PHASE II INVESTIGATION

CERRO CONDUIT SITE
SYOSSET, NEW YORK
NASSAU COUNTY

NYSDEC SITE No. 130002

PREPARED FOR

SY ASSOCIATES

FEBRUARY 1989

H2MGROUP

HOLZMACHER, McLENDON & MURRELL, P.C.
CONSULTING ENGINEERS · ARCHITECTS · PLANNERS · SCIENTISTS · SURVEYORS
MELVILLE, N.Y. RIVERHEAD, N.Y. FAIRFIELD, N.J.

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H2M GROUP
575 BROAD HOLLOW ROAD
MELVILLE, NEW YORK 11747

FEBRUARY 1989

PHASE II HYDROGEOLOGIC INVESTIGATION

CERRO CONDUIT SITE

SYOSSET, NEW YORK

FEBRUARY 1989

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CERRO CONDUIT SITE

SYOSSET, NEW YORK

FEBRUARY 1989

SECTION 1.0 - EXECUTIVE SUMMARY

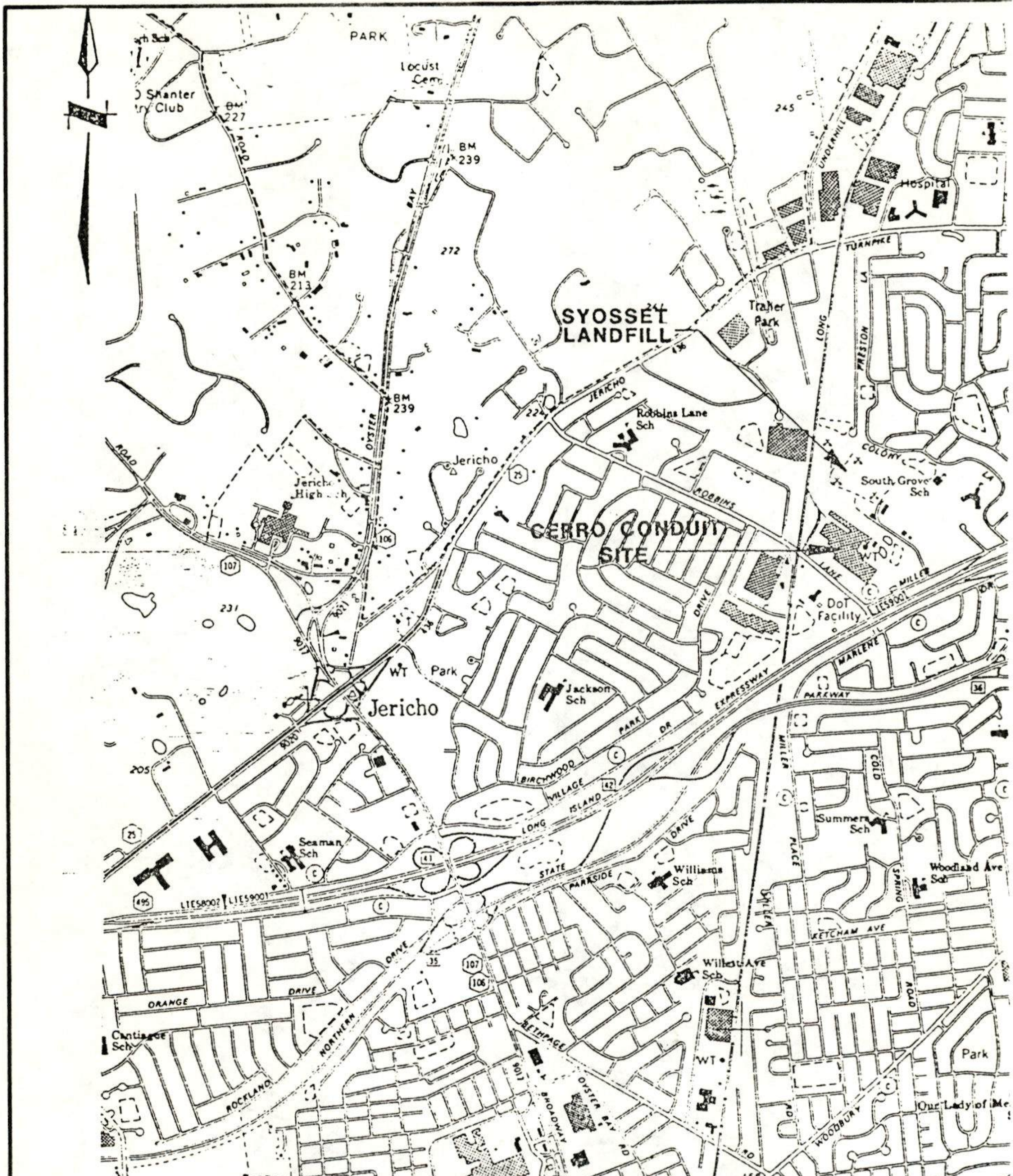
1.1 - INTRODUCTION

The "Cerro Conduit Site", as referred to in this report, is the location where the Cerro Conduit Company operated a copper rolling, drawing and extruding facility in Syosset, New York (Figure 1). The facility had employed up to 100 people. The site is no longer owned by Cerro Conduit Company, and no other manufacturing activity has occurred at the site since the plant closed in 1984.

Sy Associates, Inc. purchased the property in 1984 and are the current owners. They have initiated this Phase II Investigation to satisfy the requirements of the New York State Department of Environmental Conservation (NYSDEC) guidelines for investigation of sites listed on the inactive hazardous waste disposal site list.

The purpose of this study is to determine the nature and extent of on-site groundwater contamination that may have occurred due to the former activities of Cerro Conduit Company and/or neighboring land users. This second phase hydrogeologic investigation is a continuation of the first phase study that was submitted to NYSDEC by H2M in December 1987.

Figure 1



SCALE: 1"= 2000'

LOCATION MAP

CERRO CONDUIT SITE
SYOSSET, NEW YORK

REF: HICKSVILLE, N.Y. QUAD

