified detection limit ater than zero (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

(1)

INORGANIC ANALYSIS DATA SHEET

FORM I

SMPL NO.: SW-11.19 2/18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 2/19/88

Lab Sample ID: 88-EW 5657

Date Reported:

Location ID: SYO 12.19/NASH RD.

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM ______

MATRIX : WATER __X__ SOIL ______ SLUDGE ____ OTHER ______

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	10200.0 PE		13. MAGNESIUM	398000.0 PE	
2. ANTIMONY	50.0 UP		14. MANGANESE	12100.0 PE	
3. ARSENIC	5.0 UF		15. MERCURY	0.3 C.V.	
4. BARIUM	550.0 P		16. NICKEL	180.0 P	
5. BERYLLIUM	1.0 UP		17. POTASSIUM	25100.0 P	
6. CADMIUM	5.0 UP		18. SELENIUM	40.0 UF N	(1:10)
7. CALCIUM	2380000.0 P	(1:50)	19. SILVER	31.0 P	-
8. CHROMIUM	15.0 P		20. SODIUM	165000.0 PE	
9. COBALT	[34.0]P		21. THALLIUM	4.0 UF N	
10. COPPER	120.0 P		22. VANADIUM	25.0 UP	
11. IRON	34500.0 PE		23. ZINC	540.0 P N E	
12. LEAD	180.0 F	(1:10)	PERCENT SOLIDS (%)	NA	
CYANIDE	NR				
PHENOL	NR				

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that became light yellow after ICP yellow after furnace digestion procedures. Pb and Se were analyzed at a 1:10 dilution. Ca was analyzed at a 1:50 dilution.

LAB MANAGER

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER
OW-14B.19 2/17

SY012.19/NASH RD

Laboratory Name: NANCO LABORATORY INC.	Case No: ENG. SCI.
Lab File ID No: H0193	QC Report No: N/A
Sample Matrix: WATER	Contract No: N/A
Data Release Authorized By: P.G.Heinrich	Date Sample Received: 02/19/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/22/88
Date Analyzed: 02/22/88
Conc/Dil Factor: 1 pH: 6.9
Percent Moisture: N/A

S ber		ug/l or ug/Kg (Circle One)
-87-3	Chloromethane	10.0 U
-83-9	Bromomethane	10.0 U
01-4	Vinyl Chloride	10.0 U
.0-3	Chloroethane	10.0 U
-09-2	Methylene Chloride	8.2
64-1	Acetone	10.0 U
15-0	Carbon Disulfide	5.0 U
-35-4	1,1-Dichloroethene	5.0 U
-34-3	1,1-Dichloroethane	5.0 U
-60-5	Trans-1,2-Dichloroethene	5.0 U
66-3	Chloroform	5.0 U
7-06-2	1,2-Dichloroethane	5.0 U
-93-3	2-Butanone	10.0 U
55-6	1,1,1-Trichloroethane	5.0 U
23-5	Carbon Tetrachloride	5.0 U
8-05-4	Vinyl Acetate	10.0 U
27-4	Bromodichloromethane	5.0 U

CAS Number		ug/l or ug/Kg (Circle One)
79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	5.0 U
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

UE
he result is a value greater than or equal to the detection
t, report the value.

icates compound was analyzed for but not detected. Report
minimum detection limit for the sample with the U(e.g.10U
ed on necessary concentration dilution actions. (This is not
essarily the instrument detection limit.) The footnote should
U-Compound was analyzed for but not detected.The number is
minimum attainable detection limit for the sample.

licates an estimated value.This flag is used either when
mating a concentration for tentatively identified compounds
e a 1 1 response is assumed or when the mass spectral data
licates the presence of a compound that meets the identification
teria but the result is less than the specified detection limit
greater than zero (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

1

INORGANIC ANALYSIS DATA SHEET

FORM I

SMPL NO.: GW-148.19 2/17

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 2/19/88

Lab Sample ID: 88-EW 5652

Date Reported:

Location ID: SYO 12.19/NASH RD.

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM _____

MATRIX : WATER __X__ SOIL _____ SLUDGE _____ OTHER _____

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1.	ALUMINUM	4900.0 PE	13.	MAGNESIUM	33300.0 PE
2.	ANTIMONY	50.0 UP	14.	MANGANESE	1200.0 PE
3.	ARSENIC	6.3 F	15.	MERCURY	0.2 U C.V.
4.	BARIUM	[76.0 IP	16.	NICKEL	25.0 UP
5.	BERYLLIUM	1.0 UP	17.	POTASSIUM	1500.0 UP
6.	CADMIUM	5.0 UP	18.	SELENIUM	4.0 UF N
7.	CALCIUM	100000.0 P	19.	SILVER	10.0 UP
8.	CHROMIUM	8.0 UP	20.	SODIUM	21900.0 PE
9.	COBALT	15.0 UP	21.	THALLIUM	4.0 UFN
10.	COPPER	[24.0 IP	22.	VANADIUM	25.0 UP
11.	IRON	9800.0 PE	23.	ZINC	140.0 PNE
12.	LEAD	28.4 SF (1:2)		PERCENT SOLIDS (%)	NA
	CYANIDE	NR			
	PHENOL	NR			

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a tan liquid that became colorless after ICP and and furnace digestion procedures. Pb was analyzed at a 1:~~10~~ 2 dilution.

Deborah H[illegible]

LAB MANAGER

ENGINEERING-SCIENCE
DRILLING RECORD

DRILLING CONTRACTOR:
[Dri]ller: Mike Logue - Rochester Drilling
[Insp]ector: L. Dobson - ES
[Rig] Type: Mobile 61
[Dri]lling Method: 4.25" I.D. HSA

PROJECT NAME: Nash Road
PROJECT NO.: SY012.19

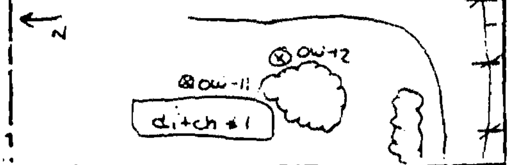
BORING NO.: OW-11
Sheet 1 of 1
Location: E. of ditch #1 - (upgradient)

[G]ROUND WATER OBSERVATIONS
from TOC

[W]ater Level	4' 3.5"		
[T]ime	1300		
[D]ate	11/02/88		
[Ca]sing Depth	9.0'		

Weather: 15°F, Breezy / Partly Sunny
Date/Time Start: 1/28/88 1100
Date/Time Finish: 1/28/88 1500

Plot Plan



[P]hotovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
1.5	0-2	S-1	7	Red-Gray Clay and Silt, Fill material (Frozen)		
	rec=5"		1			
	SS		2			
			1		GROUT	
3.6	2-4	S-2	2	Red-Gray Clay (smooth) trace silt fine sand dry	2.0" PVC RISER	4
	rec.=10"		3		Bentonite	
	SS		2			5
			2			
41.7	4-6	S-3	2	Red-Gray Clay - lamination evident Some sand/gravel moist	SAND	
	rec=10"		1			7
	SS		1		2.0" PVC SCREEN	
			2			
31.7	6-8	S-4	2	Red/Gray Clay and Gray/black Sand on bottom - odor		
	rec=10"		2			
	SS		2			
			3			9.0'
23.7	8-10	S-5	3	Gray/Red Clay (laminated), Some fine sand - odor		
	rec=10"		2			
	SS		2			
			2			
	10-12		1	No Recovery 1st attempt Saturated gray clay / fill material (glass/garbage)		
	rec=6"		2			
	SS		3			
			3			
				boring terminated at 12.0' @ 12:00		

SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary
Red-Gray Clay with thin (<2.0") sand seams some fill

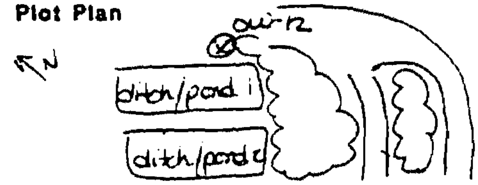
DRILLING CONTRACTOR:	**ENGINEERING-SCIENCE DRILLING RECORD**	**BORING NO.** DW-12
iller: M. Lewre - Rochester Drilling		**Sheet** 1 **of** 2
ıcector: L. Dobson - ES		**Location** E/NE of ditch/pond #1
ıg Type Mobile 61	**PROJECT NAME** NASH RD	
rilling Method 4.25" HSA	**PROJECT NO.** SY012.19	

GROUND WATER OBSERVATIONS

Vater Level	11' 2.0"		
Time	900		
Date	2/02/88		
asing Depth	34'		

Weather Cold - 10°F, Partly Sunny
Date/Time Start 1/26/88 1330
Date/Time Finish 1/27/88

Plot Plan



Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
53.5	0-2 rec=14" SS	S-1	3 5 5 7	Red/Gray Clay and fine sand, trace angular gravel (3mm) dry		auger cuttings read high 20's on photovac
1.8	5-7 rec.=24" SS	S-2	8 8 12 21	Fine red/brown sand with clay grading into smooth gray clay moist		
0.8	10-12 rec.=24" SS	S-3	4 5 6 6	light brown clay (8.0") grading into smoother red/gray clay		saturation @ 8.0' cuttings read 9.0 on photovac
0.9	15-17 rec.=24" SS	S-4	3 2 1 1	Red-Gray Clay - smooth/moist trace of orange sand @ 15'		
0	20-22 rec=24" SS	S-5	3 1 2 1	Gray/Red Clay - smooth/moist	2.0" PVC RISER	
0.1	22-24 rec=24" SS	S-6	3 3 2 2	Gray/Red Clay - some lamination smooth, high plasticity - Moist	GROUT	
0.5	24-26 rec=24" SS	S-7	2 2 1 1	same as above - some very fine sand @ 26.0'		25.5
–	26-28 rec=24" SS	S-8	2 1 2 1	Red/Gray Clay - saturated, smooth 1" v.fine sand @ 27.8'	BENTONITE SAND	27.5

SPT - STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR: Rochester Drilling
ller: M. Legare
ispector: L. Dobson - ES
g Type 4.25" HSA
illing Method Mobile B61

ENGINEERING-SCIENCE DRILLING RECORD

PROJECT NAME Nash Rd
PROJECT NO. SY012.19

BORING NO. OW-12
Sheet 2 of 2
Location

2

GROUND WATER OBSERVATIONS

Vater Level			
Time			
Date			
asing Depth			

Weather Cold, 10°F partly cloudy
Date/Time Start 1/26/88 1330
Date/Time Finish 1/27/88 1230

Plot Plan

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0	28-30	S-9	1	Gray/brown clay with fine brown	riser	
	Rec=10"		2	sand/trace gravel		29.5
			2			
			2			
0.1	30-32	S-10	26	Stiff brown fine-medium sand	2"	
	rec=20"		34	and rounded gravel (1mm-3mm)	PVC	
			34	Some clay - fairly dense	SAND SCREEN	
			32			
0.2	32-34	S-11	6	Same as above higher clay		
	rec=24"		12	content		32.5
			28			
			19			
				boring terminated @ 34' @ 1230 1/27/88		

SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR: Rochester Drilling Co.	**ENGINEERING-SCIENCE DRILLING RECORD**	BORING NO. DW-13
er: M Legare / C. Reynolds		Sheet 1 of 1
ector: L. Scibson - Eng. Science		Location
Type: Mobile B61	PROJECT NAME: Nash Road	downgradient of ditch/pond
lling Method: HSA 4.25 I.D.	PROJECT NO.: SY012.19	

(2)

ROUND WATER OBSERVATIONS

from TOC

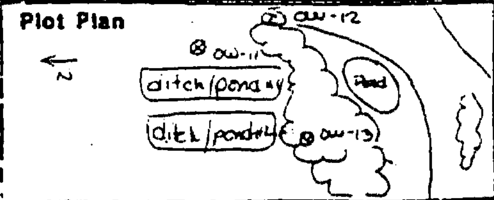
ater Level	3.00		
Time	1300		
Date	12/02/88		
sing Depth	5'		

Weather: Sunny, 30°F

Date/Time Start: 1/29/88 1130

Date/Time Finish: 1/29/88 1200

Plot Plan



Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0	0-2	S-1	5	Top Soil - Roots/organic material & very fine sand, trace angular gravel	Grout / 2" PVC RISER	1
	rec.=6.0"		1		Bentonite	2½
	SS		3			
			1		SAND	
0.2	2-4	S-2	29	Orange/Grey m-c sand, well sorted Saturated.	2" PVC SCREEN (3')	High blow count due to tree root
	rec.=6.0"		4			
	SS		10			
			12			5'
0	4-6	S-3	15	Orange/Brown m-c sand grading into stiff clay with silt, trace gravel		
	rec.=12"		15			
	SS		9			
			13			
				End of Boring 6.0' @ 1200		

SPT - STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED

U - UNDISTURBED SS - SPLIT SPOON

P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR:	ENGINEERING-SCIENCE DRILLING RECORD	BORING NO. 14-A (deep)
Driller: M. Legare - Roch Drilling		Sheet 1 of 2
Inspector: L. Dobson - ES		Location
Rig Type: ATV	PROJECT NAME: Nash Rd	
Drilling Method: 4.25" I.D.	PROJECT NO.: SY012.19	

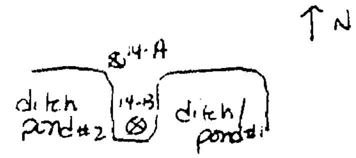
(2)

GROUND WATER OBSERVATIONS

Water Level		
Time		
Date		
Casing Depth		

Weather: 10°F / snowing
Date/Time Start: 2/04/88 1645
Date/Time Finish: 2/08/88 1100

Plot Plan



Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
−	0-2			See 14-B drilling log for soil description from 0'-7'		3.58' stickup
−	5-7					No elevated photovac readings in auger cuttings
1.5	10-12	S-1	3	Gray / Red Clay and fine sand (stiff)		
	rec=24"		3			
	SS		4			
			4			
0	15-17	S-2	1	Gray / Red Clay - layering evident smooth, moist, plastic.		
	rec=24"		2			
	SS		2			
			1			
0	20-22	S-3	0*	same as above with trace of silt @ 20'		
	rec=24"		0			* spoon went 2' under weight of rod.
	SS		0		grout	
			0			
0.1	25-27	S-4	1	Gray / Red Clay - smooth / moist		
	rec=24'		2			
	SS		1			
			2			
	30-32	S-5	1	Red / Gray Clay - layering evident trace fine sand and gravel.	bentonite	30.5
			1			32.5
			1			
			1			
0	32-34		0*	Gray / Red Clay grading into fine sand & gravel w/clay @ 33'	sand	33.5
			0			
			0		2.0" PVC screen	
			0			

SPT - STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED

U - UNDISTURBED SS - SPLIT SPOON

P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR:	
Driller:	H. Moore - Rock drill
Inspector:	L. Dobson - ES
Rig Type	ATV
Drilling Method	4.25" I.D.

ENGINEERING-SCIENCE DRILLING RECORD

PROJECT NAME Nash Rd.

PROJECT NO. SY012.19

BORING NO. 14-A (deep)

Sheet 2 of 2

Location

2

GROUND WATER OBSERVATIONS

Water Level		
Time		
Date		
Casing Depth		

Weather 10°F / snowing

Date/Time Start 2/04/88 1645

Date/Time Finish 2/05/88 1100

Plot Plan

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0	34-36		13	fine sand & gravel w/ clay grading into dense light gray silt w/ some gravel & med. sand.	SAND; 2" PVC SCREEN	
	SS		35			
			82			
			47			
	36-38		12	damp, gray-brown silt, sand, clay w/ angular to subangular pebbles.		36.5
	Rec=2.0		63			
	SS		70			
			91			
	38-40		104	Same as above		Auger refusal at 40'
	rec=0.5"		100/5"			
				boring terminated @ 40' 2/08/88		

SPT- STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED

U - UNDISTURBED SS - SPLIT SPOON

P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

ENGINEERING-SCIENCE DRILLING RECORD

DRILLING CONTRACTOR:
Driller: M. Logare - Rochester Drilling
Inspector: L. Dobson - Eng. Sci.
Rig Type: Mobile B-61
Drilling Method: HSA 4.25" I.D.

PROJECT NAME: Nash Rd
PROJECT NO.: SY012.19

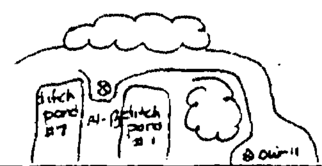
BORING NO.: 4-B (shallow)
Sheet 1 of 1
Location: mound 15' out from edge of pond.

GROUND WATER OBSERVATIONS

Water Level		
Time		
Date		
Casing Depth		

Weather: 25°F Partly Sunny
Date/Time Start: 2/04/88 1130
Date/Time Finish: 2/4/88 1230

Plot Plan



Photovac Reading	Sample Depths	Sample I.D.	SPT	Field Identification of Material	Well Schematic	Comments
0.8	0-2	S-1	5	fine medium gray sand, trace angular gravel upper 6" frozen rest saturated	GROUT; 2" PVC riser	
	rec=10"		3			
	SS		2			1.5
			6		BENT. PELLETS	
0.6	2-4	S-2	10	v.f. gray sand with some clay grading into a m-c orange/brown sand (wet)		2.5'
	rec=12"		10			3.0'
	SS		20		SAND; 2" PVC SCREEN	
			19			
0	4-6	S-3	13	med. brown/orange m-c sand (wet)		
	rec=12"		24			
	SS		26			
			23			
0.1	6-8	S-4	3	m-c brown sand trace rounded black gravel grading into stiff red/gray clay @ 7.0'		
			7			7.0'
			15			
			21			
-	8-10		19	No sample		No return on 1st or 2nd attempts in SS.
			~~20~~ 12			
			20			
			18	Boring terminated 10' @ 1230		

SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR:
Driller: D. MILLER
Inspector: K. ISAKOWER
Rig Type: MOBILE 61
Drilling Method: 4 1/4" ID HSA

ENGINEERING-SCIENCE
DRILLING RECORD

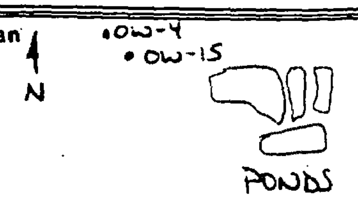
PROJECT NAME: NASH RD.
PROJECT NO. SY012.19

BORING NO. OW-15 (2)
Sheet 1 of 3
Location: DOWNGRADIENT, ALONG NORTH BORDER OF SITE

GROUND WATER OBSERVATIONS

Water Level			
Time			
Date			
Casing Depth			

Weather
Date/Time Start: 12/9/87 1415
Date/Time Finish: 12/11/87 0945

Plot Plan


Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC Not To Scale	Comments
0.0	0-2	S-1	3	BROWN CLAY, SOME SILT		
			4			
			2			
			1			
						GREY WET CUTTINGS (W/TRASH) AT 3'
0.0	5-7	S-2	9	BROWN MOIST SAND		
	REC = 12		5			
			7	BROWN MOIST CLAY		
			11			
0.0	10-12	S-3	6			
	REC = 22		18	REDDISH-BROWN WET PLASTIC "STICKY" CLAY		
			14			
			15			
0.0	15-17	S-4	1			
	REC = 24		1			
			1			
			3			

Well schematic: CEMENT / BENTONITE GROUT; 2" ID PVC RISER; 36'; BENT. PEL.; 38'; 40'; #4 Q-ROCK; 2" ID #10 SLOT PVC SCREEN; 45'

SPT - STANDARD PENETRATION TEST
D = DRY W = WASHED C = CORED
U = UNDISTURBED SS = SPLIT SPOON
P = PIT A = AUGER CUTTINGS

Soil Stratigraphy Summary: SOIL AND NON SOIL FILL TO 3' OVER MOIST SAND TO 6' OVER LEAN CLAY TO 10' OVER FAT CLAY TO 39' TO WATER BEARING SAND & CLAY WITH GRAVEL

DRILLING CONTRACTOR:
Driller: D. MILLER
Inspector: K. ISAKOWER
Rig Type: MOBILE 61
Drilling Method: 4 1/4 ID HSA

ENGINEERING-SCIENCE DRILLING RECORD

PROJECT NAME: NASH RD.
PROJECT NO.

BORING NO. OW-15 (2)
Sheet 2 of 3
Location: DOWNGRADIENT, NORTH BORDER OF SITE

GROUND WATER OBSERVATIONS

Water Level			
Time			
Date			
Casing Depth			

Weather
Date/Time Start
Date/Time Finish

Plot Plan

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0.0	20-22	S-5	1*	REDDISH-BROWN WET PLASTIC		*SPOON PUSH
	REC= 24		1*	"STICKY" CLAY		BY WEIGHT O
			1			ROD
			1			
0.0	25-27	S-6	1*			
	REC= 24		1*			
			1			
			2			
0.2	30-32	S-7	2			
	REC= 24		2			
			1			
			3			
	NO SAMPLE					NO SAMPLE TAKEN AT 32 PLUG PUSHED WHILE AUGER
0.0	34-36	S-8	1*			
	REC= 24		1			
			1			
			1			
0.0	36-38	S-9	1*			
	REC= 24		1*			
			1*			
			1*			
0.0	38-40	S-10	1*			
	REC= 24		1*			
			2	REDDISH-BROWN CLAY AND SAND,		
			2	SOME GRAVEL		

SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR:	ENGINEERING-SCIENCE DRILLING RECORD	BORING NO. OW-15 (2)
Driller: D. MILLER		Sheet 3 of 3
Inspector: K. ISAKOWER		Location DOWNGRADIENT NORTH BORDER OF SITE
Rig Type MOBILE 61	PROJECT NAME NASH RD	
Drilling Method 4¼" ID HSA	PROJECT NO.	

GROUND WATER OBSERVATIONS			
Water Level			
Time			
Date			
Casing Depth			

Weather

Date/Time Start

Date/Time Finish

Plot Plan

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0.0	40-42	S-11	1	REDDISH-BROWN CLAY AND SAND, SOME GRAVEL		SPOON PUSHED BY WEIGHT OF ROD.
	REC=24		1			
			14			
			16			
0.0	42-44	S-12	1*			
	REC=24		6			
			18			
			74			COARSE GRAVEL
0.0	44-46	S-13	45			
	REC=24		71/6"			
				Boring terminated at 45'		

SPT - STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED

U - UNDISTURBED SS - SPLIT SPOON

P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR:	ENGINEERING-SCIENCE DRILLING RECORD	BORING NO. OW-16 (2)
Driller: D. MILLER		Sheet 1 of 1
Inspector: K. ISAKOWER		Location WEST END OF SITE
Rig Type MOBILE 61	PROJECT NAME NASH RD.	
Drilling Method 4¼" ID HSA	PROJECT NO. S4012.19	

GROUND WATER OBSERVATIONS

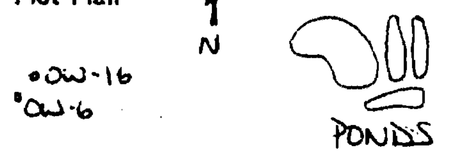
Water Level	8.5'	1.0'
Time	0919	0735
Date	12/8	12/10
Casing Depth	10'	10'

Weather

Date/Time Start 12/8/87 0750

Date/Time Finish 12/8/87 1230

Plot Plan



Photovac Reading	Sample Depths	Sample I.D.	SPT	Field Identification of Material	Well Schematic	Comments
0.0	0-2	S-1	2	BROWN CLAY, SOME SAND, TRACE SILT	CEMENT/BENT. GROUT; 2" ID PVC RISER	
	REC ± 12		3			
			4			
			15			
0.0	2-4	S-2	11			
	REC ± 6		13		3'	
			4		BENT. PEL.	
			8		4'	
0.5	4-6	S-3	1			
	REC # 10		1	WET BROWN & GREY SILT, SOME SAND, TRASH PRESENT	5'	
			2		#4 Q-ROCK; 2" ID #10 SLOT PVC SCREEN	
			6			
0.0	6-8	S-4	6			S-4: WOOD IN NOSE
	REC # 3		9			
			2			
			4			
0.0	8-10	S-5	7	MOIST BROWN CLAY, SOME SILT		
	REC # 7		8			
			3			
			10		10'	

Boring terminated at 10'

SPT - STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED

U - UNDISTURBED SS - SPLIT SPOON

P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary SOIL FILL TO 4.5' OVER SOIL AND NON-SOIL FILL TO 8' SILTY CLAY.

TABLE IV-2
MONITORING WELL DATA
NASH ROAD LANDFILL

Well ID	Ground Surface Elevation (feet)	Top of Bedrock Depth (feet)	Top of Bedrock Elevation (feet)	Top of Screen Depth (feet)	Top of Screen Elevation (feet)	Bottom of Screen Depth (feet)	Bottom of Screen Elevation (feet)	Bottom of Hole Depth (feet)	Bottom of Hole Elevation (feet)	Stratigraphic Unit Monitored
OW-1	98.6			4.0	94.6	9.0	89.6	10.0	88.6	brown/gray silty clay
OW-1B	98.6	68.6	30.0	58.1	40.5	68.1	30.5	68.6	30.0	glacial till
OW-2	97.5			9.0	88.5	14.0	83.5	14.0	83.5	brown/gray silty clay
OW-3	99.0	68.7	30.3	45.0	54.0	55.0	44.0	68.7	30.3	glacial till
OW-4	98.4	70.3	28.1	60.1	38.3	70.1	28.3	70.3	28.1	glacial till
OW-5	100.8	69.8	31.0	60.0	40.8	70.0	30.8	70.0	30.8	glacial till
OW-6	101.0	66.0	35.0	56.0	45.0	66.0	35.0	66.0	35.0	glacial till
OW-11	97.8			7.0	90.8	9.0	88.8	12.0	85.8	upper sand lens
OW-12	98.5			29.5	69.0	32.5	66.0	34.0	64.5	lower sand lens
OW-13	97.4			3.0	94.4	5.0	92.4	6.0	91.4	upper sand lens
OW-14A	97.8			33.5	64.3	36.5	61.3	40.0	57.8	lower sand lens
OW-14B	98.4			3.0	95.4	7.0	91.4	10.0	88.4	upper sand lens
OW-15	99.4			40.0	59.4	45.0	54.4	45.0	54.4	lower sand lens
OW-16	100.8			5.0	95.8	10.0	90.8	10.0	90.8	fill

NOTE: All elevations are in feet relative to an assumed datum.

TABLE IV-3
WATER LEVEL DATA
NASH ROAD LANDFILL **

Well ID	Elevation of Measuring Point	Date: Feb 10, 88		Date: Feb 18, 88		Date: Jun 20, 88		Date: Oct 12, 88	
		Depth (feet)	Elevation (feet)	Depth (feet)	Elevation (feet)	Depth (feet)	Elevation (feet)	Depth (feet)	Elevation (feet)
OW-1	100.3					5.3	95.0		
OW-1B	100.3					14.1	86.2		
OW-2	99.3					3.9	95.4		
OW-3	101.3					15.0	86.3	14.4	86.9
OW-4	100.6					14.5	86.1		
OW-5	101.2					15.1	86.1	15.1	86.1
OW-6	103.6					17.3	86.3	17.7	85.9
OW-11	100.4	8.3	92.1	8.5	92.0	4.6	95.8	4.5	95.9
OW-12	101.1			16.9	84.3	11.5	89.6		
OW-13	100.4			2.8	97.6				
OW-14A	101.2			15.5	85.8	11.3	89.9	11.7	89.5
OW-14B	100.6	3.2	97.4	3.2	97.4	4.2	96.4		
OW-15	100.8	10.8	90.0	10.8	90.0	11.4	89.4	11.8	89.0
OW-16	103.3			4.8	98.5	6.3	97.0	8.7	94.6

**NOTES:

1) All elevations are in feet relative to an assumed datum.
2) Depth is measured from ground surface.
3) Wells OW-11, OW-12 and OW-14A may not have been completely recovered from drilling and development when measured during February, 1988.

2

August 9, 1978

Disposal of Chemical Waste
Contract FAC 67-15; FALSE 67-1
LaSalle Arterial, Niagara Falls, Niagara County

ORIGINAL SIGNED BY
D. H. KETCHUM

D. H. Ketchum, Regional Director - Region 5

H. C. Hennessy, Commissioner of Transportation, Bldg. 5, Room 507

cc ~~[illegible]~~ M. J. Cuddy

During the course of construction of the LaSalle Arterial in the City of Niagara Falls, buried chemical waste was encountered during excavation for a storm sewer line along Frontier Avenue between 97th and 99th Streets. Further exploration revealed that the chemical waste material extended under the proposed location of relocated Frontier Avenue north of the existing street. The total quantity of chemicals in the proposed roadway was estimated to be 1100 CY. No chemicals were found under, or south of, existing Frontier Avenue.

When the sewer line excavation first began, the chemicals were piled to one side along with the other excavated material. This prompted several complaints from adjacent property owners about the offensive odor of the material.

After consulting with Hooker Chemical and the Niagara County Health Department, some of the chemicals were trucked to an existing dump owned by Hooker off Hyde Park Blvd. near the north city line of Niagara Falls. After approximately 200 CY were disposed of at this location, the contractor was advised by Hooker officials that no more would be accepted at their dump.

After negotiation with the Town of Wheatfield, and with the approval of the Niagara County Health Department, the remainder of the chemical waste was trucked to a Town dump area off Nash Road in the Town of Wheatfield.

The following is a chronological summary of events from March 15, 1968, when the chemicals were first encountered to July 15, 1968, when the disposal of the chemicals was completed.

Date	Event	Source
3-15-68	First encountered chemical waste material between 97th and 99th Sts. in relocated Frontier Ave. area.	Engineer's Diary
3-15-68	Contacted Hooker Chem. Co. requesting information on material makeup.	Joe Cains Diary
3-19-68	Mr. Capong, property owner, complained of stench coming off chemical waste stockpile.	Engineer's diary Joe Cain's diary

e	Event	Source
)-68	Messrs. Popovici, Maida, Niagara County Health Dept. investigating	Joe Cain's diary
3-22-68	Ken Reitmeier, Supervising Soils and Materials Engr., investigated and wrote memo this date recommending removal of chemical waste.	Memo dated 3-22-68
3-25-68	Mr. Popovici telephoned ordering chemical waste excavated to date, removed from project site and disposted of at a dump operated by Hooker Chemical Co. located off Hyde Park Blvd. near north city line.	Joe Cain's diary
3-27-68	Letter confirming the telephone conversation 3-25-68 from Ernest R. Gedeon, Niagara County Health Dept.	Letter dated 3-27-68
4-1-68	Letter from J.P. Cain, ordering contractor to remove chemical waste to the Hooker Dump on Hyde Park Blvd.	Letter dated 4-1-68
4-1-68	Stimm sent letter disputing work to removed chemical waste material.	Letter dated 4-1-68
4-3-68	Removal of chemical waste to Hooker's dump site off Hyde Park Blvd. began.	Joe Cain's diary
4-8-68	Hooker officials (Fred T. Olotka) ordered a halt to further dumping of chemical waste at their Hyde Park Blvd. dump. Niagara County Health Dept. informed.	Joe Cain's diary.
4-15-68	Letter to Robert W. Sweet, Chief Engineer from A. J. Kopczynski recommending extra payment for work to remove approx. 1,000 CY of chemical waste.	Letter dated 4-15-68
4-23-68	Letter to J. P. Cain from Stimm requesting permission to use Town of Wheatfield dump site.	Letter dated 4-23-68
4-25-68	Maps and borings received from Krehbiel, Quay, Rugg & Hall, Engr. - Bel Air Subdivision.	Package dated 4-25-68
5-1-68	Letter to Ernest R. Gedeon, Chief Air Pollution Control, Niagara County Health Dept. from J.P. Cain outlining proposed method of disposing of chemical waste.	Letter dated 5-1-68

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Date	Event	Source
5-3-68	Wm. Friedman, Jr., Asst. Comm. of Env. Health, telephoned listing information he will require before approval of Wheatfield site is given.	Memo to Files dated 5-3-68
5-6-68	Letter from Friedman confirming the above telephone conversation (5-3-68) to Brzeninski (Stimm) requesting permission to use Wheatfield dump.	Letter dated 5-6-68
5-9-68	Letter from Hooker (Fred Olotka), listing makeup of chemical waste from ground samples taken.	Letter dated 5-9-68
5-16-68	Boring taken on Frontier Ave. between 97th and 99th Sts. to determine the limits of chemical waste.	Memo dated 5-16-68, P. Nowadly to J.P.Cain
5-16-68	Borings of proposed Wheatfield dump site sent to Friedman, Niagara County Health.	Letter dated 5-16-68, P. Nowadly to Friedman
5-21-68	Verbal permission received from Friedman granting permission to use Wheatfield site. Letter ordering Stimm to excavate and remove chemical waste to Wheatfield.	J. Cain's diary. Letter dated 5-21-6 Cain to Stimm.
5-27-68	Began excavating Wheatfield dumpsite.	MURK II dated 5-27-68
6-6-68	Began hauling chemical waste to dump.	MURK II 6-6-68
7-15-68	Complete all work including regrading dump site.	MURK II 7-15-68

The disposal area off Nash Road was visited on August 8, 1978 by J. Powers, Jr., and P. Goodman of my staff. Although they were unable to pin point the exact location of the buried chemicals, the approximate area was examined and no sign of the chemicals was found. The area in which the chemicals were buried was an excavation approximately 100 ft. by 30 ft. by 27 ft. deep. The area is located in a Town of Wheatfield dump just north of the North Tonawanda City Line, approximately 1/2 mile east of Nash Road and 1/2 mile south of Niagara Falls Blvd. There has been no development in the area and no apparent hazard exists at this time.

Our records indicate that the chemicals were placed in the 100' x 30' area to a depth of approximately 15 ft. and covered with at least 12 ft. of the excavated material. A review of Inspectors' reports indicates that the estimate of 1100 CY of chemicals was exceeded by about 50 percent for a total of 1600 CY ± placed in this excavation.

Disposal of the chemicals in the Nash Road area was done with the full knowledge and consent of the Town of Wheatfield and the Niagara County Health Dept. Soil exploration was conducted by our Soils Engineer prior to disposal of the chemicals and the area was found to be acceptable for disposal purposes.

Attached are copies of all pertinent correspondence, drawings and boring logs.

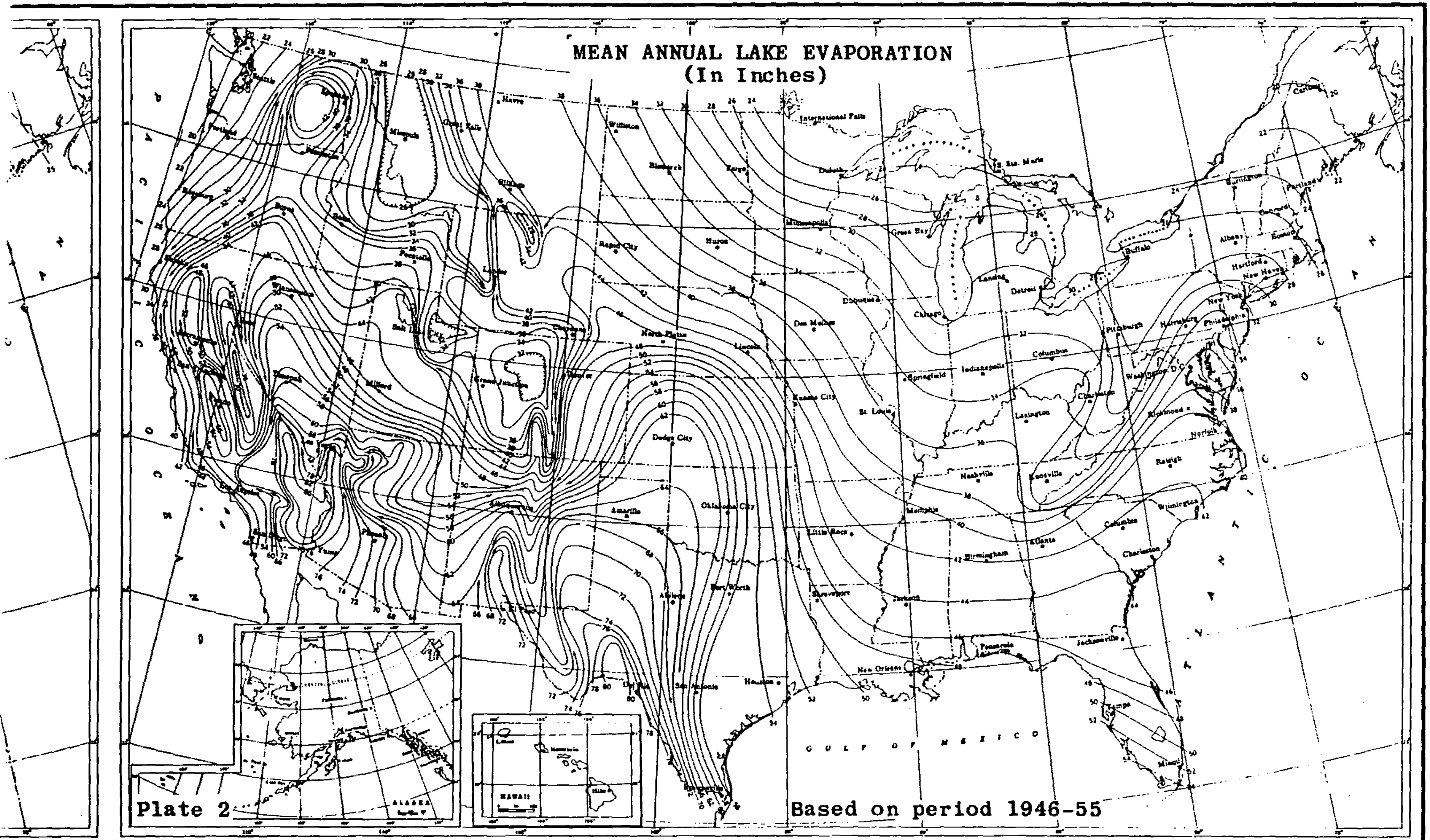
DHK:JEP:mh

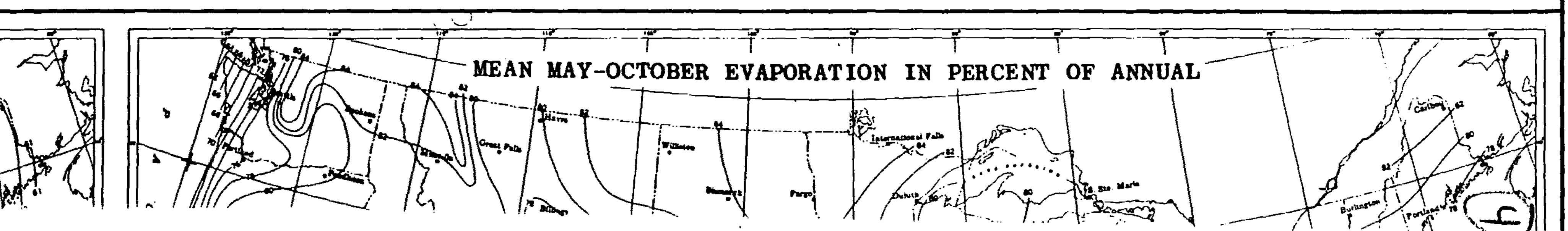
Attachments

CLIMATIC ATLAS OF THE UNITED STATES

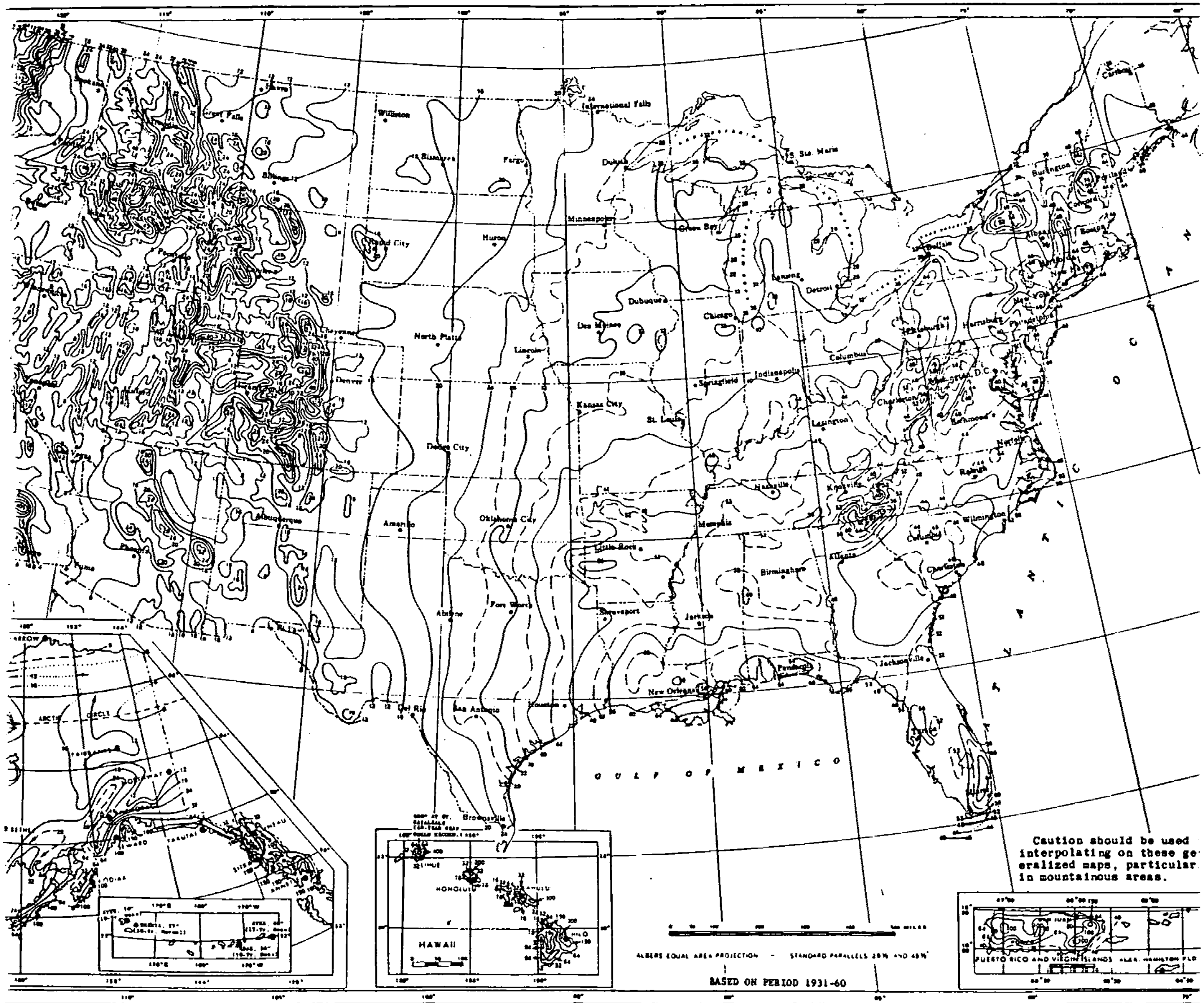
nvironmental Science Services Administration . Environmental Data Service

4


MEAN ANNUAL LAKE EVAPORATION
(In Inches)
Plate 2
Based on period 1946-55
GULF OF MEXICO


MEAN MAY-OCTOBER EVAPORATION IN PERCENT OF ANNUAL

NORMAL ANNUAL TOTAL PRECIPITATION (Inches)



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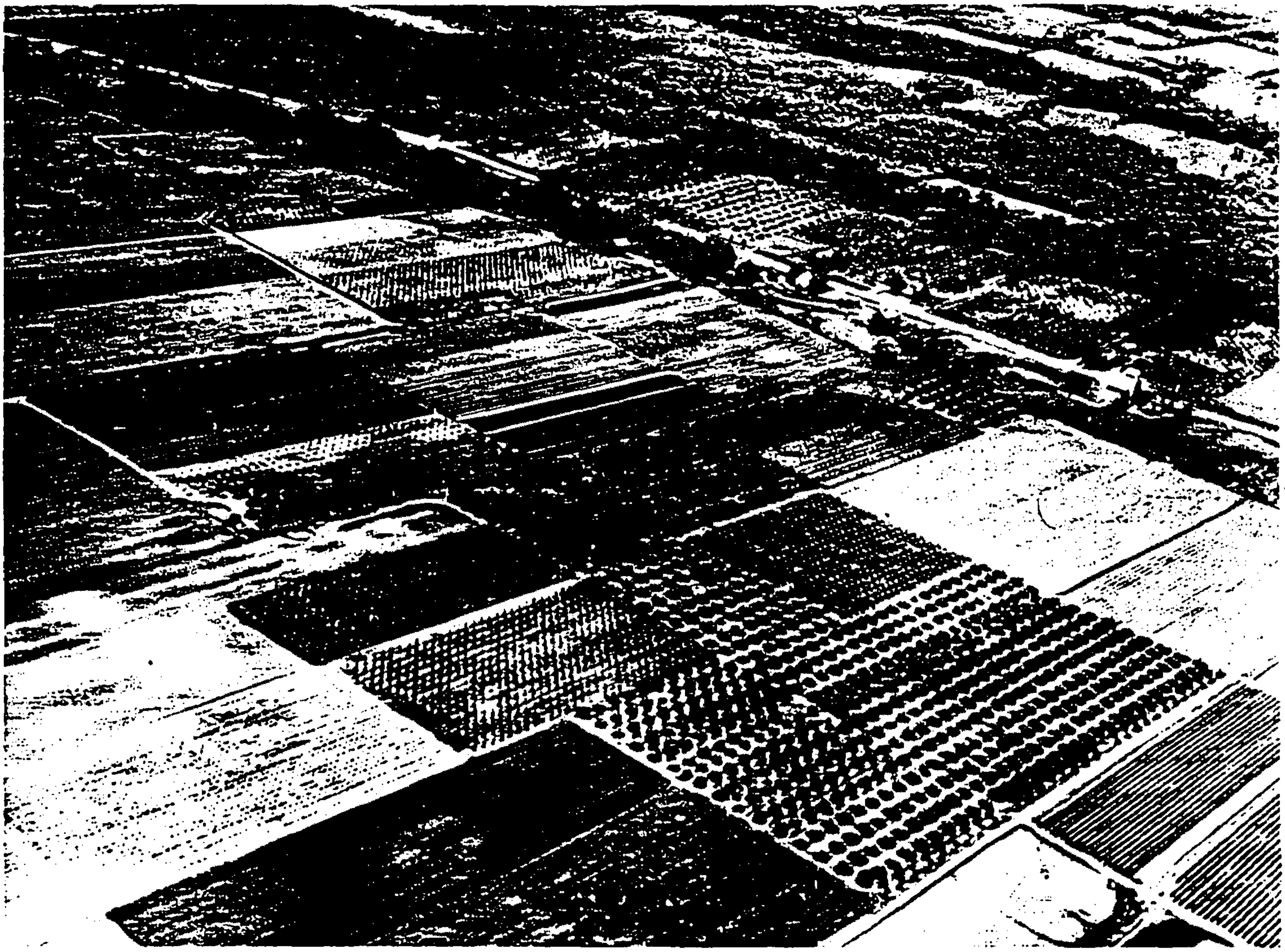
SOIL SURVEY OF

Niagara County, New York



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

Issued October 1972

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GUIDE TO MAPPING UNITS

To obtain a complete description of a mapping unit, it is necessary to read the description of the mapping unit and the description of the soil series to which it belongs. In referring to a capability unit or a woodland group, read the introduction to the section it is in for general information about its management. Other information in this soil survey is in tables as follows:

Estimated yields, tables 1, 2, and 3 pp. 27 through 36.
Woodland, table 4, page 38.
Wildlife, table 5, page 43.
Engineering uses of soils, tables 6, 7, and 8, pp. 48 through 97.
Nonfarm uses of soils, table 9, page 100.