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The Cerro Conduit Company, under an agreement with NYSDEC, also completed independent investigations of possible soil contamination. A report, "Soil Sampling Program, Phase 2 Report," was prepared by the Avendt Group, Inc. for Cerro and submitted to NYSDEC in April 1988. A subsequent soil investigation was performed concurrent with this investigation and is being reported independently to NYSDEC.

1.2 - SITE ASSESSMENT

The first phase hydrogeologic study made the following conclusions:

1) The site is located over a regional groundwater divide of the Magothy Aquifer. Groundwater flow is typified by significant vertical flow and variable flow direction.

2) Groundwater samples collected from the five on-site monitoring wells indicate that at the zones of the aquifer screened by those wells, organic contamination is not present. Furthermore, although there is indication that groundwater quality has been impacted by some inorganics, inorganic contamination is not present in significant concentrations at these locations.

3) Based upon the hydrogeologic information collected and developed, and the adequate volume of water quality data reviewed, it is apparent that the now-abandoned on-site supply wells N-3569 and N-6741 had previously intercepted a portion of the plume coming from the Syosset Landfill. This landfill is currently being investigated under a Remedial Investigation/ Feasibility Study with oversight by the United States Environmental Protection Agency (USEPA).

4) With the depth to the water table surface at approximately 100 feet and the depth to the bottom of the on-site supply wells at 350 to 423 feet, the groundwater is beyond the range of excavations associated with physical development of the site with structures. Furthermore, additional development of the site

would not prevent remediation of regional groundwater problems if deemed necessary.

As part of the current Phase II Investigation, a Hazardous Ranking System (HRS) score was computed. A score of 8.18 was computed. Computation sheets are included in Appendix D.