Map symbol	Mapping units	Described on page	Capability unit Symbol	Capability unit Page	Woodland group Symbol	Woodland group Page
Ad	Alluvial land	122	Vw-1	25	---	---
Af	Altmar loamy fine sand	123	IIw-1	19	4s1	40
Am	Altmar gravelly fine sandy loam	123	IIw-1	19	4s1	40
AnA	Appleton gravelly loam, 0 to 3 percent slopes	124	IIIw-1	21	3w2	40
ApA	Appleton silt loam, 0 to 3 percent slopes	124	IIIw-1	21	3w2	40
ArB	Arkport very fine sandy loam, 0 to 6 percent slopes	125	IIs-2	18	2o1	38
ArC	Arkport very fine sandy loam, 6 to 12 percent slopes	126	IIIe-3	20	2o1	38
AsA	Arkport fine sandy loam, gravelly substratum, 0 to 2 percent slopes	126	IIs-1	18	2o1	38
AsB	Arkport fine sandy loam, gravelly substratum, 2 to 6 percent slopes	126	IIs-2	18	2o1	38
BoA	Bombay fine sandy loam, 0 to 2 percent slopes	127	IIw-2	19	3o1	38
BoB	Bombay fine sandy loam, 2 to 6 percent slopes	127	IIe-3	17	3o1	38
BrA	Brockport silt loam, 0 to 4 percent slopes	129	IIIw-2	22	3w1	40
Ca	Canandaigua silt loam	129	IIIw-3	22	4w1	40
Cb	Canandaigua silty clay loam	130	IIIw-3	22	4w1	40
CcA	Cayuga and Cazenovia silt loams, 0 to 2 percent slopes	131	IIw-2	19	2o1	38
CcB	Cayuga and Cazenovia silt loams, 2 to 6 percent slopes	131	IIe-3	17	2o1	38
CcC	Cayuga and Cazenovia silt loams, 6 to 12 percent slopes	131	IIIe-1	20	2o1	38
CeA	Cazenovia gravelly silt loam, 0 to 3 percent slopes	132	IIw-2	19	2o1	38
CeB	Cazenovia gravelly silt loam, 3 to 8 percent slopes	132	IIe-3	17	2o1	38
CgA	Cazenovia gravelly silt loam, shale substratum, 0 to 3 percent slopes	133	IIw-2	19	2o1	38
CgB	Cazenovia gravelly silt loam, shale substratum, 3 to 8 percent slopes	133	IIe-3	17	2o1	38
Ch	Cheektowaga fine sandy loam	134	IIIw-3	22	5w1	40
ClA	Churchville silt loam, 0 to 2 percent slopes	135	IIIw-2	22	3w1	40
ClB	Churchville silt loam, 2 to 6 percent slopes	135	IIIw-5	23	3w1	40
CmA	Claverack loamy fine sand, 0 to 2 percent slopes	136	IIw-1	19	3s1	40
CmB	Claverack loamy fine sand, 2 to 6 percent slopes	136	IIw-1	19	3s1	40
CnA	Collamer silt loam, 0 to 2 percent slopes	138	IIw-2	19	2o1	38
CnB	Collamer silt loam, 2 to 6 percent slopes	138	IIe-2	17	2o1	38
CoB	Colonie loamy fine sand, 0 to 6 percent slopes	139	IIIs-1	21	4s1	40
Cs	Cosad fine sandy loam	140	IIIw-4	23	4w1	40
Cu	Cut and fill land	140	------	---	---	---
DuB	Dunkirk silt loam, 2 to 6 percent slopes	141	IIe-2	17	2o1	38
DuC3	Dunkirk silt loam, 6 to 12 percent slopes, eroded	141	IVe-2	24	2r1	38
DvD3	Dunkirk and Arkport soils, 12 to 20 percent slopes, eroded	142	VIe-1	25	2r3	38
ElA	Elnora loamy fine sand, 0 to 2 percent slopes	143	IIw-1	19	4s1	40
ElB	Elnora loamy fine sand, 2 to 6 percent slopes	143	IIw-1	19	4s1	40
FaA	Farmington silt loam, 0 to 8 percent slopes	144	IIIs-2	21	5d1	40
Fo	Fonda mucky silt loam	145	IVw-1	24	5w1	40
Fr	Fredon gravelly loam	146	IIIw-1	21	3w2	40
GnA	Galen very fine sandy loam, 0 to 2 percent slopes	147	IIw-1	19	2o1	38
GnB	Galen very fine sandy loam, 2 to 6 percent slopes	147	IIw-1	19	2o1	38
Ha	Hamlin silt loam	148	IIw-3	19	2o2	38
HgA	Hilton gravelly loam, 0 to 3 percent slopes	150	IIw-2	19	2o1	38
HgB	Hilton gravelly loam, 3 to 8 percent slopes	150	IIe-3	17	2o1	38

U.S. GOVERNMENT PRINTING OFFICE : 1972 O - 450-901

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Map symbol	Mapping unit	Described on page	Capability unit Symbol	Capability unit Page	Woodland group Symbol	Woodland group Page
HlA	Hilton silt loam, 0 to 3 percent slopes	150	IIw-2	19	2o1	[illegible]
HlB	Hilton silt loam, 3 to 8 percent slopes	150	IIe-3	17	2o1	[illegible]
HmA	Hilton and Cayuga silt loams, limestone substratum, 0 to 3 percent slopes	151	IIw-2	19	2o1	[illegible]
HmB	Hilton and Cayuga silt loams, limestone substratum, 3 to 8 percent slopes	151	IIe-3	17	2o1	[illegible]
HoA	Howard gravelly loam, 0 to 3 percent slopes	152	IIs-1	18	2o1	[illegible]
HoB	Howard gravelly loam, 3 to 8 percent slopes	152	IIs-2	18	2o1	[illegible]
HoC	Howard gravelly loam, 8 to 15 percent slopes	153	IIIe-2	20	2o1	[illegible]
HsB	Hudson silt loam, 2 to 6 percent slopes	154	IIe-2	17	2o1	[illegible]
HtC3	Hudson silty clay loam, 6 to 12 percent slopes, eroded	154	IVe-2	24	2r1	[illegible]
HuF3	Hudson soils, 20 to 45 percent slopes, eroded	154	VIe-1	25	2r3	[illegible]
LaB	Lairdsville silt loam, 0 to 6 percent slopes	155	IIe-4	17	3o1	[illegible]
Lc	Lakemont silty clay loam	156	IVw-1	24	5w1	[illegible]
Ld	Lamson very fine sandy loam	158	IIIw-3	22	4w1	[illegible]
Lg	Lamson fine sandy loam, gravelly substratum	158	IIIw-3	22	4w1	[illegible]
Lo	Lockport silt loam	159	IIIw-2	22	3w1	[illegible]
Ma	Madalin silt loam	161	IVw-1	24	5w1	[illegible]
Md	Madalin silt loam, loamy subsoil variant	162	IVw-1	24	5w1	40
Me	Made land	162	-----	--	---	---
Mf	Massena fine sandy loam	163	IIIw-1	21	3w2	40
Mn	Minoa very fine sandy loam	164	IIIw-1	21	3w2	40
Ms	Muck, shallow	165	IVw-2	24	---	---
NaA	Niagara silt loam, 0 to 2 percent slopes	166	IIIw-1	21	3w2	40
NaB	Niagara silt loam, 2 to 6 percent slopes	166	IIIw-5	23	3w2	40
OdA	Odessa silty clay loam, 0 to 2 percent slopes	167	IIIw-2	22	3w1	40
OdB	Odessa silty clay loam, 2 to 6 percent slopes	167	IIIw-5	23	3w1	40
OnB	Ontario loam, 2 to 8 percent slopes	169	IIe-1	16	2o1	38
OnC	Ontario loam, 8 to 15 percent slopes	169	IIIe-1	20	2o1	[illegible]
OnC3	Ontario loam, 8 to 15 percent slopes, eroded	169	IVe-1	23	2o1	[illegible]
OnD3	Ontario loam, 15 to 30 percent slopes, eroded	169	VIe-1	25	2r2	38
OoA	Ontario loam, limestone substratum, 0 to 3 percent slopes	170	I-1	16	2o1	38
OoB	Ontario loam, limestone substratum, 3 to 8 percent slopes	170	IIe-1	16	2o1	[illegible]
OsA	Otisville gravelly sandy loam, 0 to 3 percent slopes	171	IIIs-1	21	4s1	40
OsB	Otisville gravelly sandy loam, 3 to 8 percent slopes	171	IIIs-1	21	4s1	40
OvA	Ovid silt loam, 0 to 2 percent slopes	172	IIIw-1	21	3w2	40
OvB	Ovid silt loam, 2 to 6 percent slopes	173	IIIw-5	23	3w2	40
OwA	Ovid silt loam, limestone substratum, 0 to 3 percent slopes	173	IIIw-1	21	3w2	40
OwB	Ovid silt loam, limestone substratum, 3 to 8 percent slopes	173	IIIw-5	23	3w2	40
PsA	Phelps gravelly loam, 0 to 5 percent slopes	174	IIw-2	19	2o1	38
Prime RaA	Raynham silt loam, 0 to 2 percent slopes	175	IIIw-1	21	3w2	40
RaB	Raynham silt loam, 2 to 6 percent slopes	176	IIIw-5	23	3w2	40
RbA	Rhinebeck silt loam, 0 to 2 percent slopes	177	IIIw-2	22	3w1	40
RbB	Rhinebeck silt loam, 2 to 6 percent slopes	177	IIIw-5	23	3w1	40
RhA	Rhinebeck silty clay loam, sandy substratum, 0 to 2 percent slopes	177	IIIw-2	22	3w1	40
RhB	Rhinebeck silty clay loam, sandy substratum, 2 to 6 percent slopes	178	IIIw-5	23	3w1	40
Rk	Rhinebeck silt loam, thick surface variant	179	IIIw-2	22	3w1	40
RoA	Rock land, nearly level	179	VIIIs-1	25	---	---
RoF	Rockland, steep	179	VIIIs-1	25	---	---
ShB	Schoharie silty clay loam, 2 to 6 percent slopes	181	IIe-4	17	2o1	38
St	Stafford loamy fine sand	182	IIIw-4	23	4w1	40
Su	Stafford loamy fine sand, gravelly substratum	182	IIIw-4	23	4w1	40
Sw	Sun silt loam	183	IVw-1	24	4w1	40
Wa	Wayland silt loam	184	IIIw-6	23	4w1	40

Soil series and map symbols	Depth to bedrock	Depth to seasonal high water table	No. 200 (0.074 mm.)	Permeability	Available moisture capacity	Reaction
	Feet	Feet		Inches per hour	Inches per inch of depth	pH
Minoa: Mn--------------------	6+	½-1	15-90	0.63-6.3	0.06-0.20	5.6-7.3
			15-90	0.63-6.3	0.06-0.20	5.6-7.3
			(1/)	(1/)	(1/)	--------
Niagara: NaA, NaB------------	6+	½-1	35-90	0.63-2.0	0.12-0.20	6.1-7.3
			65-95	<0.63	---------	6.6-7.6+
Odessa: OdA, OdB-------------	6+	½-1	65-95 75-100	0.20-2.0 <0.20	0.15-0.20 0.13-0.17	6.1-7.3 6.1-7.6+
Ontario: OnB, OnC, OnC3, OnD3, OoA, OoB. Mapping units OoA and OoB have the same properties as the other units, except they are underlain by limestone bedrock at a depth of 3½ to 6 feet.	6+	3+	30-80 20-70	0.63-2.0 <0.63	0.10-0.20 0.10-0.20	5.6-7.3 5.6-7.6+
Otisville: OsA, OsB----------	6+	3+	10-45	>6.3	0.05-0.12	5.1-7.3
			10-30	>6.3	0.02-0.06	5.6-7.3
			0-25	>6.3	---------	6.1-7.6+
Ovid: OvA, OvB, OwA, OwB----- Mapping units OwA and OwB have the same properties as the other units, except they are underlain by limestone bedrock at a depth of 3½ to 6 feet.	6+	½-1	45-90 60-80	0.63-2.0 <0.63	0.14-0.20 0.13-0.16	5.6-7.3 6.1-7.6+
			40-65	<0.20	---------	7.6+
Phelps: PsA------------------	6+	1½-2	25-75	0.63-6.3	0.09-0.14	5.6-7.3
			(1/)	(1/)	(1/)	(1/)
Raynham silt loam: RaA, RaB--	6+	½-1½	50-95 45-85	0.63-2.0 0.63-6.3	0.15-0.20 0.11-0.16	5.6-7.3 6.1-7.6+

See footnotes at end of table.

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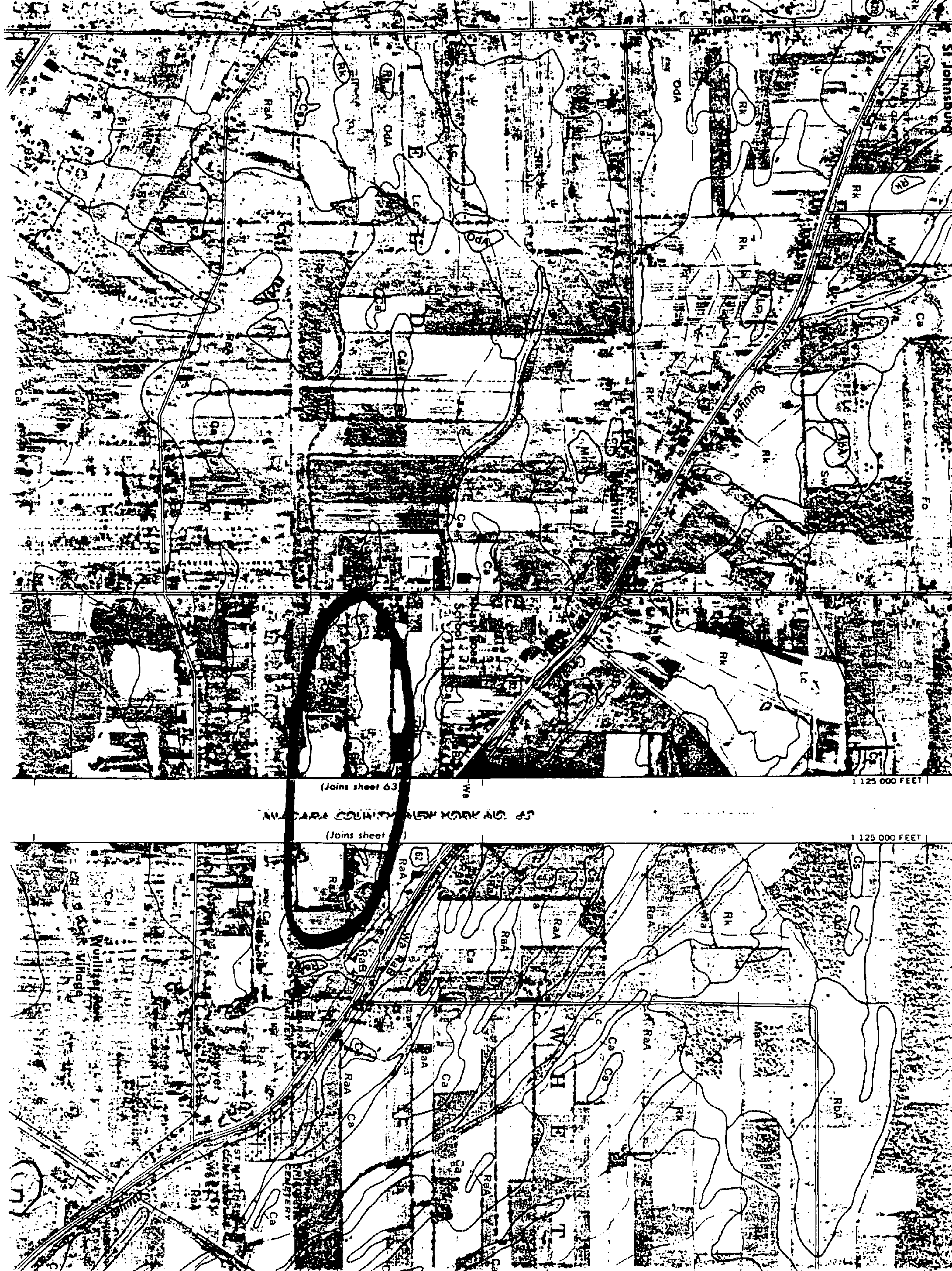
[Alluvial land (Ad), Cut and fill land (Cu), Made land ... properties were not estimated. Absence of data indicates estimate was not made. The sign > means more than; ... series is made up of two or more kinds of soil. The soils in such mapping units may have different prop... ...series that appear in the first column of this table]

Soil series and map symbols	Depth to bedrock	Depth to seasonal high water table		No. 200 (0.074 mm.)	Permeability	Available moisture capacity	Reaction
	Feet	Feet			Inches per hour	Inches per inch of depth	pH
Altmar: Af, Am---------------	6+	$1\frac{1}{2}$-2		15-50	>6.3	0.05-0.13	5.5-7.0
				15-30	>6.3	0.02-0.07	5.5-7.0
				0-30	>6.3	---------	7.0-7.6+
Appleton: AnA, ApA-----------	$3\frac{1}{2}$+	$\frac{1}{2}$-1		25-80	0.63-2.0	0.09-0.18	6.0-7.0
				50-80	0.63-2.0	0.13-0.18	6.0-7.0
				30-70	<0.63	---------	7.6+
Arkport: ArB, ArC, AsA, AsB-- Properties are for ArB and ArC. Mapping units AsA and AsB have the same properties as ArB and ArC, except they are underlain by gravelly layers below a depth of 40 inches. Estimates are variable for these layers.	6+	$2\frac{1}{2}$-3		25-60	2.0-6.3	0.07-0.15	5.0-6.5
				20-60	2.0-6.3	0.07-0.15	5.6-7.3
				20-85	2.0-6.3	---------	6.6-7.6+
Bombay: BoA, BoB-------------	5+	$1\frac{1}{2}$-2		35-75	2.0-6.3+	0.09-0.20	5.6-7.3
				20-65	2.0-6.3+	0.03-0.15	5.6-7.3
				20-80	0.20-0.63	0.05-0.20	6.1-7.3
				25-65	<0.63	---------	7.6+
Brockport: BrA---------------	2-$3\frac{1}{2}$	$\frac{1}{2}$-1		50-95	6.3-2.0	0.13-0.20	6.0-7.0
				70-95	<0.20	0.12-0.17	6.5-7.5
Canandaigua: Ca, Cb----------	6+	0-$\frac{1}{2}$		65-95	0.63-2.0	0.15-0.20	6.6-7.6+
				(1/)	(1/)	(1/)	(1/)

See footnotes at end of table.


St Johnsburg
Sawyer
(Joins sheet 63)
NIAGARA COUNTY NEW YORK NO. 63
1 125 000 FEET
1 125 000 FEET

6

Niagara County DOH, 1981

NAME OF LANDFILL

NIAGARA SANITATION COMPANY (DEC #932054)

LOCATION Nash Road, Town of Wheatfield

The site is estimated to be about seven acres in size and located north of the Niagara Mohawk easement which straddles the North Tonawanda - Wheatfield town line. The site extends from the eastern end of the access road running from Nash Road approximately 350 yards east to the fork in the power easement (Tower #365). The site is estimated to be 120 yards wide at the western end tapering to about 70 yards wide at the eastern end.

The landfill location and extent are shown on the attached drawing.

OWNERSHIP

The property is owned by the Town of Wheatfield.

HISTORY

This landfill was used by the Niagara Sanitation Company for waste disposal from 1964 to 1968. The refuse site was used for both industrial and municipal refuse. The site received refuse from Niagara Falls Air Force Base, Bell Aerospace, Carborundum, Frontier Chemical, Graphite Specialties, Continental Can and Grief Bros. Wastes disposed of may include caustics, plating tank sludge and municipal wastes.

Historical information was obtained from Hazardous Waste Disposal Sites in New York State, Volume 3, NYS DEC.

INVESTIGATION

A site visit was made by Mr. M.E. Hopkins of the Niagara County Health Department on June 11, 1981. The site was found to be poorly covered with protruding refuse. Visible items included rubber blocks, tubes and hoses, tires, concrete fragments and other demolition debris, broken glass, ash, wood, rusted cans and pieces of graphite rods. Also found were what appeared to be remnants of steel drums. There was evidence of some unauthorized dumping after the site was closed. Access to the site was not restricted.

Red-brown (rust-colored) stains were found on vegetation and soil in numerous locations around the perimeter of the site, particularly along the northern and western edges. Additional stained areas were found throughout the marshes and other low points within the site. Although most of these stained areas were dry, two areas were found beneath standing water. It was noted that although the ground was stained beneath the water, the water was not discolored. No flowing leachate streams were found. The sampling well was not found on the June 11th visit. A well was found on June19th on a subsequent visit. The well was located 20 feet east of Niagara Mohawk Tower #363. The location is shown on the attached drawing. The well had apparently been

INVESTIGATION (continued)

vandalized. The upper standpipe had been broken off at ground level and the well had, therefore, been left uncovered. The well may still be useable for sampling.

No evidence of landfill activity was noted east of Niagara Mohawk Tower #365. However, USDA aerial photographs (ARE 3V-75;1966) indicate that the landfilled area may extend 300 to 400 ft. east of Tower #365.

SOILS

The soils surrounding the site are Raynham and Canandaigua series soils. The composition of the soil contained with the site itself is not known, although it is expected to be largely composed of refuse. The surface is generally a silty clay material with some sand in spots. Portions of the site are marshy while others appear well drained, indicating that the soil may not be uniform throughout the site. Boring records of the sampling well immediately south of the site, indicate a profile of silty sand and sandy silt to a depth of about 9 feet over clay to an unknown depth. The records also show the water table at 4 feet. This suggests that the water table may be perched. Fluctuations of the water table are not known.

CONCLUSIONS

The potential for the migration of contaminants off-site is present. Visible leachate stains and the odor in the well south of the landfill indicate that material may be leaching in perched groundwater. Permeable soils in some areas could allow lateral migration. The site requires proper closing. The proximity of houses along Forbes Road and potential for migration justify sampling at this site.

SAMPLING

Well and soil samples were taken for THO, heavy metals and phenol analysis. It was noted at the time of sampling, that the water drawn from the well was discolored gray and strongly odorous with an organic odor. A slight oily sheen was present on the surface of the sample. Two soil samples were taken near Towers #364 and #365. These samples were taken from the bottoms of hand augered holes roughly 4 feet deep. The boring near pole #364 indicated a gray silt over a darker gray silty clay layer at the point of sampling. The second boring showed a tan silty clay over clay at about 4 feet. The sample was taken from this interface. Groundwater was encountered slightly below the 4 foot level in both holes.

RECOMMENDATIONS

This site must be properly closed. Additional sampling wells along the Niagara Mohawk easement would be desireable to facilitate future sampling. The existing well should be maintained. Annual inspection and periodic monitoring is recommended. The Town of Wheatfield was notified to submit an abatement plan for the site..

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SUMMARY OF SAMPLES TAKEN

SAMPLE #	LOCATION	TYPE	PARAMETER	DATE	NEAREST HOUR
1	Gratwick # 13	Well	Metals	7/16/81	11:00
2	Gratwick # 10	Well	Metals	7/16/81	11:00
3	Gratwick # 11	Well	Metals	7/16/81	11:00
4	Gratwick # 12	Well	Metals	7/16/81	11:00
5	Gratwick # 13	Well	THO	7/16/81	11:00
6	Gratwick # 10	Well	THO	7/16/81	11:00
7	Gratwick # 11	Well	THO	7/16/81	11:00
8	Gratwick # 12	Well	THO	7/16/81	11:00
9	Nia. Sanitation	Well	Metals	7/16/81	1:00
10	Nia. Sanitation	Well	THO	7/16/81	1:00
11	Zimmerman	Well	THO	7/16/81	12:00
12	Old Falls	Well	THO	7/16/81	12:00
13	Artpark	Leachate	Metals	7/17/81	12:00
14	Artpark	Leachate	THO	7/17/81	12:00
15	PASNY	Soil	Metals	7/21/81	10:00
16	PASNY	Soil	THO	7/21/81	10:00
17	Nia. Sanitation	Soil	Metals	7/24/81	12:00
18	Nia. Sanitation	Soil	THO	7/24/81	12:00
19	Nia. Sanitation	Soil	Metals	7/24/81	12:00
20	Nia. Sanitation	Soil	THO	7/24/81	12:00
21	Walck Road	Soil	THO	7/24/81	12:00
22	Gratwick # 13	Well	Phenol	8/12/81	10:00
23	Gratwick # 10	Well	Phenol	8/12/81	10:00
24	Gratwick # 11	Well	Phenol	8/12/81	10:00
25	Gratwick # 12	Well	Phenol	8/12/81	10:00
26	Zimmerman	Well	Phenol	8/12/81	11:00
27	Old Falls	Well	Phenol	8/12/81	11:00
28	Nia. Sanitation	Well	Phenol	8/12/81	12:00
29	Olin-Industrial Welding	Soil	THO, TOC Lindane	9/07/81	12:00

6

ANALYTICAL RESULTS FOR SAMPLES TAKEN AT GRATWICK - RIVERSIDE PARK

WELL # 10

Sample # 2 Sampled 11:00 7/16/81

Cadmium, total	L.T. 0.02	MG/L
Chromium, total	L.T. 0.1	MG/L
Lead; total	L.T. 0.1	MG/L
Mercury, total	L.T. 0.4	MCG/L
Nickle, total	0.05	MG/L

Sample # 6 Sampled 11:00 7/16/81

THO 35 MCG/L

Sample #24 Sampled 10:00 8/12/81

Phenol 3 MG/L

WELL # 11

Sample # 3 Sampled 11:00 7/16/81

Cadmium, total	L.T. 0.02	MG/L
Chromium, total	L.T. 0.1	MG/L
Lead, total	L.T. 0.1	MG/L
Mercury, total	L.T. 0.4	MCG/L
Nickle; total	L.T. 0.05	MG/L

Sample # 7 Sampled 11:00 7/16/81

THO Less than 1 MCG/L

Sample # 25 Sampled 10:00 8/12/81

Phenol 3 MG/L

WELL # 12

Sample # 4 Sampled 11:00 7/16/81

Cadmium, total	L.T. 0.02	MG/L
Chromium, total	L.T. 0.1	MG/L
Lead, total	L.T. 0.1	MG/L
Mercury, total	L.T. 0.4	MCG/L
Nickle, total	L.T. 0.05	MG/L

Sample # 8 Sampled 11:00 7/16/81

THO 4 MCG/L

Sample # 26 Sampled 10:00 8/12/81

Phenols 0.2 MG/L

6

GRATWICK - RIVERSIDE PARK (continued)

WELL # 13

Sample # 1	Sampled 11:00			7/16/81
Cadmium, total	L.T.	0.02	MG/L	
Chromium, total	L.T.	0.1	MG/L	
Lead, total		0.1	MG/L	
Mercury, total	L.T.	0.4	MCG/L	
Nickle, total		0.05	MG/L	
Sample # 5	Sampled 11:00			7/16/81
THO	18	MCG/L		
Sample # 22	Sampled 10:00			8/12/81
Phenols	17	MG/L		

RESULTS OF SAMPLES TAKEN AT NIAGARA SANITATION SITE

WELL SAMPLES

Sample # 9	Sampled 1:00			7/16/81
Cadmium, total	L.T.	0.02	MG/L	
Chromium, total	L.T.	0.1	MG/L	
Lead, total		0.2	MG/L	
Mercury, total	L.T.	0.4	MCG/L	
Nickle, total		0.12	MG/L	
Sample # 10	Sampled 1:00			7/16/81
THO	4	MCG/L		
Sample # 28	Sampled 12:00			8/12/81
Phenol		0.008	MG/L	

well + sample location not marked on map

SOIL SAMPLES

Samples # 17,18,19 & 20 all Sampled 10:00 7/24/81
Samples # 17 & 18 Metals - Results not yet available
Sample # 19 L.T. 10 PPB THO
Sample # 20 L.T. 10 PPB THO

6

RESULTS OF SAMPLES TAKEN AT ARTPARK

LEACHATE SAMPLES

Sample # 13 Sampled 1:00 7/17/81

Cadmium, total	0.02	MG/L
Chromium, total	0.1	MG/L
Lead, total	0.5	MG/L
Nickle, total	0.73	MG/L
Mercury, total	L.T. 0.4	MCG/L

Sample # 14 Sampled 1:00 7/17/81

THO 47 MCG/L

RESULTS OF SAMPLES TAKEN AT HOLIDAY PARK

WELL SAMPLES

WELL # 4

Sample # 11 (Zimmerman) Sampled 12:00 7/16/81

THO 4 MG/L

Sample # 26 Sampled 11:00 8/12/81

Phenols ? .008 MG/L

WELL # 8

Sample # 12 (Old Falls) Sampled 12:00 7/16/81

THO 3 MCG/L

Sample # 27 Sampled 11:00 8/12/81

Phenol .01 MG/L

SOIL SAMPLES

Sample # 21 Walch Road Sampled 12:00 7/24/81

THO Less than 10 PPB

6

NIAGARA SANITATION NASH ROAD SITE (DEC # 932054)

Approx. Scale.
1: 3600
(All distances estimated)

100 yd — 75 — 50 — 25 — 0 — 100 yd — 200 yd

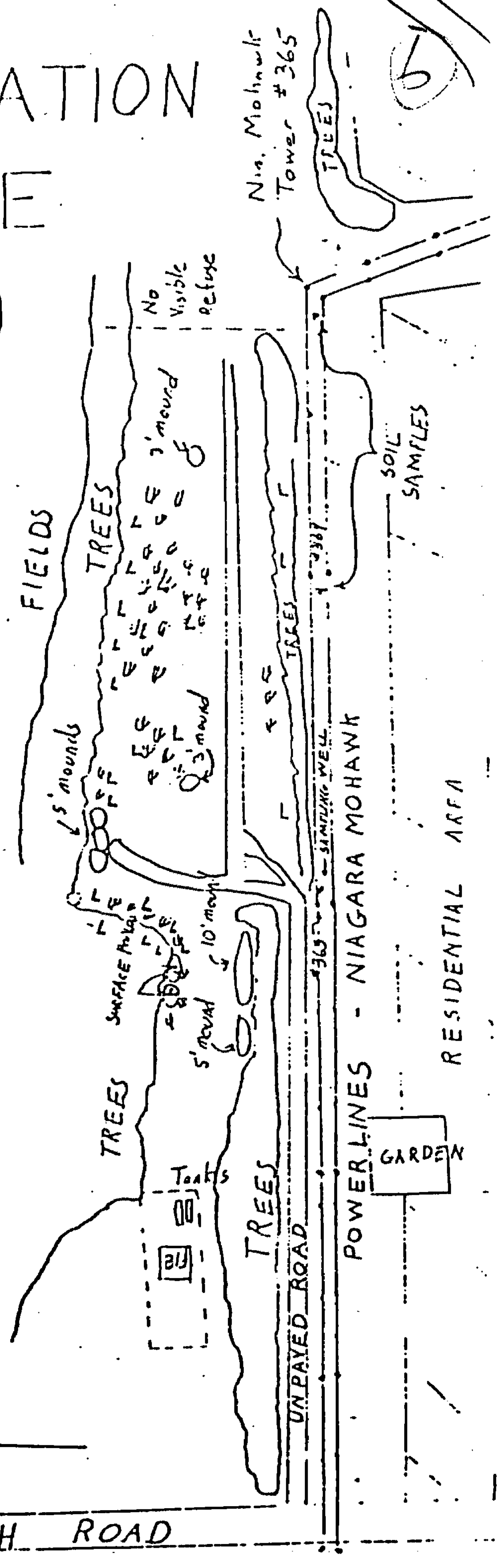
Ψ - Marsh Area
{ - Treeline
|| - Powerlines
L - Red-Brown Leachate stains

Slope - downward toward SE (<1%)

Mapped from field observation only by M. Hopkins NCHD

Michael E. Hopkins

N ←



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 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

(7)

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

Nash Rd.

RECEIV... 22 1987 ES SYRACUSE

3

8

NIAGARA COUNTY

HEALTH DEPARTMENT
HUMAN RESOURCES BUILDING
MAIN POST OFFICE BOX 428
10th AND EAST FALLS STREET
NIAGARA FALLS, NEW YORK 14302

October 21, 1987

Engineering-Science Inc.
290 Elwood Davis Road
Liverpool, NY 13088

Attention: Ms. Elizabeth Dobson

Dear Ms. Dobson:

Attached are the corrected interview sheets you requested.

I can be contacted with any questions at (716) 284-3128.

Sincerely,

Michael E. Hopkins
Ass't. Public Health Engineer

MEH:cs

INTERVIEW FORM

INTERVIEWEE/CODE Mr. Mike Hopkins - Niagra County Dept of Health
TITLE - POSITION Assistant Public Health Engineer
ADDRESS Main Post Office Box 428, 10th & East Falls St.
CITY Niagra Falls STATE NY ZIP 14302
PHONE (716) 284-3124 RESIDENCE PERIOD ______ TO ______
LOCATION Niagra Falls INTERVIEWER Liz Dobson
DATE/TIME October 8, 1987 / 1000 AM
SUBJECT: Groundwater use in vicinity of Phase II sites: Nash Road, Chisholm Ryder and Buffalo Pumps.

REMARKS: During our telephone conversation, Mr Hopkins related the following information:

Buffalo Pumps - drinking source is public water supply water. There are no residential wells within a 3 mile radius of site. City of N. Tonawanda and Town of Wheatfield receive drinking water from Niagra River. There are no industrial or agricultural wells in the vicinity of the site.

Chisholm Ryder - four family homes located on Pennsylvania Ave (Town of Niagra) and Deloware Ave near Rte. 31 have shallow dug wells as their drinking water supply. These families are in the process of being hooked up to public water supply lines.

?. This should be ... Town of Niagara Water District

Analyses of wells showed high bacterial content and some low volatile concentrations. Wells are probably upgradient of Chisholm Ryder site. Also in Town of Niagra Water District is a

foot of Pennsylvania Ave

Junkyard (location?) which has a well that is not used for drinking but is used as 'wash water' 2 wells which exist on Bellvadeer Ave. are now abandoned. No industrial wells or Agricultural wells exist within vicinity of ...

cont'd →

8

INTERVIEW FORM

INTERVIEWEE/CODE Mr. Mike Hopkins - Niagra County Health Dept.

TITLE - POSITION Assistant Public Health Engineer

ADDRESS Main Post Office Box 428, 10th & East St.

CITY Niagra Falls STATE NY ZIP 14302

PHONE (916) 284-3124 RESIDENCE PERIOD ______ TO ______

LOCATION Niagra Falls INTERVIEWER Liz Dobson

DATE/TIME Oct. 08, 1987 / 10:00 AM

SUBJECT: Groundwater Use in vicinity of Phase II sites: Nash Road, Chisholm Ryder and Buffalo Pumps.

REMARKS:

Nash Road - ~~Town~~ City of North Tonawanda is on public water supply; no private drinking wells. Doesn't think Town of Wheatfield has any private drinking/municipal wells, this must be checked with Town of Wheatfield Water Authority

Other information: General Bedrock info for N. Tonawanda: Camillus Shale, approx 30 feet to top of bedrock. Overlain by Till, overlain by clay.

as corrected 10/15/87

[signature]

N. TONA.
693-4262

TOWN OF WHEATFIELD WATER DISTRICT

Norman A. Walck
Water Superintendent

3113 NIAGARA FALLS BOULEVARD
N. TONAWANDA, NEW YORK 14120

9

October 28, 1987

To Whom It May Concern:

According to our records, the following residences are not supplied water by the Town of Wheatfield. We assume their water requirements are supplied by wells.

Mrs. Walck
2083 Lockport Rd.
Niagara Falls, NY 14304

Ronald Fritz
2469 Lockport Rd.
Sanborn, NY 14132

Carl Goerss
3454 Lockport Rd.
Sanborn, NY 14132

R. Billing
3660 Lockport Rd.
Sanborn, NY 14132

F. Wrazin
3601 Lockport Rd.
Sanborn, NY 14132

Roy Kunselman
3846 Lockport Rd.
Sanborn, NY 14132

A. Kaufman
3892 Lockport Rd.
Sanborn, NY 14132

W. Hauck
3920 Lockport Rd.
Sanborn, NY 14132

G. LeRoy
3926 Lockport Rd.
Sanborn, NY 14132

Mr./Mrs. Sadowski
3942 Lockport Rd.
Sanborn, NY 14132

D. Churpita
7496 Townline Rd.
No.Tonawanda, NY 14120

A. Barney
6080 Shawnee Rd.
Sanborn, NY 14132

E. Labuszewski
6765 Shawnee Rd.
No. Tonawanda, NY 14120

S. Labuszewski
6777 Shawnee Rd.
No.Tonawanda, NY 14120

Erv Wendt
6913 Shawnee Rd.
No.Tonawanda, NY 14120

Mr./Mrs. Masters
3260 Hoover Rd.
Sanborn, NY 14132

L. Hoover
6022 Hoover Rd.
Sanborn, NY 14132

John Nagy
6689 Nash Rd.
No.Tonawanda, NY 14120

R. Zastrow
7116 Nash Rd.
No.Tonawanda, NY 14120

E. Diehe
3125 Niagara Falls Blvd.
No.Tonawanda, NY 14120

A. Priest
6185 Ward Rd.
Sanborn, NY 14132

W. Smith
6827 Ward Rd.
No.Tonawanda, NY 14120

Yours truly,

Norman A. Walck

Norman A. Walck
Water Superintendent

NAW/dw

ES ENGINEERING-SCIENCE
INTERVIEW FORM

9

Interviewee/Code: Michael Hopkins /

Title-Position: Ass't. Public Health Engineer

Address: Niagara Co. Health Department

City: Niagara Falls State: NY Zip: 14302

Phone: (716) 284-3128 Residence Period: ____ to ____

Location: (Telephone) Interviewer: W. Bradford

Date/Time: 1/3/89 / 10:30 AM

Subject: Distances to various residences near Nash Rd. site

Remarks: The following addresses are within approx. 3 miles of the site (old Town of Wheatfield Landfill on Nash Road): 7496 Townline Rd, 6765 Shawnee Rd, 6777 Shawnee Rd, 6913 Shawnee Rd, 6689 Nash Rd, 7116 Nash Rd, 3125 Niagara Falls Blvd, and 6827 Ward Rd. Both 7116 Nash Rd and 3125 Niagara Falls Blvd. as discussed these addresses are are about ~~2~~ 1 mile ~~[illegible]~~

The following addresses are more than 3 miles from the site: 6080 Shawnee Rd, 3260 Hoover Rd, 6022 Hoover Rd, and 6185 Ward Rd.

All the above distances are rough estimates.

I agree with the above summary of the interview: ____

Signature: [signature]

Comments: ____

New York State Atlas of Community Water System Sources

NEW YORK STATE
DEPARTMENT OF HEALTH

1982

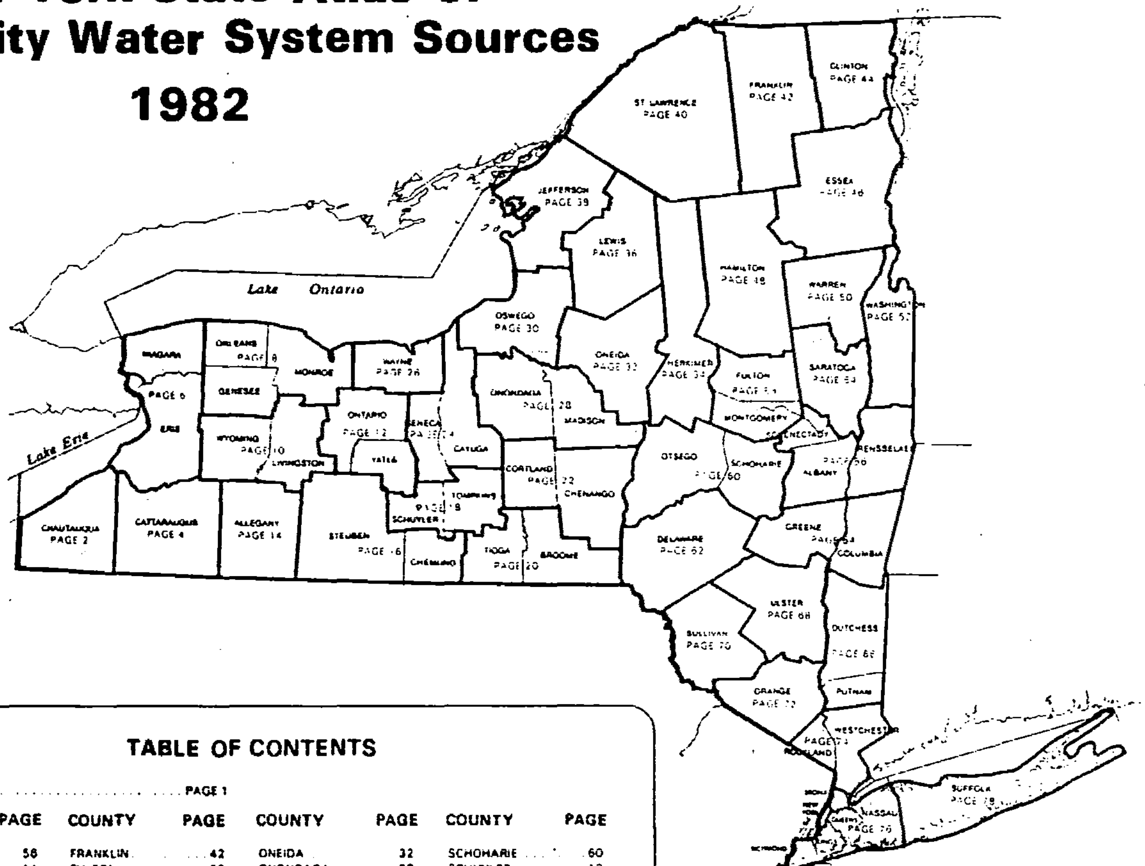


TABLE OF CONTENTS

LEGEND

BOUNDARIES AND PLACES

International
State
County
Town
Indian Reservation
City — Village
Unincorporated Place — Federal Reservation
Built-up Area (Over 25 000 population including any contiguous city or village)

CLASSIFICATION OF POPULATED PLACES

100 000 or more	YONKERS
50 000 to 100 000	Levittown
12 500 to 50 000	Poughkeepsie
2 500 to 12 500	Hampton Bays
250 to 2 500	Rockville
250 or less	

TRANSPORTATION

Highways

- Divided Highways
  - Full Control of Access
  - Partial or No Control of Access
- Undivided Highway
- Interchange
- Touring Route (State, U.S., Interstate) or State Parkway
- Touring Route Markers
  - State, U.S., Interstate

Railroads

- Operating Line — Service Discontinued
- Operator — DELAWARE AND HUDSON
- Owner (If Other than Operator) — (PENN CENTRAL)
- Company Having Trackage Rights — (CONRAIL)

Airports (Open to the Public, Military)

- Runway under 4000' — Runway over 4000'

Rest Areas

- Food, Gas, Rest Rooms — Rest Rooms
- Gas, Rest Rooms — Parking Only

RECREATION FACILITIES

State or National Recreation Area
State Campground
State Boat Launching Site
State Canal Park
State Fish Hatchery
Other State Recreation Site

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

ERIE COUNTY

ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
	Municipal Community		
	Akron Village (See No 1 Wyoming Co, Page 10)	3640	
1	Alden Village	3460	Wells
2	Angola Village	8500	Lake Erie
3	Buffalo City Division of Water	357870	Lake Erie
4	Caffee Water Company	210	Wells
5	Collins Water District #3	704	Wells
6	Collins Water Districts #1 and #2	1384	Wells
7	Erie County Water Authority (Sturgeon Point Intake)	375000	Lake Erie
8	Erie County Water Authority (Van DeWater Intake)	NA	Niagara River - East Branch
9	Grand Island Water District #2	9390	Niagara River
10	Holland Water District	1670	Wells
11	Lawtons Water Company	138	Wells
12	Lockport City (Niagara Co)		Niagara River - East Branch
13	Niagara County Water District (Niagara Co)		Niagara River - West Branch
14	Niagara Falls City (Niagara Co)		Niagara River - West Branch
15	North Collins Village	1500	Wells
16	North Tonawanda City (Niagara Co)		Niagara River - West Branch
17	Orchard Park Village	3671	Pipe Creek Reservoir
18	Springville Village	4169	Wells
19	Tonawanda City	18538	Niagara River - East Branch
20	Tonawanda Water District #1	91269	Niagara River
21	Wanakah Water Company	10750	Lake Erie
	Non-Municipal Community		
22	Aurora Mobile Park	125	Wells
23	Bush Gardens Mobile Home Park	270	Wells
24	Circle B Trailer Court	50	Wells
25	Circle Court Mobile Park	125	Wells
26	Creekside Mobile Home Park	120	Wells
27	Donnelly's Mobile Home Court	99	Wells
28	Gowanda State Hospital	NA	Clear Lake
29	Hillside Estates	160	Wells
30	Hunters Creek Mobile Home Park	150	Wells
31	Knox Apartments	NA	Wells
32	Maple Grove Trailer Court	72	Wells
33	Millgrove Mobile Park	100	Wells
34	Perkins Trailer Park	75	Wells
35	Quarry Hill Estates	400	Wells
36	Springville Mobile Park	114	Wells
37	Springwood Mobile Village	132	Wells
38	Taylors Grove Trailer Park	39	Wells
39	Valley View Mobile Court	42	Wells
40	Villager Apartments	NA	Wells

NIAGARA COUNTY

ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
	Municipal Community		
	Lockport City (See No 12, Erie Co)	25000	
1	Middleport Village	2000	Wells (Springs)
	Niagara County Water District (See No 13, Erie Co)	48	
2	Niagara Falls City (See also No 14 Erie Co)	77384	Niagara River - East Branch
	North Tonawanda City (See No 16 Erie Co)	36000	
	Non-Municipal Community		
3	Country Estates Mobile Village	28	Wells

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

VOLUME I

Nash Road Landfill — Site No. 932054

Town of Wheatfield — Niagara County

Date: July 1985

Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233

Henry G. Williams, *Commissioner*

Division of Solid and Hazardous Waste

Norman H. Nosenchuck, P.E., *Director*

By:

ENGINEERING-SCIENCE

In Association With

DAMES & MOORE

(11)

that flow direction within the shallow aquifer to follow the contours of the underlying clay unit. Again, this clay unit has been partially excavated in the trench, thereby providing a connection between the upper aquifer and trench water, and, by extension, possibly into the lower aquifer.

Contamination

Contamination of the environment within the site boundaries has been evaluated by chemical analyses of surface water, sediment, and groundwater samples and an HNU air quality survey. Migration of contamination away from the site is assessed by chemical analyses of surface water and one nearby (unused) residential well, as well as our interpretation of groundwater and surface water flow characteristics.

Surface Water Contamination

Water samples from ponds and from the ditch were analyzed in July 1983, as an emergency measure to assess the migration of contamination off-site via a surface water pathway. The results of these analyses are shown on Table IV.2. The samples were analyzed for the indicator parameters. Only very low levels of total organic halogens and methylene chloride were found. The ditch water sample had slightly greater levels than any of the pond and trench samples. This may indicate another subsurface or surface water source to the ditch, either west or north of the site. The TOX values (10 ppb and less) could be indicative of background levels. Alternately, the low levels of methylene chloride could be due to the laboratory contamination. These chemical analyses were performed without complete quality assurance procedures due to the emergency response nature of this part of the study.

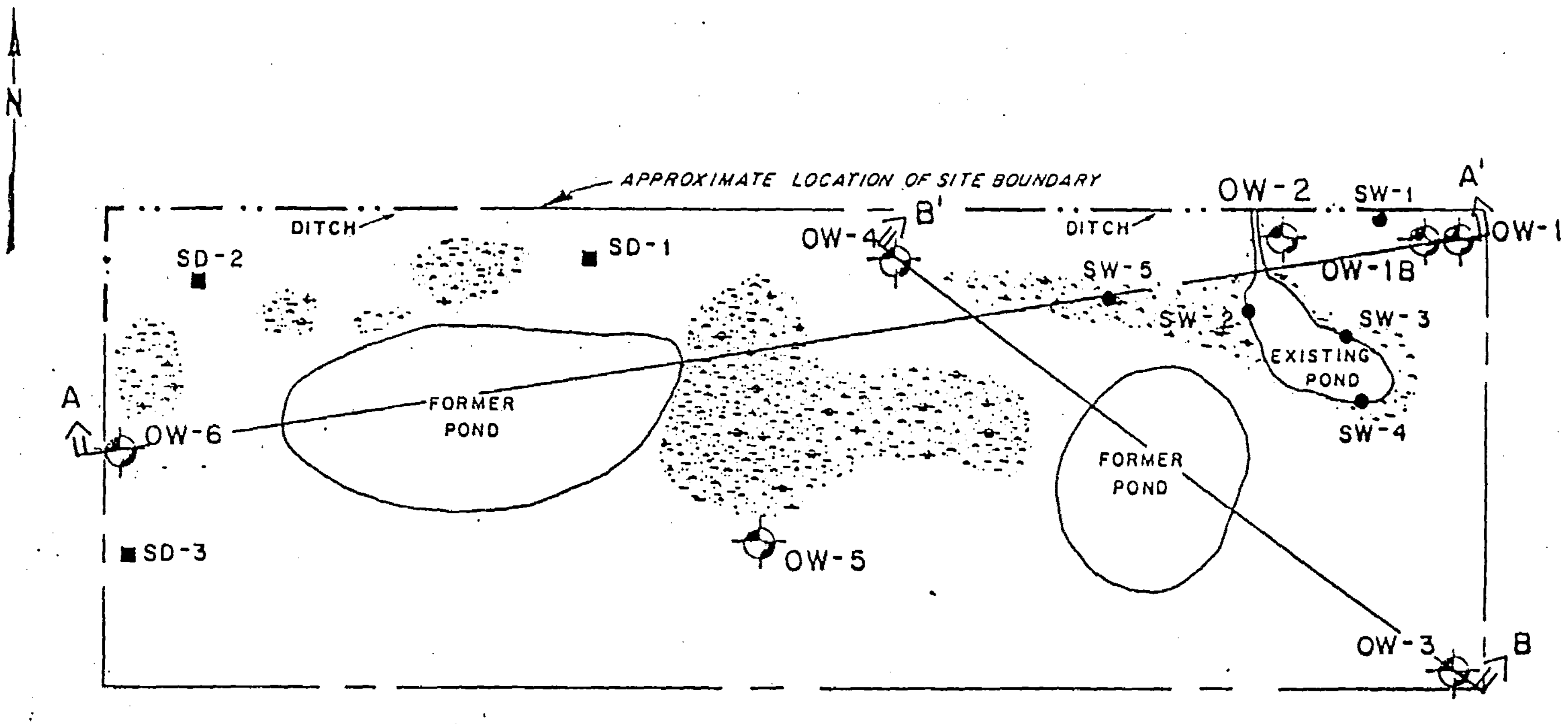
A sample of ponded water was collected by Region 9 DEC on July 11, 1983 and analyzed for GC/MS organics. Two compounds were identified at low concentrations including: Diethylphthalate (identified) and Toluene (42.7 ug/l).

From these analyses, no significant surface water contamination from organic indicator pollutants is believed to exist at the eastern end of the site.

Sediment Contamination

In the summer of 1984, three sediment samples were taken from "dried puddles" in the western end of the site (see Figure III.1 for sampling locations). These samples were analyzed for organic priority pollutants and metals. The results of these analyses are presented in Table IV.3. Also presented in this table are ranges of concentrations of metals in non-contaminated soils. The values for cadmium, chromium, copper, lead, nickel and zinc are all within the range of "typical" soils. Also there is no significant variation between the values for different sampling locations. Values for mercury and cyanide were not presented in Friberg, Nordberg and Vouk (1979); however, the values of cyanide are less than the detection limit. Mercury was detected at very low levels. Based on the results of the analysis of these

BY D. Tomas DATE 8/3/84



EXPLANATION:

■ SEDIMENT SAMPLE

● SURFACE WATER SAMPLE

⌖ SAMPLING WELL
OW-1

0 200 400 FEET
SCALE

NOTE 1 OSTERMAN WELL IS LOCATED APPROXIMATELY 1000 FEET WEST OF SITE.

PLOT PLAN
SHOWING CROSS SECTION LOCATIONS
NASH ROAD SITE

DAMES & MOORE

FIGURE III.1

TABLE IV.2

Analytical Results for Surface Water Samples

Parameter (ug/l)	SW-1	SW-2	SW-3	SW-4	SW-5
Methylene Chloride	11	<10	10	<10	<10
Chloroform	<10	<10	<10	<10	<10
Carbon Tetrachloride	<10	<10	<10	<10	<10
Benzene	<10	<10	<10	<10	<10
Toluene	<10	<10	<10	<10	<10
Chlorobenzene	<10	<10	<10	<10	<10
1,1,2,2,-trichloroethane	<10	<10	<10	<10	<10
Tetrachloroethane	<10	<10	<10	<10	<10
1,1,2,2,-tetrachloro-ethene	<10	<10	<10	<10	<10
Trichloroethene	<10	<10	<10	<10	<10
Trichlorobenzene (isomers)	<10	<10	<10	<10	<10
Dichlorobenzene (isomer)	<10	<10	<10	<10	<10
Hexchlorobutadiene	<10	<10	<10	<10	<10
pH	6.9	8.1	7.1	7.4	7.4
Total organic halogens	10.	5.	7.	7.	8.

(See Figure III.1 for location of sampling points)

TABLE IV.3

Analytical Results(1) for Sediment Samples

Parameter (ug/g)	Sample No. SD-1	SD-2	SD-3	Range of Concentration in non-contaminated soils(2)
Cadmium	0.30	< .2	< .2	<1
Chromium	6.8	6.3	5.6	trace to 250
Copper	5.7	8.2	10.0	2 to 100
Lead	18.	7.0	14.	2 to 200
Mercury	0.0084	0.064	0.010	(3)
Nickel	6.5	8.5	9.4	3 to 1,000
Zinc	40.	34.	48.	10 to 300
Cyanide	<1	<1	<1	(3)

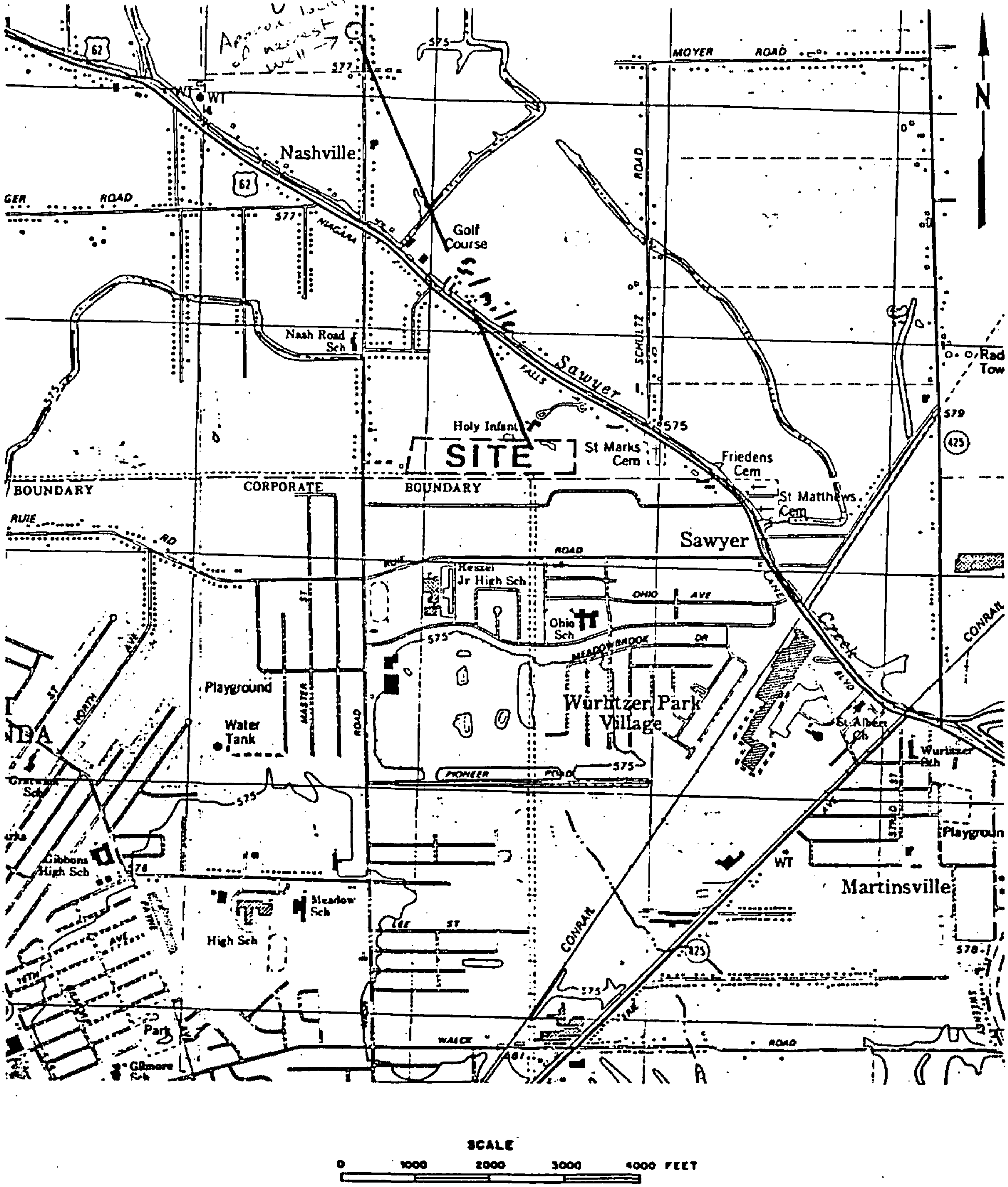
(1) Samples were analyzed for volatile organics, acid and base/neutral extractable organics and pesticides/PCB's. All results for organics analysis were less than detection limits

(2) Source: Handbook on the Toxicology of Metals, Edited by L. Friberg, G. F. Nordberg and V. Vouck, 1979.

(3) No information for this parameter available in Friberg, Nordberg, and Vouk (1979)

(See Figure III.1 for location of sampling points)

10



SITE COORDINATES: 43°04' 10.0" N. LAT
78°51' 33.8" W. LONG

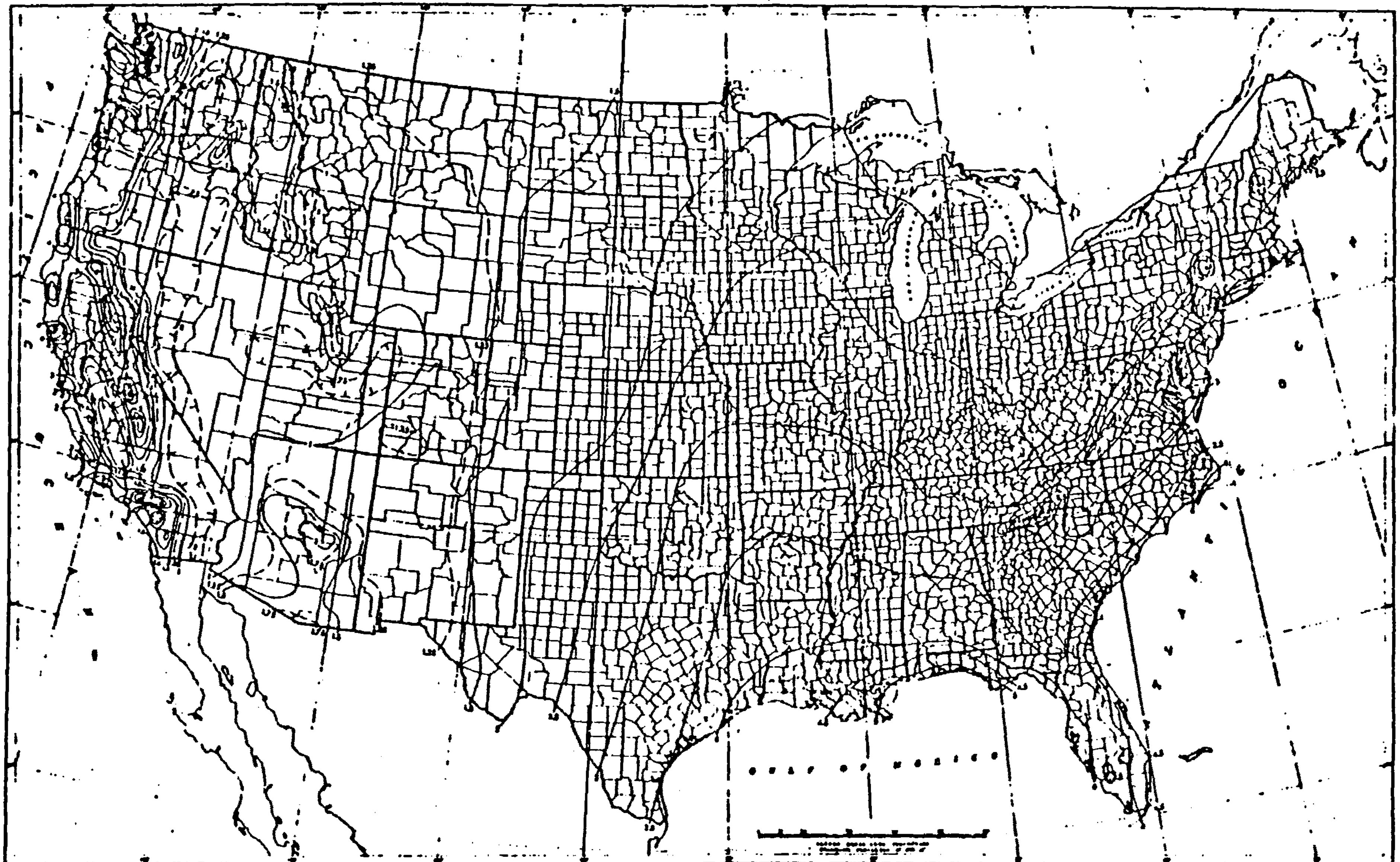
REFERENCE: U.S.G.S. 7.5' TOPOGRAPHIC MAP
TONAWANDA EAST, NY (1980) AND
TONAWANDA WEST, NY (1980) QUADRANGLES

SITE LOCATION MAP

NASH ROAD SITE

DAMES & MOORE

FIGURE I.1



Source: Rainfall Frequency Atlas of the United States, Technical Paper No. 40, U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C., 1963.

FIGURE 8
1-YEAR 24-HOUR RAINFALL
(INCHES)

United States
Environmental Protection
Agency

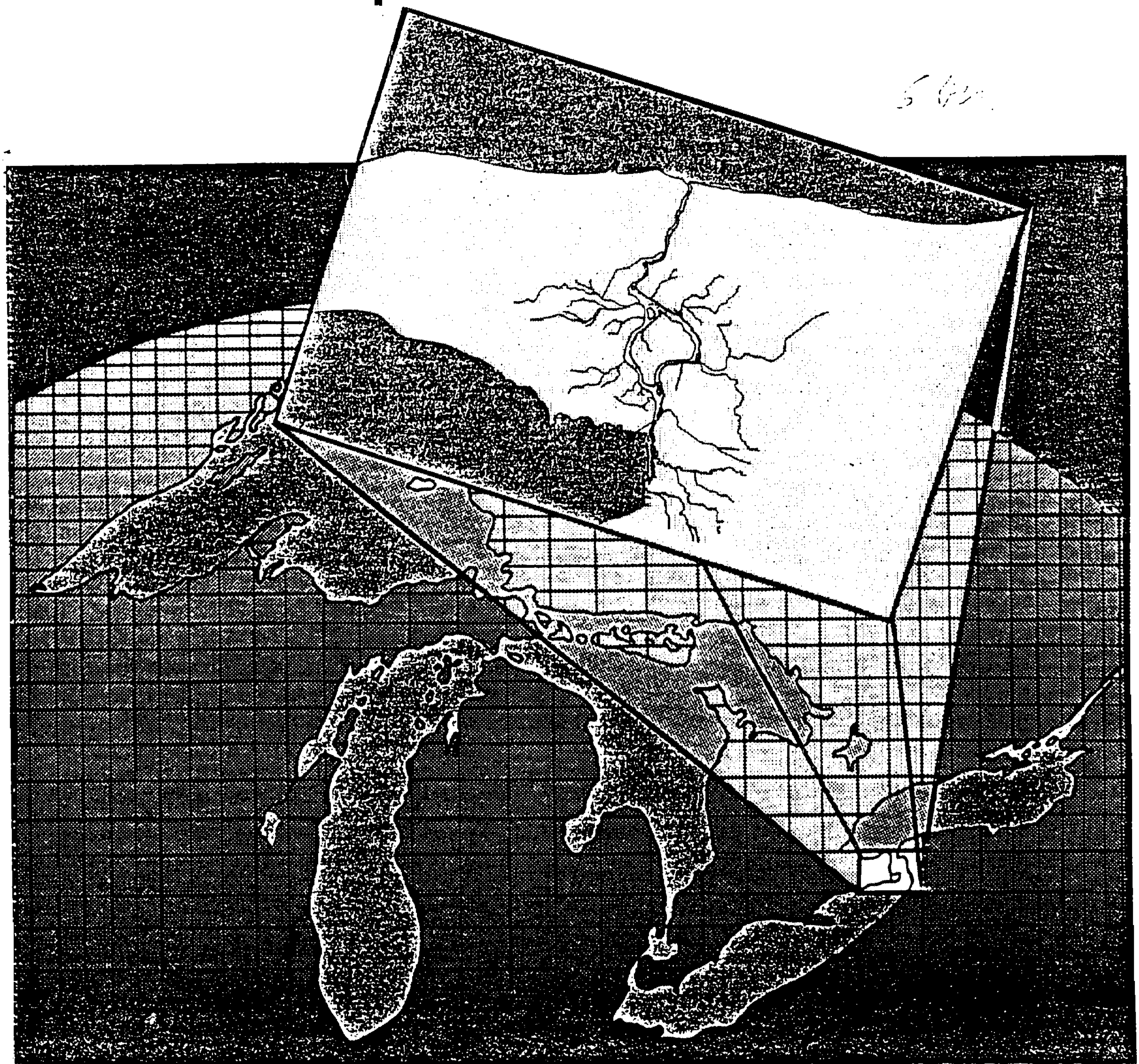
Great Lakes National
Program Office
536 South Clark Street
Chicago, Illinois 60605

EPA-905/4-85-001
March 1985

14

EPA

Preliminary Evaluation Of Chemical Migration To Groundwater and The Niagara River from Selected Waste-Disposal Sites



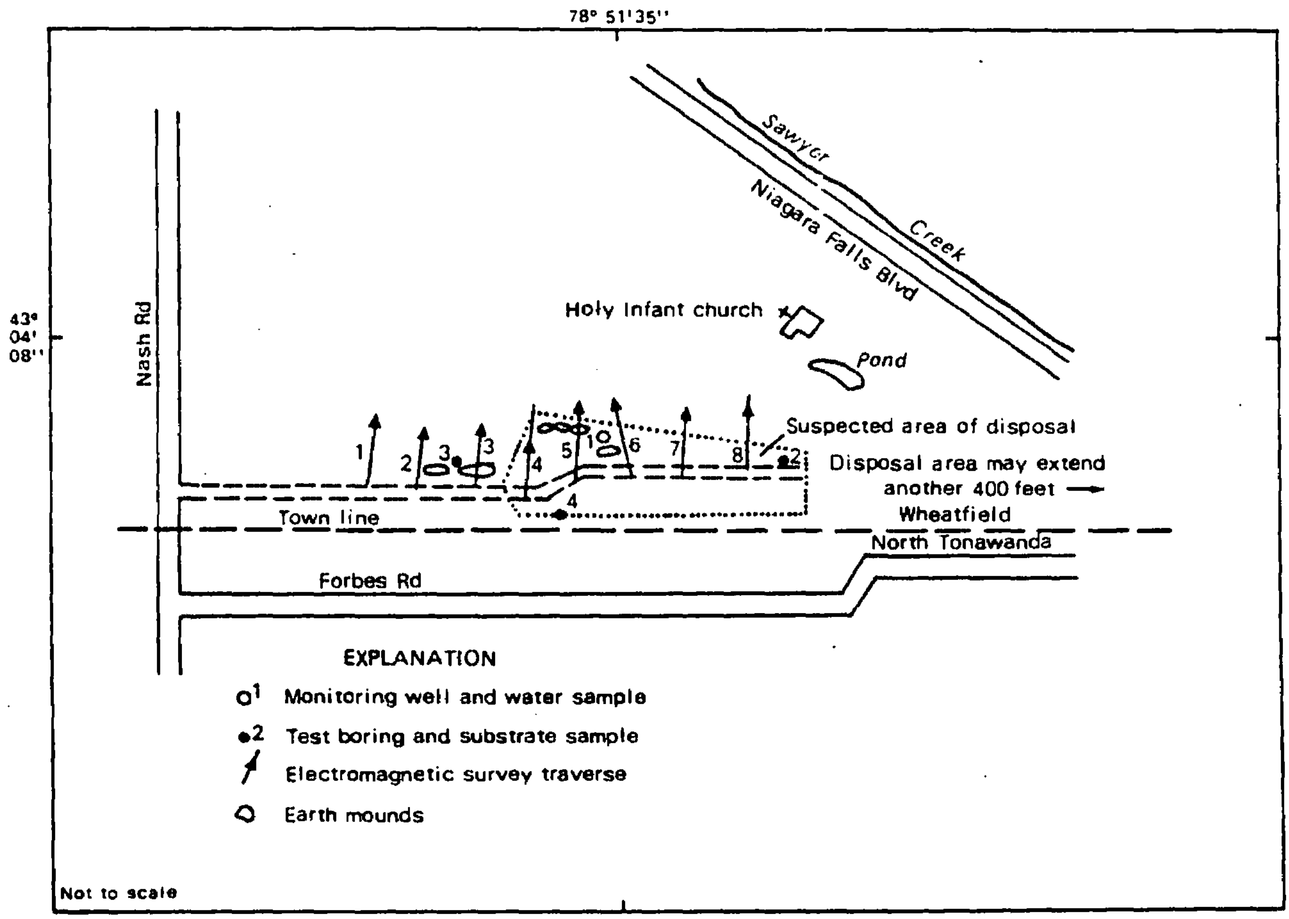
93. NASH ROAD (USGS field reconnaissance) NYSDEC 932054

(14)

General information and chemical-migration potential.--The Nash Road site, in the town of Wheatfield, was used by seven firms for disposal of an unknown quantity of caustics, plating-tank sludge, and municipal waste during 1964-68. Material excavated during construction of a highway adjacent to the southern border of the Love Canal was buried in a trench 100 ft by 30 ft across and 27 ft deep in the northeast corner of the site. Clean fill 15 ft deep was reportedly placed over the material.

The potential for contaminants to travel downward through the underlying clay seems limited, and the potential for lateral migration cannot be evaluated from the available data. The chemical data indicate several organic compounds in the ground water, but the rate at which these compounds move is unknown. Additional data and monitoring would be needed to confirm offsite migration. Thus, the potential for contaminant migration is indeterminable.

Geologic information.--The site consists of a Holocene lacustrine clay unit overlying bedrock of Camillus Shale. The U.S. Geological Survey drilled four test borings on the site in 1982; the locations are shown in figure B-9. The geologic logs are as follows:



Base from USGS field sketch, 1982

Figure B-9. Location of monitoring wells and electromagnetic-conductivity survey lines at Nash Road, site 93, Wheatfield.

14

Boring no.	Depth (ft)	Description
1	0 - 5.0	Fill.
	5.0 - 6.5	Clay, pink.
		WATER SAMPLE: 6.0 ft.
2	0 - 8.0	Clay, tan to light green, sandy, dry.
	8.0 - 10.0	Clay, green.
	10.0 - 11.5	Clay, pink.
		SOIL SAMPLE: 8 - 10 ft.
3	0 - 1.5	Tan and black fill.
	1.5 - 3.5	Clay, greenish, sandy, dry.
	3.5 - 7.0	Clay, greenish, sandy, wet.
		SOIL SAMPLE: 7 ft.
4	0 - 1.0	Topsoil.
	1.0 - 3.5	Clay, sandy, dry.
	3.5 - 6.5	Clay, greenish, wet.
		SOIL SAMPLE: 6.5 ft.

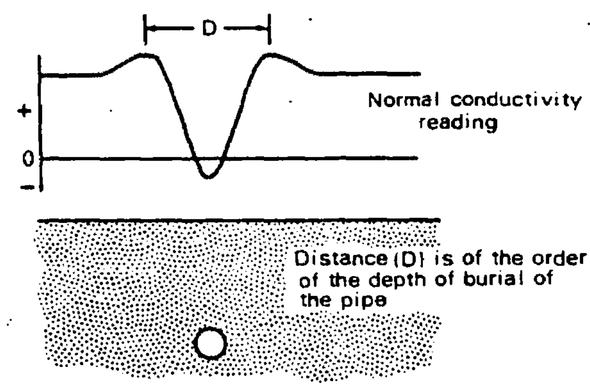
Hydrologic information.--Ground water was encountered approximately 6 ft below land surface. The water table is estimated to be between 570 and 575 ft above NGVD. The direction of ground-water flow is probably northeastward toward Sawyer Creek, a tributary to Cayuga Creek, but additional wells would be needed to confirm this.

Chemical information.--In 1982, the Geological Survey collected one water sample and three soil samples for arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, and organic-compound analyses. Results are given in table B-9. In sample 2, copper concentrations exceeded those in soils from undisturbed sites, and in sample 1, iron and lead exceeded USEPA criteria for drinking water and the New York State standard for ground water. The samples contained five organic priority pollutants, but except for fluoranthene (538 µg/kg), concentrations were not above the quantifiable detection limit. In addition, 39 organic nonpriority pollutants and four possibly naturally occurring compounds were found.

The site was also investigated by Recra Research in 1979 and by NYSDEC in 1983. The data are available from NYSDEC in Buffalo, N.Y.

Electromagnetic survey.--The Geological Survey ran an electromagnetic survey with eight traverses in November 1982; locations are shown in figure B-9. The effect of buried pipe is evident in the stripchart in fig. B-10.

Figure B-10. Effect of buried pipe on electromagnetic-conductivity reading.



The southern parts of lines 1 through 8 (fig. B-11) show the effects of interference by a series of high-power electrical transmission lines. These powerlines and a housing development south of them made it impossible to begin the southern end of each line in a waste-free area.

Lines 1, 2, and 3 show an irregular pattern of conductivity values within the disturbed area. Beyond the trees that form the northern border of the site, the conductivity values are within the background range.

Lines 4, 5, and 6, though longer than the first three lines, show a similar pattern. Areas of zero conductivity probably correspond to a zone of buried metallic debris. (When readings are taken over a buried pipe or other metal conductor, the conductivity value first rises, then drops to zero.)

Line 7 both begins and ends in a obvious zone of dumping. Data collection beyond 340 ft was impeded by a small pond. Line 8 shows the clearest example of powerline interference; the conductivity range throughout this line becomes artifically elevated within 40 ft of the powerlines.

No definite conclusions could be made from the survey. Variability of fill and interferences make data interpretation questionable.

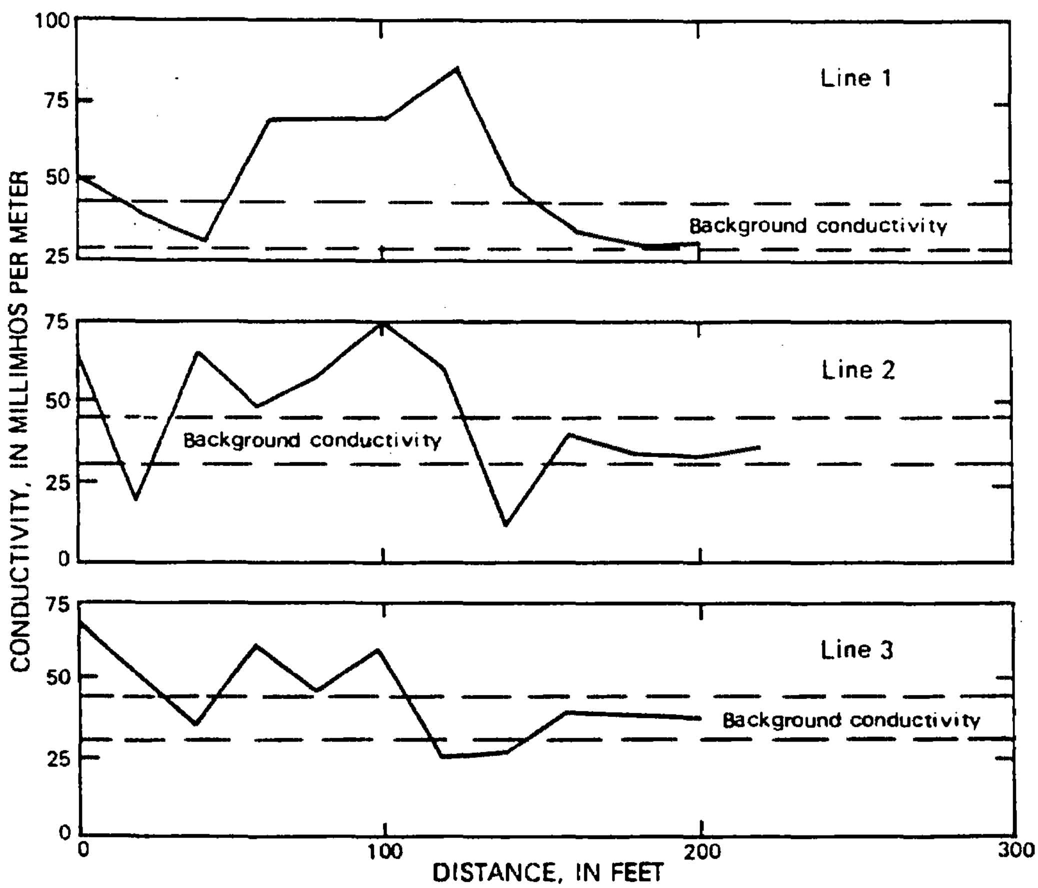


Figure B-11. Results of electromagnetic-conductivity survey at Nash Road, site 93, Wheatfield. (Locations of lines are shown in fig. B-10.)

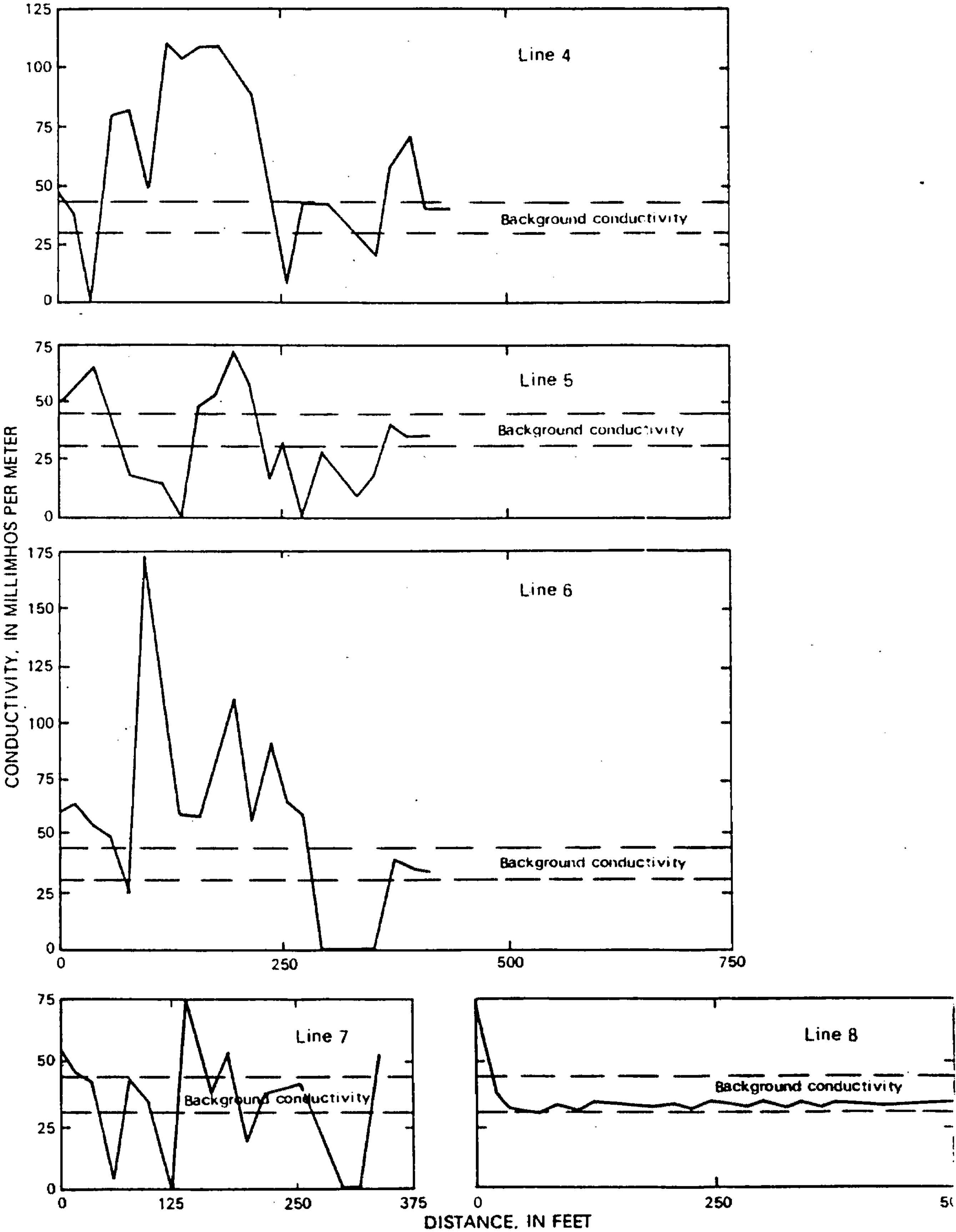


Figure B-11 (continued). Results of electromagnetic-conductivity survey at Nash Road, site 93, Wheatfield.

14

Table B-9.--Analyses of ground-water and substrate samples from Nash Road, site 93, Wheatfield, N.Y., June 24, 1982.
[Locations shown in fig. B-9. Concentrations are in µg/L and µg/kg; dashes indicate that constituent or compound was not found, LT indicates it was found but below the quantifiable detection limit.]

	Sample number and depth below land surface (ft)			
	Ground water		Substrate	
	1 (6.0)	duplicate	2 (9.5)	split
pH	6.4			
Specific conductance (µmho/cm)	2,650			
Temperature (°C)	17.0			
<u>Inorganic constituents</u>				
Arsenic	5†	(5†)	--	(--)
Cadmium	1	(1)	1,000	(1,000)
Chromium	--	(--)	2,000	(4,000)
Copper	17	(21)	77,000††	(100,000††)
Iron	90,000†	(90,000†)	2,500,000	(5,000,000)
Lead	67†	(74†)	20,000	(20,000)
Mercury	0.3	(0.5)	--	(--)
Nickel	34	(34)	--	(--)
<u>Organic compounds</u>				
Priority pollutants				
Fluoranthene	--	(--)	--	(538)
Benzo(a)anthracene	--	(--)	--	(LT)
Chrysene	--	(--)	--	(LT)
Benzo(b)fluoranthene	--	(--)	--	(LT)
Benzo(k)fluoranthene	--	(--)	--	(LT)
1,4-dichlorobenzene	7.3	(--)	--	(--)
Di-n-butyl phthalate	LT	(5.7**)	--	(--)
Nonpriority pollutants				
1,2,3-Trimethylbenzene[1]	6.2	(--)	--	(--)
1,2,4-trimethylbenzene[1]	18	(--)	--	(--)
(1-methylethyl)benzene[1]	9.3	(--)	--	(--)
1,3,3-Trimethyl-bicyclo-[2.2.1]heptan-2-one[1]	62	(--)	--	(--)
1,7,7-Trimethyl-bicyclo-[2.2.1]heptan-2-one[1]	390	(17**)	--	(--)

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

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

†† Exceeds concentrations in samples taken from undisturbed soils in the Tonawanda area. Undisturbed soils not analyzed for iron.

** Surrogate recoveries were outside the acceptance limits.

(14)

Table B-9.--Analyses of ground-water and substrate samples from Nash Road, site 93, Wheatfield, N.Y., June 24, 1982 (continued)
[Locations shown in fig. B-9. Concentrations are in µg/L and µg/kg; dashes indicate that constituent or compound was not found, LT indicates it was found but below the quantifiable detection limit.]

	Sample number and depth below land surface (ft)	
	Substrate	
	3	4 (6.5)
pH		
Specific conductance (µmho/cm)		
Temperature (°C)		
Inorganic constituents		
Arsenic	--	--
Cadmium	1,000	1,000
Chromium	2,000	2,000
Copper	71,000	71,000
Iron	2,100,000	2,400,000
Lead	13,000	20,000
Mercury	--	--
Nickel	--	--
Organic compounds		
Priority pollutant		
D-n-butyl/phthalate	--	--
Nonpriority pollutants		
1,2,3-Trimethylbenzene[1]	LT	--
1,2,4-trimethylbenzene[1]	LT	--
1,4-dichlorobenzene[1]	LT	--
(1-methylethyl)benzene[1]	LT	--
1,3,3-Trimethyl-bicyclo-[2.2.1]heptan-2-one[1]	LT	--
1,7,7-Trimethyl-bicyclo-[2.2.1]heptan-2-one[1]	LT	--

14

Table B-9.--Analyses of ground-water and substrate samples from Nash Road, site 93, Wheatfield, N.Y., June 24, 1982 (continued) [Locations shown in fig. B-9. Concentrations are in µg/L and µg/kg; dashes indicate that constituent or compound was not found, LT indicates it was found but below the quantifiable detection limit.]

	Sample number					
	Ground water		Substrate			
	1	(duplicate)	2	(split)	3	4
Organic compounds (continued)						
Nonpriority pollutants (continued)						
1,7,7-Trimethyl-bicyclo [2.2.1]heptane-2,5-dione[1]	LT	(20**)	--	(--)	--	--
3-(1,1-dimethylethyl) phenol[1]	20	(LT**)	--	(--)	--	--
2-methylbenzo chloride[1]	LT	(--)	--	(--)	--	--
Diethyl phthalate[1]	6.2	(8.0**)		(--)		
Phosphoric acid tributylester[1]	10	(110**)	--	(--)	--	--
2(3H)-benzothiazolone	LT	(60**)	--	(--)	--	--
1,2,3,4,4a,9,10,10a-octahydro-1,4a-dimethyl-7-(1-methyethyl)-[1R-(1 alpha, 4a beta, 10a alpha)]-1-phenanthrenecarboxaldehyde[1]	LT	(LT**)	--	(--)	--	--
Cyclohexl phthalate[1]	LT	(--)	--	(--)	--	--
3,5-Dimethylphenol[1]	--	(11**)	--	(--)	--	--
2-ethyl-4-phenol-.delta. 2-1,3,4-oxadiazolin-5-one[1]	--	(100**)	--	(--)	--	--
n-butylbenzenesulfonamide[1]	--	(9.9**)	--	(--)	--	--
3-(2-phenylethyl)phenol[1]	--	(LT**)	--	(--)	--	--
2H-1-benzopyran[1]	--	(LT**)	--	(--)	--	--
2-methylpentadecane[1]	--	(LT**)	--	(--)	--	--
4,8,12-Trimethyl-3, 7,11-tridecatriene-nitrile[1]	--	(LT**)	--	(--)	--	--
o-methyloxime-3,5-dimethyl-2-cyclohexen-1-one[1]	--	(--)	804	(--)	--	--
Iococyclohexane[1]	--	(--)	10,052	(--)	--	--
N-[2-methyl-1-(1-methylethyl) bitulidiene]methanamine[1]	--	(--)	36,569	(--)	--	--

(14)

Table B-9.--Analyses of ground-water and substrate samples from Nash Road, site 93, Wheatfield, N.Y., June 24, 1982 (continued)
[Locations shown in fig. B-9. Concentrations are in μg/L and μg/kg; dashes indicate that constituent or compound was not found, LT indicates it was found but below the quantifiable detection limit.]

	Sample number					
	Ground water		Substrate			
	1	(duplicate)	2	(split)	3	4
Organic compounds (continued)						
Nonpriority pollutants (continued)						
N-(2-hydroethyl)-dodecanamide[1]	—	(--)	16,342	(--)	--	--
1-(2-butenyl)-2,3-dimethylbenzene[1]	—	(--)	1,301	(--)	--	--
2,3,5,6,7,8,9,10-octahydri-5-hydroxy-2,2,7,7,9-pentamethyl-5,9-menthano-benzocycloocten-4(1H)-one	--	(--)	6,294	(--)	--	--
10-methylisocosane[1]	--	(--)	LT	(--)		
Hexamethylcyclotrisiloxane[1]	—	(--)	—	(--)	—	1,300
Octamethylcyclotetra-siloxane[1]	--	(--)	—	(--)	--	5,440
Decamethylcyclopenta-siloxane[1]	--	(--)	--	(--)	—	LT
Dodecamethylcyclohexa-siloxane[1]	—	(--)	--	(--)	--	90.7
5-Methyl-3-hexen-2-one[1]	--	(--)	--	(3,500)	--	--
Dichloromethylbenzene[1]	--	(--)	—	(LT)	—	--
2-(1,1-Dimethyl)-4-methylfuran[1]	—	(--)	--	(183,000)	—	--
2,4-Dimethyl-2-pentene			--	(182,000)	—	--
3-Octanol[1]			—	(45,000)	--	--
2,6-Bis(1,1-dimethylethyl) naphthalene[1]	—	(--)	—	(1,650)	—	--
1,1,4,5,5,8-Hexamethyl-S-hydrindacene[1]	--	(--)	--	(5,750)	—	—
2,6-Dimethyl-2,5-heptadien-4-one[1]	—	(--)	—	(--)	509	--
2-Methyl-2-octen-4-one[1]	—	(--)	--	(--)	13,300	—
1,2,4-Trimethyl-5-(1-methyl-ethenyl)benzene[1]	--	(--)	--	(--)	159	--
Compounds potentially of natural origin						
Heptadecane[1]	—	(LT**)	--	(--)	--	—
Octacosane[1]	—	(LT**)	—	(--)	--	--
Nonadecane[1]	—	(LT**)	--	(--)	--	—
3,8-Dimethylundecane[1]	—	(LT**)	—	(--)	—	--

15

Hooker Industrial chemicals DIVISION

NIAGARA FALLS, NEW YORK 14302, PHONE (716) 285-6655

May 9, 1968

Mr J P Caine
Resident Engineer NYS Dept of Transportation
355 - 77th Street
Niagara Falls, New York

Subject: LaSalle Expressway - Ground Samples

Dear Mr Caine:

This letter is written in reply to your phone conversation with us on May 3rd.

Samples of liquors taken from the 97 - 99th Streets excavation on March 15, 1968 analyzed as follows:

Specific gravity @ 25°C	=	1.198
pH	=	3.0
Loss on ignition	=	86.4%
Flash pt °F		130 (Cleveland open cup)
Chlorate, Phosphorous and Fluoride	=	None

We were able to detect small amounts of chlorotoluenes, trace benzoyl chloride and approximately 5% benzoic acid in this material.

The sample taken represented the worst portion of the excavation. It was obtained from organic puddles in the vicinity of the dirt pile.

Very truly yours

Frad T Olotka
Technical Supervisor
sj

cc W M Friedman - Niagara County Health Department
E R Gedeon - Niagara County Health Department
E Padlo
J N Brogard

(16)

Stream Classification
6 NYCRR Volume E

Site Name	Stream	Classif.	Standards	Reference: Article	Part #	Map*
Londville	Delaware R	A	A(T) TROUT	4	815	N-19
Carl Krom	Fall Kill	C	C	10	862	N-24
Norton	Mettawee R	C	C(T)	7	830	6-26
Copeland	Valatie Kill Trib.	D	D	10	863	K-25 S
VanBureN	Waterbase Creek	D	D	14	897	6-14
	Oswego River	C	C	14	897	G14c
LeRoy	Mud River	D	D	5	821	J-8 NW
	Trib to Oatka Creek	D	D			
Ontario Knife	Ishua Creek	C	C(T)	1	801	1
Buffalo Pumps	Niagara River	A*	A*	8	837	2
Pratt & Letchworth	Scajaquada Creek	B	B	8	837	6
MacNaughton Brooks	Buffalo River	D	D	8	837	6
Hisholm Ryder	Niagara River	A*	A*	8	837	1
Nash Rd	Sawyer Creek	D	D	8	837	2
Lancaster Rec.	N. Branch Plum Bottom Creek	D	D	8	837	7
Mino	French Creek Trib.	D	D	1	800	2
Fox Rd-Erie	Jennings Creek	B	B	8	837	10
Allied	Buffalo R.	D	D	8	837	6
Ashland	Niagara R	A*	A*	8	837	6
	Two Mile Creek	B	B	8	837	2
Salt Rock						
Onondaga L						
SWOCO						

800 · French Creek D. Basin / 801 · Olean Creek / 837 L. Erie · N. River D. Basin / 897 Oswego River Basin

* - Special international boundary waters 862 · Lower Hudson · 815 · Delaware R / 830 · Champlain · Mettawee Sub-basin

Nash Road

(17)

New York State Department of Environmental Conservation
FISH AND WILDLIFE DIVISION - REGION 9
600 Delaware Avenue, Buffalo, New York 14202-1073
(716) 847-4550

Thomas C. Jorling
Commissioner

September 2, 1987

Ms. Elizabeth M. Dobson
Engineering-Science
290 Elwood Davis Road
Liverpool, New York 13088

Dear Ms. Dobson:

This letter will serve as verification that I traced NYS designated wetland boundaries on the accompanying maps. The boundaries shown are from official Department of Environmental Conservation Maps promulgated on September 10, 1986 (Erie County) and December 5, 1984 (Niagara County).

Very truly yours,

James F. Farquhar III

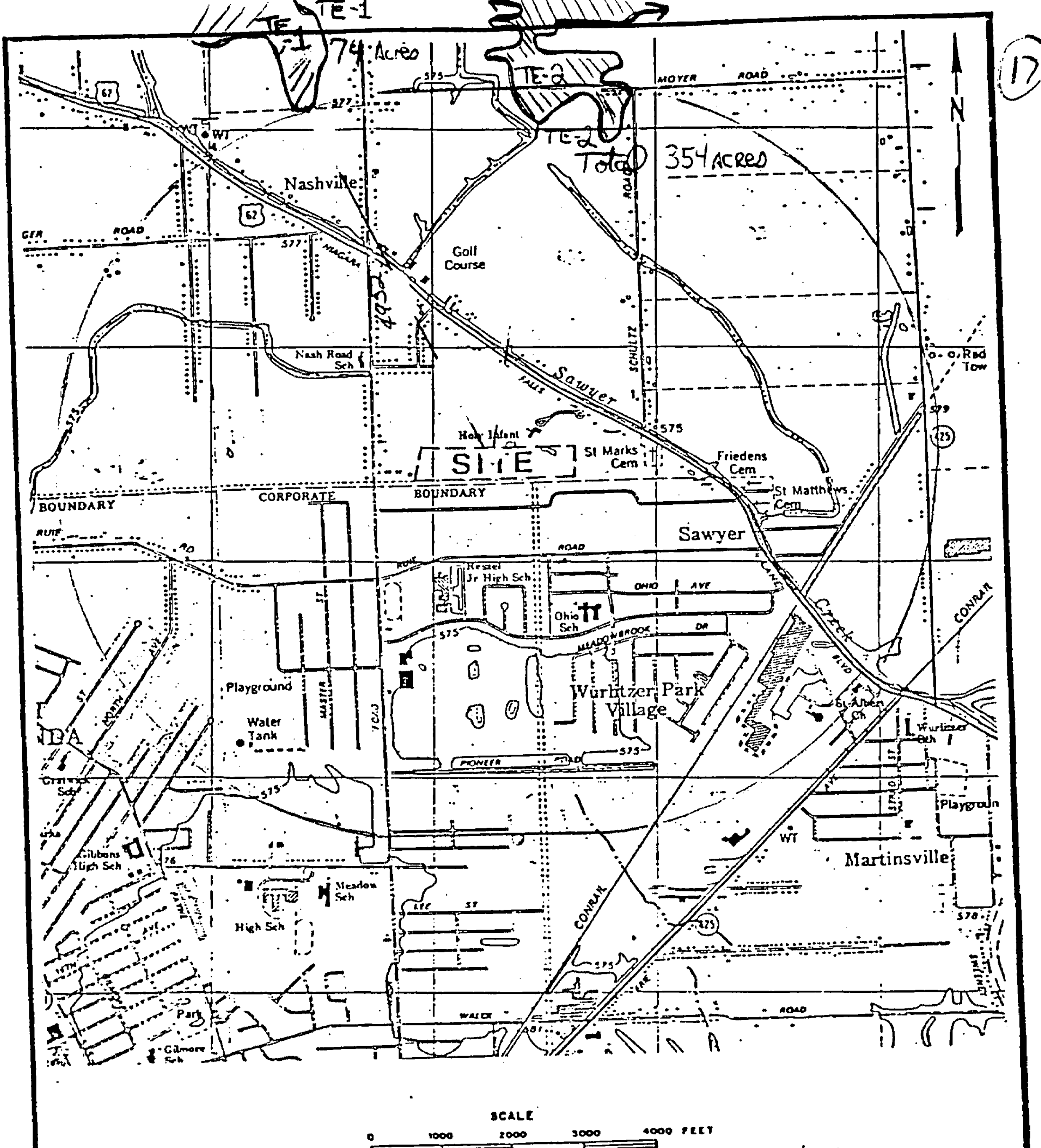
James F. Farquhar III
Fish and Wildlife Division

JFF:slm

cc: Mr. Gordon R. Batcheller

Enclosures

(17)



Niagra County

white out is covering distance lines drawn in by EMD -ES

9/28/87
EMD

SITE COORDINATES: 43°04' 10.0" N. LAT
78°51' 33.8" W. LONG

REFERENCE: U.S.G.S. 7.5' TOPOGRAPHIC MAP
TONAWANDA EAST, NY (1980) AND
TONAWANDA WEST, NY (1980) QUADRANGLES

NASH ROAD SITE

DAMES & MOORE

FIGURE IV.1

18

INTERVIEW FORM

INTERVIEWEE/CODE John W. Ozard /

TITLE - POSITION Senior Wildlife Biologist

ADDRESS WRC New York State DEC

CITY Delmar STATE NY ZIP 12054

PHONE (518) 439-7488 RESIDENCE PERIOD ______ TO ______

LOCATION phone conversation INTERVIEWER W. Bradford

DATE/TIME 4/14/88 / 11:00 AM

SUBJECT: Critical habitats in New York state.

REMARKS: There are no federally designated critical habitats of endangered species located within New York state.

I AGREE WITH THE ABOVE SUMMARY OF THE INTERVIEW: John W. Ozard

SIGNATURE: JOHN W. OZARD

COMMENTS:

FROM: New York Prime Farmland Mapping Units USDA 5/89

19

Phelps gravelly fine sandy loam, 0 to 4 percent slopes
Phelps gravelly loam, 0 to 3 percent slopes
Phelps gravelly loam, 0 to 4 percent slopes
Phelps gravelly loam, 0 to 5 percent slopes
Phelps gravelly loam, 3 to 8 percent slopes
Phelps gravelly loam, fan
Phelps gravelly sandy loam, 0 to 3 percent slopes
Phelps gravelly silt loam
Phelps gravelly silt loam, 0 to 5 percent slopes
Phelps gravelly silt loam, 3 to 8 percent slopes
Phelps gravelly silt loam, clay substratum, 2 to 8 percent slopes
Philo silt loam
Pinckney silt loam, 3 to 8 percent slopes
Pittsfield fine sandy loam, 0 to 3 percent slopes
Pittsfield fine sandy loam, 3 to 8 percent slopes
Pittsfield gravelly fine sandy loam, 0 to 3 percent slopes
Pittsfield gravelly fine sandy loam, 3 to 8 percent slopes
Pittsfield gravelly loam, 3 to 8 percent slopes
Pittsfield gravelly loam, 3 to 8 percent slopes
Pittsfield stony fine sandy loam, 3 to 8 percent slopes
Pittsfield-Galway fine sandy loam, 0 to 3 percent slopes
Pittsfield-Galway fine sandy loam, 3 to 8 percent slopes
Pittstown gravelly silt loam, 3 to 8 percent slopes
Pittstown silt loam, 3 to 8 percent slopes
Podunk and Eel fine sandy loam, 0 to 2 percent slopes
Podunk and Eel fine sandy loams, high bottoms, 0 to 2 percent slopes
Pompton gravelly fine sandy loam, 0 to 3 percent slopes
Pompton gravelly fine sandy loam, 3 to 8 percent slopes
Pompton silt loam
Pompton fine sandy loam
Podunk fine sandy loam
Podunk fine sandy loam, 0 to 3 percent slopes
Pootatuck fine sandy loam
Pope silt loam
Pope very fine sandy loam, high bottom
Potsdam very fine sandy loam, 0 to 3 percent slopes
Pyrities fine sandy loam, 3 to 8 percent slopes
Rayne channery silt loam, 3 to 8 percent slopes
Raynham loam-where drained
RaA → Raynham silt loam, 0 to 2 percent slopes-where drained
Raynham silt loam, 0 to 3 percent slopes-where drained
Raynham silt loam, 0 to 4 percent slopes-where drained
Raynham silt loam, 0 to 5 percent slopes-where drained
Raynham silt loam, 0 to 6 percent slopes-where drained
RaB → Raynham silt loam, 2 to 6 percent slopes-where drained
Raynham silt loam-where drained
Raynham silt loam, loamy substratum, 0 to 3 percent slopes-where drained
Raynham variant silt loam, 0 to 3 percent slopes - where drained
Raynham very fine sandy loam, 0 to 3 percent slopes - where drained
Raynham very fine sandy loam-where drained
Raypol silt loam-where drained

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NATIONAL REGISTER OF HISTORIC PLACES

ANNUAL LISTING OF PROPERTIES

JANUARY 1979 THROUGH DECEMBER 1982

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

JULY 1983

federal register

Tuesday
March 1, 1983

Part III

Department of the Interior

National Park Service

National Registry of Natural Landmarks

NAME OF LANDFILL

NIAGARA SANITATION COMPANY (DEC #932054)

LOCATION Nash Road, Town of Wheatfield

The site is estimated to be about seven acres in size and located north of the Niagara Mohawk easement which straddles the North Tonawanda - Wheatfield town line. The site extends from the eastern end of the access road running from Nash Road approximately 350 yards east to the fork in the power easement (Tower #365). The site is estimated to be 120 yards wide at the western end tapering to about 70 yards wide at the eastern end.

The landfill location and extent are shown on the attached drawing.

OWNERSHIP

The property is owned by the Town of Wheatfield.

HISTORY

This landfill was used by the Niagara Sanitation Company for waste disposal from 1964 to 1968. The refuse site was used for both industrial and municipal refuse. The site received refuse from Niagara Falls Air Force Base, Bell Aerospace, Carborundum, Frontier Chemical, Graphite Specialties, Continental Can and Grief Bros. Wastes disposed of may include caustics, plating tank sludge and municipal wastes.

Historical information was obtained from Hazardous Waste Disposal Sites in New York State, Volume 3, NYS DEC.

INVESTIGATION

A site visit was made by Mr. M.E. Hopkins of the Niagara County Health Department on June 11, 1981. The site was found to be poorly covered with protruding refuse. Visible items included rubber blocks, tubes and hoses, tires, concrete fragments and other demolition debris, broken glass, ash, wood, rusted cans and pieces of graphite rods. Also found were what appeared to be remnants of steel drums. There was evidence of some unauthorized dumping after the site was closed. Access to the site was not restricted.

Red-brown (rust-colored) stains were found on vegetation and soil in numerous locations around the perimeter of the site, particularly along the northern and western edges. Additional stained areas were found throughout the marshes and other low points within the site. Although most of these stained areas were dry, two areas were found beneath standing water. It was noted that although the ground was stained beneath the water, the water was not discolored. No flowing leachate streams were found. The sampling well was not found on the June 11th visit. A well was found on June19th on a subsequent visit. The well was located 20 feet east of Niagara Mohawk Tower #363. The location is shown on the attached drawing. The well had apparently been

INVESTIGATION (continued)

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vandalized. The upper standpipe had been broken off at ground level and the well had, therefore, been left uncovered. The well may still be useable for sampling.

No evidence of landfill activity was noted east of Niagara Mohawk Tower #365. However, USDA aerial photographs (ARE 3V-75;1966) indicate that the landfilled area may extend 300 to 400 ft. east of Tower #365.

SOILS

The soils surrounding the site are Raynham and Canandaigua series soils. The composition of the soil contained with the site itself is not known, although it is expected to be largely composed of refuse. The surface is generally a silty clay material with some sand in spots. Portions of the site are marshy while others appear well drained, indicating that the soil may not be uniform throughout the site. Boring records of the sampling well immediately south of the site, indicate a profile of silty sand and sandy silt to a depth of about 9 feet over clay to an unknown depth. The records also show the water table at 4 feet. This suggests that the water table may be perched. Fluctuations of the water table are not known.

CONCLUSIONS

The potential for the migration of contaminants off-site is present. Visible leachate stains and the odor in the well south of the landfill indicate that material may be leaching in perched groundwater. Permeable soils in some areas could allow lateral migration. The site requires proper closing. The proximity of houses along Forbes Road and potential for migration justify sampling at this site.

SAMPLING

Well and soil samples were taken for THO, heavy metals and phenol analysis. It was noted at the time of sampling, that the water drawn from the well was discolored gray and strongly odorous with an organic odor. A slight oily sheen was present on the surface of the sample. Two soil samples were taken near Towers #364 and #365. These samples were taken from the bottoms of hand augered holes roughly 4 feet deep. The boring near pole #364 indicated a gray silt over a darker gray silty clay layer at the point of sampling. The second boring showed a tan silty clay over clay at about 4 feet. The sample was taken from this interface. Groundwater was encountered slightly below the 4 foot level in both holes.

RECOMMENDATIONS

This site must be properly closed. Additional sampling wells along the Niagara Mohawk easement would be desireable to facilitate future sampling. The existing well should be maintained. Annual inspection and periodic monitoring is recommended. The Town of Wheatfield was notified to submit an abatement plan for the site..