1.3 - SITE DESCRIPTION

The Cerro Conduit Site is located along Robbins Lane and Miller Place in Syosset, New York. It is bounded on the north by an inactive landfill and on the west by the Long Island Railroad. The total area of the site is approximately 40 acres.

The site is currently listed as a Class 4 site on the New York State Department of Environmental Conservation (NYSDEC) list of inactive hazardous waste disposal sites. A Class 4 site is defined as a site that has been properly closed, but requires continued management.

The aforementioned landfill, north of the site, is the Syosset Landfill and is listed on USEPA's National Priorities List (NPL) of uncontrolled hazardous waste sites. It is classified as a Class 2 site on the NYSDEC list of inactive hazardous waste disposal sites. A Class 2 site is defined as a site that requires action and presents a significant threat to the public health or environment.

The entire Cerro Conduit Site is now commercially inactive. Most structures are still intact, but in poor condition. There has been an extensive amount of vandalisim at the site. In addition to the buildings and warehouses on site, there is also an access track to the Long Island Railroad, a Long Island Lighting Company electrical substation, a large industrial water tower, and two high-capacity water supply wells.

1.4 - PHASE II EFFORT

The Phase II Investigation at the Cerro Conduit Site will provide data to further define hydrogeologic characteristics and the nature and extent of groundwater contamination, if any, that might be present beneath the site. The scope of the investigation was developed in consultation with NYSDEC and is described in a work plan approved by NYSDEC and dated July 1988. The primary field activities are (1) the installation of three additional groundwater monitoring wells, including a strategically placed deep well, 2) geophysical logging, 3) water level monitoring and 4) groundwater sampling of the five existing and three new monitoring wells.

This report is formatted after the NYSDEC Division of Hazardous Waste Remediation's guidance for Phase II Investigations.

SECTION 2.0 - PURPOSE OF SITE INVESTIGATIONS

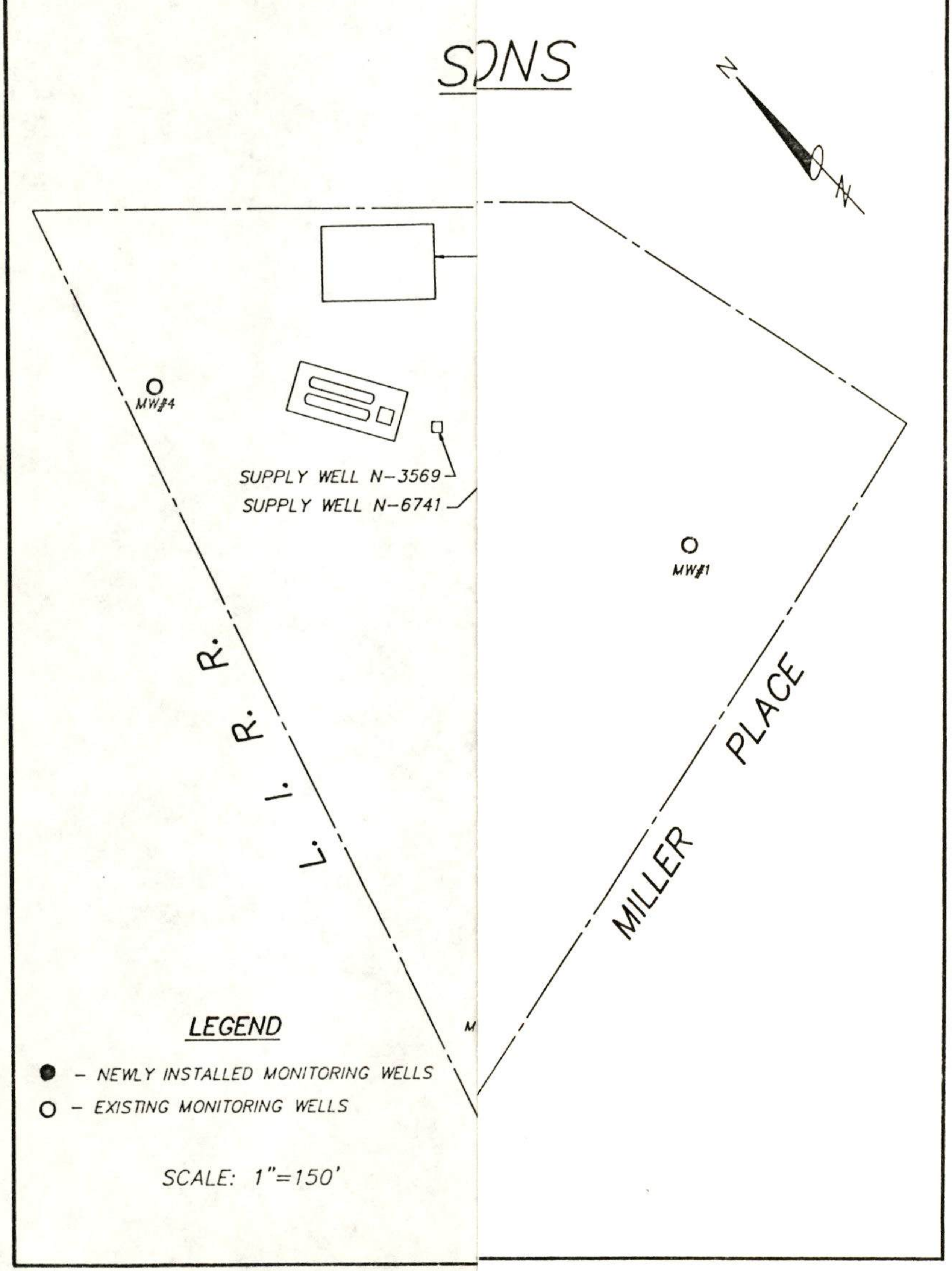
2.1 - PREVIOUS BORING AND MONITORING WELL INSTALLATION PROGRAM