SUMMARY OF SAMPLES TAKEN

SAMPLE #	LOCATION	TYPE	PARAMETER	DATE	NEAREST HOUR
1	Gratwick # 13	Well	Metals	7/16/81	11:00
2	Gratwick # 10	Well	Metals	7/16/81	11:00
3	Gratwick # 11	Well	Metals	7/16/81	11:00
4	Gratwick # 12	Well	Metals	7/16/81	11:00
5	Gratwick # 13	Well	THO	7/16/81	11:00
6	Gratwick # 10	Well	THO	7/16/81	11:00
7	Gratwick # 11	Well	THO	7/16/81	11:00
8	Gratwick # 12	Well	THO	7/16/81	11:00
9	Nia. Sanitation	Well	Metals	7/16/81	1:00
10	Nia. Sanitation	Well	THO	7/16/81	1:00
11	Zimmerman	Well	THO	7/16/81	12:00
12	Old Falls	Well	THO	7/16/81	12:00
13	Artpark	Leachate	Metals	7/17/81	12:00
14	Artpark	Leachate	THO	7/17/81	12:00
15	PASNY	Soil	Metals	7/21/81	10:00
16	PASNY	Soil	THO	7/21/81	10:00
17	Nia. Sanitation	Soil	Metals	7/24/81	12:00
18	Nia. Sanitation	Soil	THO	7/24/81	12:00
19	Nia. Sanitation	Soil	Metals	7/24/81	12:00
20	Nia. Sanitation	Soil	THO	7/24/81	12:00
21	Walck Road	Soil	THO	7/24/81	12:00
22	Gratwick # 13	Well	Phenol	8/12/81	10:00
23	Gratwick # 10	Well	Phenol	8/12/81	10:00
24	Gratwick # 11	Well	Phenol	8/12/81	10:00
25	Gratwick # 12	Well	Phenol	8/12/81	10:00
26	Zimmerman	Well	Phenol	8/12/81	11:00
27	Old Falls	Well	Phenol	8/12/81	11:00
28	Nia. Sanitation	Well	Phenol	8/12/81	12:00
29	Olin-Industrial Welding	Soil	THO, TOC Lindane	9/07/81	12:00

ANALYTICAL RESULTS FOR SAMPLES TAKEN AT GRATWICK - RIVERSIDE PARK

WELL # 10

Sample # 2 Sampled 11:00 7/16/81

Cadmium, total	L.T. 0.02	MG/L
Chromium, total	L.T. 0.1	MG/L
Lead; total	L.T. 0.1	MG/L
Mercury, total	L.T. 0.4	MCG/L
Nickle, total	0.05	MG/L

Sample # 6 Sampled 11:00 7/16/81

THO 35 MCG/L

Sample #24 Sampled 10:00 8/12/81

Phenol 3 MG/L

WELL # 11

Sample # 3 Sampled 11:00 7/16/81

Cadmium, total	L.T. 0.02	MG/L
Chromium, total	L.T. 0.1	MG/L
Lead, total	L.T. 0.1	MG/L
Mercury, total	L.T. 0.4	MCG/L
Nickle, total	L.T. 0.05	MG/L

Sample # 7 Sampled 11:00 7/16/81

THO Less than 1 MCG/L

Sample # 25 Sampled 10:00 8/12/81

Phenol 3 MG/L

WELL # 12

Sample # 4 Sampled 11:00 7/16/81

Cadmium, total	L.T. 0.02	MG/L
Chromium, total	L.T. 0.1	MG/L
Lead, total	L.T. 0.1	MG/L
Mercury, total	L.T. 0.4	MCG/L
Nickle, total	L.T. 0.05	MG/L

Sample # 8 Sampled 11:00 7/16/81

THO 4 MCG/L

Sample # 26 Sampled 10:00 8/12/81

Phenols 0.2 MG/L

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GRATWICK - RIVERSIDE PARK (continued)

WELL # 13

Sample # 1	Sampled 11:00			7/16/81
Cadmium, total	L.T.	0.02	MG/L	
Chromium, total	L.T.	0.1	MG/L	
Lead, total		0.1	MG/L	
Mercury, total	L.T.	0.4	MCG/L	
Nickle, total		0.05	MG/L	

Sample # 5 Sampled 11:00 7/16/81

THO 18 MCG/L

Sample # 22 Sampled 10:00 8/12/81

Phenols 17 MG/L

RESULTS OF SAMPLES TAKEN AT NIAGARA SANITATION SITE

WELL SAMPLES

Sample # 9	Sampled 1:00			7/16/81
Cadmium, total	L.T.	0.02	MG/L	
Chromium, total	L.T.	0.1	MG/L	
Lead, total		0.2	MG/L	
Mercury, total	L.T.	0.4	MCG/L	
Nickle, total		0.12	MG/L	

Sample # 10 Sampled 1:00 7/16/81

THO 4 MCG/L

Sample # 28 Sampled 12:00 8/12/81

Phenol 0.008 MG/L

well + sample locations not marked on map

SOIL SAMPLES

Samples # 17,18,19 & 20 all Sampled 10:00 7/24/81
Samples # 17 & 18 Metals - Results not yet available
Sample # 19 L.T. 10 PPB THO
Sample # 20 L.T. 10 PPB THO

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RESULTS OF SAMPLES TAKEN AT ARTPARK

LEACHATE SAMPLES

Sample # 13 Sampled 1:00 7/17/81

Cadmium, total	0.02	MG/L
Chromium, total	0.1	MG/L
Lead, total	0.5	MG/L
Nickle, total	0.73	MG/L
Mercury, total	L.T. 0.4	MCG/L

Sample # 14 Sampled 1:00 7/17/81

THO 47 MCG/L

RESULTS OF SAMPLES TAKEN AT HOLIDAY PARK

WELL SAMPLES

WELL # 4

Sample # 11 (Zimmerman) Sampled 12:00 7/16/81

THO 4 MG/L

Sample # 26 Sampled 11:00 8/12/81

Phenols .008 MG/L

WELL # 8

Sample # 12 (Old Falls) Sampled 12:00 7/16/81

THO 3 MCG/L

Sample # 27 Sampled 11:00 8/12/81

Phenol .01 MG/L

SOIL SAMPLES

Sample # 21 Walch Road Sampled 12:00 7/24/81

THO Less than 10 PPB

NIAGARA SANITATION NASH ROAD SITE (DEC # 932054)

Approx. Scale.
1: 3600
(All distances estimated)

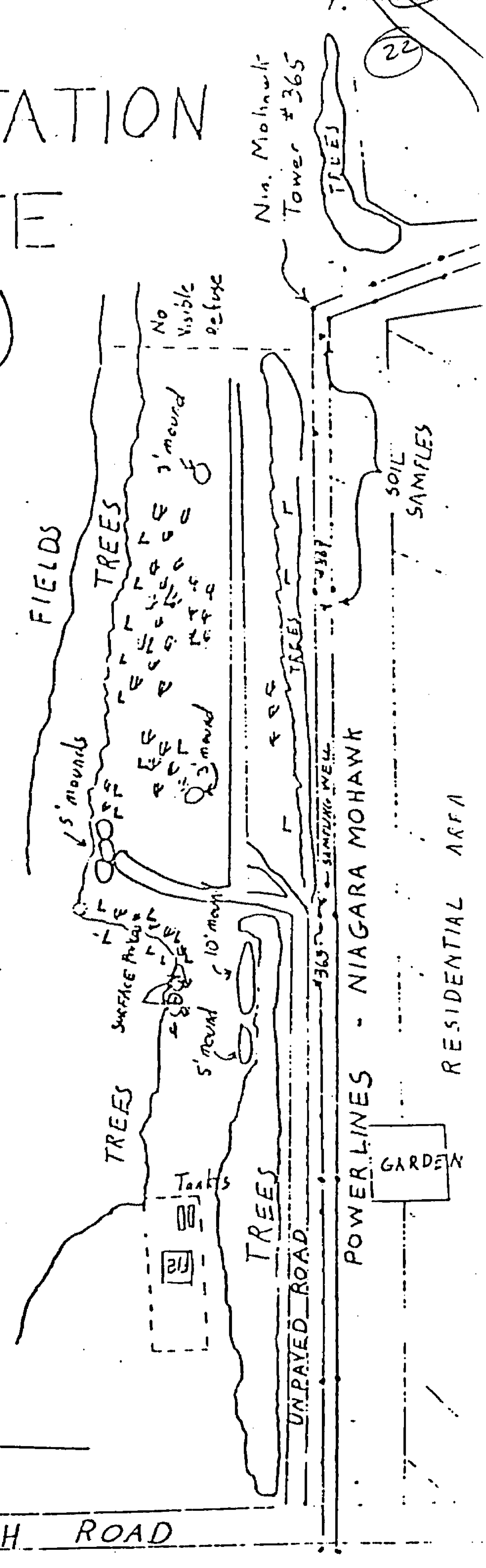
25 50 75
100yd 0 100yd 200yd

Ψ - Marsh Area
{ - Treeline
|| - Powerlines
L - Red-Brown Leachate stains

Slope - downward toward SE (<1%)

Mapped from field observation only by M. Hopkins NCHD

Michael E. Hopkins



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GROUND WATER IN THE NIAGARA FALLS AREA, NEW YORK

With Emphasis on the Water-Bearing Characteristics of the Bedrock

BY

RICHARD H. JOHNSTON

GEOLOGIST

U.S. GEOLOGICAL SURVEY

STATE OF NEW YORK

CONSERVATION DEPARTMENT

WATER RESOURCES COMMISSION

BULLETIN GW-53

1964

(23)

GROUND WATER IN THE NIAGARA FALLS AREA, NEW YORK

With Emphasis on the Water-Bearing Characteristics of the Bedrock

By

Richard H. Johnston

... ABSTRACT

The Niagara Falls area encompasses 550 square miles in the extreme northwestern corner of New York. The area is one of very low relief except for the Niagara escarpment and the gorge of the Niagara River. A thin cover of Pleistocene unconsolidated deposits overlies the bedrock throughout most of the area. These deposits consist of three types: (1) glacial till, (2) lake deposits, and (3) a few small sand and gravel deposits. The bedrock consists of nearly flat-lying sedimentary rocks of Paleozoic age. The southern one-third of the area is underlain by the Lockport Dolomite (Silurian) and the northern two-thirds of the area by the Queenston Shale (Ordovician). Between these is a small area along the gorge and escarpment which is underlain by a series of thin limestones, shales, and sandstones.

The Lockport Dolomite is the only important aquifer in the Niagara Falls area. Ground water occurs in it in three types of openings: (1) bedding joints which constitute at least seven important water-bearing zones, (2) vertical joints, and (3) small cavities from which gypsum has been dissolved. Of these, the bedding joints are the most important and transmit nearly all the water moving through the formation. The character of the three types of water-bearing openings results in two distinct sets of ground-water conditions: (1) a moderately permeable zone at the top of rock, generally 10 to 15 feet thick, characterized by both vertical joints and bedding joints that have been widened by solution of dolomite and by small cavities formed by solution of gypsum, and (2) the remainder of the formation consisting of seven permeable zones (composed of bedding joints) surrounded by essentially impermeable rock. In the upper part of rock, either artesian or water-table conditions may exist locally. However, in the lower part of rock, the seven water-bearing zones act as separate and distinct artesian aquifers. Recharge to the water-bearing zones apparently occurs directly at the outcrop of the bedding joints composing the zones rather than by downward movement of water through vertical joints. Ground water in the Lockport, characteristically a calcium sulfate or calcium bicarbonate water, is very hard and moderately mineralized. A highly mineralized water, characterized by higher concentrations of sodium and chloride than those measured in typical Lockport water, occurs in the lowest two zones of the formation.

Bibliography of New York Quaternary Geology

by

Ernest H. Muller

with

Historical Note on Studies of New York Quaternary Geology

by

Ernest H. Muller and William A. Garrabrant

ALBANY, NEW YORK

The University of the State of New York

The State Education Department

MAY 1965

D. **The Mohawk-Black River Lowland** is a belt of low to moderate relief developed on nonresistant, relatively undeformed shales and limestones between the Adirondack Mountains and the Appalachian Plateaus. These low-lying areas channeled glacier flow and hence are rather intensively scoured and drift-covered.

E. **The St. Lawrence Lowland** includes the area south of the St. Lawrence River, approximately to the limit of marine invasion and proglacial lake sediments flanking the crystalline rocks of the Adirondacks. It is an area of low relief in the north, but hilly in the south.

F. **The Erie-Ontario Lowland** includes areas of low relief that border Lakes Erie and Ontario on the south. It extends south to the Onondaga limestone scarp and the strandlines of proglacial Lakes Whittlesey and Warren. It includes an extensive drumlin field.

G. **The Adirondack Highland** comprises an area of moderate to high relief with maximum elevations more than 5,000 feet above sea level. The area is underlain by metamorphic and igneous rocks. It has been intensively glaciated and was the source of accumulation for small valley and cirque glaciers during waning of the continental ice sheet.

H. **The Tug Hill Plateau** is an area of moderate relief, an outlier isolated from the Appalachian Plateau by the Mohawk lowland and a southeastward extension of the Ontario lowland. It is like other parts of the Appalachian Plateau Province in its undeformed bedrock structure, its moderate elevation and dissection, and in its glacial modification.

I. **The Catskill Section of the Appalachian Plateaus** includes the highest elevations in southern New York. It is an area of moderate relief in the west and moderate to high relief in the east. Bedrock structure is essentially undeformed. The continental ice sheet covered even the highest summits.

J. **The Southern New York Section of the Appalachian Plateaus** is an area of moderate relief, underlain by essentially undeformed Paleozoic rocks with low southward regional dip. The intensity of glacial erosion decreases southward. The Finger Lakes and associated through valleys are conspicuous products of glacial modification.

K. **The Kanawha Section of the Appalachian Plateaus** differs from other parts of the province in New York, in that it escaped glaciation. The part of this section in New York lies chiefly south of the bend of the Allegheny River in southwestern New York.

L. **New York.** This indicator refers to references which deal not with specific parts of the State, but with the State as a whole.

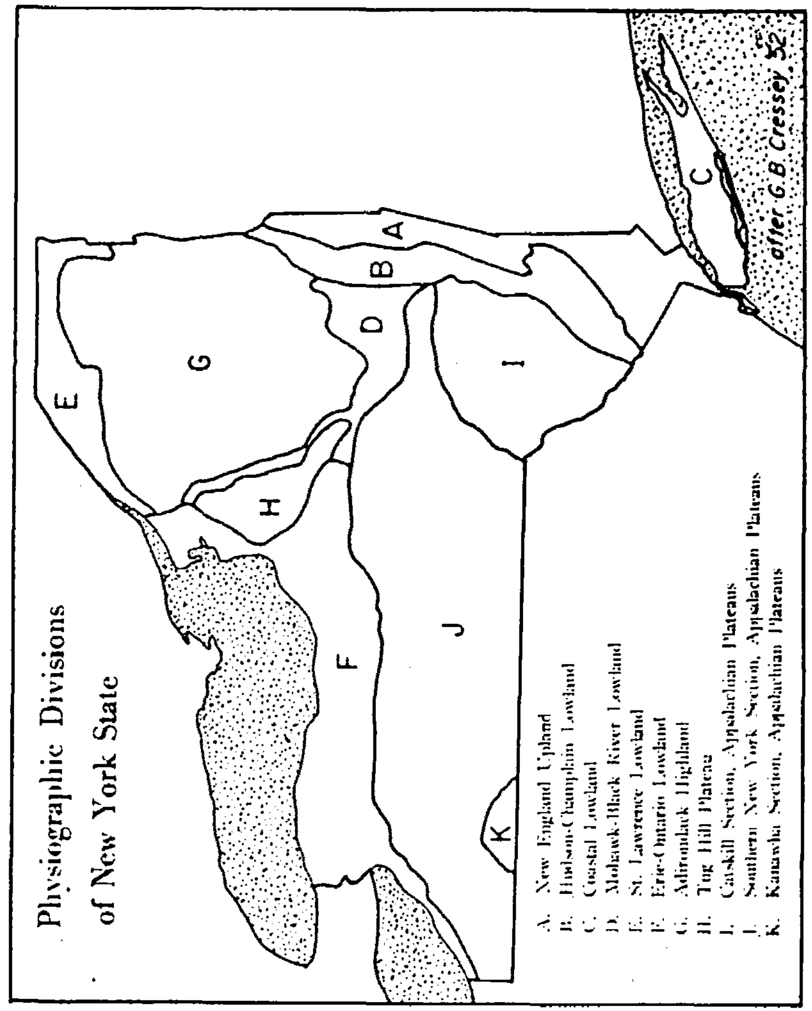

Fig. 3 Outline of physiographic units employed in geographic listing of titles

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Muller, Ernest H. (1977)
New York State Museum and Science Service
Map and Chart Series Number 28

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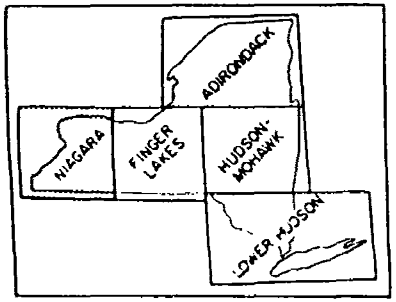

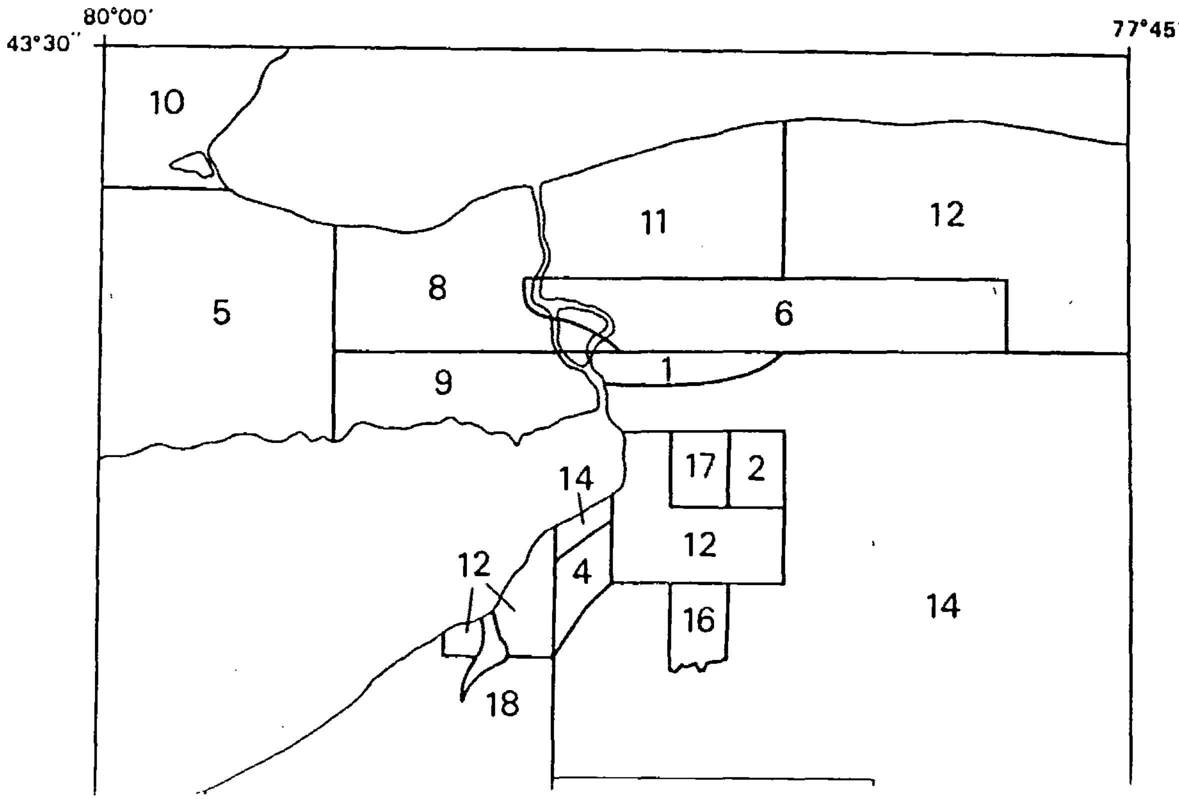

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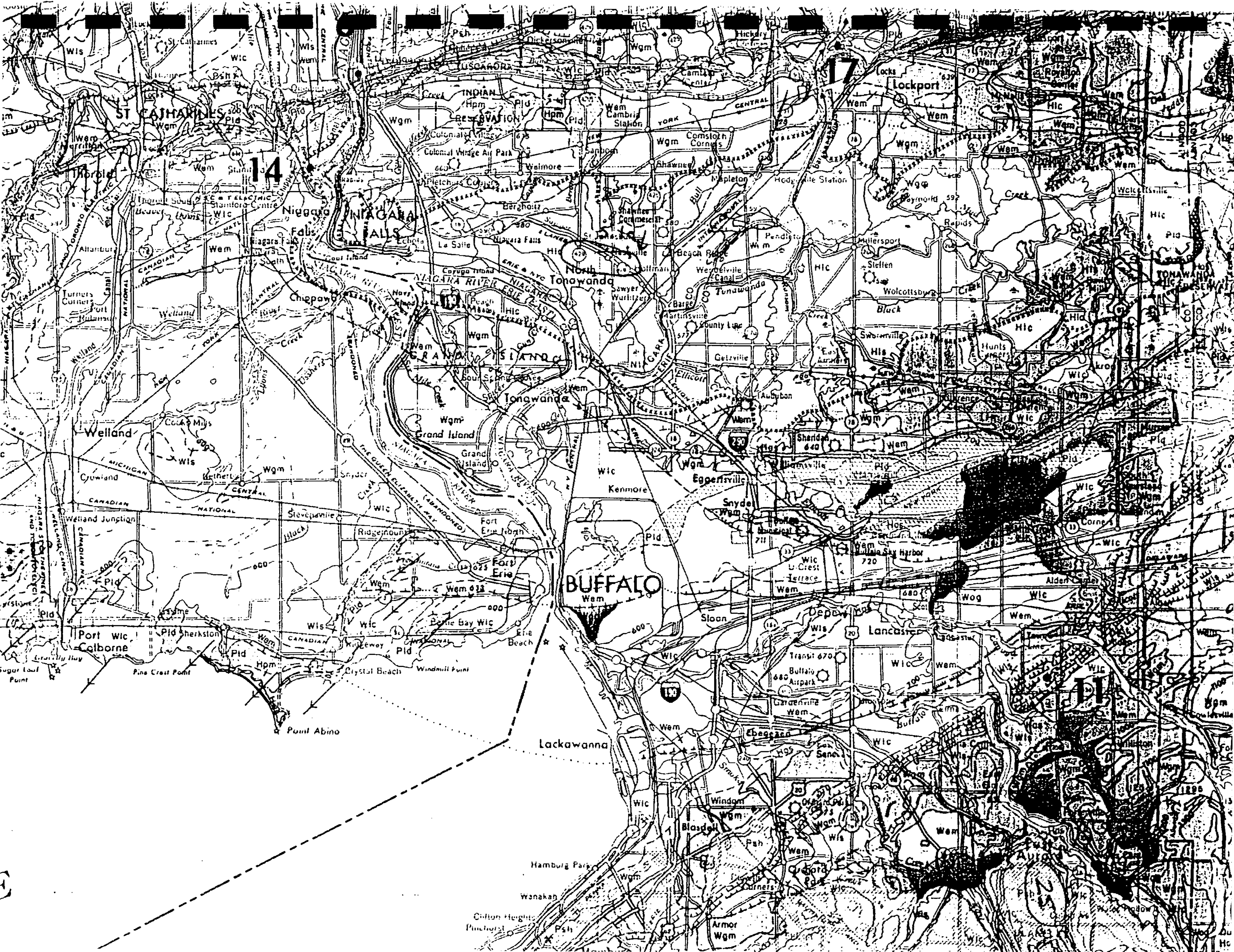

St Catharines
Thorold
Merritton
14
Niagara Falls
NIAGARA FALLS
Chippawa
Welland
Cooks Mills
Crowland
Welland Junction
Turners Corners
Port Robinson
Allanburg
Stevensville
Ridgemount
Snyder
Fort Erie
Fort Erie North
Port Colborne
Sherkston
Crystal Beach
Ridgeway
Bertie Bay
Erie Beach
Point Abino
Pine Crest Point
Sugar Loaf Point
Windmill Point
Pld
Wem
Wlc
Wls
Wgm
Hlc
Hpm
Hpm
INDIAN RESERVATION
TUSCARORA
Colonial Village
Colonial Village Air Park
Walmore
Sanborn
Cambria Station
Comstock Corners
Shawnee
Lockport
17
Hodgeville Station
Mapleton
Raymond
Rapids
Millersport
Pendleton
Bergholtz
La Salle
Echota
Niagara Falls
North Tonawanda
Tonawanda
Grand Island
GRAND ISLAND
Sawyer
Martinsville
Getzville
Swormville
Hunts Corners
Akron
Wolcottsville
Wolcottsburg
Black Creek
Tonawanda
Ellicott
Audubon
Sheridan 640
Williamsville
Eggertsville
Kenmore
Snyder
U-Crest Terrace
BUFFALO
Sloan
Depew
Lancaster
Alden Center
Transit 670
Buffalo Airpark
Gardenville
Ebenezer
Lackawanna
Windom
Blasdell
Hamburg Park
Wanakan
Clifton Heights
Pinehurst
Armor
Orchard Park
11
NIAGARA RIVER
CANADIAN NATIONAL
NEW YORK CENTRAL
ERIE
THE QUEEN ELIZABETH WAY
WELLAND CANAL

Bill Lill

THE STATE OF NEW YORK

E X P L A N A T I O N

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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 impending 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 muc with subordinate gyttja; marl is a majo component except in the southern tier c counties. Silt and clay are intercalate at base of organic section.

Deposition during late stages of in-filli of pond and lake basins, including num ous kettles and other shallow depressi on glacial drift; also parts of former Lake Tonawanda such as the Oak Orch and Bergen Swamps.

Wls

Beach sand and gravel of ice-dammed lakes

Coarse sand with subordinate meduim 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

nt till; till generally rather poorly sorted gravel; generally exceed 20%; ble but generally greater ne.

dge of ice sheet either at llstand at a stable ice-border

ipal moraines and schematic 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 extremely permeable; carbonate and crystal exceed 30% of the coarse fraction; locally secondary calcium carbonate.

Deposition by strongly aggrading streams ice sheets. Coarse alluvium deposited near the ice sheet, or as valley trains freely from the glacier margin. Comm terraces or terrace remnants. Includes coarse torrent (hloup) deposits.

Comprises a major source of rel

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-

(26)

NOV ~~31~~ 13 1987

Thomas C. Jorling
Commissioner

Mr. George Moreau
Engineering-Science, Inc.
290 Elwood Davis Road
Liverpool, NY 13088

Dear Mr. Moreau:

Re: Nash Road Landfill
I.D. No. 932054
Phase II Work Plan

This letter is to confirm our discussions of November 12, 1987 at the above-referenced site regarding alterations to the well locations for the referenced project. Enclosed is a Plot Plan and well listings for your review.

Please let me know as soon as possible when you are ready to proceed on this. You can contact me at (518) 457-9538.

Sincerely,

Daniel J. Eaton

Daniel J. Eaton
Assistant Engineering Geologist
Western Investigation Section
Bureau of Hazardous Site Control
Division of Hazardous Waste Remediation

Enclosures

cc: M. Hopkins, NCHD

NASH ROAD LANDFILL
I.D. No. 932054

WELL NO.	ESTIMATED DEPTH (ft)	SCREEN	ESTIMATED DEPTH (ft)	TARGET
OW-11	5 to 7	2	3-5	Upgradient S
OW-12	30	2	26-28	Upgradient D
OW-13	10	2	6-8	Downgradient S
OW-14A	45	5	40-45	Downgradient D
OW-14B	10	2	8-10	Downgradient S
OW-15	45	5	40-45	Downgradient D
OW-16	10	5	4-9	Downgradient S

Shallow wells OW-11, 13, 14B, and 16 are intended to monitor the SAND lense near the upper limits of the waste area. This lense was encountered during installation of wells OW-2,4,5 and 6 and slopes slightly to the west.

Deep wells OW-12, 14A, and 15 are intended to monitor the SAND lense near the lower limits of the waste area. This lense was encountered during installation of wells OW-3,4,5 and 6 and slopes to the north-northwest.

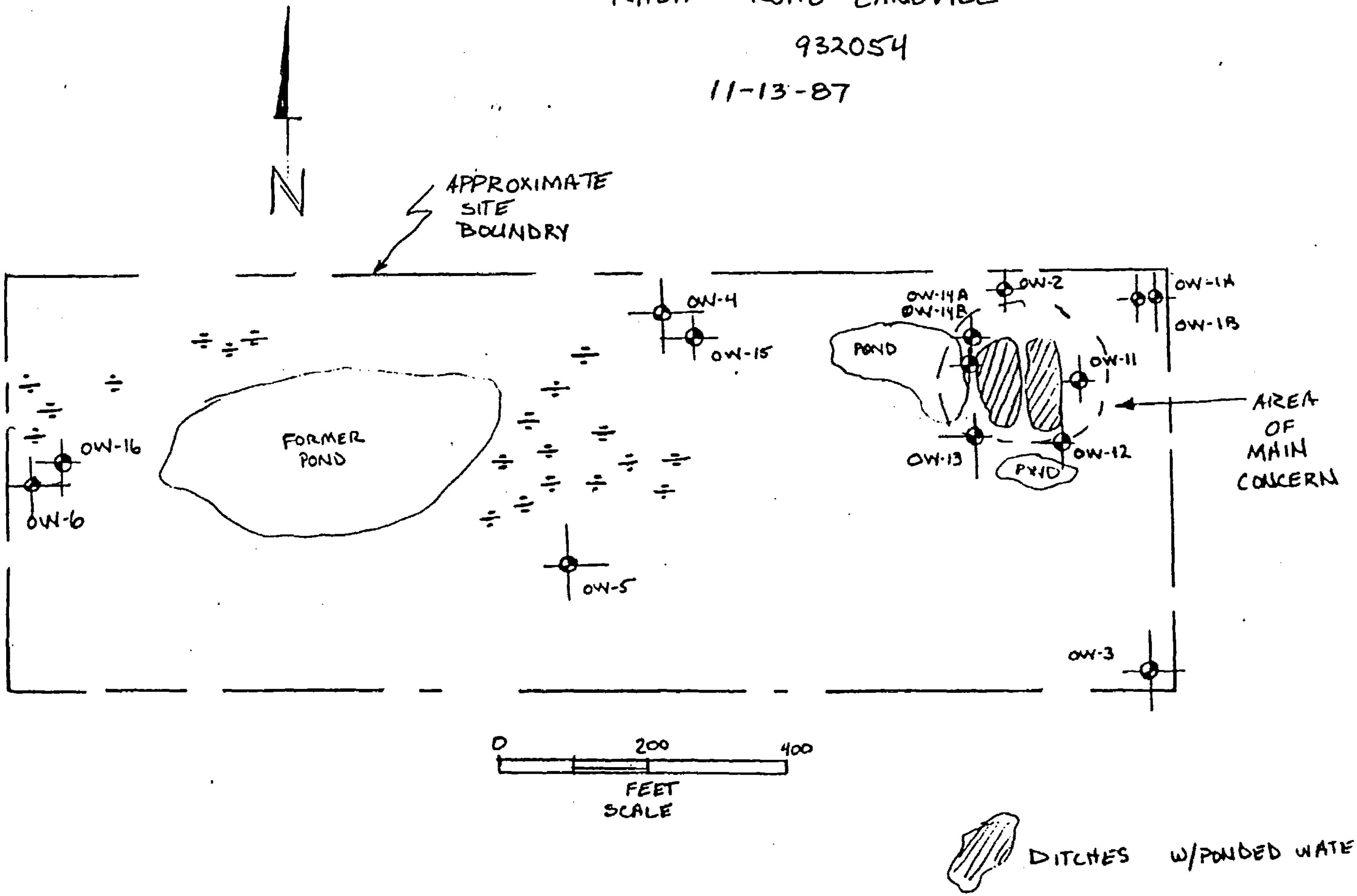
These wells should be installed in the sand lense as each lense is encountered. Augering past the sand lense into the clay below may cause the clay to combine with the sand limiting the effectiveness of the well.

26

NASH ROAD LANDFILL

932054

11-13-87



2

World Atlas

CENSUS EDITION

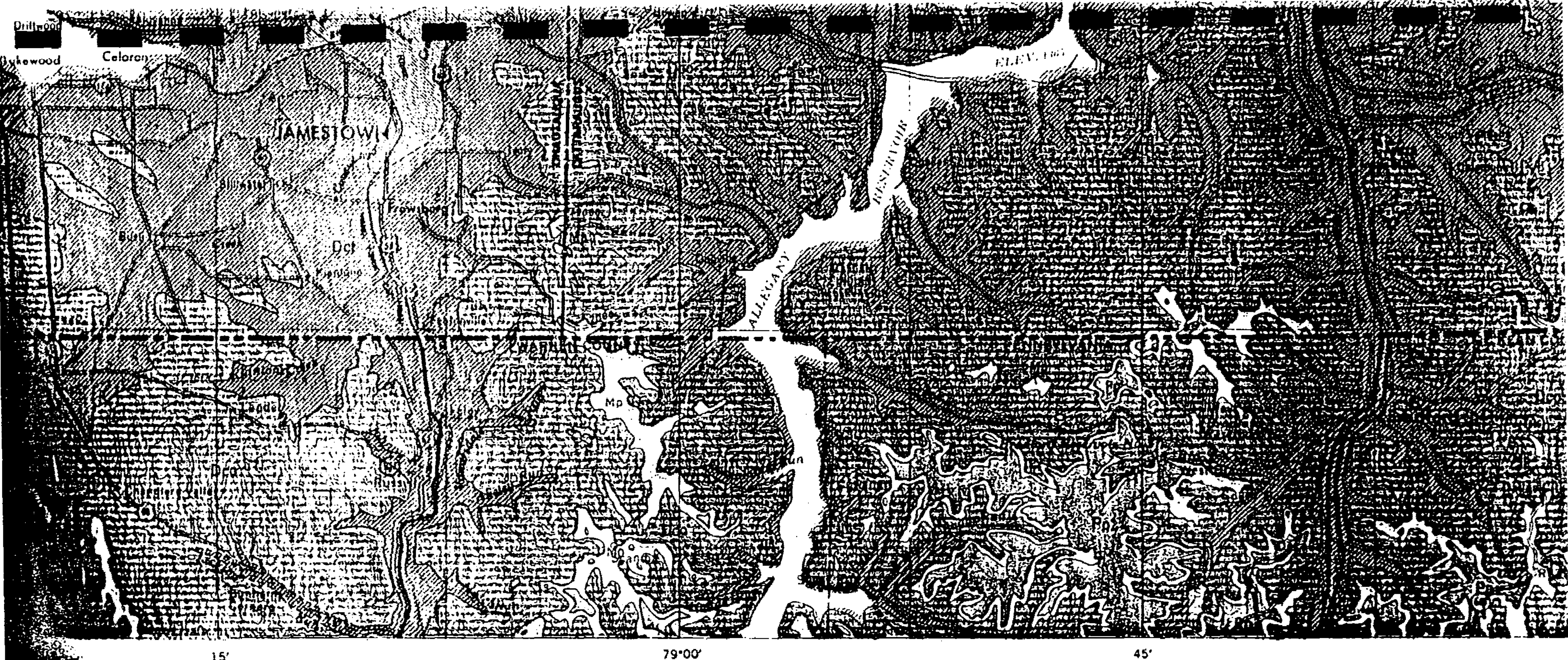
RAND McNALLY & COMPANY

Chicago / New York / San Francisco

2

Colonie A-S-T	8,869
Cotton	450
Commack N.Y.	24,300
Congers N.Y.	5,000
Conklin BING	1,900
Constantia SYR	900
Cooperstown	2,342
Copake	700
Copenhagen	656
Copiague N.Y.	21,000
Coram N.Y.	5,400
Corfu BUF	589
Corinth	2,702
Corning ELM	12,953
Cornwall on the Hudson NWBG	3,164
Cortland	20,138
Coxsackie	2,786
Croghan	703
Croton-on-Hudson N.Y.	6,889
Crown Point	900
Cuba	1,739
Cutchogue	1,000
Dalton	500
Dannemora	3,770
Dansville	4,979
Deer Park N.Y.	33,400
Delanson A-S-T	448
Delevan	1,113
Delhi	3,374
Delmar A-S-T	8,900
Depew BUF	18,819
Deposit	1,897
Derby BUF	1,200
De Ruyter	542
De Witt SYR	10,032
Dexter WATN	1,053
Dix Hills N.Y.	10,500
Dobbs Ferry N.Y.	10,053
Downsville	950
Dryden ITH	1,761
Dundee	1,556
Dunkirk	15,310
Earlville	985
East Aurora BUF	6,803
Eastchester N.Y.	22,800
East Glenville A-S-T	11,800
East Half Hollow Hills N.Y.	9,691
East Hampton	1,886
East Hills N.Y.	7,160
East Islip N.Y.	13,700
East Marion	900
East Meadow N.Y.	47,300
East Northport N.Y.	22,200
East Patchogue N.Y.	8,300
Eastport N.Y.	1,308
East Randolph	655
East Rochester ROCH	7,596
East Rockaway N.Y.	10,917
East Vestal BING	6,300
Eden BUF	3,000
Edmeston	800
Edwards	581
Elba	750
Elizabethtown	850
Ellenville	4,405
Ellicottville	713
ELMIRA ELM	35,327
Elmira Heights ELM	4,279
Elmont N.Y.	30,000
Elsmere A-S-T	5,500
Elwood N.Y.	15,400
Endicott BING	14,457
Endwell BING	15,999
Etna ITH	500
Evans Mills	651
Fair Haven	976
Fairmount SYR	6,700
Fairport ROCH	5,970
Fairview POK	8,517
Falconer JMST	2,778
Farmingdale N.Y.	7,946
Farmingville N.Y.	5,700
Fillmore	563
Fishkill POK	1,555
Floral Park N.Y.	18,805
Florida MIDD	1,947
Flower Hill N.Y.	4,558
Fonda A-S-T	1,006
Forestville	804
Fort Ann GLFLS	509
Fort Covington	1,200
Fort Edward GLFLS	3,561
Fort Plain	2,555
Frankfort UT-R	2,995
Franklin	440
Franklin Square N.Y.	32,800
Franklinville	1,887
Fredonia	11,126
Freeport N.Y.	38,272
Freeville ITH	449
Frewsburg JMST	2,800
Friendship	1,285
Fulton SYR	13,312
Galeville SYR	5,800
Gang Mills ELM	1,258
Garden City N.Y.	22,827
Garden City Park N.Y.	8,200
Garrison N.Y.	660
Gasport LOCK	860
Gates ROCH	29,756
Geneseo	6,746
Geneva	16,133
Ghent	600
Gilbertsville	466
Glasco KNGST	1,198
Glen Cove N.Y.	24,618
Glenham POK	2,720
Glen Head N.Y.	6,800
GLENS FALLS GLFLS	18,887
Gloversville	17,836
Gorham	800
Goshen MIDD	4,874
Gouverneur	4,285
Gowanda	2,713
Grand Gorge	600
Granville	2,986
Great Neck (P.O.) N.Y.	5,804
Great Neck N.Y.	9,168
Great Neck Estates N.Y.	2,936
Greece ROCH	63,700
Greene	1,747
Green Island A-S-T	2,696
Greenlawn N.Y.	8,600
Greenport	2,273
Greenville N.Y.	5,500
Greenwich	1,955
Greenwood	450
Greenwood Lake N.Y.	2,809
Groton	2,313
Hadley	500
Hames Falls	700
Half Hollow Hills N.Y.	12,830
Hamburg BUF	10,582
Hamilton	3,725
Hammondsport	1,065
Hampton Bays	3,550
Hannibal SYR	680
Harrison N.Y.	23,046
Harrisville	937
Hartsdale N.Y.	12,226
Hartwick	600
Hastings-on-Hudson N.Y.	8,573
Hauppauge N.Y.	14,200
Haverstraw N.Y.	8,800
Hawthorne N.Y.	4,900
Hemlock ROCH	500
Hempstead N.Y.	40,404
Henrietta ROCH	1,200
Herkimer UT-R	8,383
Hermon	490
Heuvelton	777
Hewlett N.Y.	6,880
Hicksville N.Y.	50,000
Highland POK	2,184
Highland Falls	4,187
Hillcrest N.Y.	6,357
Hilton ROCH	4,151
Hobart	473
Holbrook N.Y.	12,800
Holland BUF	1,000
Holland Patent UT-R	534
Holley ROCH	1,882
Homer	3,635
Honeoye Falls ROCH	2,410
Hoosick Falls	3,609
Hopewell Junction POK	2,055
Hornell	10,234
Horseheads ELM	7,348
Houghton	1,520
Hudson	7,986
Hudson Falls GLFLS	7,419
Huntington N.Y.	12,601
Huntington Bay N.Y.	3,943
Huntington Station N.Y.	30,300
Hurley KNGST	4,081
Hurleyville	500
Hyde Park POK	2,805
Ilion UT-R	9,190
Indian Lake	450
Interlaken	685
Inwood N.Y.	8,200
Irondequoit ROCH	57,648
Irvington N.Y.	5,774
Island Park N.Y.	4,847
Islip N.Y.	12,100
Islip Terrace N.Y.	5,200
ITHACA ITH	28,732
JAMESTOWN JMST	35,775
Jasper	450
Jay	600
Jeffersonville	554
Jericho N.Y.	14,200
Johnson City BING	17,126
Johnstown	9,360
Jordan SYR	1,371
Keene	450
Keeseville	2,025
Kenmore BUF	18,474
Kennedy	500
Kerhonkson	1,243
Kinderhook A-S-T	1,377
Kings Point N.Y.	5,234
KINGSTON KNGST	24,481
Lackawanna BUF	22,701
Lacona	582
LaFargeville	500
Lake Delta UT-R	2,400
Lake Erie Beach BUF	3,500
Lake George	1,047
Lake Grove N.Y.	9,692
Lake Katrine KNGST	1,092
Lake Luzerne	1,000
Lake Placid	2,490
Lake Ronkonkoma N.Y.	9,800
Lake View BUF	4,600
Lakeville ROCH	950
Lakewood JMST	3,941
Lancaster BUF	13,056
Larchmont N.Y.	6,308
Larchmont North N.Y.	11,500
Latham A-S-T	8,000
Lawrence N.Y.	6,175
Leicester	462
Leonardsville	500
Le Roy	4,800
Levittown N.Y.	66,400
Lewiston BUF	3,336
Liberty	4,293
Lima ROCH	2,025
Limestone	496
Lindenhurst N.Y.	28,918
Little Falls	6,188
Little Valley	1,203
Livingston Manor	1,522
Livonia ROCH	1,238
Lloyd Harbor N.Y.	3,406
Locke	600
LOCKPORT LOCK	24,844
Locust Grove N.Y.	11,646
Long Beach N.Y.	34,073
Long Lake	900
Loudonville A-S-T	9,800
Lowville	3,364
Lyndonville	916
Lyon Mountain	960
Lyons	4,190
Lyons Falls	755
Macedon ROCH	1,400
McGraw	1,188
Machias	700
Madrid	800
Mahopac N.Y.	5,265
Maine BING	700
Malone	7,668
Malverne N.Y.	9,262
Mamaroneck N.Y.	17,616
Manchester ROCH	1,698
Manhasset N.Y.	8,530
Manlius SYR	5,241
Mannsville	431
Manorhaven N.Y.	5,384
Marathon	1,046
Margaretville	755
Marion ROCH	950
Marlboro NWBG	1,580
Massapequa N.Y.	27,500
Massapequa Park N.Y.	19,779
Massena	12,851
Mastic N.Y.	5,200
Mastic Beach N.Y.	5,200
Mattituck N.Y.	1,200
Mattydale SYR	8,292
Mayfield	944
Mayville	1,626
Mechanicville A-S-T	5,500
Medford N.Y.	5,000
Medina	6,392
Melville N.Y.	8,350
Menands A-S-T	4,012
Merrick N.Y.	26,400
Mexico	1,621
Middleburg	1,358
Middle Granville	600
Middleport LOCK	1,995
MIDDLETOWN MIDD	21,454
Middleville	647
Milford	514
Millbrook POK	1,343
Millerton	1,013
Mineola N.Y.	20,757
Minetto	900
Mineville	1,000
Mohawk UT-R	2,856
Monroe N.Y.	5,996
Monsey N.Y.	7,400
Montauk	1,300
Montgomery NWBG	2,316
Monticello	6,306
Montour Falls	1,791
Mooers	548
Moravia	1,582
Moriah	500
Morris	681
Morrisonville	1,500
Morristown	461
Morrisville	2,707
Mountain Dale	1,200
Mount Kisco N.Y.	8,025
Mount Morris	3,039
Mount Upton	500
Mount Vernon N.Y.	66,713
Mumfordville	499
Nanuet N.Y.	8,300
Napanoch	800
Naples	1,225
Narrowsburg	700
Nassau A-S-T	1,285
Nassau Shores N.Y.	5,500
Natural Bridge	650
Nedrow SYR	3,000
Nesconset N.Y.	8,300
Newark	10,017
Newark Valley BING	1,190
New Baltimore	700
New Berlin	1,392
NEWBURGH NWBG	23,438
New Cassel N.Y.	8,817
New City N.Y.	30,800
Newcomb	800
Newfane LOCK	2,700
New Hyde Park N.Y.	9,801
New Lebanon	800
New Paltz	4,941
Newport	746
New Rochelle N.Y.	70,794
Newton Falls	560
New Windsor NWBG	8,803
New Woodstock SYR	450
NEW YORK N.Y.	7,071,030
Niagara Falls BUF	71,384
Nichols BING	613
Niskayuna A-S-T	17,471
Norfolk	1,378
North Amityville N.Y.	11,936
North Babylon N.Y.	33,000
North Bellmore N.Y.	23,800
North Collins BUF	1,496
North Creek	860
Northeast Henrietta ROCH	12,000
North Great River N.Y.	12,400
North Lindenhurst N.Y.	11,400
North Massapequa N.Y.	23,180
North Merrick N.Y.	13,650
North New Hyde Park N.Y.	16,100
North Norwich	600
North Patchogue N.Y.	8,000
Northport N.Y.	7,651
North Rose	700
North Syracuse SYR	7,970
North Tarrytown N.Y.	7,994
North Tonawanda BUF	36,780
North Valley Stream N.Y.	14,881
Northville	1,304
North Wantagh N.Y.	15,117
Norwich	8,082
Norwood	1,802
Nunda	1,169
Nyack N.Y.	6,428
Oakdale N.Y.	7,800
Oakfield	1,791
Oceanside N.Y.	36,400
Odessa	613
Ogdensburg	12,375
Olcott LOCK	1,860
Old Bethpage N.Y.	7,180
Old Forge	950
Olean	18,207
Oneida	10,810
Oneonta	14,933
Ontario ROCH	750
Orchard Park BUF	3,671
Orient	800
Oriskany UT-R	1,680
Oriskany Falls UT-R	802
Ossining N.Y.	20,196
Oswego	19,793
Otego	1,089
Ovid	666
Owego BING	4,364
Oxford	1,765
Oyster Bay N.Y.	7,200
Painted Post ELM	2,196
Palmyra ROCH	3,729
Panama	511
Parish SYR	535
Parksville	500
Patchogue N.Y.	11,291
Patterson N.Y.	950
Pavilion	550
Pawling POK	1,996
Pearl River N.Y.	17,146
Peconic	800
Peekskill N.Y.	18,236
Pelham N.Y.	6,848
Pelham Manor N.Y.	6,130
Penfield ROCH	9,600
Penn Yan	5,242
Perry	4,196
Peru	1,300
Petersburg	500
Phelps	2,004
Philadelphia	855
Philmont	1,539
Phoenicia	700
Phoenix SYR	2,357
Pine Bush NWBG	1,200
Pine Island MIDD	950
Plainview N.Y.	32,300
Plattsburgh	21,057
Pleasant Valley POK	1,372
Pleasantville N.Y.	6,749
Poland	553
Port Byron AUB	1,400
Port Chester N.Y.	23,565
Port Dickinson BING	1,974
Port Ewen KNGST	2,600
Port Henry	1,450
Port Jefferson N.Y.	6,731
Port Jefferson Station N.Y.	7,500
Port Jervis	8,699
Portland	600
Port Leyden	740
Portville	1,136
Port Washington N.Y.	15,923
Potsdam	10,635
Pottersville	600
POUGHKEEPSIE POK	29,757
Prattsburg	750
Prattsville	500
Pulaski	2,415
Randolph	1,398
Ransomville BUF	1,500
Ravena A-S-T	3,091
Raymondville	800
Red Creek	845
Red Hook	1,692
Redwood	600
Remsen UT-R	621
Rensselaer A-S-T	9,047
Rhinebeck POK	2,542
Richburg	494
Richfield Springs	1,561
Richmondville	797
Ridgemont ROCH	8,500
Ripley	1,000
Riverhead	7,400
ROCHESTER ROCH	241,741
Rockville Centre N.Y.	25,405
Roessleville A-S-T	5,476
Rome UT-R	43,826
Ronkonkoma N.Y.	20,200
Roosevelt N.Y.	15,000
Roslyn Heights N.Y.	7,270
Rotterdam A-S-T	24,800
Round Lake A-S-T	791
Rouses Point	2,266
Roxbury	700
Rushford	500
Rushville	548
Rye N.Y.	15,083
Sackets Harbor	1,017
Sag Harbor	2,581
St. James N.Y.	11,000
St. Johnsville	2,019
St. Regis Falls	950
Salamanca	6,890
Salem	959
Sandy Creek	765
San Remo N.Y.	8,700
Saranac Lake	6,676
Saratoga Springs A-S-T	23,906
Saugerties KNGST	3,882
Savannah	636
Savona ELM	932
Sayville N.Y.	18,300
Scarsdale N.Y.	17,650
Schaghticoke A-S-T	677
Schenectady A-S-T	67,972
Schenevus	625
Schoharie	1,018
Schroon Lake	1,000
Schuylerville	1,256
Scotia A-S-T	7,380
Scottsville ROCH	1,789
Sea Cliff N.Y.	5,364
Seaford N.Y.	17,180
Selden N.Y.	24,100
Seneca Falls	7,466
Shandaken	900
Shelter Island	1,000
Sherburne	1,861
Sherman	775
Sherrill	2,830
Shirley N.Y.	8,700
Shortsville ROCH	1,669
Sidney	4,861
Sidney Center	600
Silver Creek BUF	3,088
Silver Springs	801
Sinclairville	772
Skaneateles SYR	2,789
Sloan BUF	4,526
Sloatsburg N.Y.	3,154
Smithtown N.Y.	23,000
Sodus ROCH	1,790
Sodus Point	1,334
Solvay SYR	7,140
Sound Beach N.Y.	5,400
Southampton	4,000
South Bethlehem A-S-T	500
South Corning ELM	1,195
South Dayton	861
South Fallsburg	1,590
South Farmingdale N.Y.	20,500
South Glens Falls GLFLS	3,714
South Huntington N.Y.	9,115
South New Berlin	450
South Nyack N.Y.	3,602
Southold	2,030
South Otselic	450
Southport ELM	8,700
South Stony Brook N.Y.	15,329
South Valley Stream N.Y.	6,600
South Westbury N.Y.	10,700
Spencer	863
Spencerport ROCH	3,424
Spring Valley N.Y.	20,537
Springville	4,285
Springwater	500
Staatsburg POK	850
Stamford	1,240
Stillwater A-S-T	1,572
Stony Brook N.Y.	6,600
Stony Creek	450
Stony Point N.Y.	8,270
Stottville	1,300
Suffern N.Y.	10,794
Sylvan Beach UT-R	1,243
Syosset N.Y.	10,200
SYRACUSE SYR	170,105
Tappan N.Y.	6,100
Tarrytown N.Y.	10,648
Terryville N.Y.	5,900
Theresa	827
Thornwood N.Y.	5,400
Three Mile Bay	600
Ticonderoga	2,938
Tillson KNGST	1,300
Tivoli KNGST	711
Tomkins Cove N.Y.	700
Tonawanda BUF	18,693
Town of Tonawanda BUF	78,100
Troy A-S-T	56,638
Trumansburg ITH	1,722
Tuckahoe N.Y.	6,076
Tully SYR	1,049
Tupper Lake	4,478
Unadilla	1,367
Uniondale N.Y.	24,500
Union Springs AUB	1,201
University Gardens N.Y.	5,400
UTICA UT-R	75,632
Valatie A-S-T	1,492
Valhalla N.Y.	6,600
Valley Cottage N.Y.	6,007
Valley Stream N.Y.	35,769
Van Etten	559
Vestal BING	6,000
Vestal Center BING	900
Victor ROCH	2,370
Waddington	960
Wading River	2,500
Walden NWBG	5,659
Wallkill NWBG	1,849
Walton	3,329
Wampsville	569
Wantagh N.Y.	22,300
Wappingers Falls POK	5,110
Warrensburg	2,743
Warsaw	3,619
Warwick N.Y.	4,320
Waterford A-S-T	2,405
Waterloo	5,303
WATERTOWN WATN	27,861
Waterville UT-R	1,672
Watervliet A-S-T	11,354
Watkins Glen	2,440
Waverly	4,738
Wayland	1,846
Webster ROCH	5,499
Weedsport SYR	1,852
Wellsburg ELM	647
Wellsville	5,769
West Amityville N.Y.	6,470
West Babylon N.Y.	32,530
West Bay Shore N.Y.	8,900
Westbury N.Y.	13,871
West Carthage	1,824
West Chazy	700
West Elmira ELM	5,901
Westfield	3,446
West Haverstraw N.Y.	9,181
West Hempstead N.Y.	28,600
West Huntington N.Y.	6,170
West Islip N.Y.	21,800
Westmere A-S-T	6,800
West Point	8,000
Westport	613
West Sayville N.Y.	6,000
West Seneca BUF	51,710
Westvale SYR	7,300
West Webster ROCH	10,800
West Winfield	979
Whitehall	3,241
White Plains N.Y.	46,999
Whitesboro UT-R	4,460
Whitesville	600
Whitney Point BING	1,083
Willard	700
Williamson ROCH	1,991
Williamsville BUF	6,017
Williston Park N.Y.	8,716
Willsboro	950
Wilmington	500
Wilson LOCK	1,259

◊ Rand McNally estimate (not reported in census)
▲ Population of entire township or town, including rural area
● Independent city. Population not included in county totals.



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

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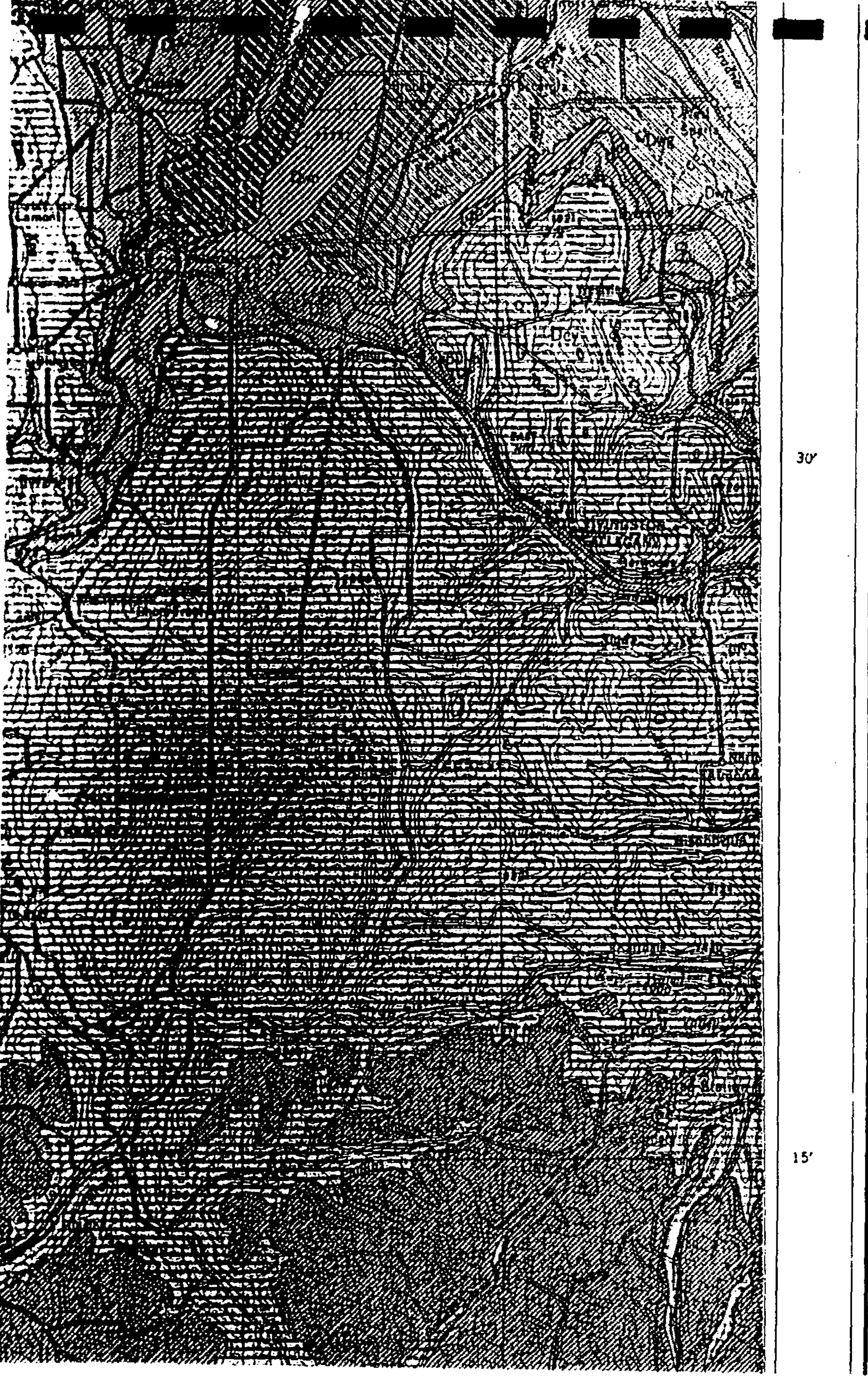

continued.

Lower Devonian

[redacted] Ont[redacted]unde[redacted]stone[redacted] For[redacted]. 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.

Lower Silurian

CLINTON GROUP
100-150 ft. (30-45 m.)

Scl — Decew Dolostone; Rochester Shale; Irondequoit and Merriton Limestones.

Sr — Decew Dolostone; Rochester Shale.

Sik — Irondequoit Limestone; Rockway Dolostone; Hickory Corners Limestone; Neahga Shale; Kodak Sandstone.

MEDINA GROUP AND QUEENSTON FORMATION
800 ft. (250 m.)

Sm — Thorold Sandstone; Grimsby Formation—sandstone, shale; Power Glen and Cabot Head Shales; Whirlpool Sandstone.

Upper Ordovician

Oq — Queenston Shale.

MAP SYMBOLS

Observed or approximately located contact

Conjectural contact; includes projections beneath extensive Quaternary cover and many contacts based on reconnaissance mapping

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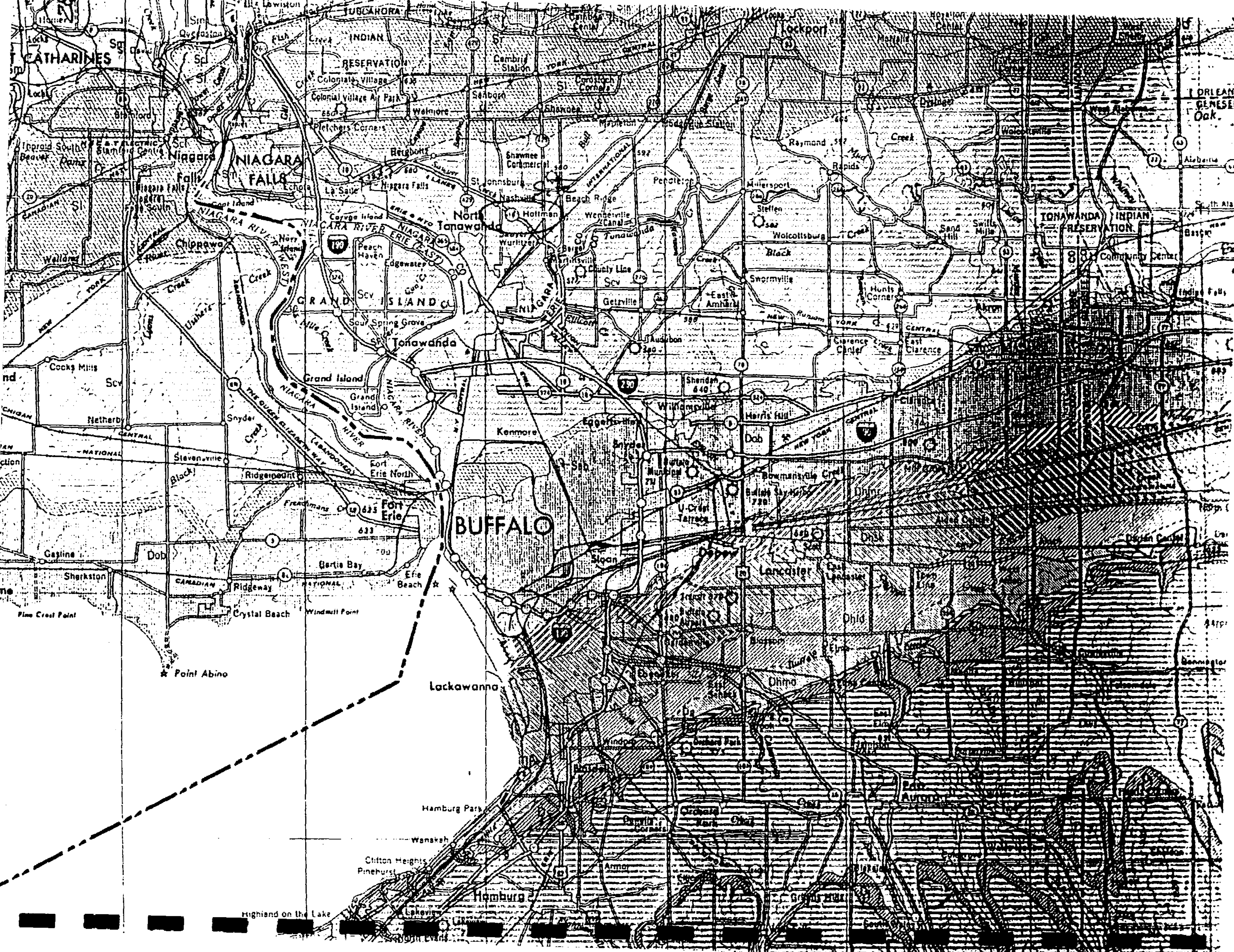
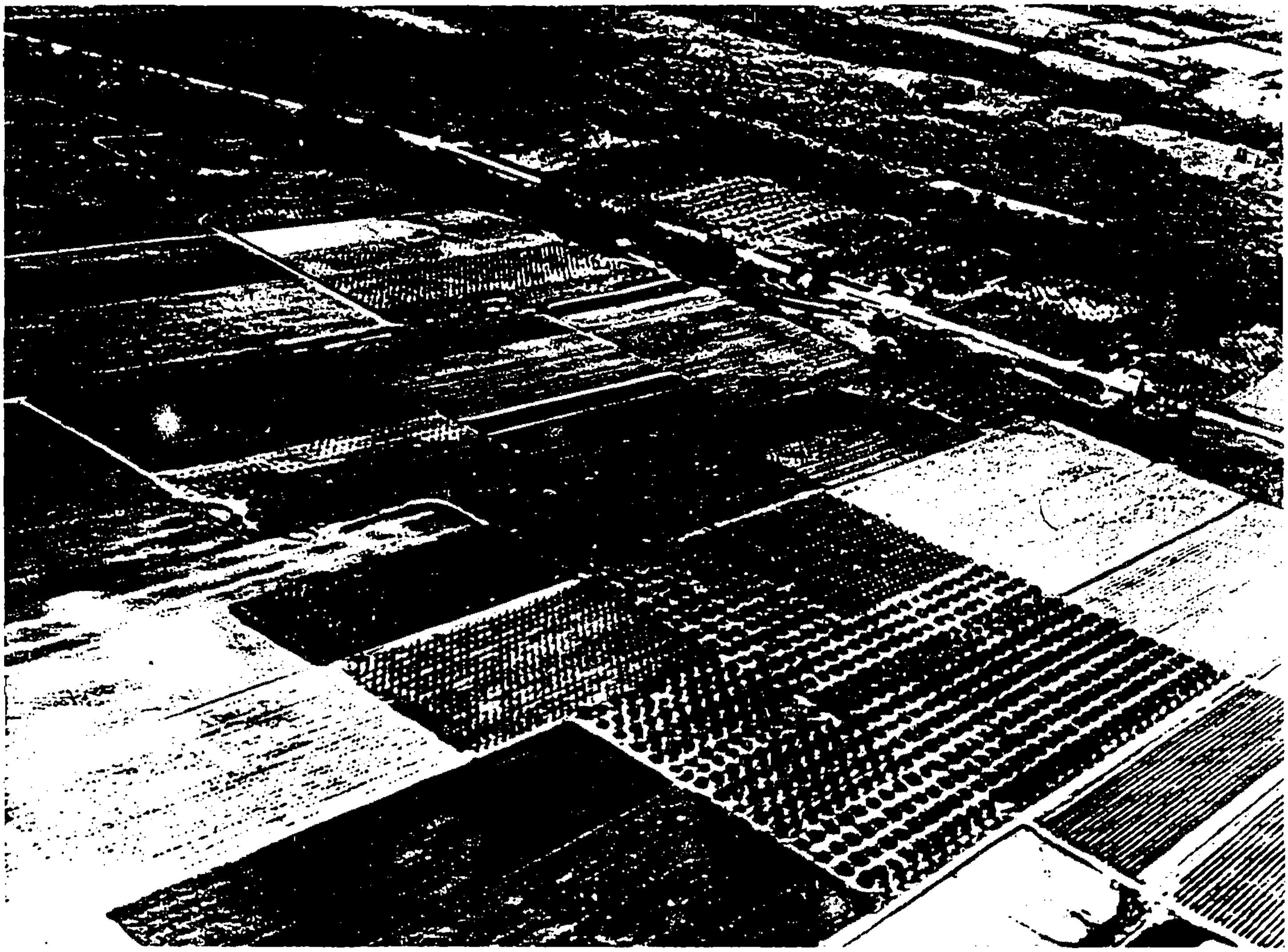


ST. CATHARINES
TUSCARORA INDIAN RESERVATION
Lockport
Colonial Village
Cambria Station
Sanborn
Shawnee
Fletchers Corners
Wolcottsburg
Raymond
Rapids
Bergholtz
Niagara
NIAGARA FALLS
Niagara Falls
La Salle
St. Johnsburg
Nashville
Beach Ridge
Pendleton
Millersport
Steffen
North Tonawanda
NIAGARA RIVER WEST
NIAGARA RIVER (EAST)
Chippawa
Welland
Peach Haven
Edgewater
GRAND ISLAND
Sour Spring Grove
Tonawanda
Grand Island
County Line
Getzville
Swormville
East Amherst
Hunts Corner
Clarence Center
East Clarence
Akron
TONAWANDA INDIAN RESERVATION
Community Center
Cooks Mills
Netherby
Snyder
THE QUEEN ELIZABETH WAY
Stevensville
Ridgemount
Fort Erie North
Fort Erie
Kenmore
Williamsville
Harris Hill
BUFFALO
Bowmansville
Lancaster
East Lancaster
Sloan
Gasline
Sherkston
Bertie Bay
Erie Beach
Ridgeway
Crystal Beach
Windmill Point
Pine Crest Point
Point Abino
Lackawanna
Orchard Park
East Aurora
Hamburg Park
Wanakah
Clifton Heights
Pinehurst
Hamburg
Highland on the Lake
Lakeview

SOIL SURVEY OF

Niagara County, New York



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

Issued October 1972

GUIDE TO MAPPING UNITS

To obtain a complete description of a mapping unit, it is necessary to read the description of the mapping unit and the description of the soil series to which it belongs. In referring to a capability unit or a woodland group, read the introduction to the section it is in for general information about its management. Other information in this soil survey is in tables as follows:

Estimated yields, tables 1, 2, and 3 pp. 27 through 36.
Woodland, table 4, page 38.
Wildlife, table 5, page 43.
Engineering uses of soils, tables 6, 7, and 8, pp. 48 through 97.
Nonfarm uses of soils, table 9, page 100.

Map symbol	Mapping units	Described on page	Capability unit Symbol	Capability unit Page	Woodland group Symbol	Woodland group Page
Ad	Alluvial land	122	Vw-1	25	---	---
Af	Altmar loamy fine sand	123	IIw-1	19	4s1	40
Am	Altmar gravelly fine sandy loam	123	IIw-1	19	4s1	40
AnA	Appleton gravelly loam, 0 to 3 percent slopes	124	IIIw-1	21	3w2	40
ApA	Appleton silt loam, 0 to 3 percent slopes	124	IIIw-1	21	3w2	40
ArB	Arkport very fine sandy loam, 0 to 6 percent slopes	125	IIs-2	18	2o1	38
ArC	Arkport very fine sandy loam, 6 to 12 percent slopes	126	IIIe-3	20	2o1	38
AsA	Arkport fine sandy loam, gravelly substratum, 0 to 2 percent slopes	126	IIs-1	18	2o1	38
AsB	Arkport fine sandy loam, gravelly substratum, 2 to 6 percent slopes	126	IIs-2	18	2o1	38
BoA	Bombay fine sandy loam, 0 to 2 percent slopes	127	IIw-2	19	3o1	38
BoB	Bombay fine sandy loam, 2 to 6 percent slopes	127	IIe-3	17	3o1	38
BrA	Brockport silt loam, 0 to 4 percent slopes	129	IIIw-2	22	3w1	40
Ca	Canandaigua silt loam	129	IIIw-3	22	4w1	40
Cb	Canandaigua silty clay loam	130	IIIw-3	22	4w1	40
CcA	Cayuga and Cazenovia silt loams, 0 to 2 percent slopes	131	IIw-2	19	2o1	38
CcB	Cayuga and Cazenovia silt loams, 2 to 6 percent slopes	131	IIe-3	17	2o1	38
CcC	Cayuga and Cazenovia silt loams, 6 to 12 percent slopes	131	IIIe-1	20	2o1	38
CeA	Cazenovia gravelly silt loam, 0 to 3 percent slopes	132	IIw-2	19	2o1	38
CeB	Cazenovia gravelly silt loam, 3 to 8 percent slopes	132	IIe-3	17	2o1	38
CgA	Cazenovia gravelly silt loam, shale substratum, 0 to 3 percent slopes	133	IIw-2	19	2o1	38
CgB	Cazenovia gravelly silt loam, shale substratum, 3 to 8 percent slopes	133	IIe-3	17	2o1	38
Ch	Cheektowaga fine sandy loam	134	IIIw-3	22	5w1	40
ClA	Churchville silt loam, 0 to 2 percent slopes	135	IIIw-2	22	3w1	40
ClB	Churchville silt loam, 2 to 6 percent slopes	135	IIIw-5	23	3w1	40
CmA	Claverack loamy fine sand, 0 to 2 percent slopes	136	IIw-1	19	3s1	40
CmB	Claverack loamy fine sand, 2 to 6 percent slopes	136	IIw-1	19	3s1	40
CnA	Collamer silt loam, 0 to 2 percent slopes	138	IIw-2	19	2o1	38
CnB	Collamer silt loam, 2 to 6 percent slopes	138	IIe-2	17	2o1	38
CoB	Colonie loamy fine sand, 0 to 6 percent slopes	139	IIIs-1	21	4s1	40
Cs	Cosad fine sandy loam	140	IIIw-4	23	4w1	40
Cu	Cut and fill land	140	------	---	---	---
DuB	Dunkirk silt loam, 2 to 6 percent slopes	141	IIe-2	17	2o1	38
DuC3	Dunkirk silt loam, 6 to 12 percent slopes, eroded	141	IVe-2	24	2r1	38
DvD3	Dunkirk and Arkport soils, 12 to 20 percent slopes, eroded	142	VIe-1	25	2r3	38
ElA	Elnora loamy fine sand, 0 to 2 percent slopes	143	IIw-1	19	4s1	40
ElB	Elnora loamy fine sand, 2 to 6 percent slopes	143	IIw-1	19	4s1	40
FaA	Farmington silt loam, 0 to 8 percent slopes	144	IIIs-2	21	5d1	40
Fo	Fonda mucky silt loam	145	IVw-1	24	5w1	40
Fr	Fredon gravelly loam	146	IIIw-1	21	3w2	40
GnA	Galen very fine sandy loam, 0 to 2 percent slopes	147	IIw-1	19	2o1	38
GnB	Galen very fine sandy loam, 2 to 6 percent slopes	147	IIw-1	19	2o1	38
Ha	Hamlin silt loam	148	IIw-3	19	2o2	38
HgA	Hilton gravelly loam, 0 to 3 percent slopes	150	IIw-2	19	2o1	38
HgB	Hilton gravelly loam, 3 to 8 percent slopes	150	IIe-3	17	2o1	38

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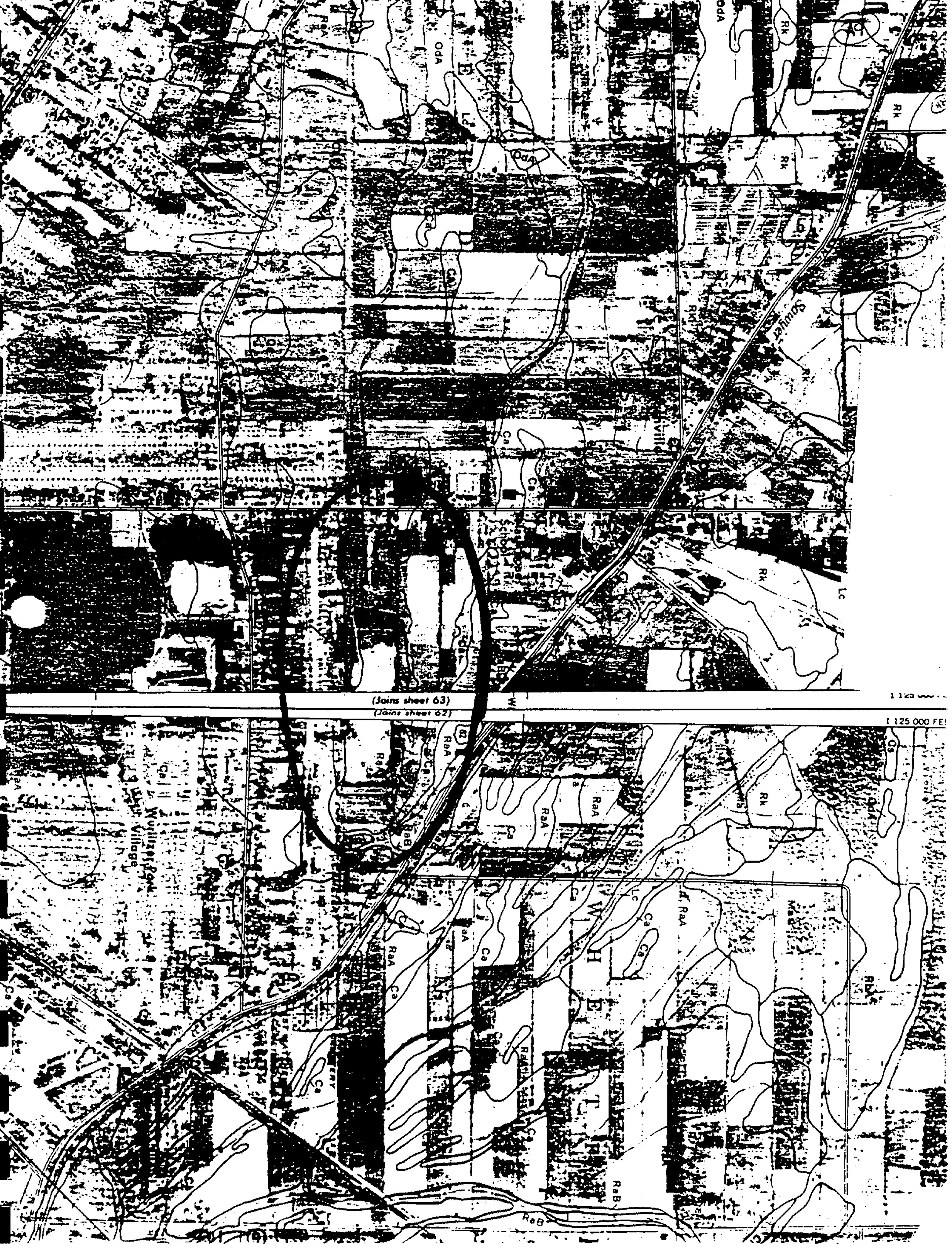
Map symbol	Mapping unit	Described on page	Capability unit Symbol	Capability unit Page	Woodland group Symbol	Woodland group Page
HlA	Hilton silt loam, 0 to 3 percent slopes----------------	150	IIw-2	19	2o1	[illegible]
HlB	Hilton silt loam, 3 to 8 percent slopes----------------	150	IIe-3	17	2o1	[illegible]
HmA	Hilton and Cayuga silt loams, limestone substratum, 0 to 3 percent slopes--------------------------------	151	IIw-2	19	2o1	[illegible]
HmB	Hilton and Cayuga silt loams, limestone substratum, 3 to 8 percent slopes--------------------------------	151	IIe-3	17	2o1	[illegible]
HoA	Howard gravelly loam, 0 to 3 percent slopes------------	152	IIs-1	18	2o1	[illegible]
HoB	Howard gravelly loam, 3 to 8 percent slopes------------	152	IIs-2	18	2o1	[illegible]
HoC	Howard gravelly loam, 8 to 15 percent slopes-----------	153	IIIe-2	20	2o1	[illegible]
HsB	Hudson silt loam, 2 to 6 percent slopes----------------	154	IIe-2	17	2o1	[illegible]
HtC3	Hudson silty clay loam, 6 to 12 percent slopes, eroded--	154	IVe-2	24	2r1	[illegible]
HuF3	Hudson soils, 20 to 45 percent slopes, eroded----------	154	VIe-1	25	2r3	[illegible]
LaB	Lairdsville silt loam, 0 to 6 percent slopes-----------	155	IIe-4	17	3o1	[illegible]
Lc	Lakemont silty clay loam-------------------------------	156	IVw-1	24	5w1	[illegible]
Ld	Lamson very fine sandy loam----------------------------	158	IIIw-3	22	4w1	[illegible]
Lg	Lamson fine sandy loam, gravelly substratum------------	158	IIIw-3	22	4w1	[illegible]
Lo	Lockport silt loam-------------------------------------	159	IIIw-2	22	3w1	[illegible]
Ma	Madalin silt loam--------------------------------------	161	IVw-1	24	5w1	[illegible]
Md	Madalin silt loam, loamy subsoil variant---------------	162	IVw-1	24	5w1	40
Me	Made land--	162	-----	--	---	---
Mf	Massena fine sandy loam--------------------------------	163	IIIw-1	21	3w2	40
Mn	Minoa very fine sandy loam-----------------------------	164	IIIw-1	21	3w2	40
Ms	Muck, shallow--	165	IVw-2	24	---	---
NaA	Niagara silt loam, 0 to 2 percent slopes---------------	166	IIIw-1	21	3w2	40
NaB	Niagara silt loam, 2 to 6 percent slopes---------------	166	IIIw-5	23	3w2	40
OdA	Odessa silty clay loam, 0 to 2 percent slopes----------	167	IIIw-2	22	3w1	40
OdB	Odessa silty clay loam, 2 to 6 percent slopes----------	167	IIIw-5	23	3w1	40
OnB	Ontario loam, 2 to 8 percent slopes--------------------	169	IIe-1	16	2o1	38
OnC	Ontario loam, 8 to 15 percent slopes-------------------	169	IIIe-1	20	2o1	38
OnC3	Ontario loam, 8 to 15 percent slopes, eroded-----------	169	IVe-1	23	2o1	38
OnD3	Ontario loam, 15 to 30 percent slopes, eroded----------	169	VIe-1	25	2r2	38
OoA	Ontario loam, limestone substratum, 0 to 3 percent slopes--	170	I-1	16	2o1	38
OoB	Ontario loam, limestone substratum, 3 to 8 percent slopes--	170	IIe-1	16	2o1	38
OsA	Otisville gravelly sandy loam, 0 to 3 percent slopes---	171	IIIs-1	21	4s1	40
OsB	Otisville gravelly sandy loam, 3 to 8 percent slopes---	171	IIIs-1	21	4s1	40
OvA	Ovid silt loam, 0 to 2 percent slopes------------------	172	IIIw-1	21	3w2	40
OvB	Ovid silt loam, 2 to 6 percent slopes------------------	173	IIIw-5	23	3w2	40
OwA	Ovid silt loam, limestone substratum, 0 to 3 percent slopes--	173	IIIw-1	21	3w2	40
OwB	Ovid silt loam, limestone substratum, 3 to 8 percent slopes--	173	IIIw-5	23	3w2	40
PsA	Phelps gravelly loam, 0 to 5 percent slopes------------	174	IIw-2	19	2o1	38
Prime RaA	Raynham silt loam, 0 to 2 percent slopes---------------	175	IIIw-1	21	3w2	40
RaB	Raynham silt loam, 2 to 6 percent slopes---------------	176	IIIw-5	23	3w2	40
RbA	Rhinebeck silt loam, 0 to 2 percent slopes-------------	177	IIIw-2	22	3w1	40
RbB	Rhinebeck silt loam, 2 to 6 percent slopes-------------	177	IIIw-5	23	3w1	40
RhA	Rhinebeck silty clay loam, sandy substratum, 0 to 2 percent slopes------------------------------------	177	IIIw-2	22	3w1	40
RhB	Rhinebeck silty clay loam, sandy substratum, 2 to 6 percent slopes------------------------------------	178	IIIw-5	23	3w1	40
Rk	Rhinebeck silt loam, thick surface variant-------------	179	IIIw-2	22	3w1	40
RoA	Rock land, nearly level--------------------------------	179	VIIIs-1	25	---	---
RoF	Rockland, steep--	179	VIIIs-1	25	---	---
ShB	Schoharie silty clay loam, 2 to 6 percent slopes-------	181	IIe-4	17	2o1	38
St	Stafford loamy fine sand-------------------------------	182	IIIw-4	23	4w1	40
Su	Stafford loamy fine sand, gravelly substratum----------	182	IIIw-4	23	4w1	40
Sw	Sun silt loam--	183	IVw-1	24	4w1	40
Wa	Wayland silt loam--------------------------------------	184	IIIw-6	23	4w1	40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1 125 000 FE
OdA
Rk
Ca
RaA
RaB
Lc
Sawyer

APPENDIX A

FIELD PROCEDURES

APPENDIX A

FIELD PROCEDURES

These procedures were utilized by Engineering-Science field teams during the Phase II field investigations. These procedures are taken from the NYSDEC approved "Quality Assurance Project Plan for the Phase II Engineering Investigations and Evaluations at Inactive Hazardous Waste Disposal Sites", dated June, 1987.

The following procedures are contained in this appendix:

drilling well borings;

monitoring well installations;

well development;

groundwater sampling;

air monitoring.

DRILLING WELL BORINGS

The procedures utilized to drill monitor wells at the site are described in the "Guidelines for Exploratory Boring, Monitoring Well Installation and Documentation for these Activities" as developed by the NYSDEC. The procedures listed in the Work Plan and Quality Assurance Plan for the site were modified in the field, with NYSDEC approval, in response to site-specific conditions.

Holes were drilled with a Mobile B-61 truck-mounted drilling rig or with a CME-45 ATV mounted rig. Prior to drilling, the drill rig and tools were steam cleaned. During drilling, downhole equipment and other tools were placed on wooden pallets or sheets of plastic to limit contamination by surface contaminants.

Unconsolidated materials were drilled with 4-1/4 inch inside diameter hollow stem augers. Clean water from a municipal supply was used as the drilling fluid. Soil samples were generally collected continuously in the shallow wells. In deeper wells, samples were collected at intervals of five feet until drilling approached the depth where the lower sand lens was expected to be found and continuous sampling was resumed. The samples were visually classified in terms of moisture content, color, texture, density and structure. The soil samples and cuttings were monitored with a Photovac TIP-II to detect volatile organic compounds. Selected samples were submitted to a laboratory and analyzed for grain-size characteristics. Soil materials and rock cuttings from the well borings were left on the ground surface when readings were not in excess of 5 ppm above background. All cuttings were spread on the ground upon completion of drilling. Bedrock was not drilled during this study.

Monitoring Well Installation

All wells were constructed of 2-inch I.D. threaded flush-joint PVC riser pipe and 2- to 6-foot lengths of 0.010-inch slotted screen. All well materials were steam cleaned prior to installation.

Well casings were set through the augers and a quartz sand was placed around the screen with a tremie to a point one to two feet above the screen. A two-foot thick bentonite pellet seal was placed above the sand pack with a tremie to isolate the screened section from overlying sediments. The remainder of the annular space was filled to the land surface with a cement and bentonite grout. A vented PVC cap was placed on the well and the well was secured with a locking 4-inch I.D. protective steel casing.

Well Development

Wells were allowed to set up for twelve hours or more after installation. Wells were subsequently developed by removing water until the discharge water turbidity was less than 100 Jackson Turbidity Units or was largely sediment free. All tools and materials used to develop the wells were steam cleaned prior to installation. Water was removed from the wells by bailing or by air-lift pumping. During air-lift pumping, an oil separating device was installed on the discharge line of the compressor. Airlines were placed just above the screened section and air pressure was increased until water discharged from the well. The discharge of the airline was monitored with a Photovac to insure readings were not above background. Wells were surged periodically to aid in removing sediment.

Groundwater Sampling

The sampling program conducted by Engineering-Science consisted of groundwater samples only. Seven groundwater samples were collected at the site in accordance with the Quality Assurance Project Plan. All sampling equipment was cleaned prior to sampling by successively rinsing with detergent (Alconox) water, methanol and distilled water. After the samples were bottled, additional water was collected for field tests of temperature, pH, and conductivity. Field sampling records are presented in Appendix C of this report.

In addition to the samples collected from the site, two types of blanks were collected. Two trip blanks, consisting of organic-free water prepared by the laboratory, accompanied the samples throughout the sampling and shipping procedures. A trip blank provides an indication of bottle preparation procedures and possible exposure of the samples to contaminants during shipping. Two field wash blanks were taken by collecting organic-free water prepared by the laboratory or a commercial distributor during the final rinse of sampling equipment. A field wash blank measures the effectiveness of field decontamination procedures. Blanks were assigned non-existent sample location numbers and submitted to the laboratory to be analyzed for volatile organic compounds.

The static water level relative to the top of the PVC casing was measured and recorded at each well and three well volumes of water were removed with a decontaminated Teflon bailer and dedicated polypropylene line prior to collection of the sample. The sample bottles were filled using the same Teflon bailer.

Air Quality Monitoring

Air quality monitoring for volatile organic compounds was performed as a health and safety measure during drilling, well installation and sampling events using a Photovac TIP-II photoionization meter. The meter was calibrated daily before use with a 100 ppm isobutylene standard. Background conditions were determined by holding the intake of the instrument at head height for 30 seconds and recording the reading. During drilling, the split-spoon soil samples were held about 1 inch from the intake. The air in completed wells was monitored by removing the PVC cap and placing the intake into the well opening. All readings were recorded on field forms at the time of sampling.

APPENDIX B

GEOLOGIC DATA

BORING LOGS AND WELL SCHEMATICS

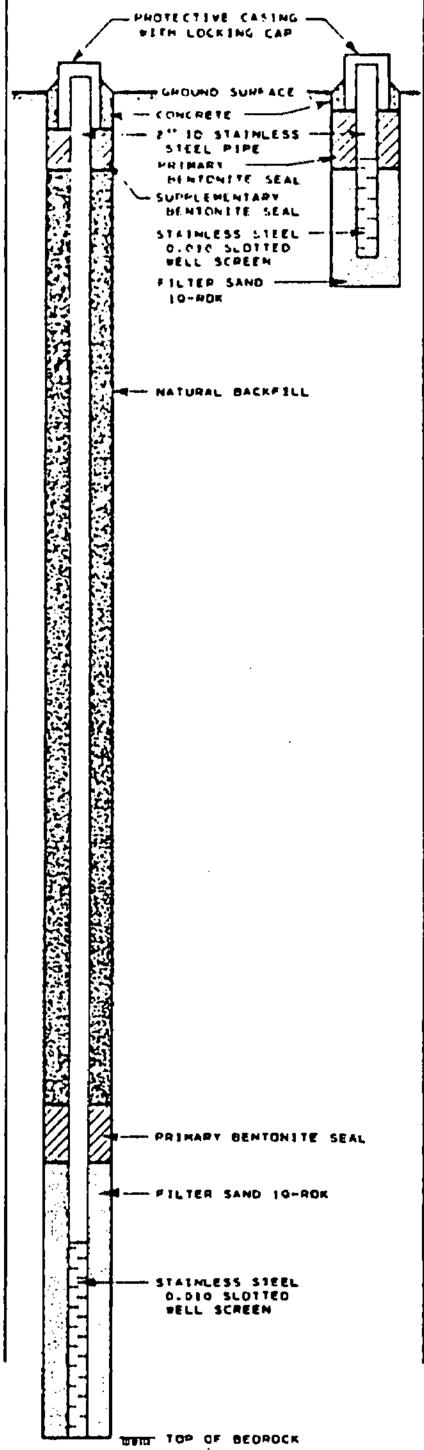
EXISTING MONITORING WELLS

(INSTALLED IN 1985)

BORING OW-1
NASH ROAD SITE

WELL SCHEMATICS

OW-1B OW-1



SAMPLING							
BLOW COUNT	*SAMPLE NO & TYPE*	*RUN NO*	*CORE REC*	*CORE RQD*	*FRACTURES*	*DEPTH IN FEET*	*GRAPHIC LOG*
5	1					0	ML
16	2						
15	3					5	CL
35	4						
15	5						
9	6					10	
10	7						
2	8						
2	9					15	
	10						
	11					20	
9	1B:1					25	CH
4	1B:2					30	
						35	
38/6"	1B:3						
55/6"	1B:4						
14/6"	1B:5					40	
20/6"	1B:6						
						45	
98	1B:7					50	GM
55/6"	1B:8					55	
65/6"	1B:9					60	
76/6"	1B:10					65	

DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: GRASSY, WET.

LIGHT BROWN MOIST MEDIUM SILT AND CLAY, TRACE OF SAND, OCCASIONAL BLACK ORGANIC STAINS

GRAY MOIST STIFF LAYERED CLAY AND SILT WITH OCCASIONAL SEAMS OF FINE TO MEDIUM SAND, 1/8" IN THICKNESS

GRADES TO LESS STIFF

GRAY MOIST MEDIUM LAYERED CLAY, RED CLAY LAYERS APPROXIMATELY 1/10' THICKNESS AT IRREGULAR INTERVALS

GRADES TO VERY SOFT CLAY

GRADES TO SOFT

GRADES TO VERY SOFT

BROWN, MOIST SILT AND COARSE TO FINE GRAVEL, LITTLE CLAY, LITTLE FINE SAND (TILL)

GRADES TO WET

GRADES TO MOIST, DENSE SILT, SOME FINE TO COARSE SAND, LITTLE FINE GRAVEL

GRADES TO WET

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

80 CORE LOSS ZONE
PERCENT CORE RECOVERY

82 CORE ROD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures-shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

BORING OW-1
NASH ROAD SITE

WELL SCHEMATICS	SAMPLING: BLOW COUNT	SAMPLING: SAMPLE NO. & TYPE	SAMPLING: OVA NO	SAMPLING: CORE REC	SAMPLING: CORE RQD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
							65	GM	
		1B<11							TOP OF BEDROCK AT 68.6'. BEDROCK IS DOLOSTONE.
							70		BORING TERMINATED AT A DEPTH OF 68.6' ON JUNE 11, 1986.

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

- RQ — CORE LOSS ZONE
- PERCENT CORE RECOVERY
- 82 — CORE RQD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

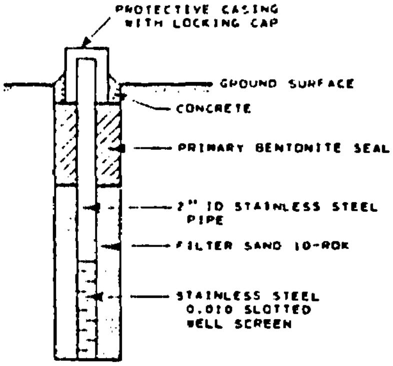
FIGURE B.1B

BORING OW-2

NASH ROAD SITE

WELL SCHEMATICS

OW-2



SAMPLING							
BLOW COUNT	SAMPLE NO. & TYPE	RUN NO	CORE REC	CORE RQD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG
10	1 ◘					0	ML
11	2 ◘						SW
13	3 ◘					5	
36	4 ◘						
18	5 ◘						CL
5	6 ◘					10	
3	7 ◘						CH
						15	

DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: GRASSY, MUDDY

LIGHT BROWN MOIST STIFF SILT, LITTLE FINE SAND

GRAY WET MEDIUM DENSE FINE SAND, TRACE SILT

GRAY AND BROWN MOIST STIFF LAYERED CLAY AND SILT; SILT LAYERS ABOUT 1/2" THICK

GRADES TO MEDIUM

GRADES TO SOFT

GRAY MOIST, VERY SOFT LAYERED CLAY; RED CLAY LAYERS ARE APPROXIMATELY 1/5" THICK AT 3/4" INTERVALS

BORING TERMINATED AT A DEPTH OF 14.0' ON JUNE 6, 1984.

SOIL SAMPLING INFORMATION

- ◘ STANDARD PENETRATION TEST
- ■ UNDISTURBED SAMPLE
- ◙ DISTURBED SAMPLE
- □ NO SAMPLE RECOVERED

ROCK CORE INFORMATION

RQ CORE LOSS ZONE

PERCENT CORE RECOVERY

82 CORE RQD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

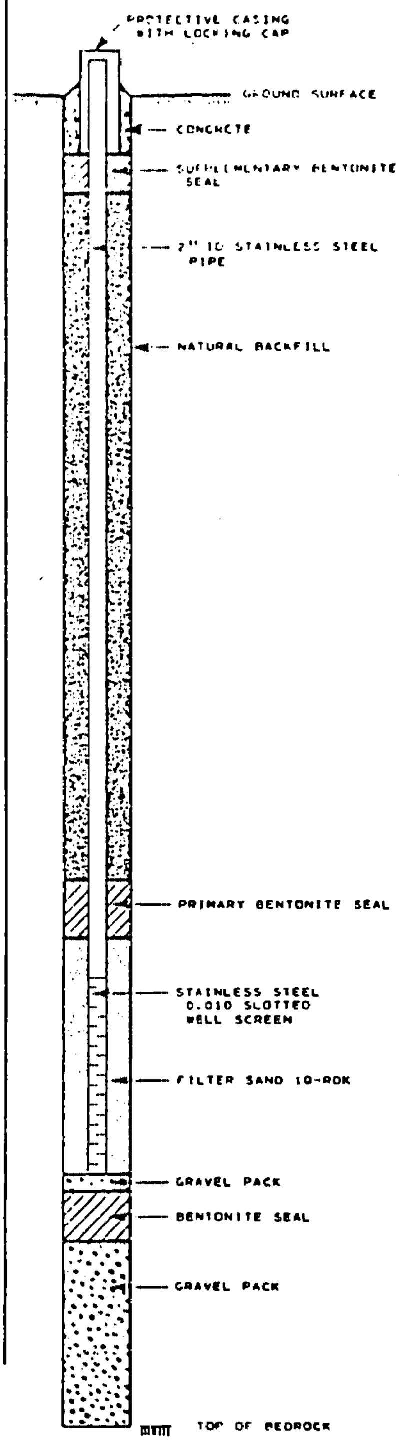
FIGURE B.2

BORING OW-3

NASH ROAD SITE

WELL SCHEMATICS

OW-3



SAMPLING

BLOW COUNT	SAMPLE NO. & TYPE	RUN NO.	CORE REC.	CORE RQD	FRACTURES
6	1				
11	2				
7/.5'	3A				
9/.5'	3B				
32	4				
20	5				
7	6				
6	7				
4	8				
2	9				
2	10				
2	11				
3	12A				
3	12B				
72/.5'	13				
	14				
65/.5'	15				
100/.4'	16				
29	17				
21	18				
23	19				
17	20				
75/.5'	21				
96/.5'	22				

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65

GRAPHIC LOG

DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: GRASSY, TALL BRUSH

MIXED SAND/WASTE FILL

GRAY AND BROWN MOIST MEDIUM LAYERED CLAY AND SILT, TRACE FINE SAND, BROWN SILT LAYERS APPROXIMATELY 1/2"-1" IN THICKNESS AT 1 1/2" INTERVALS
- GRADES TO STIFF AT 6.0'

GRAY MOIST MEDIUM LAYERED CLAY
- RED CLAY LAYERS APPROXIMATELY 1/10" THICK AT 1/2" INTERVALS
- GRADES TO SOFT WITH OCCASIONAL SILT LAYERS APPROXIMATELY 1/2" THICK AT 10.0'
- CLAY LAYERS BECOME LESS DISTINCT AT 12.0'
- GRADES TO VERY SOFT AT 16.0'

GRAY AND BROWN/RED MOIST MEDIUM STIFF LAYERED CLAY AND SILT AT 26.0'
- SEAM OF MOIST MEDIUM TO FINE SAND AT 26.3'

BROWN MOIST MEDIUM SILT AND COARSE TO FINE GRAVEL, TRACE FINE SAND, TRACE CLAY (TILL)
- GRADES TO DRY AND VERY STIFF SILT AT 28.5'
- GRADES TO MOIST AND HARD SILT
- GRADES TO MOIST AND MEDIUM
- GRADES TO WET
- GRADES TO COARSE TO FINE GRAVEL AND BROWN DRY HARD SILT, SOME WEATHERED ROCK FRAGMENTS, TRACE FINE SAND

SOIL SAMPLING INFORMATION
- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

2-01-80 PIEZOMETRIC SURFACE & DATE TESTED

ROCK CORE INFORMATION
- RO — CORE LOSS ZONE
- PERCENT CORE RECOVERY
- R2 CORE RUN

FRACTURES
- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures-shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC
- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

FIGURE B.3A

BORING OW-3

NASH ROAD SITE

WELL SCHEMATICS	SAMPLING: BLOW COUNT	SAMPLING: SAMPLE NO. & TYPE	SAMPLING: RUN NO.	SAMPLING: CORE REC	SAMPLING: CORE RQD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
							65	CM	
							70		TOP OF BEDROCK 68.7' BEDROCK IS DOLOSTONE BORING TERMINATED AT A DEPTH OF 68.7' ON JUNE 7, 1984.

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

- 80 CORE LOSS ZONE
- PERCENT CORE RECOVERY
- 82 CORE ROD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

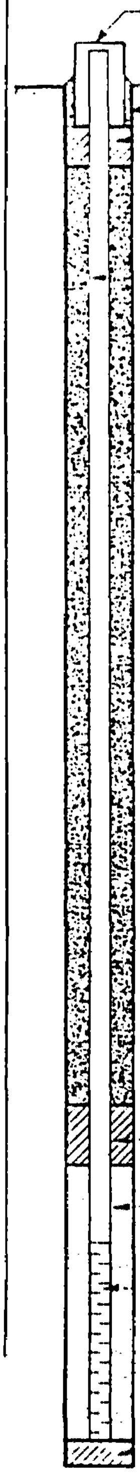
FIGURE B.3B

BORING OW-4

NASH ROAD SITE

WELL SCHEMATICS

OW-4



SAMPLING: BLOW COUNT	SAMPLE NO & TYPE	RUN NO	CORE REC	CORE RQD	FRACTURES	DEPTH IN FEET
						0
22	1 ▣					5
15	2 ▣					
17	3 ▣					
33	4 ▣					
10	5 ▣					
18	6 ▣					10
16						
8	7 ▣					
6	8 ▣					
5	9 ▣					
2	10 ▣					15
3						
2	11 ▣					20
2						
2	12 ▣					25
2						
2	13 ▣					30
2						
2	14 ▣					35
2						
26	15 ▣					40
46	16					
50/.2'	17 ▣					45
	18					
80/.5'	19 ▣					50
50/.5'	20 ▣					55
50/.4'	21 ▣					60
50/.5"	22 ▣					65

GRAPHIC LOG

DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: GRASSY, SOME SURFACE TRASH

MIXED SAND/WASTE FILL

GRAY MOIST SILT AND CLAY

GRAY WET MEDIUM TO FINE SAND, TRACE SILT, ORGANIC ODOR, SOME BLACK STAIN

GRAY AND BROWN MOIST LAYERED SILT AND CLAY, TRACE FINE SAND

LAYERS APPROX. 1/2" THICK

GRADES TO WET BROWN SILT AND CLAY

GRADES TO CLAY, TRACE SILT

BROWN WET SILT AND FINE TO COARSE SAND, LITTLE MEDIUM TO FINE GRAVEL

BROWN WET MEDIUM TO FINE SAND

BROWN MOIST SILT, AND COARSE TO FINE SAND, LITTLE FINE TO COARSE SAND (TILL)

GRADES TO WET

GRADES TO MOIST

SOIL SAMPLING INFORMATION

- ▣ STANDARD PENETRATION TEST
- ■ UNDISTURBED SAMPLE
- ⊠ DISTURBED SAMPLE
- □ NO SAMPLE RECOVERED

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

FIGURE B.4A

BORING OW-4
NASH ROAD SITE

WELL SCHEMATICS	SAMPLING: BLOW COUNT	SAMPLE NO. & TYPE	RUN NO	CORE REC	CORE RQD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
							65	GM	
							70		TOP OF BEDROCK 70.3' BEDROCK IS DOLOSTONE BORING TERMINATED AT A DEPTH OF 70.3' ON JUNE 13, 1984.

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

80 CORE LOSS ZONE

PERCENT CORE RECOVERY

82 CORE RQD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures-shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

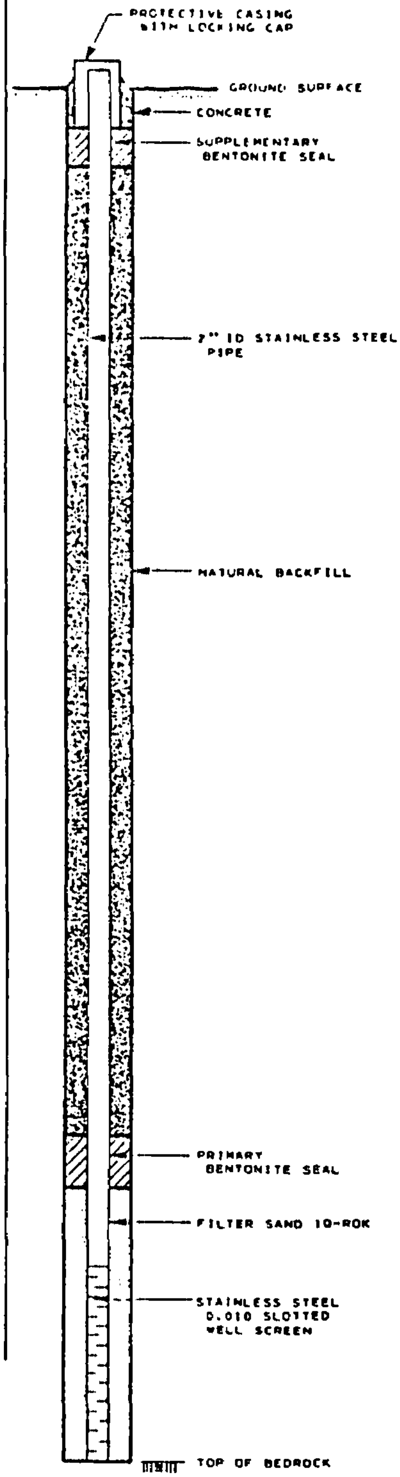
DAMES & MOORE

FIGURE B.4B

BORING OW-5
NASH ROAD SITE

WELL SCHEMATICS

OW-5



SAMPLING

BLOW COUNT	SAMPLE NO. & TYPE	RUN NO.	CORE REC.	CORE RQD	FRACTURES
17	1 ◘				
11/6"	2 ◘				
9/6"	3 ◘				
12	4				
29	5 ◘				
5	6 ◘				
6	7 ◘				
2	8 ◘				
2	9 ◘				
2	10 ◘				
2	11 ◘				
2	12 ◘				
39/4.5'	13 ◘				
50/4'	14 ◘				
50/2'	15 ◘				
60/4'	16 ◘				
65/4.5'	17 ◘				
	18 ◘				

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65

GRAPHIC LOG

DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: GRASSY, ATOP FILL

GRAY, WET MEDIUM TO FINE SAND, TRACE SILT

GRADES TO FINE SAND

GRAY AND BROWN MOIST LAYERED CLAY AND SILT, TRACE FINE SAND

SILT LAYERS APPROXIMATELY 1/2" THICK, OCCASIONAL SEAMS OF WET FINE TO MEDIUM SAND APPROXIMATELY 1/8" THICKNESS

GRAY WET SOFT LAYERED CLAY

RED CLAY LAYERS APPROXIMATELY 1/10" THICKNESS AT IRREGULAR INTERVALS

GRADES TO VERY SOFT

RED CLAY LAYERS APPROXIMATELY 1/10" THICKNESS AT 3/4" INTERVALS

BROWN WET LAYERED SILT AND COARSE TO FINE SAND

BROWN WET SILT AND FINE TO COARSE GRAVEL, SOME COARSE TO FINE SAND, TRACE CLAY (TILL)

GRADES TO MOIST

GRADES TO MORE GRAVEL, LESS SILT, DRY

GRADES TO WET SILT, SOME MEDIUM TO FINE GRAVEL, LITTLE WEATHERED BEDROCK FRAGMENTS AT 65.0'

SOIL SAMPLING INFORMATION

- ◘ STANDARD PENETRATION TEST
- ■ UNDISTURBED SAMPLE
- ⊠ DISTURBED SAMPLE
- □ NO SAMPLE RECOVERED

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

FIGURE B-5A

BORING OW-5
NASH ROAD SITE

WELL SCHEMATICS	SAMPLING: BLOW COUNT	SAMPLING: SAMPLE NO. & TYPE	SAMPLING: RUN NO.	SAMPLING: CORE REC	SAMPLING: CORE RQD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
							65	GM	
									TOP OF DOLOSTONE BEDROCK AT 69.0'
							70		BORING TERMINATED AT A DEPTH OF 70.0' ON JUNE 14, 1986.

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

- RC — CORE LOSS ZONE
- PERCENT CORE RECOVERY
- 82 — CORE RQD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

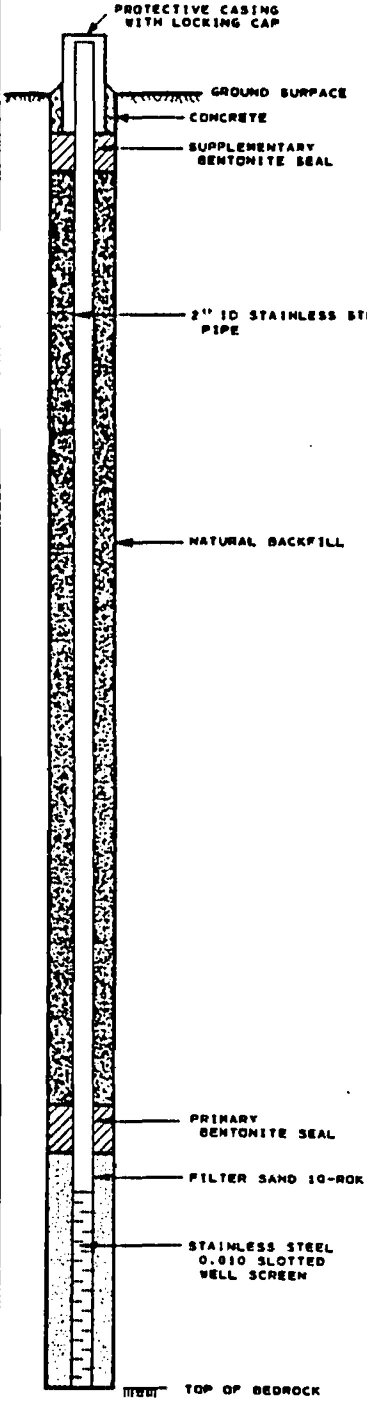
FIGURE B.5B

BORING OW-6

NASH ROAD SITE

WELL SCHEMATICS

OW-6

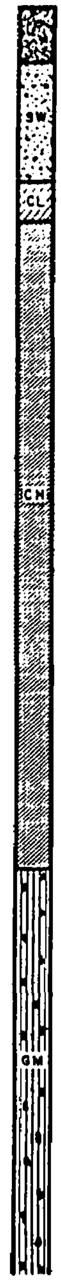


SAMPLING

BLOW COUNT	SAMPLE NO & TYPE	RUN NO	CORE REC	CORE RQD	FRACTURES
12	1				
31	2				
17	3				
41	4				
15	5				
4	6				
2	7				
2	8				
2	9				
2	10				
2	11				
39	12				
39	13				
63/5'	14				
55/5'	15				

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65

GRAPHIC LOG



DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: VERY MUDDY WITH STANDING WATER; MARSHY GRASS

MIXED SAND/WASTE FILL

GRAY WET MEDIUM TO FINE SAND, LITTLE SILT, SOME BLACK STAINS

GRAY AND BROWN MOIST STIFF LAYERED CLAY AND SILT.
SILT LAYERS APPROXIMATELY 1/4" THICK AT 1" INTERVALS

GRAY MOIST STIFF CLAY
GRADES TO MEDIUM CLAY AT 13.0'
GRADES TO SOFT AT 15.0'

GRADES TO WET
RED CLAY LAYERS APPROXIMATELY 1/2" THICK AT 1 1/2 TO 2" INTERVALS (DETECTABLE ORGANIC ODOR)

RED CLAY LAYERS APPROXIMATELY 2" THICK AT 1" INTERVALS AT 35.0'
TRACE SMALL BLACK MOTTLES OF ORGANIC MATERIAL IN RED LAYERS

BROWN DRY MEDIUM SILT, AND MEDIUM TO FINE GRAVEL, TRACE CLAY, TRACE FINE TO COARSE SAND (TILL)

GRADES TO MOIST

GRADES TO WET, MORE GRAVEL, LESS SILT

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

80 — CORE LOSS ZONE
PERCENT CORE RECOVERY

82 CORE RQD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures-shown at approximate angle to core axis
- Mineralized fracture c - calcite s - sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

FIGURE B.6A

BORING OW-6
NASH ROAD SITE

WELL SCHEMATICS	SAMPLING					FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
	BLOW COUNT	SAMPLE NO & TYPE	RUN NO	CORE REC	CORE RQD				
							65		TOP OF BEDROCK 66.0' BEDROCK IS DOLOSTONE BORING TERMINATED AT A DEPTH OF 66.0' ON JUNE 10, 1984.
							70		

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

80 — CORE LOSS ZONE
PERCENT CORE RECOVERY

82 CORE RQD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c - calcite s - sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

FIGURE B.6B

NEW PHASE II WELLS

(INSTALLED IN 1987-1988)

DRILLING CONTRACTOR:
Driller: Mike Logue - Rochester Drilling
Inspector: L. Dobson-ES
Rig Type: Mobile 61
Drilling Method: 4.25" I.D. HSA

ENGINEERING-SCIENCE DRILLING RECORD

PROJECT NAME: Nash Road
PROJECT NO.: SY012.19

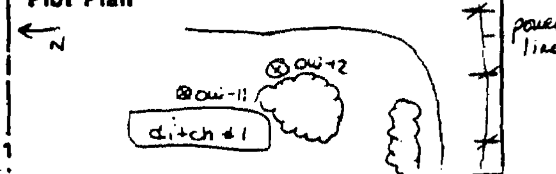
BORING NO. OW-11
Sheet 1 of 1
Location: E. of ditch #1 - (upgradient)

GROUND WATER OBSERVATIONS (from TOC)

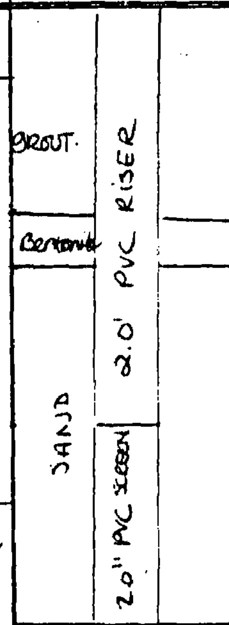
Water Level	4' 3.5"		
Time	1800		
Date	12/02/88		
Casing Depth	9.0'		

Weather: 15°F, Breezy / Partly Sunny
Date/Time Start: 1/28/88 1100
Date/Time Finish: 1/28/88 1500

Plot Plan



Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
1.5	0-2	S-1	7	Red-Gray Clay and Silt, Fill material (Frozen)		
	rec: 5"		1			
	SS		2			
			1			
3.6	2-4	S-2	2	Red-Gray Clay (smooth) trace silt fine sand dry		4
	rec.=10"		3			5
	SS		2			
			2			
41.7	4-6	S-3	2	Red-Gray Clay - lamination evident some sand/gravel moist		
	rec.=10"		1			7
	SS		1			
			2			
31.7	6-8	S-4	2	Red/Gray Clay and Gray/black Sand on bottom - odor		
	rec.=10"		2			
	SS		2			9.0'
			3			
23.7	8-10	S-5	3	Gray/Red Clay (laminated), Some fine sand - odor		
	rec=10"		2			
	SS		2			
			2			
	10-12		1	No Recovery 1st attempt Saturated gray clay / fill material (glass/garbage)		
	rec=6"		2			
	SS		3			
			3			
				boring terminated at 12.0' @ 12:00		



SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary
Red-Gray Clay with thin (<2.0") sand seams some fill

ENGINEERING-SCIENCE DRILLING RECORD

DRILLING CONTRACTOR:
ler: M. Weare - Rochester Drilling
ector: J. Dobson - ES
Type: Mobile 61
lling Method: 4.25" HSA

PROJECT NAME: NASH RD
PROJECT NO.: SY012.19

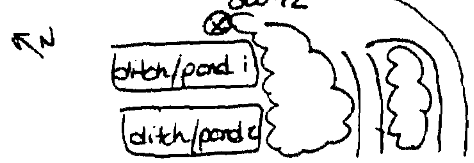
BORING NO. OW-12
Sheet 1 of 2
Location: E/NE of ditch/pond #1

GROUND WATER OBSERVATIONS

ater Level	11' 2.0"
Time	800
Date	2/02/88
sing Depth	34'

Weather: Cold - 10°F, Partly Sunny
Date/Time Start: 1/26/88 1330
Date/Time Finish: 1/27/88

Plot Plan



Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
53.5	0-2	S-1	3	Red/Gray Clay and fine sand, trace angular gravel (3mm) dry		auger cuttings read high 20's on photovac
	rec=14"		5			
	SS		5			
			7			
1.8	5-7	S-2	8	Fine red/brown sand with clay grading into smooth gray clay moist		
	rec.=24"		8			
	SS		12			
			21			
0.8	10-12	S-3	4	light brown clay (8.0") grading into smoother red/gray clay		Saturation @ 8.0' cuttings read 9.0 on photovac
	rec.=24"		5			
	SS		6			
			6			
0.9	15-17	S-4	3	Red-Gray Clay - smooth/moist trace of orange sand @ 15'		
	rec.=24"		2			
	SS		1			
			1			
0	20-22	S-5	3	Gray/Red Clay - smooth/moist	2.0" PVC RISER	
	rec=24"		1			
	SS		2			
			1			
0.1	22-24	S-6	3	Gray/Red Clay - some lamination smooth, high plasticity - Moist		
	rec=24"		3			
	SS		2			
			2		GROUT	
0.5	24-26	S-7	2	same as above - some very fine sand @ 26.0'		
	rec=24"		2			
	SS		1			25.5
			1			
–	26-28	S-8	2	Red/Gray Clay - saturated, smooth 1" v.fine sand @ 27.8'	BENTONITE	
	rec=24"		1			
	SS		2			27.5
			1		SAND	

SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

ENGINEERING-SCIENCE DRILLING RECORD

DRILLING CONTRACTOR: Rochester Drilling
Driller: M. Legare -
Inspector: L Dobson - ES
Rig Type: 4.25" HSA
Drilling Method: Mobile 61

PROJECT NAME: Nash Rd
PROJECT NO.: SY012.19

BORING NO.: OW-12
Sheet 2 of 2
Location

GROUND WATER OBSERVATIONS

Water Level		
Time		
Date		
Casing Depth		

Weather: Cold, 10°F partly cloudy
Date/Time Start: 1/26/88 1330
Date/Time Finish: 1/27/88 1230

Plot Plan

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0	28-30	S-9	1	Gray/brown clay with fine brown	riser	
	Rec=10"		2	sand / trace gravel		29.5
			2			
			2			
0.1	30-32	S-10	26	Stiff brown fine-medium sand	2"	
	rec.=20"		34	and rounded gravel (1mm-3mm)	PVC	
			34	Some clay - fairly dense	SAND SCREEN	
			32			
0.2	32-34	S-11	6	Same as above - higher clay		
	rec=24"		12	content		32.5
			28			
			19			
				boring terminated @ 34' @ 1230 1/27/88		

SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

ENGINEERING-SCIENCE DRILLING RECORD

DRILLING CONTRACTOR: Rochester Drilling Co.
...ler: M Legare/C. Reynolds
...ector: L. Dobson - Eng. Science
... Type: Mobile B61
...lling Method: HSA 4.25" I.D.

PROJECT NAME: Nash Road
PROJECT NO.: SY012.19

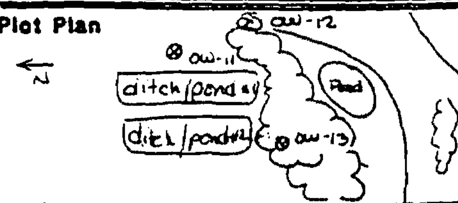
BORING NO.: OW-13
Sheet 1 of 1
Location: downgradient of ditch/pond

...ROUND WATER OBSERVATIONS

	from TOC		
...ter Level	3.00		
...ime	1800		
...ate	12/02/88		
...ing Depth	5'		

Weather: Sunny, 30°F
Date/Time Start: 1/29/88 1130
Date/Time Finish: 1/29/88 1200

Plot Plan



...otovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0	0-2	S-1	5	Top Soil - Roots/organic material & very fine sand, trace angular gravel	Cut; 2" PVC Riser	1
	rec.=6.0"		1		Bentonite	
	SS		3			2½
			1		Sand	
0.2	2-4	S-2	29	Orange/Grey m-c sand, well sorted Saturated.	3'; 2" PVC Screen	High blow count due to tree root
	rec.=6.0"		4			
	SS		10			
			12			5'
0	4-6	S-3	15	Orange/Brown m-c sand grading into stiff clay with silt, trace gravel		
	rec.=12"		15			
	SS		9			
			13			
				End of Boring 6.0' @ 1200		

...T - STANDARD PENETRATION TEST
...D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

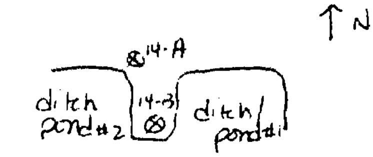
Soil Stratigraphy Summary

DRILLING CONTRACTOR:	ENGINEERING-SCIENCE DRILLING RECORD	BORING NO. 14-A (deep)
Driller: M. Legare - Roch. Drilling		Sheet 1 of 2
Inspector: L. Dobson - ES		Location
Rig Type: ATV	PROJECT NAME: Nash Rd	
Drilling Method: 4.25" I.D.	PROJECT NO.: SY012.19	

GROUND WATER OBSERVATIONS			
Water Level			
Time			
Date			
Casing Depth			

Weather: 10°F / snowing
Date/Time Start: 2/04/88 1645
Date/Time Finish: 2/08/88 1100

Plot Plan



Photovac Reading	Sample Depths	Sample I.D.	SPT	Field Identification of Material	Well Schematic	Comments
–	0-2			See 14-B drilling log for soil description from 0'-7'		3.58' stickup
–	5-7					No elevated photovac readings in auger cuttings
1.5	10-12	S-1	3	Gray / Red Clay and fine sand (stiff)		
	rec: 24"		3			
	SS		4			
			4			
0	15-17	S-2	1	Gray / Red Clay - layering evident smooth, moist, plastic.		
	rec: 24"		2			
	SS		2			
			1			
0	20-22	S-3	0*	same as above with trace of silt @ 20'	grout	* spoon went 2' under weight of rod.
	rec: 24"		0			
	SS		0			
			0			
0.1	25-27	S-4	1	Gray / Red Clay - smooth / moist		
	rec: 24'		2			
	SS		1			
			2			
	30-32	S-5	1	Red / Gray Clay - layering evident trace fine sand and gravel.	bentonite	30.5
			1			32.5
			1			
			1			
0	32-34		0*	Gray / Red Clay grading into fine sand & gravel w/clay @ 33'	sand; 2.0" PVC screen	33.5
			0			
			0			
			0			

SPT - STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

... DRILLING CONTRACTOR:
...iller: M. Legare - Rochdrill.
...pector: L. Dobson - ES
...g Type ATV
...rilling Method 4.25" I.D.

ENGINEERING-SCIENCE DRILLING RECORD

PROJECT NAME Nash Rd
PROJECT NO. SY012.19

BORING NO. 14-A (deep)
Sheet 2 of 2
Location

GROUND WATER OBSERVATIONS

Water Level			
Time			
Date			
...sing Depth			

Weather 10°F / snowing
Date/Time Start 2/04/88 1645
Date/Time Finish 2/05/88 1100

Plot Plan

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0	34-36		13	fine sand & gravel w/ clay grading into dense light gray silt w/ some gravel & med. sand.	SAND; 2" PVC SCREEN	
	SS		35			
			82			
			47			
	36-38		12	damp, gray-brown silt, sand, clay w/ angular to subangular pebbles.		34.5
	Rec.=2.0'		63			
	SS		70			
			91			
	38-40		104	Same as above		Auger refusal at 40'
	rec=0.5'		100/5"			
				boring terminated @ 40' 2/08/88		

SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR:
Driller: M. Lagare- Rochester Drilling
Inspector: L. Dobson- Eng. Sci.
Rig Type: Mobile B-61
Drilling Method: HSA 4.25" I.D.

ENGINEERING-SCIENCE
DRILLING RECORD

PROJECT NAME: Nash Rd
PROJECT NO.: SY012.19

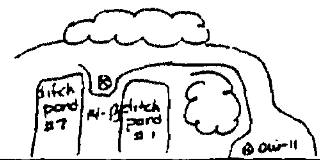
BORING NO. 14-B (shallow)
Sheet 1 of 1
Location: mound 15' out from edge of pond.

GROUND WATER OBSERVATIONS

Water Level		
Time		
Date		
Casing Depth		

Weather: 25°F, Partly Sunny
Date/Time Start: 2/04/88 1130
Date/Time Finish: 2/04/88 1230

Plot Plan



Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0.8	0-2	S-1	5	fine medium gray sand, trace angular gravel upper 6" frozen rest saturated	GROUT; 2" PVC riser	
	rec=10"		3			
	SS		2			1.5
			6			
					BENT. PELLETS	
0.6	2-4	S-2	10	v.f. gray sand with some clay grading into a m-c orange/brown sand (wet)		2.5'
	rec=12"		10			
	SS		20			3.0'
			19		2" PVC SCREEN	
0	4-6	S-3	13	med. brown/orange m-c sand (wet)	SAND	
	rec=12"		24			
	SS		26			
			23			
0.1	6-8	S-4	3	m-c brown sand trace rounded black gravel grading into stiff red/gray clay @ 7.0'		
			7			7.0'
			15			
			21			
-	8-10		19	No sample		
			~~20~~ 12			No return on 1st or 2nd attempts in SS.
			20			
			18	Boring terminated 10' @ 1230		

SPT - STANDARD PENETRATION TEST
D = DRY W = WASHED C = CORED
U = UNDISTURBED SS = SPLIT SPOON
P = PIT A = AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR:	ENGINEERING-SCIENCE DRILLING RECORD	
Driller: D. MILLER	PROJECT NAME NASH RD.	BORING NO. OW-15
Inspector: K. ISAKOWER	PROJECT NO. SY012.19	Sheet 1 of 3
Rig Type MOBILE 61		Location DOWNGRADIENT, ALONG NORTH BORDER OF SITE
Drilling Method 4¼" ID HSA		

GROUND WATER OBSERVATIONS

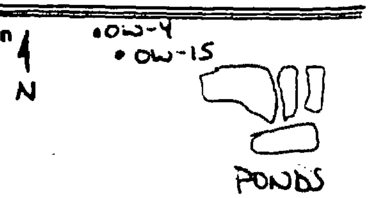
Water Level			
Time			
Date			
Casing Depth			

Weather

Date/Time Start 12/9/87 1415

Date/Time Finish 12/11/87 0945

Plot Plan



Photovac Reading	Sample Depths	Sample I.D.	SPT	Field Identification of Material	Comments
0.0	0-2	S-1	3	BROWN CLAY, SOME SILT	
			4		
			2		
			1		
					GREY WET CUTTINGS (W/TRASH) AT 3'
0.0	5-7	S-2	9	BROWN MOIST SAND	
	REC = 12		5		
			7	BROWN MOIST CLAY	
			11		
0.0	10-12	S-3	6	REDDISH-BROWN WET PLASTIC "STICKY" CLAY	
	REC = 22		18		
			14		
			15		
0.0	15-17	S-4	1		
	REC = 24		1		
			1		
			3		

WELL SCHEMATIC Not To Scale

CEMENT / BENTONITE GROUT

2" ID PVC RISER

36'

BENT. PEL.

38'

#4 Q-ROCK

40'

2" ID #10 SLOT PVC SCREEN

45'

SPT - STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED

U - UNDISTURBED SS - SPLIT SPOON

P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary SOIL AND NON SOIL FILL TO 3' OVER MOIST SAND TO 6' OVER LEAN CLAY TO 10' OVER FAT CLAY TO 39' OVER WATER BEARING SAND & CLAY WITH GRAVEL

DRILLING CONTRACTOR:
Driller: D. MILLER
Inspector: K. ISAKOWER
Rig Type: MOBILE 61
Drilling Method: 4 1/4 ID HSA

ENGINEERING-SCIENCE
DRILLING RECORD

PROJECT NAME: NASH RD.
PROJECT NO.

BORING NO. OW-15
Sheet 2 of 3
Location: DOWNGRADIENT, NORTH BORDER OF SITE

GROUND WATER OBSERVATIONS

Water Level		
Time		
Date		
Casing Depth		

Weather
Date/Time Start
Date/Time Finish

Plot Plan

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0.0	20-22	S-5	1*	REDDISH-BROWN WET PLASTIC "STICKY" CLAY		*SPOON PUSHED BY WEIGHT OF ROD
	REC=24		1*			
			1			
			1			
0.0	25-27	S-6	1*			
	REC=24		1*			
			1			
			2			
0.2	30-32	S-7	2			
	REC=24		2			
			1			
			3			
	NO SAMPLE					NO SAMPLE TAKEN AT 32- PLUG PUSHED DO[WN] WHILE AUGERI[NG]
0.0	34-36	S-8	1*			
	REC=24		1			
			1			
			1			
0.0	36-38	S-9	1*			
	REC=24		1*			
			1*			
			1*			
0.0	38-40	S-10	1*			
	REC=24		1*			
			2	REDDISH-BROWN CLAY AND SAND, SOME GRAVEL		
			2			

SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR:
Driller: D. MILLER
Inspector: K. ISAKOWER
Rig Type: MOBILE 61
Drilling Method: 4 1/4" ID HSA

ENGINEERING-SCIENCE DRILLING RECORD

PROJECT NAME: NASH RD
PROJECT NO.

BORING NO. OW-15
Sheet 3 of 3
Location: DOWNGRADIENT, NORTH BORDER OF SITE

GROUND WATER OBSERVATIONS

Water Level		
Time		
Date		
Casing Depth		

Weather
Date/Time Start
Date/Time Finish

Plot Plan

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0.0	40-42	S-11	1	REDDISH-BROWN CLAY AND SAND, SOME GRAVEL		SPOON PUSHED BY WEIGHT OF ROD.
	REC=24		1			
			14			
			16			
0.0	42-44	S-12	1*			
	REC=24		6			
			18			
			74			COARSE GRAVEL
0.0	44-46	S-13	45			
	REC=24		71/6"			
				Boring terminated at 45'		

SPT - STANDARD PENETRATION TEST
D - DRY W - WASHED C - CORED
U - UNDISTURBED SS - SPLIT SPOON
P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary

DRILLING CONTRACTOR:	ENGINEERING-SCIENCE DRILLING RECORD	BORING NO. OW-16
Driller: D. MILLER		Sheet 1 of 1
Inspector: K. ISAKOWER		Location WEST END OF SITE
Rig Type MOBILE 61	PROJECT NAME NASH RD.	
Drilling Method 4¼" ID HSA	PROJECT NO. 54012.19	

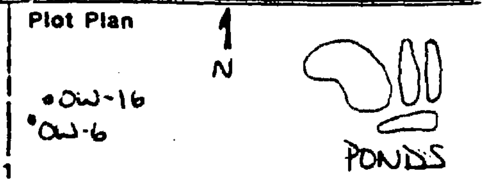
GROUND WATER OBSERVATIONS		
Water Level	8.5'	1.0'
Time	0919	0735
Date	12/8	12/10
Casing Depth	10.'	10.'

Weather

Date/Time Start 12/8/87 0750

Date/Time Finish 12/8/87 1230

Plot Plan



Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0.0	0-2	S-1	2	BROWN CLAY, SOME SAND, TRACE SILT	CEMENT/BENT. GROUT; 2" ID PVC RISER	
	REC± 12		3			
			4			
			15			
0.0	2-4	S-2	11			
	REC# 6		13		3'	
			4		BENT. PEL.	
			8		4'	
0.5	4-6	S-3	1			
	REC# 10		1		5'	
			2	WET BROWN & GREY SILT, SOME SAND, TRASH PRESENT.	#4 Q-ROCK; 2" ID #10 SLOT PVC SCREEN	
			6			
0.0	6-8	S-4	6			S-4: WOOD IN NOSE
	REC# 3		9			
			2			
			4			
0.0	8-10	S-5	7	MOIST BROWN CLAY, SOME SILT.		
	REC# 7		8			
			3			
			10		10'	
				Boring terminated at 10'		

SPT - STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED

U - UNDISTURBED SS - SPLIT SPOON

P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary SOIL FILL TO 4.5' OVER SOIL AND NON-SOIL FILL TO 8' SILTY CLAY.

GRAIN-SIZE ANALYSES RESULTS

R&R
INTERNATIONAL, INC.

PROJECT: ENGINEERING SCIENCE, NASH ROAD PROJECT NUMBER: 870833

MOISTURE AND GRADATION ANALYSIS

Gradation
(% Retained on Standard Sieve)

<table>
<tr><th>BORING NUMBER</th><th>DEPTH (FT.)</th><th>#4</th><th>#10</th><th>#40</th><th>#100</th><th>#200</th><th>SILT</th><th>CLAY</th><th>CLASSIFICATION</th></tr>
<tr><td>OW-11</td><td>2-4</td><td>14.8</td><td>4.5</td><td>3.4</td><td>5.9</td><td>7.0</td><td>60.2</td><td>4.2</td><td>ML</td></tr>
<tr><td>OW-12</td><td>5-7</td><td>0.3</td><td>0.5</td><td>0.5</td><td>3.2</td><td>2.5</td><td>69.8</td><td>23.2</td><td>ML</td></tr>
<tr><td></td><td>20-22</td><td>0.0</td><td>0.1</td><td>0.2</td><td>0.4</td><td>0.2</td><td>15.1</td><td>84.0</td><td>CL</td></tr>
<tr><td></td><td>30-32</td><td>10.2</td><td>6.0</td><td>8.1</td><td>8.8</td><td>9.6</td><td colspan="2">57.3</td><td>ML</td></tr>
<tr><td>OW-13</td><td>2-4</td><td>0.3</td><td>0.2</td><td>0.2</td><td>54.9</td><td>32.3</td><td colspan="2">12.1</td><td>SM</td></tr>
<tr><td></td><td>4-6</td><td>0.1</td><td>0.3</td><td>0.3</td><td>1.0</td><td>3.2</td><td colspan="2">95.1</td><td>ML</td></tr>
</table>

R&R INTERNATIONAL, INC.

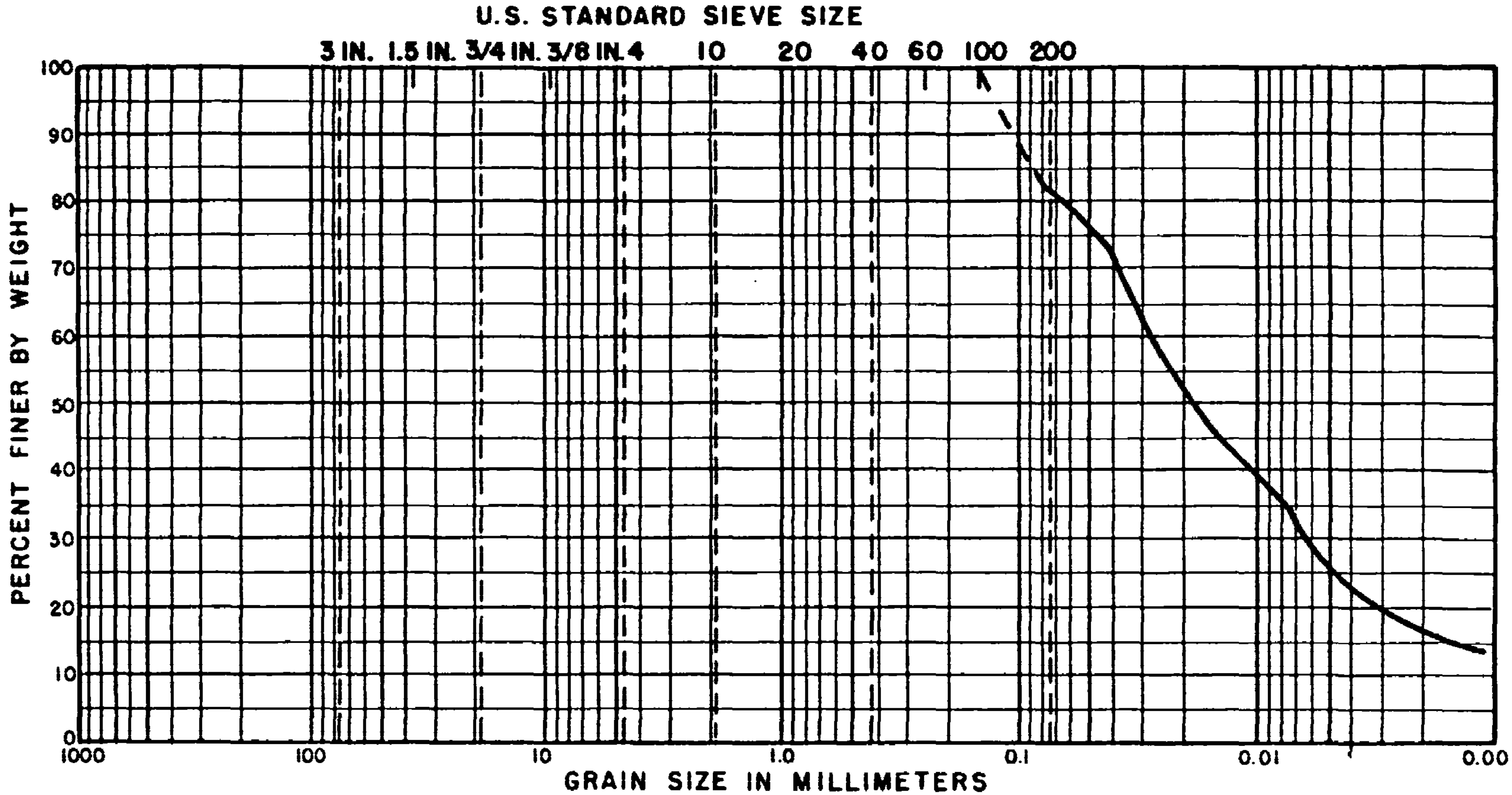
PROJECT: ENGINEERING SCIENCE, NASH ROAD   PROJECT NUMBER: 870833

MOISTURE AND GRADATION ANALYSIS

Gradation
(% Retained on Standard Sieve)

BORING NUMBER	DEPTH (FT.)	#4	#10	#40	#100	#200	SILT	CLAY	CLASSIFICATION
OW-14A	25-27	0.0	0.1	0.1	0.1	0.0	13.7	86.0	CL
	36-38	15.3	5.1	7.4	10.7	11.0	11.4	39.1	CL
OW-14B	4-6	0.0	0.0	0.9	46.0	27.5	23.2	2.4	SM
OW-15	15-17	0.0	0.2	0.2	0.1	0.1	16.4	83.0	CL
	42-44	18.3	5.6	7.5	8.4	8.9	39.2	12.1	ML
OW-16	2-4	0.1	2.3	18.6	31.8	14.2	26.2	6.8	SM
	6-8	26.9	5.1	4.3	8.6	8.6	25.3	21.2	GM

CHECKED BY______ DATE______ PLATE______ OF______



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

BORING	DEPTH	CLASSIFICATION		NAT. WC	LL	PL	PI	
OW-1	2.0' - 4.0'	ML	YELLOW SILT	15.2%				NASH ROAD SITE

Note: Black sand sized particles and froth
on top of solution in hydrometer;
soapy odor

Color: Yellow

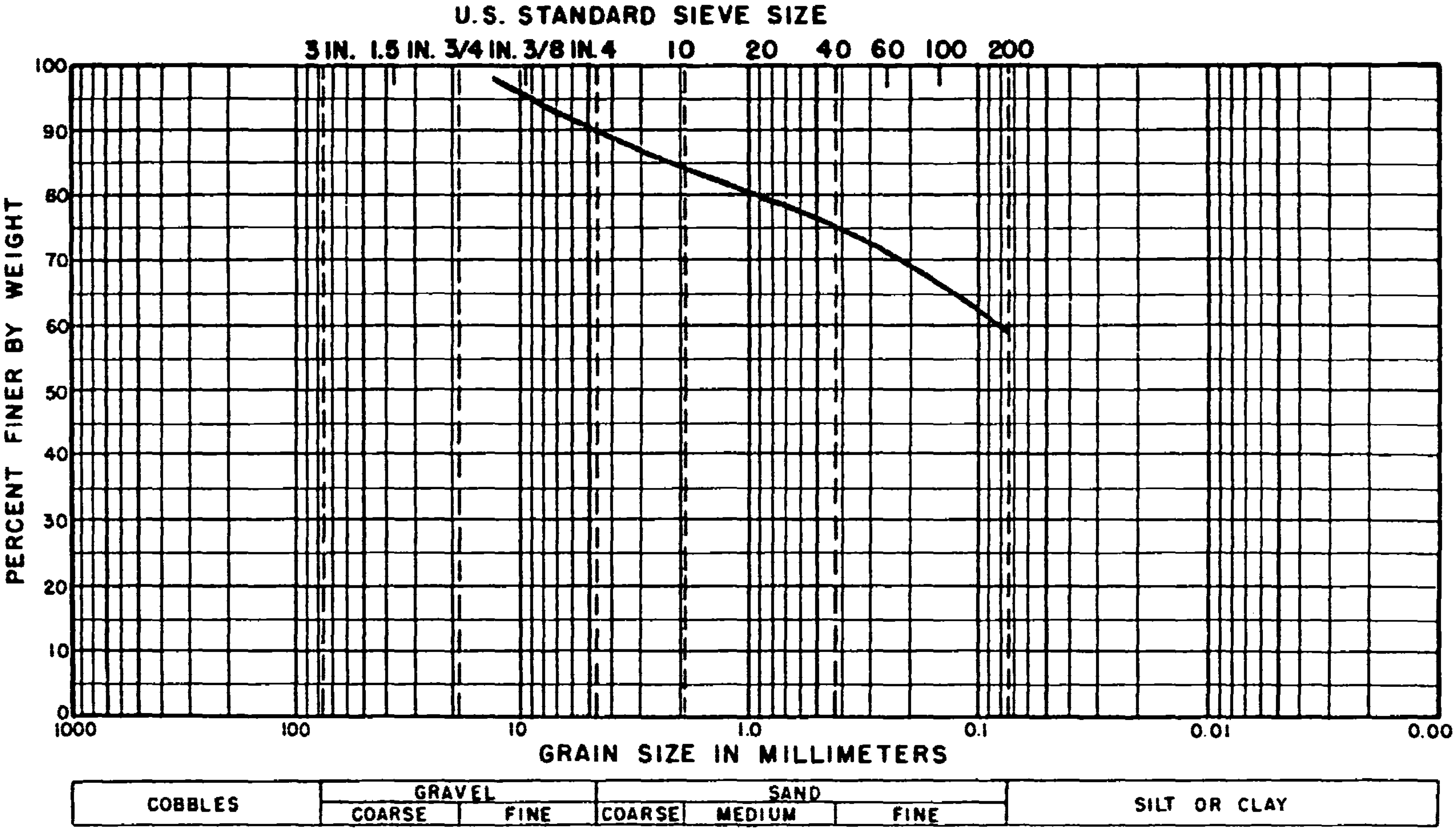
GRADATION CURVE

DAMES & MOORE

FIGURE B.7

D7.2 (REV. 4-62)

CHECKED BY ______ DATE ______ PLATE ______ OF ______



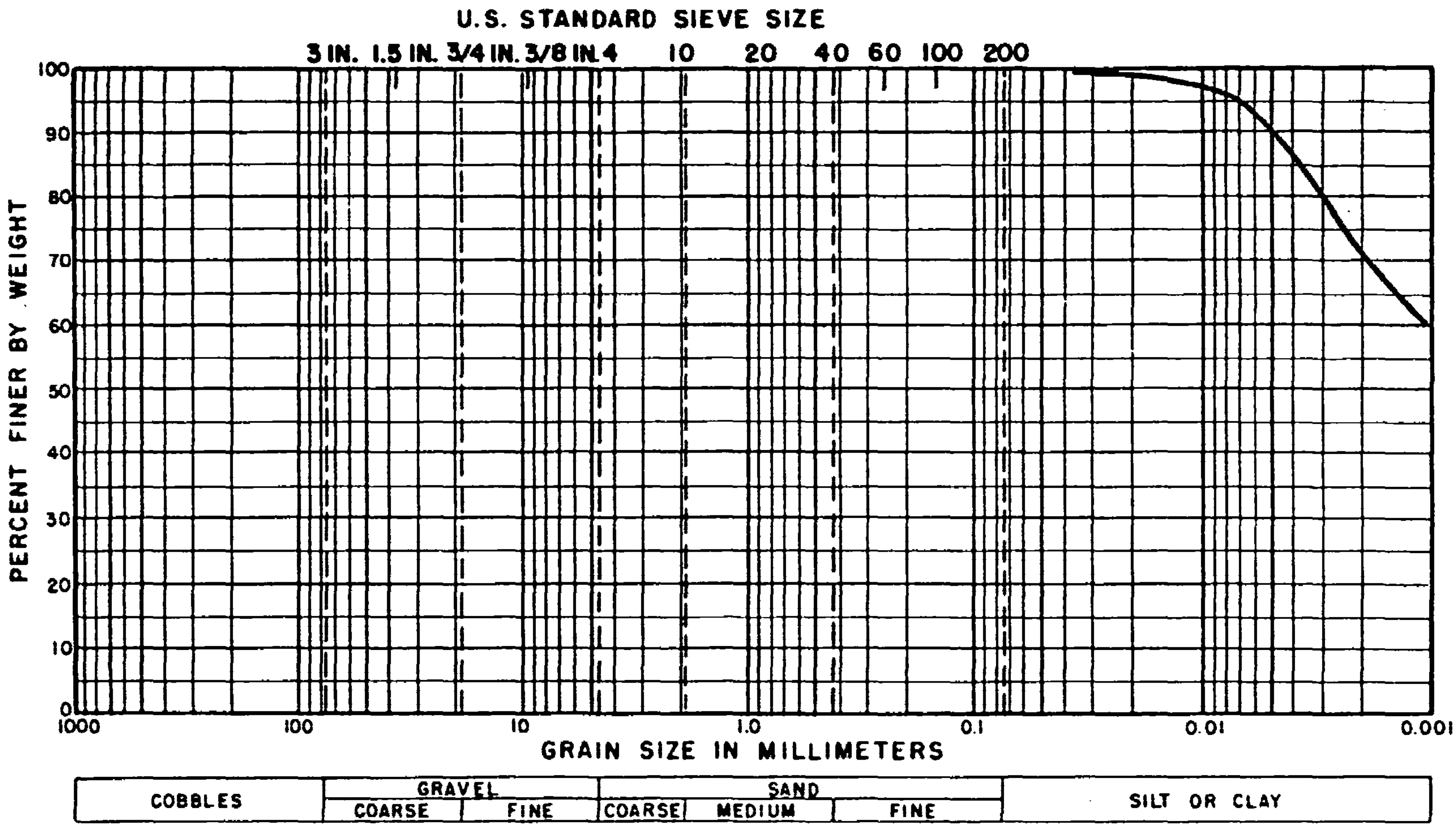
BORING	DEPTH	CLASSIFICATION		NAT. WC	LL	PL	PI	
OW1-B	50.0 - 51.5'	GM	PINKISH BROWN TILL					NASH ROAD SITE

DAMES & MOORE

GRADATION CURVE

FIGURE B.8

CHECKED BY ________ DATE ________ PLATE ________ OF ________



BORING	DEPTH	CLASSIFICATION		NAT. WC	LL	PL	PI	
OW-4	12.0' - 13.0'	CL	GRAY BROWN LACUSTRINE CLAY	33.2%				NASH ROAD SITE

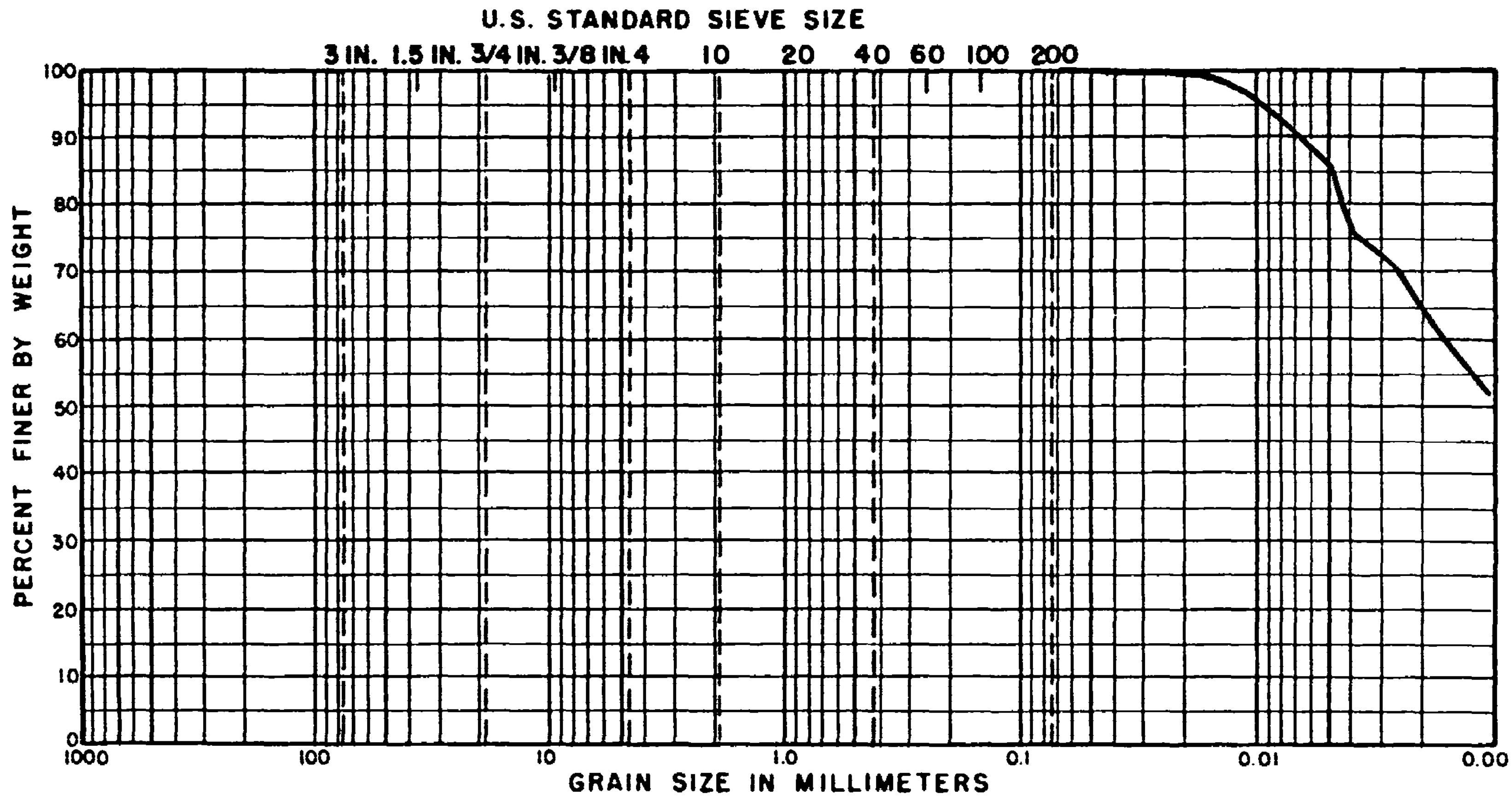
COLOR: GRAY - BROWN

GRADATION CURVE

DAMES & MOORE

FIGURE B.9

CHECKED BY ________ DATE ________ PLATE ________ OF ________



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

BORING	DEPTH	CLASSIFICATION		NAT. WC	LL	PL	PI	
OW-4	30.0' - 32.0'	CLT	BROWN LACUSTRINE CLAY	36.5%				NASH ROAD SITE

NOTE: Small bubbles throughout
solution in hydrometer

COLOR: Light brown

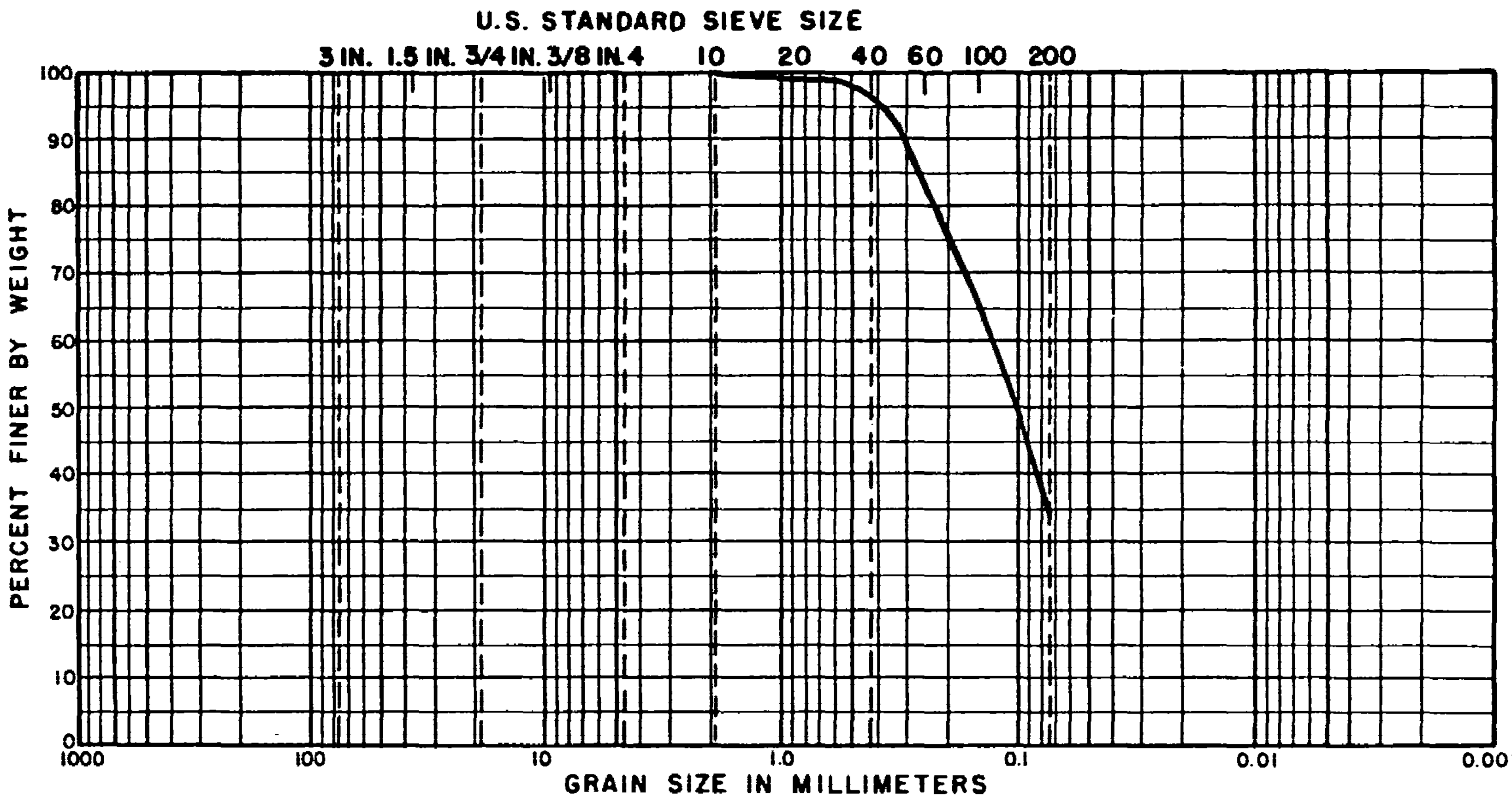
GRADATION CURVE

DAMES & MOORE

FIGURE B.10

CHECKED BY________ DATE________ PLATE________ OF________

57.2 (REV. 4-62)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

BORING	DEPTH	CLASSIFICATION		NAT. WC	LL	PL	PI	
OW-4	44.6 - 45.0'	SP	LOWER SAND UNIT					NASH ROAD SITE

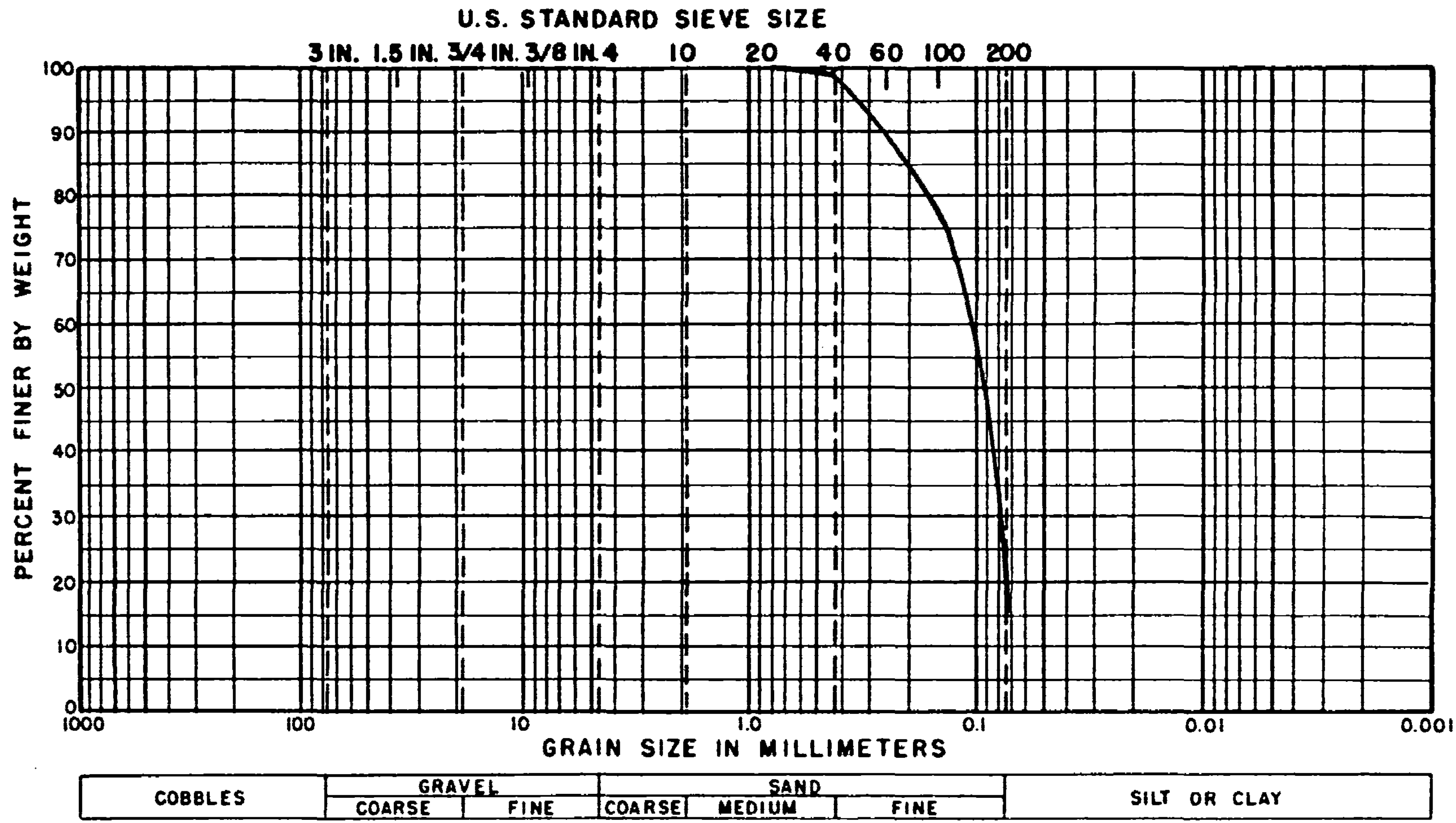
DAMES & MOORE

GRADATION CURVE

FIGURE B.11

CHECKED BY________ DATE________ PLATE________ OF________

7.2 (REV. 4-63)



BORING	DEPTH	CLASSIFICATION		NAT. WC	LL	PL	PI	
OW-5	5.0 - 7.0'	SW	UPPER SAND UNIT					NASH ROAD SITE

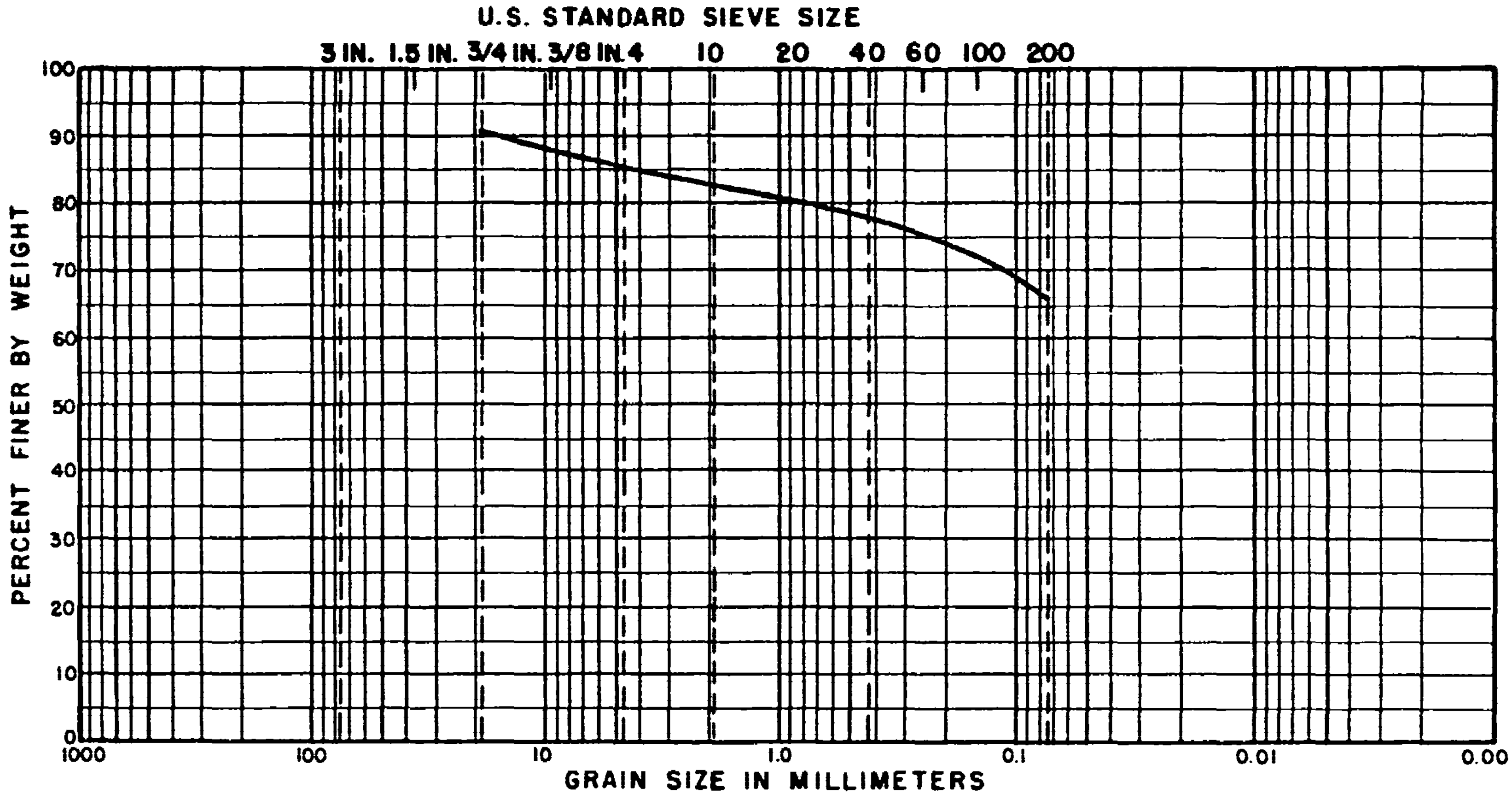
DAMES & MOORE

GRADATION CURVE

FIGURE B.12

757.2 (REV. 4-62)

CHECKED BY________ DATE________ PLATE______ OF________



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

BORING	DEPTH	CLASSIFICATION		NAT. WC	LL	PL	PI	
OW-6	60.0 - 60.5'	GM	PINKISH BROWN TILL					NASH ROAD SITE

DAMES & MOORE

GRADATION CURVE

FIGURE B.13

Summary

In-Situ Permeability

Well	Permeability cm/sec	
OW-1	4.37×10^{-4}	silt
OW-2	6.75×10^{-4}	silt and sand
OW-1B	8.43×10^{-7}	till/bedrock
OW-3	1.43×10^{-6}	wet zone in till
OW-4	7.88×10^{-7}	till/bedrock
OW-5	7.5×10^{-4}	till/bedrock
OW-6	6.8×10^{-4}	till/bedrock

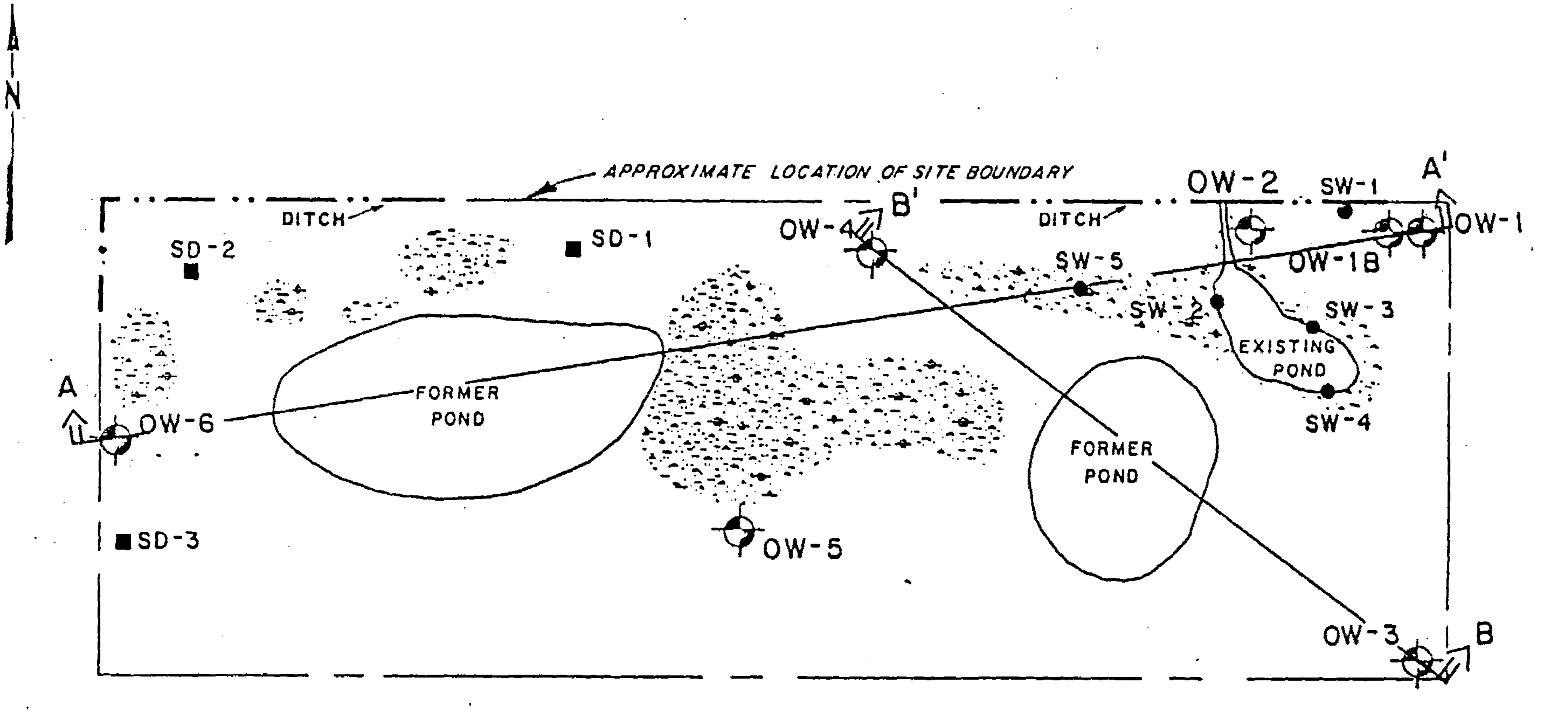
APPENDIX C

LABORATORY ANALYTICAL DATA

1985 PHASE II

ANALYTICAL RESULTS

BY D. Tomas DATE 8/3/84



EXPLANATION:

- ■ SEDIMENT SAMPLE
- ● SURFACE WATER SAMPLE
- ⌖ SAMPLING WELL (OW-1)

0 200 400 FEET
SCALE

NOTE: OSTERMAN WELL IS LOCATED APPROXIMATELY 1000 FEET WEST OF SITE.

PLOT PLAN
SHOWING CROSS SECTION LOCATIONS
NASH ROAD SITE

DAMES & MOORE

FIGURE III.1

11

TABLE IV.2

Analytical Results for Surface Water Samples

Parameter (ug/l)	SW-1	SW-2	SW-3	SW-4	SW-5
Methylene Chloride	11	<10	10	<10	<10
Chloroform	<10	<10	<10	<10	<10
Carbon Tetrachloride	<10	<10	<10	<10	<10
Benzene	<10	<10	<10	<10	<10
Toluene	<10	<10	<10	<10	<10
Chlorobenzene	<10	<10	<10	<10	<10
1,1,2,2,-trichloroethane	<10	<10	<10	<10	<10
Tetrachloroethane	<10	<10	<10	<10	<10
1,1,2,2,-tetrachloro-ethene	<10	<10	<10	<10	<10
Trichloroethene	<10	<10	<10	<10	<10
Trichlorobenzene (isomers)	<10	<10	<10	<10	<10
Dichlorobenzene (isomer)	<10	<10	<10	<10	<10
Hexchlorobutadiene	<10	<10	<10	<10	<10
pH	6.9	8.1	7.1	7.4	7.4
Total organic halogens	10.	5.	7.	7.	8.

(See Figure III.1 for location of sampling points)

TABLE IV.3
Analytical Results[1] for Sediment Samples

Parameter (ug/g)	Sample No. SD-1	SD-2	SD-3	Range of Concentration in non-contaminated soils[2]
Cadmium	0.30	< .2	< .2	<1
Chromium	6.8	6.3	5.6	trace to 250
Copper	5.7	8.2	10.0	2 to 100
Lead	18.	7.0	14.	2 to 200
Mercury	0.0084	0.064	0.010	(3)
Nickel	6.5	8.5	9.4	3 to 1,000
Zinc	40.	34.	48.	10 to 300
Cyanide	<1	<1	<1	(3)

(1) Samples were analyzed for volatile organics, acid and base/neutral extractable organics and pesticides/PCB's. All results for organics analysis were less than detection limits

(2) Source: Handbook on the Toxicology of Metals, Edited by L. Friberg, G. F. Nordberg and V. Vouck, 1979.

(3) No information for this parameter available in Friberg, Nordberg, and Vouk (1979)

(See Figure III.1 for location of sampling points)

1985 PHASE II INVESTIGATION

ANALYTICAL RESULTS (ORGANICS AND pH) FOR GROUND WATER SAMPLES

<u>SAMPLE IDENTIFICATION</u>

Parameter	OW-1	OW-1B	OW-2	OW-3	OW-4	OW-5	OW-6	PT-1	Osterman Well	Osterman Property	OST-1
Methylene Chloride (ug/l)	ND	ND	ND	ND	ND	ND	15	ND	ND	ND	14
Toluene (ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	<6.0	ND	ND
1,1,1,-trichloroethane (ug/l)	ND	<3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butylbenzylphthalate (ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33
Total Organic Halides (mg/l)	<0.02	<0.02	0.04	0.04	0.09	<0.02	0.12	--	0.04	--	--
pH	8.05	8.14	8.12	8.11	8.14	8.16	8.07	6.45	8.20	--	--

ND = Not Detected

APPENDIX C

LABORATORY ANALYTICAL DATA

GROUNDWATER

Results are listed in the following order for each sample number: volatile organics, semi-volatile organics, metals. Following the results for individual samples, the TOX (total organic halogens) and dioxin results are presented. Organic data qualifiers can be found at the bottom of each Form I, page 1 (volatile compounds). Inorganic data qualifiers are listed following this cover page.

DATA QUALIFIERS

PAGE 2

Lab Name: NANCO LABORATORIES, INC.

Lab Address: Robinson Lane, RD 6

Wappingers Falls, New York

DATE REPORTED: 2/3/88

VALUE - IF THE RESULT IS A VALUE GREATER THAN OR EQUAL TO THE INSTRUMENT DETECTION LIMIT BUT LESS THAN THE CONTRACT-REQUIRED DECTECTION LIMIT, THE VALUE IS REPORTED IN BRACKETS (i.e., [10]. THE ANALYTICAL METHOD USED IS INDICATED WITH P (FOR ICP), A (FOR FLAME AA) OR F (FOR FURNACE AA).

U - INDICATES ELEMENT WAS ANALYZED FOR BUT NOT DETECTED. REPORTED WITH THE INSTRUMENT DETECTION LIMIT VALUE (e.g., 10 U).

E - INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCE OF INTERFERENCE.

S - INDICATES A VALUE DETERMINED BY METHOD OF STANDARD ADDITION.

N - INDICATES SPIKE SAMPLE RECOVERY IS NOT WITHIN CONTROL LIMITS.

* - INDICATES DUPLICATE ANALYSIS IS NOT WITHIN CONTROL LIMITS.

+ - INDICATES THE CORRELATION COEFFICIENT FOR METHOD OF STANDARD ADDITION IS LESS THAN 0.995

M - INDICATES DUPLICATE INJECTION RESULTS EXCEEDED CONTROL LIMITS.

P - INDICATES ICP ANALYSIS

F - INDICATES FURNACE ANALYSIS

[] - INDICATES SAMPLE VALUE IS BETWEEN IDL AND CRDL

COMMENTS :

SAMPLE DATA

OW-11.19 2/18

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER
SY012.19/NASH RD OW-11.19 2/18

Laboratory Name:NANCO LABORATORY INC.
Lab File ID No: H0213
Sample Matrix: WATER
Data Release Authorized By: [illegible]

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/19/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/23/88
Date Analyzed: 02/23/88
Conc/Dil Factor: 75 pH: 6.3
Percent Moisture: N/A

CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	750.0 U
74-83-9	Bromomethane	750.0 U
75-01-4	Vinyl Chloride	750.0 U
-00-3	Chloroethane	750.0 U
5-09-2	Methylene Chloride	240.0 J
67-64-1	Acetone	2300.0
75-15-0	Carbon Disulfide	375.0 U
75-35-4	1,1-Dichloroethene	375.0 U
75-34-3	1,1-Dichloroethane	375.0 U
156-60-5	Trans-1,2-Dichloroethene	375.0 U
67-66-3	Chloroform	375.0 U
107-06-2	1,2-Dichloroethane	375.0 U
78-93-3	2-Butanone	750.0 U
71-55-6	1,1,1-Trichloroethane	67.0 J
56-23-5	Carbon Tetrachloride	375.0 U
108-05-4	Vinyl Acetate	750.0 U
75-27-4	Bromodichloromethane	375.0 U

CAS Number		ug/l or ug/Kg (Circle One)
79-34-5	1,1,2,2-Tetrachloroethane	375.0 U
78-87-5	1,2-Dichloropropane	375.0 U
10061-02-6	Trans-1,3-Dichloropropene	375.0 U
79-01-6	Trichloroethene	375.0 U
124-48-1	Dibromochloromethane	375.0 U
79-00-5	1,1,2-Trichloroethane	375.0 U
71-43-2	Benzene	4500.0
10061-01-5	cis-1,3-Dichloropropene	375.0 U
110-75-8	2-Chloroethylvinylether	750.0 U
75-25-2	Bromoform	375.0 U
591-78-6	2-Hexanone	750.0 U
108-10-1	4-Methyl-2-Pentanone	750.0 U
127-18-4	Tetrachloroethene	375.0 U
108-88-3	Toluene	14000.0
108-90-7	Chlorobenzene	590.0
100-41-4	Ethylbenzene	375.0 U
100-42-5	Styrene	375.0 U
	Total Xylenes	375.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE
If the result is a value greater than or equal to the detection limit, report the value.

U
Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U(e.g.10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected.The number is the minimum attainable detection limit for the sample.

J
Indicates an estimated value.This flag is used either when estimating a concentration for tentatively identified compounds where a 1 1 response is assumed or when the mass spectral data 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 (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

Aqueous

TABLE 2.0
30890-0092 Addendum
ENGINEERING SCIENCE
EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

Sample Identification

Dilution Factor	1.0	5,000.0	
Method Blank I.D.	>H2615	>H2615	
Compound	Method Blank	OW-11	Lower Limits of Detection with no Dilution
Phenol	U	U	10
bis(2-Chloroethyl)Ether	U	U	10
2-Chlorophenol	U	U	10
1,3-Dichlorobenzene	U	U	10
1,4-Dichlorobenzene	U	U	10
Benzyl Alcohol	U	770,000	10
1,2-Dichlorobenzene	U	U	10
2-Methylphenol	U	U	10
bis(2-chloroisopropyl)ether	U	U	10
4-Methylphenol	U	U	10
N-Nitroso-Di-n-propylamine	U	U	10
Hexachloroethane	U	U	10
Nitrobenzene	U	U	10
Isophorone	U	U	10
2-Nitrophenol	U	U	10
2,4-Dimethylphenol	U	U	10
Benzoic Acid	14J	2,100,000B	50
bis(-2-Chloroethoxy)Methane	U	U	10
2,4-Dichlorophenol	U	U	10
1,2,4-Trichlorobenzene	U	U	10
Naphthalene	U	U	10
4-Chloroaniline	U	U	10
Hexachlorobutadiene	U	U	10
4-Chloro-3-methylphenol	U	U	10
2-Methylnaphthalene	U	U	10
Hexachlorocyclopentadiene	U	U	10
2,4,6-Trichlorophenol	U	U	10
2,4,5-Trichlorophenol	U	U	50
2-Chloronaphthalene	U	U	10
2-Nitroaniline	U	U	50
Dimethyl Phthalate	U	U	10
Acenaphthylene	U	U	10
3-Nitroaniline	U	U	50

U, J, B - See Appendix for definition.

Note: Sample detection limit is determined by multiplying dilution factor by detection limit value with no dilution.

TABLE 2.00
30890-0092 Addendum
ENGINEERING SCIENCE
EPA TCL BASE/NEUTRAL/ACID COMPOUNDS

All results reported in ug/L.

Sample Identification

Compound	Method Blank	OW-11	Lower Limits of Detection with no Dilution
Dilution Factor	1.0	5,000.0	
Method Blank I.D.	>H2615	>H2615	
Acenaphthene	U	U	10
2,4-Dinitrophenol	U	U	50
4-Nitrophenol	U	U	50
Dibenzofuran	U	U	10
2,4-Dinitrotoluene	U	U	10
2,6-Dinitrotoluene	U	U	10
Diethylphthalate	U	U	10
4-Chlorophenyl-phenylether	U	U	10
Fluorene	U	U	10
4-Nitroaniline	U	U	50
4,6-Dinitro-2-methylphenol	U	U	50
N-Nitrosodiphenylamine	U	U	10
4-Bromophenyl-phenylether	U	U	10
Hexachlorobenzene	U	U	10
Pentachlorophenol	U	U	50
Phenanthrene	U	U	10
Anthracene	U	U	10
Di-n-Butylphthalate	0.6J	U	10
Fluoranthene	U	U	10
Pyrene	U	U	10
Butylbenzylphthalate	U	U	10
3,3'-Dichlorobenzidine	U	U	20
Benzo(a)Anthracene	U	U	10
Chrysene	U	U	10
bis(2-Ethylhexyl)Phthalate	2J	U	10
Di-n-Octyl Phthalate	0.8J	U	10
Benzo(b)fluoranthene	U	U	10
Benzo(k)fluoranthene	U	U	10
Benzo(a)pyrene	U	U	10
Indeno(1,2,3-cd)pyrene	U	U	10
Dibenzo(a,h)anthracene	U	U	10
Benzo(g,h,i)perylene	U	U	10

U, J - See Appendix for definition.

Note: Sample detection limit is determined by multiplying dilution factor by detection limit value with no dilution.

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
OW-11.19 2/18

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SYO12.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration ug/l or ug/Kg)
1	96479	TETRAHYDRO, 2-METHYL FURAN	VOA	14.80	2200.0 J
2	----	ISOMER METHYL-HEXADIENE	VOA	26.29	1800.0 J
3	----	ISOMER CHLOROMETHYL BENZENE	VOA	33.78	360.0 J
4	----	ISOMER CHLOROMETHYL BENZENE	VOA	35.56	2800.0 J
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6					
7					
8					
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FORM I, PART B

ORGANICS ANALYSIS DATA SHEET

(PAGE 4)

SAMPLE NUMBER

LABORATORY NAME :NANCO LABS.INC.

CASE NO: ENGINEERING SCIENCE

NASH ROAD

OW.11.19

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1	108907	CHLOROBENZENE	BN/A	6.67	200.0 J
2	928949	2-HEXEN-1-OL	BN/A	8.17	26000.0 J
3	-----	UNKNOWN	BN/A	8.52	1000.0 J
4	-----	UNKNOWN ISOMER OF METHYL CYCLOHEXANOL	BN/A	9.47	3200.0 J
5	-----	UNKNOWN CYCLIC ACID	BN/A	10.94	3600.0 J
6	-----	UNKNOWN	BN/A	13.48	650.0 J
7	-----	UNKNOWN ISOMER OF DIMETHYL PHENOL	BN/A	13.54	1000.0 J
8	-----	UNKNOWN ISOMER OF CHLORO BENZALDEHYDE	BN/A	13.72	3100.0 J
9	-----	UNKNOWN ISOMER OF BENZOIC ACID	BN/A	15.59	4100.0 J
10	-----	UNKNOWN ALCOHOL	BN/A	19.33	280.0 J
11	-----	UNKNOWN CYCLIC ACID	BN/A	19.58	330.0 J
12	-----	UNKNOWN ALCOHOL	BN/A	19.86	200.0 J
13	-----	CYCLOHEXANOL,2-PHENYL	BN/A	20.00	490.0 J
14	-----	UNKNOWN	BN/A	20.74	5600.0 J
15	-----	UNKNOWN CYCLIC ACID	BN/A	23.20	680.0 J
16	-----	UNKNOWN CYCLIC ACID	BN/A	23.93	1300.0 J
17	-----	UNKNOWN CYCLIC ACID	BN/A	24.15	1200.0 J
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26					

FORM I, PART B

INORGANIC ANALYSIS DATA SHEET

FORM I

SMPL NO.: DW-11.19 2/18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 2/19/88

Lab Sample ID: 88-EW 5657

Date Reported:

Location ID: SYO 12.19/NASH RD.

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM ______

MATRIX : WATER __X__ SOIL ______ SLUDGE _____OTHER ______

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1.	ALUMINUM	10200.0 PE		13.	MAGNESIUM	398000.0 PE	
2.	ANTIMONY	50.0 UP		14.	MANGANESE	12100.0 PE	
3.	ARSENIC	5.0 UF		15.	MERCURY	0.3 C.V.	
4.	BARIUM	550.0 P		16.	NICKEL	180.0 P	
5.	BERYLLIUM	1.0 UP		17.	POTASSIUM	25100.0 P	
6.	CADMIUM	5.0 UP		18.	SELENIUM	40.0 UF N	(1:10)
7.	CALCIUM	2380000.0 P	(1:50)	19.	SILVER	31.0 P	
8.	CHROMIUM	15.0 P		20.	SODIUM	165000.0 PE	
9.	COBALT	[34.0]P		21.	THALLIUM	4.0 UF N	
10.	COPPER	120.0 P		22.	VANADIUM	25.0 UP	
11.	IRON	34500.0 PE		23.	ZINC	540.0 P N E	
12.	LEAD	180.0 F	(1:10)		PERCENT SOLIDS (%)	NA	
	CYANIDE	NR					
	PHENOL	NR					

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that became light yellow after ICP yellow after furnace digestion procedures. Pb and Se were analyzed at a 1:10 dilution. Ca was analyzed at a 1:50 dilution.

D. Scott [signature]

LAB MANAGER

SAMPLE DATA

OW-12.19 2/17

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER
OW-12.19 2/18

SYO12.19/NASH RD

Laboratory Name:NANCO LABORATORY INC.
Lab File ID No: H0202
Sample Matrix: WATER
Data Release Authorized By: B.L. Wunsch

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/19/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/22/88
Date Analyzed: 02/22/88
Conc/Dil Factor: 1 pH: 8.5
Percent Moisture: N/A

CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	10.0 U
74-83-9	Bromomethane	10.0 U
75-01-4	Vinyl Chloride	10.0 U
·00-3	Chloroethane	10.0 U
/5-09-2	Methylene Chloride	21.0
67-64-1	Acetone	10.0 U
75-15-0	Carbon Disulfide	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U
67-66-3	Chloroform	5.0 U
107-06-2	1,2-Dichloroethane	5.0 U
78-93-3	2-Butanone	10.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U
108-05-4	Vinyl Acetate	10.0 U
75-27-4	Bromodichloromethane	5.0 U

CAS Number		ug/l or ug/Kg (Circle One)
79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	5.0 U
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE
If the result is a value greater than or equal to the detection limit, report the value.

U
Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U(e.g.10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected.The number is the minimum attainable detection limit for the sample.

J
Indicates an estimated value.This flag is used either when estimating a concentration for tentatively identified compounds where a 1 1 response is assumed or when the mass spectral data 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 (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

ORGANIC ANALYSIS DATA SHEET
(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

SAMPLE NO.

OW-12.19 2/17

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/19/88
Date Analyzed: 02/24/88
Conc/Dil Factor:------------> 1
Percent Moisture: N/A

GPC Cleanup: Yes____ No__X___
Separatory Funnel Extraction: Yes__X___
Continuous Liquid - Liquid Extraction: Yes___

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	10.0 U
111-44-4	bis(-2-Chloroethyl)Ether	10.0 U
95-57-8	2-Chlorophenol	10.0 U
541-73-1	1,3-Dichlorobenzene	10.0 U
106-46-7	1,4-Dichlorobenzene	10.0 U
100-51-6	Benzyl Alcohol	10.0 U
95-50-1	1,2-Dichlorobenzene	10.0 U
95-48-7	2-Methylphenol	10.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	10.0 U
106-44-5	4-Methylphenol	10.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	10.0 U
67-72-1	Hexachloroethane	10.0 U
98-95-3	Nitrobenzene	10.0 U
78-59-1	Isophorone	10.0 U
88-75-5	2-Nitrophenol	10.0 U
105-67-9	2,4-Dimethylphenol	10.0 U
65-85-0	Benzoic Acid	50.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	10.0 U
120-83-2	2,4-Dichlorophenol	10.0 U
120-82-1	1,2,4-Trichlorobenzene	10.0 U
91-20-3	Naphthalene	10.0 U
106-47-8	4-Chloroaniline	10.0 U
87-68-3	Hexachlorobutadiene	10.0 U
59-50-7	4-Chloro-3-Methylphenol	10.0 U
91-57-6	2-Methylnaphthalene	10.0 U
77-47-4	Hexachlorocyclopentadiene	10.0 U
88-06-2	2,4,6-Trichlorophenol	10.0 U
95-95-4	2,4,5-Trichlorophenol	50.0 U
91-58-7	2-Chloronaphthalene	10.0 U
88-74-4	2-Nitroaniline	50.0 U
131-11-3	Dimethyl Phthalate	10.0 U
208-96-8	Acenaphthylene	10.0 U
99-09-2	3-Nitroaniline	50.0 U
83-32-9	Acenaphthene	10.0 U
51-28-5	2,4-Dinitrophenol	50.0 U
100-02-7	4-Nitrophenol	50.0 U
132-64-9	Dibenzofuran	10.0 U
121-14-2	2,4-Dinitrotoluene	10.0 U
606-20-2	2,6-Dinitrotoluene	10.0 U
84-66-2	Diethylphthalate	10.0 U
7005-72-3	4-Chlorophenyl-phenylether	10.0 U
86-73-7	Fluorene	10.0 U
100-01-6	4-Nitroaniline	50.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	50.0 U
86-30-6	N-Nitrosodiphenylamine (1)	10.0 U
101-55-3	4-Bromophenyl-phenylether	10.0 U
118-74-1	Hexachlorobenzene	10.0 U
87-86-5	Pentachlorophenol	50.0 U
85-01-8	Phenanthrene	10.0 U
120-12-7	Anthracene	10.0 U
84-74-2	Di-n-Butylphthalate	10.0 U
206-44-0	Fluoranthene	10.0 U
129-00-0	Pyrene	10.0 U
85-68-7	Butylbenzylphthalate	10.0 U
91-94-1	3,3'-Dichlorobenzidine	20.0 U
56-55-3	Benzo(a)Anthracene	10.0 U
117-81-7	bis(2-Ethylhexyl)Phthalate	1600.0 B
218-01-9	Chrysene	10.0 U
117-84-0	Di-n-Octyl Phthalate	10.0 U
205-99-2	Benzo(b)Fluoranthene	10.0 U
207-08-9	Benzo(k)Fluoranthene	10.0 U
50-32-8	Benzo(a)Pyrene	10.0 U
193-39-5	Indeno(1,2,3-cd)Pyrene	10.0 U
53-70-3	Dibenz(a,h)Anthracene	10.0 U
191-24-2	Benzo(g,h,i)Perylene	10.0 U

(1) - Cannot be separated from diphenylamine

FORM I

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
OW-12.19 2/18

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration ug/l or ug/Kg)
1	----	UNKNOWN	VOA	8.43	8.0 JB
2	----	UNKNOWN	VOA	33.59	5.5 J
3	----	UNKNOWN	VOA	26.33	7.2 J
4					
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ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
OW-12.19 2/17

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1	----	NOT APPLICABLE	VOA	----	----
2					
3	127184	ETHENE,TETRACHLORO	BNA	6.05	110.0 J
4	----	UNKNOWN ISOMER OF BENZENE	BNA	7.86	17.0 J
5	----	UNKNOWN	BNA	8.35	55.0 JB
6	----	UNKNOWN	BNA	8.51	22.0 J
7	----	UNKNOWN	BNA	9.53	38.0 J
8	----	UNKNOWN	BNA	11.89	5.0 J
9	----	UNKNOWN	BNA	36.41	3.0 J
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0000004

INORGANIC ANALYSIS DATA SHEET

FORM I

SMPL NO.: OW-12.19 2/18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 2/19/88

Lab Sample ID: 88-EW 5651

Date Reported:

Location ID: SYO 12.19/NASH RD.

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM _____

MATRIX : WATER __X__ SOIL _____ SLUDGE _____ OTHER _____

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	50400.0 PE		13. MAGNESIUM	93200.0 PE	
2. ANTIMONY	50.0 UP		14. MANGANESE	2500.0 PE	
3. ARSENIC	13.5 F		15. MERCURY	0.2 U C.V.	
4. BARIUM	550.0 P		16. NICKEL	89.0 P	
5. BERYLLIUM	[4.0]P		17. POTASSIUM	14900.0 P	
6. CADMIUM	5.0 UP		18. SELENIUM	40.0 UFN	(1:10)
7. CALCIUM	290000.0 P		19. SILVER	10.0 UP	
8. CHROMIUM	79.0 P		20. SODIUM	55000.0 PE	
9. COBALT	[43.0]P		21. THALLIUM	4.0 UFN	
10. COPPER	130.0 P		22. VANADIUM	81.0 P	
11. IRON	80800.0 PE		23. ZINC	330.0 PNE	
12. LEAD	92.6 SF	(1:2)	PERCENT SOLIDS (%)	NA	
CYANIDE	NR				
PHENOL	NR				

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that became light yellow after ICP and colorless after furnace digestion procedures. Se was analyzed at a 1:10 dilution, and Pb was analyzed at a 1:2 dilution.

Deborah H Ca

LAB MANAGER

SAMPLE DATA

OW-13-19

ORGANICS ANALYSIS DATA SHEET
(PAGE 1).

SAMPLE NUMBER
OW-13.19

SY012.19/NASH RD

Laboratory Name:NANCO LABORATORY INC.
Lab File ID No:>A3846
Sample Matrix: WATER
Data Release Authorized By: P.J. Gunoch

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/18/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/20/88
Date Analyzed: 02/20/88
Conc/Dil Factor: 1 pH: 6.9
Percent Moisture: N/A

CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	10.0 U
74-83-9	Bromomethane	10.0 U
75-01-4	Vinyl Chloride	10.0 U
-00-3	Chloroethane	10.0 U
/5-09-2	Methylene Chloride	21.0 B
67-64-1	Acetone	26.0 B
75-15-0	Carbon Disulfide	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U
67-66-3	Chloroform	5.0 U
107-06-2	1,2-Dichloroethane	5.0 U
78-93-3	2-Butanone	10.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U
108-05-4	Vinyl Acetate	10.0 U
75-27-4	Bromodichloromethane	5.0 U

CAS Number		ug/l or ug/Kg (Circle One)
79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	5.0 U
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE
If the result is a value greater than or equal to the detection limit, report the value.

U
Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U(e.g.10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected.The number is the minimum attainable detection limit for the sample.

J
Indicates an estimated value.This flag is used either when estimating a concentration for tentatively identified compounds where a 1 1 response is assumed or when the mass spectral data 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 (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

ORGANIC ANALYSIS DATA SHEET
(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

SAMPLE NO.
OW-13.19

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/18/88
Date Analyzed: 02/22/88
Conc/Dil Factor:------------> 1
Percent Moisture: N/A

GPC Cleanup: Yes____ No_X__
Separatory Funnel Extraction: Yes_X__
Continuous Liquid - Liquid Extraction: Yes__

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	10.0 U
111-44-4	bis(-2-Chloroethyl)Ether	10.0 U
95-57-8	2-Chlorophenol	10.0 U
541-73-1	1,3-Dichlorobenzene	10.0 U
106-46-7	1,4-Dichlorobenzene	10.0 U
100-51-6	Benzyl Alcohol	10.0 U
95-50-1	1,2-Dichlorobenzene	10.0 U
95-48-7	2-Methylphenol	10.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	10.0 U
106-44-5	4-Methylphenol	10.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	10.0 U
67-72-1	Hexachloroethane	10.0 U
98-95-3	Nitrobenzene	10.0 U
78-59-1	Isophorone	10.0 U
88-75-5	2-Nitrophenol	10.0 U
105-67-9	2,4-Dimethylphenol	10.0 U
65-85-0	Benzoic Acid	50.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	10.0 U
120-83-2	2,4-Dichlorophenol	10.0 U
120-82-1	1,2,4-Trichlorobenzene	10.0 U
91-20-3	Naphthalene	10.0 U
106-47-8	4-Chloroaniline	10.0 U
87-68-3	Hexachlorobutadiene	10.0 U
59-50-7	4-Chloro-3-Methylphenol	10.0 U
91-57-6	2-Methylnaphthalene	10.0 U
77-47-4	Hexachlorocyclopentadiene	10.0 U
88-06-2	2,4,6-Trichlorophenol	10.0 U
95-95-4	2,4,5-Trichlorophenol	50.0 U
91-58-7	2-Chloronaphthalene	10.0 U
88-74-4	2-Nitroaniline	50.0 U
131-11-3	Dimethyl Phthalate	10.0 U
208-96-8	Acenaphthylene	10.0 U
99-09-2	3-Nitroaniline	50.0 U

CAS Number		ug/l or ug/Kg (Circle One)
83-32-9	Acenaphthene	10.0 U
51-28-5	2,4-Dinitrophenol	50.0 U
100-02-7	4-Nitrophenol	50.0 U
132-64-9	Dibenzofuran	10.0 U
121-14-2	2,4-Dinitrotoluene	10.0 U
606-20-2	2,6-Dinitrotoluene	10.0 U
84-66-2	Diethylphthalate	10.0 U
7005-72-3	4-Chlorophenyl-phenylether	10.0 U
86-73-7	Fluorene	10.0 U
100-01-6	4-Nitroaniline	50.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	50.0 U
86-30-6	N-Nitrosodiphenylamine (1)	10.0 U
101-55-3	4-Bromophenyl-phenylether	10.0 U
118-74-1	Hexachlorobenzene	10.0 U
87-86-5	Pentachlorophenol	50.0 U
85-01-8	Phenanthrene	10.0 U
120-12-7	Anthracene	10.0 U
84-74-2	Di-n-Butylphthalate	10.0 U
206-44-0	Fluoranthene	10.0 U
129-00-0	Pyrene	10.0 U
85-68-7	Butylbenzylphthalate	10.0 U
91-94-1	3,3'-Dichlorobenzidine	20.0 U
56-55-3	Benzo(a)Anthracene	10.0 U
117-81-7	bis(2-Ethylhexyl)Phthalate	230.0 B
218-01-9	Chrysene	10.0 U
117-84-0	Di-n-Octyl Phthalate	10.0 U
205-99-2	Benzo(b)Fluoranthene	10.0 U
207-08-9	Benzo(k)Fluoranthene	10.0 U
50-32-8	Benzo(a)Pyrene	10.0 U
193-39-5	Indeno(1,2,3-cd)Pyrene	10.0 U
53-70-3	Dibenz(a,h)Anthracene	10.0 U
191-24-2	Benzo(g,h,i)Perylene	10.0 U

(1) - Cannot be separated from diphenylamine

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
OW-13.19

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1	3779611	1,3,6-OCTATRIENE,3,7-DIMETHYL-,(E)	VOA	27.61	8.0 J
2	----	UNKNOWN	VOA	37.72	10.0 J
3	----	BENZENE ISOMER, METHYL (METHYLETHYL)	VOA	45.75	84 J
4					
5	95476	1,2-DIMETHYL BENZENE	BNA	5.17	58.0 JB
6	----	UNKNOWN ISOMER OF BENZENE	BNA	5.88	35.0 J
7	----	UNKNOWN ISOMER OF PYRAZOLE	BNA	6.98	14.0 JB
8	535773	1-METHYL-3-(1-METHYLETHYL)-BENZENE	BNA	9.56	31.0 J
9	21368683	BICYCLO[2.2.1]HEPTAN-2-ONE,1,7,7-TRIMETHYL	BNA	12.19	10.0 J
10					
11					
12					
13					
14					
15					
16					
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21					
22					
23					
24					
25					
26					

INORGANIC ANALYSIS DATA SHEET

FORM I

SMPL NO.: OW-13.19

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 2/18/88

Lab Sample ID: 88-EW 5635

Date Reported: 2/25/88

Location ID: SY012.19/NASH RD

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM _____

MATRIX : WATER __X__ SOIL _____ SLUDGE _____ OTHER _____

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1.	ALUMINUM	4550.0 PN*	13.	MAGNESIUM	72100.0 P
2.	ANTIMONY	311.0 PN	14.	MANGANESE	2350.0 P
3.	ARSENIC	10.4 F	15.	MERCURY	0.2 C.V.
4.	BARIUM	295.0 P	16.	NICKEL	250.0 PN
5.	BERYLLIUM	1.0 UP	17.	POTASSIUM	18500.0 PE
6.	CADMIUM	7.0 PN	18.	SELENIUM	4.0 UFN
7.	CALCIUM	299000.0 P	19.	SILVER	46.0 PN*
8.	CHROMIUM	32.0 P	20.	SODIUM	68200.0 P
9.	COBALT	68.0 P	21.	THALLIUM	4.0 UFN
10.	COPPER	2270.0 P*	22.	VANADIUM	25.0 UP
11.	IRON	34100.0 P	23.	ZINC	675.0 PN* E
12.	LEAD	81.6 SF*		PERCENT SOLIDS (%)	NA
	CYANIDE	NR			
	PHENOL	NR			

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a clear, colorless liquid that remained colorless after ICP and furnace digestion procedures. Lead was analyzed at a (1:10) dilution.

Deborah H. [signature]

LAB MANAGER

SAMPLE DATA

OW-1HA-L9 2/17

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER
OW-14A.19 2/18

SY012.19/NASH RD

Laboratory Name: NANCO LABORATORY INC.
Lab File ID No: H0227
Sample Matrix: WATER
Data Release Authorized By: P.J. Munsch

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/19/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/24/88
Date Analyzed: 02/24/88
Conc/Dil Factor: 1 pH: 12.3
Percent Moisture: N/A

S mber		ug/l or ug/Kg (Circle One)	CAS Number		ug/l or ug/Kg (Circle One)
..-87-3	Chloromethane	10.0 U	79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
..-83-9	Bromomethane	10.0 U	78-87-5	1,2-Dichloropropane	5.0 U
¹-4	Vinyl Chloride	10.0 U	10061-02-6	Trans-1,3-Dichloropropene	5.0 U
..J-3	Chloroethane	10.0 U	79-01-6	Trichloroethene	5.0 U
;-09-2	Methylene Chloride	5.0 U	124-48-1	Dibromochloromethane	5.0 U
'-64-1	Acetone	10.0 U	79-00-5	1,1,2-Trichloroethane	5.0 U
;-15-0	Carbon Disulfide	5.0 U	71-43-2	Benzene	5.0 U
;-35-4	1,1-Dichloroethene	5.0 U	10061-01-5	cis-1,3-Dichloropropene	5.0 U
;-34-3	1,1-Dichloroethane	5.0 U	110-75-8	2-Chloroethylvinylether	10.0 U
;6-60-5	Trans-1,2-Dichloroethene	5.0 U	75-25-2	Bromoform	5.0 U
'-66-3	Chloroform	5.0 U	591-78-6	2-Hexanone	10.0 U
)7-06-2	1,2-Dichloroethane	5.0 U	108-10-1	4-Methyl-2-Pentanone	10.0 U
3-93-3	2-Butanone	10.0 U	127-18-4	Tetrachloroethene	5.0 U
1-55-6	1,1,1-Trichloroethane	5.0 U	108-88-3	Toluene	5.0 U
5-23-5	Carbon Tetrachloride	5.0 U	108-90-7	Chlorobenzene	5.0 U
)8-05-4	Vinyl Acetate	10.0 U	100-41-4	Ethylbenzene	5.0 U
5-27-4	Bromodichloromethane	5.0 U	100-42-5	Styrene	5.0 U
				Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

.LUE
the result is a value greater than or equal to the detection mit, report the value.

ndicates compound was analyzed for but not detected. Report e minimum detection limit for the sample with the U(e.g.10U ased on necessary concentration dilution actions. (This is not cessarily the instrument detection limit.) The footnote should ead U-Compound was analyzed for but not detected.The number is e minimum attainable detection limit for the sample.

ndicates an estimated value.This flag is used either when stimating a concentration for tentatively identified compounds here a 1 1 response is assumed or when the mass spectral data ndicates the presence of a compound that meets the identification riteria but the result is less than the specified detection limit ut greater than zero (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

ORGANIC ANALYSIS DATA SHEET
(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

SAMPLE NO.
OW-14A.19 2/17

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/19/88
Date Analyzed: 02/24/88
Conc/Dil Factor:------------> 1
Percent Moisture: N/A

GPC Cleanup: Yes_____ No__X___
Separatory Funnel Extraction: Yes__X___
Continuous Liquid - Liquid Extraction: Yes___

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	10.0 U
111-44-4	bis(-2-Chloroethyl)Ether	10.0 U
95-57-8	2-Chlorophenol	10.0 U
541-73-1	1,3-Dichlorobenzene	10.0 U
106-46-7	1,4-Dichlorobenzene	10.0 U
100-51-6	Benzyl Alcohol	10.0 U
95-50-1	1,2-Dichlorobenzene	10.0 U
95-48-7	2-Methylphenol	10.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	10.0 U
106-44-5	4-Methylphenol	10.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	10.0 U
67-72-1	Hexachloroethane	10.0 U
98-95-3	Nitrobenzene	10.0 U
78-59-1	Isophorone	10.0 U
88-75-5	2-Nitrophenol	10.0 U
105-67-9	2,4-Dimethylphenol	10.0 U
65-85-0	Benzoic Acid	50.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	10.0 U
120-83-2	2,4-Dichlorophenol	10.0 U
120-82-1	1,2,4-Trichlorobenzene	10.0 U
91-20-3	Naphthalene	10.0 U
106-47-8	4-Chloroaniline	10.0 U
87-68-3	Hexachlorobutadiene	10.0 U
59-50-7	4-Chloro-3-Methylphenol	10.0 U
91-57-6	2-Methylnaphthalene	20.0
77-47-4	Hexachlorocyclopentadiene	10.0 U
88-06-2	2,4,6-Trichlorophenol	10.0 U
95-95-4	2,4,5-Trichlorophenol	50.0 U
91-58-7	2-Chloronaphthalene	10.0 U
88-74-4	2-Nitroaniline	50.0 U
131-11-3	Dimethyl Phthalate	10.0 U
208-96-8	Acenaphthylene	10.0 U
99-09-2	3-Nitroaniline	50.0 U

CAS Number		ug/l or ug/Kg (Circle One)
83-32-9	Acenaphthene	10.0 U
51-28-5	2,4-Dinitrophenol	50.0 U
100-02-7	4-Nitrophenol	50.0 U
132-64-9	Dibenzofuran	10.0 U
121-14-2	2,4-Dinitrotoluene	10.0 U
606-20-2	2,6-Dinitrotoluene	10.0 U
84-66-2	Diethylphthalate	10.0 U
7005-72-3	4-Chlorophenyl-phenylether	10.0 U
86-73-7	Fluorene	10.0 U
100-01-6	4-Nitroaniline	50.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	50.0 U
86-30-6	N-Nitrosodiphenylamine (1)	10.0 U
101-55-3	4-Bromophenyl-phenylether	10.0 U
118-74-1	Hexachlorobenzene	10.0 U
87-86-5	Pentachlorophenol	50.0 U
85-01-8	Phenanthrene	10.0 U
120-12-7	Anthracene	10.0 U
84-74-2	Di-n-Butylphthalate	10.0 U
206-44-0	Fluoranthene	10.0 U
129-00-0	Pyrene	10.0 U
85-68-7	Butylbenzylphthalate	10.0 U
91-94-1	3,3'-Dichlorobenzidine	20.0 U
56-55-3	Benzo(a)Anthracene	10.0 U
117-81-7	bis(2-Ethylhexyl)Phthalate	79.0 B
218-01-9	Chrysene	10.0 U
117-84-0	Di-n-Octyl Phthalate	10.0 U
205-99-2	Benzo(b)Fluoranthene	10.0 U
207-08-9	Benzo(k)Fluoranthene	10.0 U
50-32-8	Benzo(a)Pyrene	10.0 U
193-39-5	Indeno(1,2,3-cd)Pyrene	10.0 U
53-70-3	Dibenz(a,h)Anthracene	10.0 U
191-24-2	Benzo(g,h,i)Perylene	10.0 U

(1) - Cannot be separated from diphenylamine

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
OW-14A.19 2/17

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1	----	NOT APPLICABLE	VOA	----	----
2					
3	----	UNKNOWN ISOMER OF ETHENE	BNA	6.04	82.0 JB
4	----	UNKNOWN BENZENE	BNA	7.85	12.0 J
5	----	UNKNOWN CYCLIC COMPOUND	BNA	8.34	57.0 J
6	----	UNKNOWN	BNA	8.40	11.0 J
7	----	UNKNOWN CYCLIC COMPOUND	BNA	8.50	22.0 J
8	6930687	2-CYCLOHEXEN-1-ONE	BNA	9.52	43.0 J
9	----	UNKNOWN	BNA	11.89	9.0 J
10	----	UNKNOWN	BNA	12.12	38.0 J
11	----	UNKNOWN	BNA	15.67	106.0 J
12	----	UNKNOWN	BNA	19.03	35.0 J
13					
14					
15					
16					
17					
18					
19					
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21					
22					
23					
24					
25					
26					

FORM I, PART B

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
OW-14A.19 2/18

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1	----	UNKNOWN	VOA	6.58	5.4 J
2	----	UNKNOWN	VOA	8.43	7.4 J
3					
4					
5					
6					
7					
8					
9					
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25					
26					

FORM I, PART B

INORGANIC ANALYSIS DATA SHEET
FORM I

SMPL NO.: OW-14A.19 2/18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 2/19/88

Lab Sample ID: 88-EW 5649

Date Reported:

Location ID: SYO 12.19/NASH RD.

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM ______

MATRIX : WATER __X__ SOIL ______ SLUDGE _____OTHER ______

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	70300.0 PE		13. MAGNESIUM	181000.0 PE	
2. ANTIMONY	[53.0]P		14. MANGANESE	4500.0 PE	
3. ARSENIC	50.0 UF	(1:10)	15. MERCURY	0.2 U C.V.	
4. BARIUM	800.0 P		16. NICKEL	140.0 P	
5. BERYLLIUM	6.0 P		17. POTASSIUM	168000.0 P	
6. CADMIUM	5.0 UP		18. SELENIUM	40.0 UFN	(1:10)
7. CALCIUM	890000.0 P		19. SILVER	10.0 UP	
8. CHROMIUM	130.0 P		20. SODIUM	97600.0 PE	
9. COBALT	65.0 P		21. THALLIUM	4.0 UFN	
10. COPPER	180.0 P		22. VANADIUM	130.0 P	
11. IRON	131000.0 PE		23. ZINC	580.0 PNE	
12. LEAD	140.0 F	(1:10)	PERCENT SOLIDS (%)	NA	
CYANIDE	NR				
PHENOL	NR				

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that became light yellow after ICP and colorless after furnace digestion procedures. As, Pb, and Se were analyzed at a 1:10 dilution.

Desulto

LAB MANAGER

SAMPLE DATA

OW-14B.19 2/17

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER
OW-148.19 2/17

SY012.19/NASH RD

Laboratory Name: NANCO LABORATORY INC.
Lab File ID No: H0193
Sample Matrix: WATER
Data Release Authorized By: P.S.L. Hunach

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/19/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/22/88
Date Analyzed: 02/22/88
Conc/Dil Factor: 1 pH: 6.9
Percent Moisture: N/A

:AS :umber		ug/l or ug/Kg (Circle One)
'4-87-3	Chloromethane	10.0 U
'4-83-9	Bromomethane	10.0 U
'5-01-4	Vinyl Chloride	10.0 U
.0-3	Chloroethane	10.0 U
'5-09-2	Methylene Chloride	8.2
57-64-1	Acetone	10.0 U
'5-15-0	Carbon Disulfide	5.0 U
'5-35-4	1,1-Dichloroethene	5.0 U
'5-34-3	1,1-Dichloroethane	5.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U
57-66-3	Chloroform	5.0 U
107-06-2	1,2-Dichloroethane	5.0 U
'8-93-3	2-Butanone	10.0 U
'1-55-6	1,1,1-Trichloroethane	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U
108-05-4	Vinyl Acetate	10.0 U
'5-27-4	Bromodichloromethane	5.0 U

CAS Number		ug/l or ug/Kg (Circle One)
79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	5.0 U
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

ALUE
f the result is a value greater than or equal to the detection imit, report the value.

ndicates compound was analyzed for but not detected. Report he minimum detection limit for the sample with the U(e.g.10U ased on necessary concentration dilution actions. (This is not ecessarily the instrument detection limit.) The footnote should ead U-Compound was analyzed for but not detected.The number is he minimum attainable detection limit for the sample.

ndicates an estimated value.This flag is used either when stimating a concentration for tentatively identified compounds here a 1 1 response is assumed or when the mass spectral data ndicates the presence of a compound that meets the identification riteria but the result is less than the specified detection limit ut greater than zero (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

ORGANIC ANALYSIS DATA SHEET

LABORATORY NAME: NANCO LABS. INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

SAMPLE NO.
OW-148.19 2/17

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/19/88
Date Analyzed: 02/26/88
Conc/Dil Factor:------------> 1
Percent Moisture: N/A

GPC Cleanup: Yes____ No_X___
Separatory Funnel Extraction: Yes_X___
Continuous Liquid - Liquid Extraction: Yes___

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	10.0 U
111-44-4	bis(-2-Chloroethyl)Ether	10.0 U
95-57-8	2-Chlorophenol	10.0 U
541-73-1	1,3-Dichlorobenzene	10.0 U
106-46-7	1,4-Dichlorobenzene	10.0 U
100-51-6	Benzyl Alcohol	10.0 U
95-50-1	1,2-Dichlorobenzene	10.0 U
95-48-7	2-Methylphenol	10.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	10.0 U
106-44-5	4-Methylphenol	10.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	10.0 U
67-72-1	Hexachloroethane	10.0 U
98-95-3	Nitrobenzene	10.0 U
78-59-1	Isophorone	10.0 U
88-75-5	2-Nitrophenol	10.0 U
105-67-9	2,4-Dimethylphenol	10.0 U
65-85-0	Benzoic Acid	50.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	10.0 U
120-83-2	2,4-Dichlorophenol	10.0 U
120-82-1	1,2,4-Trichlorobenzene	10.0 U
91-20-3	Naphthalene	10.0 U
106-47-8	4-Chloroaniline	10.0 U
87-68-3	Hexachlorobutadiene	10.0 U
59-50-7	4-Chloro-3-Methylphenol	10.0 U
91-57-6	2-Methylnaphthalene	10.0 U
77-47-4	Hexachlorocyclopentadiene	10.0 U
88-06-2	2,4,6-Trichlorophenol	10.0 U
95-95-4	2,4,5-Trichlorophenol	50.0 U
91-58-7	2-Chloronaphthalene	10.0 U
88-74-4	2-Nitroaniline	50.0 U
131-11-3	Dimethyl Phthalate	10.0 U
208-96-8	Acenaphthylene	10.0 U
99-09-2	3-Nitroaniline	50.0 U
83-32-9	Acenaphthene	10.0 U
51-28-5	2,4-Dinitrophenol	50.0 U
100-02-7	4-Nitrophenol	50.0 U
132-64-9	Dibenzofuran	10.0 U
121-14-2	2,4-Dinitrotoluene	10.0 U
606-20-2	2,6-Dinitrotoluene	10.0 U
84-66-2	Diethylphthalate	10.0 U
7005-72-3	4-Chlorophenyl-phenylether	10.0 U
86-73-7	Fluorene	10.0 U
100-01-6	4-Nitroaniline	50.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	50.0 U
86-30-6	N-Nitrosodiphenylamine (1)	10.0 U
101-55-3	4-Bromophenyl-phenylether	10.0 U
118-74-1	Hexachlorobenzene	10.0 U
87-86-5	Pentachlorophenol	50.0 U
85-01-8	Phenanthrene	10.0 U
120-12-7	Anthracene	10.0 U
84-74-2	Di-n-Butylphthalate	10.0 U
206-44-0	Fluoranthene	10.0 U
129-00-0	Pyrene	10.0 U
85-68-7	Butylbenzylphthalate	10.0 U
91-94-1	3,3'-Dichlorobenzidine	20.0 U
56-55-3	Benzo(a)Anthracene	10.0 U
117-81-7	bis(2-Ethylhexyl)Phthalate	720.0 B
218-01-9	Chrysene	10.0 U
117-84-0	Di-n-Octyl Phthalate	10.0 U
205-99-2	Benzo(b)Fluoranthene	10.0 U
207-08-9	Benzo(k)Fluoranthene	10.0 U
50-32-8	Benzo(a)Pyrene	10.0 U
193-39-5	Indeno(1,2,3-cd)Pyrene	10.0 U
53-70-3	Dibenz(a,h)Anthracene	10.0 U
191-24-2	Benzo(g,h,i)Perylene	10.0 U

(1) - Cannot be separated from diphenylamine

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
OW-148.19 2/17

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1	----	NONE FOUND	VOA	----	----
2					
3	----	UNKNOWN SUBSTITUTE OF TETRACHLORO ETHENE	BNA	5.94	120.0 J
4	----	UNKNOWN ISOMER OF DIMETHYL BENZENE	BNA	7.75	19.0 J
5	----	UNKNOWN	BNA	8.24	25.0 J
6	----	UNKNOWN	BNA	8.40	24.0 J
7	----	UNKNOWN	BNA	9.07	32.0 J
8	----	UNKNOWN	BNA	9.44	44.0 J
9	----	UNKNOWN	BNA	36.28	38.0 J
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

INORGANIC ANALYSIS DATA SHEET
FORM I

SMPL NO.: OW-148.19 2/17

Lab Name : NANCO LABORATORIES, INC.   Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A   Lab Receipt Date : 2/19/88

Lab Sample ID: 88-EW 5652   Date Reported:

Location ID: SYO 12.19/NASH RD.

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM ______

MATRIX : WATER __X__ SOIL ______ SLUDGE _____OTHER ______

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1.	ALUMINUM	4900.0 PE	13.	MAGNESIUM	33300.0 PE
2.	ANTIMONY	50.0 UP	14.	MANGANESE	1200.0 PE
3.	ARSENIC	6.3 F	15.	MERCURY	0.2 U C.V.
4.	BARIUM	[76.0]P	16.	NICKEL	25.0 UP
5.	BERYLLIUM	1.0 UP	17.	POTASSIUM	1500.0 UP
6.	CADMIUM	5.0 UP	18.	SELENIUM	4.0 UF N
7.	CALCIUM	100000.0 P	19.	SILVER	10.0 UP
8.	CHROMIUM	8.0 UP	20.	SODIUM	21900.0 PE
9.	COBALT	15.0 UP	21.	THALLIUM	4.0 UFN
10.	COPPER	[24.0]P	22.	VANADIUM	25.0 UP
11.	IRON	9800.0 PE	23.	ZINC	140.0 PNE
12.	LEAD	28.4 SF (1:2)		PERCENT SOLIDS (%)	NA
	CYANIDE	NR			
	PHENOL	NR			

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a tan liquid that became colorless after ICP and and furnace digestion procedures. Pb was analyzed at a 1:~~10~~ 2 dilution.

Deborah H[illegible]

LAB MANAGER

SAMPLE DATA

OW-15·19 2/18

ORGANICS ANALYSIS DATA SHEET

(PAGE 1)

SAMPLE NUMBER
OW-15.19 2/18

SYO12.19/NASH RD

Laboratory Name:NANCO LABORATORY INC.
Lab File ID No: H0194
Sample Matrix: WATER
Data Release Authorized By: [signature]

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/19/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/22/88
Date Analyzed: 02/22/88
Conc/Dil Factor: 1 pH: 7.8
Percent Moisture: N/A

CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	10.0 U
74-83-9	Bromomethane	10.0 U
75-01-4	Vinyl Chloride	10.0 U
-00-3	Chloroethane	10.0 U
75-09-2	Methylene Chloride	6.5
67-64-1	Acetone	10.0 U
75-15-0	Carbon Disulfide	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U
67-66-3	Chloroform	5.0 U
107-06-2	1,2-Dichloroethane	5.0 U
78-93-3	2-Butanone	10.0 U
71-55-6	1,1,1-Trichloroethane	9.4
56-23-5	Carbon Tetrachloride	5.0 U
108-05-4	Vinyl Acetate	10.0 U
75-27-4	Bromodichloromethane	5.0 U

CAS Number		ug/l or ug/Kg (Circle One)
79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	5.0 U
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE
If the result is a value greater than or equal to the detection limit, report the value.

U
Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U(e.g.10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected.The number is the minimum attainable detection limit for the sample.

J
Indicates an estimated value.This flag is used either when estimating a concentration for tentatively identified compounds where a 1 1 response is assumed or when the mass spectral data 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 (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

ORGANIC ANALYSIS DATA SHEET
(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

SAMPLE NO.

OW-15.19 2/18

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/19/88
Date Analyzed: 02/24/88
Conc/Dil Factor:------------> 1
Percent Moisture: N/A

GPC Cleanup: Yes____ No__X___
Separatory Funnel Extraction: Yes__X___
Continuous Liquid - Liquid Extraction: Yes___

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	10.0 U
111-44-4	bis(-2-Chloroethyl)Ether	10.0 U
95-57-8	2-Chlorophenol	10.0 U
541-73-1	1,3-Dichlorobenzene	10.0 U
106-46-7	1,4-Dichlorobenzene	10.0 U
100-51-6	Benzyl Alcohol	10.0 U
95-50-1	1,2-Dichlorobenzene	10.0 U
95-48-7	2-Methylphenol	10.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	10.0 U
106-44-5	4-Methylphenol	10.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	10.0 U
67-72-1	Hexachloroethane	10.0 U
98-95-3	Nitrobenzene	10.0 U
78-59-1	Isophorone	10.0 U
88-75-5	2-Nitrophenol	10.0 U
105-67-9	2,4-Dimethylphenol	10.0 U
65-85-0	Benzoic Acid	50.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	10.0 U
120-83-2	2,4-Dichlorophenol	10.0 U
120-82-1	1,2,4-Trichlorobenzene	10.0 U
91-20-3	Naphthalene	10.0 U
106-47-8	4-Chloroaniline	10.0 U
87-68-3	Hexachlorobutadiene	10.0 U
59-50-7	4-Chloro-3-Methylphenol	10.0 U
91-57-6	2-Methylnaphthalene	10.0 U
77-47-4	Hexachlorocyclopentadiene	10.0 U
88-06-2	2,4,6-Trichlorophenol	10.0 U
95-95-4	2,4,5-Trichlorophenol	50.0 U
91-58-7	2-Chloronaphthalene	10.0 U
88-74-4	2-Nitroaniline	50.0 U
131-11-3	Dimethyl Phthalate	10.0 U
208-96-8	Acenaphthylene	10.0 U
99-09-2	3-Nitroaniline	50.0 U

CAS Number		ug/l or ug/Kg (Circle One)
83-32-9	Acenaphthene	10.0 U
51-28-5	2,4-Dinitrophenol	50.0 U
100-02-7	4-Nitrophenol	50.0 U
132-64-9	Dibenzofuran	10.0 U
121-14-2	2,4-Dinitrotoluene	10.0 U
606-20-2	2,6-Dinitrotoluene	10.0 U
84-66-2	Diethylphthalate	10.0 U
7005-72-3	4-Chlorophenyl-phenylether	10.0 U
86-73-7	Fluorene	10.0 U
100-01-6	4-Nitroaniline	50.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	50.0 U
86-30-6	N-Nitrosodiphenylamine (1)	10.0 U
101-55-3	4-Bromophenyl-phenylether	10.0 U
118-74-1	Hexachlorobenzene	10.0 U
87-86-5	Pentachlorophenol	50.0 U
85-01-8	Phenanthrene	10.0 U
120-12-7	Anthracene	10.0 U
84-74-2	Di-n-Butylphthalate	10.0 U
206-44-0	Fluoranthene	10.0 U
129-00-0	Pyrene	10.0 U
85-68-7	Butylbenzylphthalate	10.0 U
91-94-1	3,3'-Dichlorobenzidine	20.0 U
56-55-3	Benzo(a)Anthracene	10.0 U
117-81-7	bis(2-Ethylhexyl)Phthalate	790.0 B
218-01-9	Chrysene	10.0 U
117-84-0	Di-n-Octyl Phthalate	10.0 U
205-99-2	Benzo(b)Fluoranthene	10.0 U
207-08-9	Benzo(k)Fluoranthene	10.0 U
50-32-8	Benzo(a)Pyrene	10.0 U
193-39-5	Indeno(1,2,3-cd)Pyrene	10.0 U
53-70-3	Dibenz(a,h)Anthracene	10.0 U
191-24-2	Benzo(g,h,i)Perylene	10.0 U

(1) - Cannot be separated from diphenylamine

FORM I

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
OW-15.19 2/18

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/L or ug/Kg)
1	----	UNKNOWN ALKENE	VOA	35.36	7.0 J
2					
3	----	UNKNOWN ISOMER OF ETHENE	BNA	6.05	110.0 JB
4	----	UNKNOWN ISOMER OF BENZENE	BNA	7.86	15.0 JB
5	----	UNKNOWN ALCOHOL	BNA	8.30	33.0 J
6	----	UNKNOWN ISOMER OF HEXANAL	BNA	8.49	16.0 J
7	----	UNKNOWN ISOMER OF PYRAZOLE	BNA	9.50	28.0 J
8	----	UNKNOWN	BNA	13.26	8.0 J
9	----	UNKNOWN	BNA	29.13	16.0 J
10	----	UNKNOWN	BNA	36.40	39.0 J
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

FORM I, PART B

INORGANIC ANALYSIS DATA SHEET
FORM I

SMPL NO.: OW-15.19 2/18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 2/19/88

Lab Sample ID: 88-EW 5655

Date Reported:

Location ID: SYO 12.19/NASH RD.

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM ______

MATRIX : WATER __X__ SOIL ______ SLUDGE _____ OTHER ______

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1.	ALUMINUM	79800.0 PE		13.	MAGNESIUM	134000.0 PE
2.	ANTIMONY	120.0 P		14.	MANGANESE	3900.0 PE
3.	ARSENIC	50.0 UF	(1:10)	15.	MERCURY	0.3 C.V.
4.	BARIUM	710.0 P		16.	NICKEL	150.0 P
5.	BERYLLIUM	7.0 P		17.	POTASSIUM	19800.0 P
6.	CADMIUM	5.0 UP		18.	SELENIUM	4.0 UFN
7.	CALCIUM	430000.0 P		19.	SILVER	10.0 UP
8.	CHROMIUM	120.0 P		20.	SODIUM	64500.0 E
9.	COBALT	81.0 P		21.	THALLIUM	4.0 UFN
10.	COPPER	190.0 P		22.	VANADIUM	130.0 P
11.	IRON	144000.0 E		23.	ZINC	570.0 PNE
12.	LEAD	130.0 F	(1:10)		PERCENT SOLIDS (%)	NA
	CYANIDE	NR				
	PHENOL	NR				

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that became light yellow after ICP and colorless after furnace digestion procedures. As and Pb were analyzed at a 1:10 dilution.

[signature]

LAB MANAGER

SAMPLE DATA

OW-16.19 2/18

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER
OW-16.19 2/18

SY012.19/NASH RD

Laboratory Name: NANCO LABORATORY INC.
Lab File ID No: H0231
Sample Matrix: WATER
Data Release Authorized By: P.J. Kunsch

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/19/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/24/88
Date Analyzed: 02/24/88
Conc/Dil Factor: 1 pH: 6.4
Percent Moisture: N/A

CAS Number		ug/l or ug/Kg (Circle One)	CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	10.0 U	79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
74-83-9	Bromomethane	10.0 U	78-87-5	1,2-Dichloropropane	5.0 U
75-01-4	Vinyl Chloride	10.0 U	10061-02-6	Trans-1,3-Dichloropropene	5.0 U
-00-3	Chloroethane	10.0 U	79-01-6	Trichloroethene	5.0 U
75-09-2	Methylene Chloride	11.0	124-48-1	Dibromochloromethane	5.0 U
67-64-1	Acetone	24.0	79-00-5	1,1,2-Trichloroethane	5.0 U
75-15-0	Carbon Disulfide	5.0 U	71-43-2	Benzene	12.0
75-35-4	1,1-Dichloroethene	5.0 U	10061-01-5	cis-1,3-Dichloropropene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U	110-75-8	2-Chloroethylvinylether	10.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U	75-25-2	Bromoform	5.0 U
67-66-3	Chloroform	5.0 U	591-78-6	2-Hexanone	10.0 U
107-06-2	1,2-Dichloroethane	5.0 U	108-10-1	4-Methyl-2-Pentanone	3.1 J
78-93-3	2-Butanone	9.8 J	127-18-4	Tetrachloroethene	5.0 U
71-55-6	1,1,1-Trichloroethane	5.5	108-88-3	Toluene	5.2
56-23-5	Carbon Tetrachloride	5.0 U	108-90-7	Chlorobenzene	25.0
108-05-4	Vinyl Acetate	10.0 U	100-41-4	Ethylbenzene	55.0
75-27-4	Bromodichloromethane	5.0 U	100-42-5	Styrene	5.0 U
				Total Xylenes	30.0

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE
If the result is a value greater than or equal to the detection limit, report the value.

U
Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U(e.g.10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected.The number is the minimum attainable detection limit for the sample.

J
Indicates an estimated value.This flag is used either when estimating a concentration for tentatively identified compounds where a 1 1 response is assumed or when the mass spectral data 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 (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

ORGANIC ANALYSIS DATA SHEET
(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

SAMPLE NO.
OW-16.19 2/19

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/19/88
Date Analyzed: 02/25/88
Conc/Dil Factor:-----------> 1
Percent Moisture: N/A

GPC Cleanup: Yes____ No_X__
Separatory Funnel Extraction: Yes_X__
Continuous Liquid - Liquid Extraction: Yes__

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	10.0 U
111-44-4	bis(-2-Chloroethyl)Ether	10.0 U
95-57-8	2-Chlorophenol	10.0 U
541-73-1	1,3-Dichlorobenzene	10.0 U
106-46-7	1,4-Dichlorobenzene	10.0 U
100-51-6	Benzyl Alcohol	10.0 U
95-50-1	1,2-Dichlorobenzene	10.0 U
95-48-7	2-Methylphenol	10.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	10.0 U
106-44-5	4-Methylphenol	25.0
621-64-7	N-Nitroso-Di-n-Propylamine	10.0 U
67-72-1	Hexachloroethane	10.0 U
98-95-3	Nitrobenzene	10.0 U
78-59-1	Isophorone	10.0 U
88-75-5	2-Nitrophenol	10.0 U
105-67-9	2,4-Dimethylphenol	19.0
65-85-0	Benzoic Acid	26.0 J
111-91-1	bis(-2-Chloroethoxy)Methane	10.0 U
120-83-2	2,4-Dichlorophenol	10.0 U
120-82-1	1,2,4-Trichlorobenzene	10.0 U
91-20-3	Naphthalene	8.3 J
106-47-8	4-Chloroaniline	10.0 U
87-68-3	Hexachlorobutadiene	10.0 U
59-50-7	4-Chloro-3-Methylphenol	10.0 U
91-57-6	2-Methylnaphthalene	10.0 U
77-47-4	Hexachlorocyclopentadiene	10.0 U
88-06-2	2,4,6-Trichlorophenol	10.0 U
95-95-4	2,4,5-Trichlorophenol	50.0 U
91-58-7	2-Chloronaphthalene	10.0 U
88-74-4	2-Nitroaniline	50.0 U
131-11-3	Dimethyl Phthalate	10.0 U
208-96-8	Acenaphthylene	10.0 U
99-09-2	3-Nitroaniline	50.0 U

CAS Number		ug/l or ug/Kg (Circle One)
83-32-9	Acenaphthene	10.0 U
51-28-5	2,4-Dinitrophenol	50.0 U
100-02-7	4-Nitrophenol	50.0 U
132-64-9	Dibenzofuran	10.0 U
121-14-2	2,4-Dinitrotoluene	10.0 U
606-20-2	2,6-Dinitrotoluene	10.0 U
84-66-2	Diethylphthalate	10.0 U
7005-72-3	4-Chlorophenyl-phenylether	10.0 U
86-73-7	Fluorene	10.0 U
100-01-6	4-Nitroaniline	50.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	50.0 U
86-30-6	N-Nitrosodiphenylamine (1)	10.0 U
101-55-3	4-Bromophenyl-phenylether	10.0 U
118-74-1	Hexachlorobenzene	10.0 U
87-86-5	Pentachlorophenol	50.0 U
85-01-8	Phenanthrene	10.0 U
120-12-7	Anthracene	10.0 U
84-74-2	Di-n-Butylphthalate	10.0 U
206-44-0	Fluoranthene	10.0 U
129-00-0	Pyrene	10.0 U
85-68-7	Butylbenzylphthalate	10.0 U
91-94-1	3,3'-Dichlorobenzidine	20.0 U
56-55-3	Benzo(a)Anthracene	10.0 U
117-81-7	bis(2-Ethylhexyl)Phthalate	57.0 B
218-01-9	Chrysene	10.0 U
117-84-0	Di-n-Octyl Phthalate	10.0 U
205-99-2	Benzo(b)Fluoranthene	10.0 U
207-08-9	Benzo(k)Fluoranthene	10.0 U
50-32-8	Benzo(a)Pyrene	10.0 U
193-39-5	Indeno(1,2,3-cd)Pyrene	10.0 U
53-70-3	Dibenz(a,h)Anthracene	10.0 U
191-24-2	Benzo(g,h,i)Perylene	10.0 U

(1) - Cannot be separated from diphenylamine

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
OW-16.19 2/18

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1	1066406	SILANOL TRIMETHYL	VOA	14.43	17.0 J
2	----	2,4-DIMETHYL-3-PENTANONE	VOA	23.10	7.0 J
3	470826	CINEOLE	VOA	28.59	6.6 J
4	----	UNKNOWN BICYCLIC COMPOUND	VOA	30.83	76.0 J
5	----	7-OXABICYCLO[2.2.1]HEPTANE, 1-METHYL-4(1-METHYLETHYL)-	VOA	33.22	31.0 J
6	----	UNKNOWN	VOA	36.93	29.0 J
7	----	SUBSTITUTED METHYL, ETHYL BENZENE	VOA	38.24	5.7 J
8					
9	127184	ETHENE, TETRACHLORO	BNA	6.05	67.0 J
10	100414	BENZENE, ETHYL	BNA	7.63	22.0 J
11	----	DIMETHYL BENZENE ISOMER	BNA	7.87	53.0 JB
12	----	UNKNOWN CYCLIC COMPOUND	BNA	8.50	16.0 J
13	930687	2-CYCLOHEXEN-1-ONE	BNA	9.52	21.0 J
14	98828	BENZENE,(1-METHYLETHYL)	BNA	11.21	16.0 J
15	620144	BENZENE,1-ETHYL-3-METHYL	BNA	11.78	15.0 J
16	----	BENZENE ISOMER, ETHYL-METHYL	BNA	11.90	13.0 J
17	----	UNKNOWN	BNA	12.81	27.0 J
18	4695629	BICYCLO[2.2.1]HEPTAN-2-ONE,1,3,3-TRIMETHYL (1R)	BNA	13.46	69.0 J
19	21368683	BICYCLO[2.2.1]HEPTAN-2-ONE,1,7,7-TRIMETHYL-,(.t-.)	BNA	14.72	370.0 J
20	----	UNKNOWN	BNA	14.79	31.0 J
21	----	UNKNOWN	BNA	17.55	14.0 J
22	134623	BENZEMIDE, N,N-DIETHYL-3-METHYL	BNA	22.51	27.0 J
23	----	UNKNOWN	BNA	24.28	32.0 J
24	----	UNKNOWN	BNA	24.52	21.0 J
25					
26					

FORM I, PART B

INORGANIC ANALYSIS DATA SHEET

FORM I

SMPL NO.: GW-16.19 2/18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 2/19/88

Lab Sample ID: 88-EW 5656

Date Reported:

Location ID: SYO 12.19/NASH RD.

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM ______

MATRIX : WATER __X__ SOIL ______ SLUDGE _____ OTHER ______

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	37300.0 PE		13. MAGNESIUM	165000.0 PE	
2. ANTIMONY	150.0 P		14. MANGANESE	1600.0 PE	
3. ARSENIC	11.4 F		15. MERCURY	0.8 C.V.	
4. BARIUM	740.0 P		16. NICKEL	110.0 P	
5. BERYLLIUM	[4.0]P		17. POTASSIUM	141000.0 P	
6. CADMIUM	5.0 UP		18. SELENIUM	40.0 UFN	(1:10)
7. CALCIUM	183000.0 P		19. SILVER	10.0 UP	
8. CHROMIUM	90.0 P		20. SODIUM	361000.0 PE	
9. COBALT	50.0 P		21. THALLIUM	4.0 UFN	
10. COPPER	160.0 P		22. VANADIUM	66.0 P	
11. IRON	131000.0 PE		23. ZINC	1800.0 PNE	
12. LEAD	600.0 F	(1:100)	PERCENT SOLIDS (%)	NA	
CYANIDE	NR				
PHENOL	NR				

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a grey/brown liquid that became light yellow after ICP and furnace digestion procedures. Se was analyzed at a 1:10 dilution and Pb was anlalyzed at a 1:100 dilution.

D. [signature]

LAB MANAGER

SAMPLE DATA

TRIP BLANK 2/18

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER
TRIP BLANK 2/18

SY012.19/NASH RD

Laboratory Name:NANCO LABORATORY INC.
Lab File ID No: H0191
Sample Matrix: WATER
Data Release Authorized By: A. L. Wunsch

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/19/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/22/88
Date Analyzed: 02/22/88
Conc/Dil Factor: 1 pH: 7.4
Percent Moisture: N/A

CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	10.0 U
74-83-9	Bromomethane	10.0 U
75-01-4	Vinyl Chloride	10.0 U
-00-3	Chloroethane	10.0 U
75-09-2	Methylene Chloride	5.0 U
67-64-1	Acetone	10.0 U
75-15-0	Carbon Disulfide	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U
67-66-3	Chloroform	5.0 U
107-06-2	1,2-Dichloroethane	5.0 U
78-93-3	2-Butanone	10.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U
108-05-4	Vinyl Acetate	10.0 U
75-27-4	Bromodichloromethane	5.0 U

CAS Number		ug/l or ug/Kg (Circle One)
79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	5.0 U
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U(e.g.10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected.The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value.This flag is used either when estimating a concentration for tentatively identified compounds where a 1 1 response is assumed or when the mass spectral data 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 (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

B

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

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
TRIP BLANK 2/18

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SYO12.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/L or ug/Kg)
1	----	NONE FOUND	VOA	----	----
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

FORM I, PART B

SAMPLE DATA

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ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER
TRIP BLANK

SY012.19/NASH RD

Laboratory Name:NANCO LABORATORY INC.
Lab File ID No:>A3850
Sample Matrix: WATER
Data Release Authorized By: P.J. Hunsch

Case No: ENG. SCI.
QC Report No: N/A
Contract No: N/A
Date Sample Received: 02/18/88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 02/20/88
Date Analyzed: 02/20/88
Conc/Dil Factor: 1 pH: 6.9
Percent Moisture: N/A

CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	10.0 U
74-83-9	Bromomethane	10.0 U
75-01-4	Vinyl Chloride	10.0 U
-00-3	Chloroethane	10.0 U
75-09-2	Methylene Chloride	29.0 B
67-64-1	Acetone	24.0 B
75-15-0	Carbon Disulfide	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U
67-66-3	Chloroform	5.0 U
107-06-2	1,2-Dichloroethane	5.0 U
78-93-3	2-Butanone	130.0
71-55-6	1,1,1-Trichloroethane	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U
108-05-4	Vinyl Acetate	10.0 U
75-27-4	Bromodichloromethane	5.0 U

CAS Number		ug/l or ug/Kg (Circle One)
79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	5.0 U
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used. Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE
If the result is a value greater than or equal to the detection limit, report the value.

U
Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U(e.g.10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected.The number is the minimum attainable detection limit for the sample.

J
Indicates an estimated value.This flag is used either when estimating a concentration for tentatively identified compounds where a 1 1 response is assumed or when the mass spectral data 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 (e.g. 10J).

C
This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

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

OTHER
Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

FORM I

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER
TRIP BLANK

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENG. SCI.
SY012.19/NASH RD

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1	----	UNKNOWN	VOA	11.73	15 J
2	----	UNKNOWN	VOA	33.35	11.0 J
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

SAMPLE IDENTIFICATION SHEET

Lab Name: NANCO LABORATORIES, INC.   DATE REPORTED : 03/10/88
Lab Address: Robinson Lane, RD #6
Wappingers Falls, New York

SAMPLING LOCATION: SY012.19/NASH ROAD

CLIENT ID	NANCO ID
OW-13.19	88-EW-5635
MSD-OW-13.19	88-EW-5635-MS
MS-OW-13.19	88-EW-5635-MSD
OW-14A.19 2/17	88-EW-5648
OW-12.19 2/17	88-EW-5650
OW-14B.19 2/17	88-EW-5652
OW-15.19 2/18	88-EW-5655
OW-16.19 2/18	88-EW-5656

INORGANIC ANALYSIS DATA SHEET
FORM I

Lab Name : NANCO LABORATORIES, INC. Customer: Engineering Science

QC Batch: EW 5649; 5651-52; 5655-57 Lab Receipt Date : 02/19/88

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW __X__ MEDIUM _____

MATRIX : WATER __X__ SOIL _____ SLUDGE ____OTHER _____

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

PROJECT ID	SAMPLE ID:	T.O.X.	Instrument Detection Limit
SY012.19/NASH RD.	EW-5649	8.0	5 ug/L
SY012.19/NASH RD.	EW-5651	53.0	5 ug/L
SY012.19/NASH RD.	EW-5652	33.0	5 ug/L
SY012.19/NASH RD.	EW-5655	34.0	5 ug/L
SY012.19/NASH RD.	EW-5656	888.0	5 ug/L
SY012.19/NASH RD.	EW-5635	59.0	5 ug/L
SY012.19/NASH RD.	EW-5635 MS	93% RECOVERY	
SY012.19/NASH RD.	EW-5635 MSD	103% RECOVERY	

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : BMRL = RESULTS ARE BELOW MINIMUM REPORTING LEVEL
ND = RESULTS ARE NOT DETECTED

[signature]

LAB MANAGER

NANCO LABS, INC.

ENGINEERING SCIENCE

Date Received: 2/18/88
Date Reported: 2/25/88

TOX	UG/L
PARAMETERS	**RESULTS**
NANCO ID: CUSTOMER ID:	
87-EW-5635 (1:5) OW-13.19	59

SPK	SPKDUP	UNSPK SMPL	CONC. ADDED	%RECOVERY
93	103	59	50	118

ND = NOT DETECTED

MINIMUM REPORTING LEVEL = 5 UG/L

(1:5) = 25 UG/L

Enseco

FORM B-1W. TCDD WATER DATA REPORT FORM

Lab: ENSECO/Cal Lab

Report Date: 9-Mar-1988

Case/Batch No: 040258

Column: SP-2331

INSTRUMENT ID: F 5

EPA Sample No.	Extr. Date	Volume	ng/L Meas.	TCDD MPC	GC/MS Date	Analysis Time	Sur. S/N	* %REC (IS)	REL. Response Ratios 320/ 322	332/ 334IS	332/ 334RS	Response (Area) 259	320	322	328	332IS	334IS	332RS	334RS
METHOD BLANK	02/25/88	0.50	ND	2.80	03/08/88	09:37:00	9.8	42	-	0.82	0.81	-	-	-	14536	237114	289934	460249	565665
EW-5635	02/25/88	0.50	ND	0.54	03/07/88	21:05:00	22	59	-	0.77	0.76	-	-	-	61984	698193	904644	960057	1257940
EW-5635-MS	02/25/88	0.50	20	-	03/07/88	23:10:00	36	46	0.78	0.76	0.77	81615	197776	252810	66200	865607	1140420	1551080	2012230
EW-5635-1MSD	02/25/88	0.50	20	-	03/07/88	23:10:00	12	53	0.78	0.76	0.76	68560	147664	189024	52640	666804	873606	1028250	1352850
EW-5648	02/25/88	0.50	ND	0.78	03/07/88	21:28:00	16	35	-	0.75	0.75	-	-	-	33836	484288	647456	1120030	1485270
EW-5650	02/25/88	0.50	ND	0.36	03/07/88	21:47:00	34	57	-	0.75	0.75	-	-	-	70243	964976	1280010	1369560	1826580
EW-5652	02/25/88	0.50	ND	0.67	03/07/88	22:07:00	20	47	-	0.74	~~0.55~~ .75	-	-	-	54126	783583	1060050	1359150	1801020
EW-5655	02/25/88	0.50	ND	0.45	03/08/88	10:02:00	32	53	-	0.79	0.80	-	-	-	69197	982951	1245830	1509610	1896620
EW-5656	02/25/88	0.50	ND	0.94	03/08/88	22:48:00	14	32	-	0.75	0.75	-	-	-	39866	527888	706572	1328480	1764300

MB = Method Blank
N = Native TCDD Spike
D = Duplicate/Fortified Field Blank
PE = EMSL-LV Performance Evaluation Sample
MPC = Maximum Possible Concentration
FB = Field Blank
IS = Internal Standard
RR = Rerun
ND = Not Detected
RS = Recovery Standard
*Note: Relative to 13C12-1,2,3,4-TCDD
Percent recovery for EW-5635-MS and EW-5635-1MSD is 100%.

Prepared by: AP

Approved by: [signature]

Date: 3/9/88

Enseco

GW 11.9

FORM B-1W. TCDD WATER DATA REPORT FORM

Lab: ENSECO/Cal Lab

Report Date: 16-Mar-1988

Case/Batch No: 040372

Column: SP-2331

INSTRUMENT ID: F-5

EPA Sample No.	Extr. Date	Volume	ng/L Meas.	TCDD MPC	GC/MS Date	Analysis Time	Sur. S/N	* %REC (IS)	REL. Response Ratios 320/322	332/334IS	332/334RS	Response (Area) 259	320	322	328	332IS	334IS	332RS	334RS
Method Blank	03/08/88	0.25	ND	0.30	03/10/88	15:22:00	131	73	-	0.79	0.79	-	-	-	174378	2324980	2929140	2570700	3244600
EW5785	03/08/88	0.25	ND	0.46	03/10/88	15:47:00	106	73	-	0.79	0.80	-	-	-	144560	2011400	2546130	2247910	2826290
EW5785NS	03/08/88	0.25	41	-	03/10/88	16:59:00	343	75	0.81	0.80	0.79	369300	855184	1050000	296832	3687620	4636810	3987020	5042010
EW5785NSD	03/08/88	0.25	46	-	03/10/88	17:25:00	85	75	0.84	0.79	0.79	169008	404129	483161	129076	1518630	1921830	1640480	2081540

MB = Method Blank
N = Native TCDD Spike
D = Duplicate/Fortified Field Blank
PE = EMSL-LV Performance Evaluation Sample
MPC = Maximum Possible Concentration
*Note: Relative to 13C12-1,2,3,4-TCDD

FB = Field Blank
IS = Internal Standard
RR = Rerun
ND = Not Detected
RS = Recovery Standard

Recovery for EW5785NS is 103%. Recovery for EW5785NSD is 116%.

Prepared by: AP

Approved by: [signature]

Date: 3/21/88

FIELD SAMPLING RECORDS

FIGURE 6.3
FIELD SAMPLING RECORD

Nash Rd   NYSDEC Site No. ______   Date: 2/17/88
Well OW-11

lers: L. Dobson of Engineering-Science
J. Kuhn of "

ial Static Water Level. 8.49
om top of well protective casing)

Stickup 2.55

uation:
g: Submersible ______ Centrifugal ______
Airlift ______ Positive Displacement ______
Bailed X ______ Times

Well Volume Calculation:
2" Casing: 3.06 ft. of water x .16 = .49 gals
3" Casing: ______ ft. of water x .36 = ______ gals
4" Casing: ______ ft. of water x .65 = ______ gal

th to intake from top of protective well casing 9'
ume of Water removed 1.5 Gals. (> 3 Well Volumes)

3 vol. = 1 1/2 gals.

pling: Time ______ ____ a.m.
____ p.m.

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______

	No. of Bottles Filled	I.D. No.	Analyses
ip Blank			
ld Blank - Wash/Atmospheric. .(circle one)			
ound-water Sample	7	OW-11.19	see below

ysical Appearance and Odor well has odor - strong chemical smell, could not identify

frigerate: Date __/__/__ Time ______

eld Tests:
Temperature (C°/°F) ______ ______
pH ______ ______
Spec. Conduc (umhos/cm) ______ ______

eather ______

omments voa, bna, pest/pcb, metals, TOX, dioxin,
only got bottles for metals & volatiles on 2/17 & 2/18
Collected dioxin sample on 2/26/88
need to get pH, temp. conductivity reading.

FIGURE 6.3
FIELD SAMPLING RECORD

S. Nash Rd. NYSDEC Site No. ______ Date: 3/01/88
Well OW-11

Samplers: L. Dobson of Engineering - Science
G. Gould of "

Initial Static Water Level. . . . . —
(from top of well protective casing)

Evacuation:
Using: Submersible ______ Centrifugal ______
Airlift ______ Positive Displacement ______
Bailed X ______ Times

Well Volume Calculation:
2" Casing: — ft. of water x .16 = — gals
3" Casing: ______ ft. of water x .36 = ______ gals
4" Casing: ______ ft. of water x .65 = ______ gals

Depth to intake from top of protective well casing ______
Volume of Water removed ______ Gals. (> 3 Well Volumes)

- Sampling continuing from Previous visits

Sampling: Time 1300 a.m. / p.m.

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank			
Field Blank - Wash/Atmospheric. .(circle one)			
Ground-water Sample	1/3 of 1 gal	OW-11.19	Pest/PCB Bna

Physical Appearance and Odor strong odor - garbage smell headspace of 20 ppm w/ photovac

Refrigerate: Date / / / Time ______

Field Tests:
Temperature (C°/°F) 4°C
pH 6-7
Spec. Conduc (umhos/cm) —

Weather ______

Comments third visit - have gotten voas, metals, dioxin previous to this - only got 1/3 gal - may not be able to analyze for both BNA & Pest/PCB
3/07/88 - called Nanco had enough water to analyze for both Bna & Pest/PCB.

FIGURE 6.1
FIELD SAMPLING RECORD

ite NASH ROAD   Site No. 34012-19   Date: 10/12/88
Well OW-11

amplers: MARK CHAUVIN of ES.
BILL BRADFORD of ES

nitial Static Water Level. . . . . 4.46' TOPC   TOTAL DEPTH = 12 (TOPC).
(from top of well protective casing)

vacuation: Well Volume Calculation:
sing: Submersible ______ Centrifugal ______   2" Casing: 7.68 ft. of water x .16 = 1.23 gals.
Airlift ______ Positive Displacement ______   3" Casing: ______ ft. of water x .36 = ______ gals.
Bailed X Dry Times   4" Casing: ______ ft. of water x .65 = ______ gals.
1.23 gal x 3 = 3.69 gal (3 volumes)

epth to intake from top of protective well casing ______
olume of Water removed Dry at 2 1/2 Gals. (> 3 Well Volumes)

ampling: Time 0800 X a.m. (10/13/88)
______ p.m.

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______ ______

	No. of Bottles Filled	I.D. No.	Analyses
ip Blank			
eld Blank - Wash/Atmospheric. (circle one)			
round-water Sample	2	OW-11	B/N/A

hysical Appearance and Odor Reddish/Brown very turbid, strong chemical odor. (75 ppm on photovac inside well, <1 in breathing zone)

efrigerate: Date ______ Time ______

eld Tests:
Temperature (C°/°F) ______ ______
pH ______ ______
Spec. Conduc (umhos/cm) ______ ______

eather Cool, Cloudy 40° wind from west at 0-5 mph

mments BECAUSE OF RECOVERY RATE, WILL SAMPLE AT A LATER DATE (10/13/88)

FIGURE 6.1
FIELD SAMPLING RECORD

Total Depth = 12'

...to Nash Road Site No. ______ Date: 1/7/88
Well OW-11

Samplers: M. Anatra of ______
D. Brown of ______

Initial Static Water Level. 6.12 ft
(from top of well protective casing)

Evacuation:
Using: Submersible ______ Centrifugal ______
Airlift ______ Positive Displacement ______
Bailed X ______ Times

Well Volume Calculation:
2" Casing: ______ ft. of water x .16 = ______ gals.
3" Casing: ______ ft. of water x .36 = ______ gals.
4" Casing: ______ ft. of water x .65 = ______ gals.

Depth to intake from top of protective well casing ______ bailed dry ~ 1.5 gallons
Volume of Water removed ______ Gals. (> 3 Well Volumes)

Sampling: Time 1630 ___ a.m. X p.m.

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______ ______

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank			
Field Blank - Wash/Atmospheric. .(circle one)			
Ground-water Sample	1 (3/4 full)	OW-11	BNA

Physical Appearance and Odor turbid brown
NOTE: well was recharging very slowly

Refrigerate: Date _/_/_ Time ______

Field Tests:
Temperature (C°/°F) ______ ______
pH ______ ______
Spec. Conduc (umhos/cm) ______ ______

Weather ______

Comments ______

FIGURE 6.3
FIELD SAMPLING RECORD

te Nash Road NYSDEC Site No. ______ Date: 2/16/88
Well OW-12

mplers: J. Kuhn of Engineering-Science
L. Dobson of "

itial Static Water Level. 16.85
(from top of well protective casing)

vacuation:
sing: Submersible ______ Centrifugal ______
Airlift ______ Positive Displacement ______
Bailed X ______ Times

Well Volume Calculation:
2" Casing: ______ ft. of water x .16 = ______ gals
3" Casing: ______ ft. of water x .36 = ______ gals
4" Casing: ______ ft. of water x .65 = ______ gals
3vol = ~12gal.

epth to intake from top of protective well casing 40'
olume of Water removed 5 (dry) Gals. (> 3 Well Volumes)

ampling: Time 1030 ✓ a.m. ______ p.m.

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______ ______

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank			
Field Blank - Wash/Atmospheric. .(circle one)			
Ground-water Sample	7	OW-12.19	See below

Physical Appearance and Odor dark brown/silty no odor

Refrigerate: Date 2/18/88 Time 1030

Field Tests:
Temperature (C°/°F) 7.4 ______
pH 8.53 ______
Spec. Conduc (umhos/cm) 593 ______

Weather ______

Comments Voa, Bna, ~~Pest~~/PCB, TOX, metals, Dioxin
Finished sampling on 2/18/88

FIGURE 6.3
FIELD SAMPLING RECORD

te Nash Rd NYSDEC Site No. ______ Date: 2/17/98
Well OW-13

mplers: J. Kuhn of Engineering-Science
L. Dobson of "

itial Static Water Level. 2.82
(from top of well protective casing)
stick up 3.10

vacuation: Well Volume Calculation:
sing: Submersible ______ Centrifugal ______ 2" Casing: 4.72 ft. of water x .16 = .76 gals
Airlift ______ Positive Displacement ______ 3" Casing: ______ ft. of water x .36 = ______ gals
Bailed X ______ Times 4" Casing: ______ ft. of water x .65 = ______ gal
3 vol. = 2.28

epth to intake from top of protective well casing 5'
olume of Water removed 2.28 Gals. (> 3 Well Volumes)

ampling: Time 1730 ___ a.m. ___ p.m.

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank	3 by lab	TRIP BLANK	VOA
Field Blank - Wash/Atmospheric. .(circle one)		OW-13.19	
Ground-water Sample	7	↓	See below

Physical Appearance and Odor light gray murky — obvious odor — hydrocarbon(?)

Refrigerate: Date 2/17/98 Time 1700

Field Tests:
Temperature (C°/°F) 3.1
pH 7.26
Spec. Conduc (umhos/cm) 1347

Weather 25°F / Cloudy

Comments MS/MSD sample taken here
Analysis for dioxin, TOX, metals, Pest/PCB, BNA, volatiles

FIGURE 6.3
FIELD SAMPLING RECORD

te Nash Rd. NYSDEC Site No. ______ Date: 2/16/88
Well OW-14A

mplers: L. Dobson of Engineering-Science
J. Kuhn of "

itial Static Water Level. 15.45
(from top of well protective casing)

vacuation:
sing: Submersible ______ Centrifugal ______
Airlift ______ Positive Displacement ______
Bailed ______ ______ Times

Well Volume Calculation:
2" Casing: ______ ft. of water x .16 = ______ gals
3" Casing: ______ ft. of water x .36 = ______ gals
4" Casing: ______ ft. of water x .65 = ______ gals

epth to intake from top of protective well casing 40 3 volumes = 11 gal.
olume of Water removed 5 (dry) Gals. (> 3 Well Volumes)

ampling: Time 1030 ~~a.m.~~ ~~p.m.~~

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______ ______

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank	3	TRIP	VOA
Field Blank - Wash/Atmospheric. .(circle one)	3	OW-12A 19	"
Ground-water Sample	7	OW-14A 19	See below

Physical Appearance and Odor ~~Very~~ Silty - light brown, no odor

Refrigerate: Date __/__/__ Time ______

Field Tests:
Temperature (C°/°F) 7.9
pH 12.77
Spec. Conduc (umhos/cm) 3.9

Weather ______

Comments Voa, Bna, Pest/PCB, TOX, metals, Dioxin
finished sampling 2/18/88

FIGURE 6.3
FIELD SAMPLING RECORD

'e Nash Rd. NYSDEC Site No. ______ Date: 2/17/88
Well OW-14B

Samplers: J. Kuhn of Engineering-Science
L. Dobson of "

Initial Static Water Level. . . . . 3.23'
(from top of well protective casing)
Stick-up: 2.29'

Evacuation:
Using: Submersible ______ Centrifugal ______
Airlift ______ Positive Displacement ______
Bailed X ______ Times

Well Volume Calculation:
2" Casing: 6.06 ft. of water x .16 = .97 gals
3" Casing: ______ ft. of water x .36 = ______ gals
4" Casing: ______ ft. of water x .65 = ______ gals

Depth to intake from top of protective well casing 7'
Volume of Water removed 3 Gals. (> 3 Well Volumes)
3 vol = 2.91 gal.

Sampling: Time 1330 / a.m. / p.m.

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank			
Field Blank - Wash/Atmospheric. .(circle one)			
Ground-water Sample	7	OW-14B.19	See below.

Physical Appearance and Odor light yellow - no odor, murky

Refrigerate: Date 2/17/88 Time 1800

Field Tests:
Temperature (C°/°F) 1.6
pH 7.20
Spec. Conduc (umhos/cm) 902

Weather 25°F, Cloudy

Comments voa, semi-voa, metals, pest/pcb, TOX, Dioxin

FIGURE 6.3
FIELD SAMPLING RECORD

te Nash Rd NYSDEC Site No. ______ Date: 2/18/88
Well OW-15

Samplers: J. Kuhn of Engineering-Science
L. Dobson of "

Initial Static Water Level. 10.79
(from top of well protective casing)

stick up = 2'

Evacuation:
Using: Submersible ______ Centrifugal ______
Airlift ______ Positive Displacement ______
Bailed X ______ Times

Well Volume Calculation:
2" Casing: 36.21 ft. of water x .16 = 5.79 gals
3" Casing: ______ ft. of water x .36 = ______ gals
4" Casing: ______ ft. of water x .65 = ______ gal

Depth to intake from top of protective well casing 45'
3 vol = 17½ gal.
Volume of Water removed 12 (dry at) Gals. (> 3 Well Volumes)

Sampling: Time 1400 (approx) ~~a.m.~~ p.m.

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______ ______

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank			
Field Blank - Wash/Atmospheric. .(circle one)			
Ground-water Sample	7	GW-15,19	See below

Physical Appearance and Odor ______

Refrigerate: Date _/_/_/ Time ______

Field Tests:

Temperature (C°/°F)	7.5	
pH	8.39	
Spec. Conduc (umhos/cm)	742	

Weather 32°F, Sunny

Comments TOX, Dioxin, metals, Pest/PCB, BNA, volatiles

FIGURE 6.3
FIELD SAMPLING RECORD

ite Nash Rd NYSDEC Site No. OW-16 Date: 2/18/88
Well

amplers: L. Dobson of Eng.-Science
J. Kuhn of "

nitial Static Water Level. . . . . 4.79'
(from top of well protective casing) stick up = 30.5"

vacuation:
ising: Submersible ______ Centrifugal ______
Airlift ______ Positive Displacement ______
Bailed X ______ Times

Well Volume Calculation:
2" Casing: 7.75 ft. of water x .16 = 1.24 gals
3" Casing: ______ ft. of water x .36 = ______ gals
4" Casing: ______ ft. of water x .65 = ______ gals

epth to intake from top of protective well casing 10'
olume of Water removed 4 Gals. (> 3 Well Volumes)

3 vol = 3.72 gal = 4 gal.

ampling: Time 1500 ~~a.m.~~ / p.m.

Bailer Type: Stainless Steel ______
Teflon X
From Pos. Dis. Pump Discharge Tube ______
Other ______

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank			
Field Blank - Wash/Atmospheric. .(circle one)			
Ground-water Sample	7	OW-16.19	See below

Physical Appearance and Odor murky gray, garbage-methane(?) odor
turbid, sometimes bubbly
Oily Sheen on Surface

Refrigerate: Date _/_/_ Time ______

Field Tests:
Temperature (C°/°F) 5.8
pH 6.68
Spec. Conduc (umhos/cm) 5.7 mS (5,700 uS)

Weather ______

Comments Analysis: TOX, dioxin, metals, Pest/PCB, BNA, volatiles

ES ENGINEERING-SCIENCE COMPANIES

MEMORANDUM TO FILE

JOB NO.

FILE DESIGNATION

DATE TIME

ONE CALL FROM George Moreau PHONE NO.

ONE CALL TO File 54012.19 PHONE NO.

NFERENCE WITH

ACE

BJECT Nash Rd Water level 6/20/88

Well #	Water level (Top of PVC or Prot. Casing)	Elevation of Reference	W. level Elevation	Comment
OW-16	6.3 PVC	103.3	97.0	
OW-6	17.3 S.Steel	103.5	86.2	
OW-15	11.4 PVC	100.8	89.4	Lock missing - Replaced
OW-12	11.5 PVC	101.1	89.6	
OW-11	4.6 PVC	100.4	95.8	No lock - replace
OW-2	3.9 T.P.C	99.3	95.4	
OW-14A	11.3 PVC	101.2	89.9	No lock - Replaced
OW-14B	4.2 PVC	100.6	96.4	
OW-1B	14.1 P.C.	100.3	86.2	lock replaced
OW-1	5.3 P.C.	100.3	95.0	lock replaced
OW-~~5~~3	~~15~~ 15.0 P.C	101.3	86.3	No lock cut off
OW-4	14.5 ~~P.C.~~ S.Steel	100.6	86.1	Prot. Casing sunk in
OW-5	15.1 P.C.	101.2	86.1	No lock cut off

No measurement on OW-13

SIGNED

ES ENGINEERING-SCIENCE COMPANIES

MEMORANDUM TO FILE

JOB NO. SY012.19
FILE DESIGNATION Nash Road
DATE 10/12/88 TIME

~~PHONE CALL~~ FROM W. Bradford PHONE NO.
PHONE CALL TO PHONE NO.

CONFERENCE WITH
PLACE

SUBJECT Monitoring Well Water Levels

Well #	Water level* (Top of PVC or Prot. Casing)		Comments
OW-3	14.4	PC	no lock, no cap
OW-~~5~~	11.8	S. steel	
OW-5	15.1	PC	no lock, no cap
OW-6	17.7	S. Steel	
OW-11	4.5	PVC	
OW-14 A	11.7	PVC	
OW-16	8.7	PVC	

*depth in feet

SIGNED William L. Bradford