Four on-site monitoring wells (MW-1, 2, 3 and 4) were installed during the July and August 1987 Phase I hydrogeologic investigation. Another monitoring well (MW-5), installed during October/November 1984, was also utilized in this investigation. Figure 2, Site Plan, shows the locations of each well/boring.

Preceding installation of the four monitoring wells, split-spoon soil samples were collected from the boreholes at five-foot intervals through the unconsolidated sediments. The purpose of collecting split-spoon soil samples was to evaluate the subsurface geology, screen them for volatile organic contamination, and retrieve samples for laboratory analysis. A total of 76 split-spoon soil samples were collected during the drilling of the four monitoring wells. Of these soil samples, 32 were submitted for laboratory analysis for halogenated and non-halogenated volatile organics, EP Toxicity (metals), copper, zinc, nickel and cyanide. Each soil sample was monitored with an HNu photoionization meter to screen the samples in the field for volatile organic contamination. No significant readings were obtained.

Following completion of the four soil borings, the boreholes were reamed wider with a 6.25-inch inner diameter hollow stem auger. A groundwater monitoring well was constructed in each borehole. There were three groundwater sampling events.

FIGURE 2


S)NS
N
MW#4
SUPPLY WELL N-3569
SUPPLY WELL N-6741
MW#1
L. I. R. R.
MILLER PLACE
LEGEND
- NEWLY INSTALLED MONITORING WELLS
- EXISTING MONITORING WELLS
SCALE: 1"=150'

Pertinent summary excerpts of the December 1987 hydrogeologic investigations report are included in Appendix A.

2.2 - PHASE II HYDROGEOLOGIC INVESTIGATIONS

2.2.1 - Objectives

The major objectives of this Phase II Hydrogeologic Investigation were to:

- Install three additional groundwater monitoring wells;
- Perform an elevation survey of the three newly installed wells;
- Perform groundwater elevation monitoring to assess changes in flow direction;
- Perform a groundwater quality sampling program by obtaining samples from the existing and newly installed wells;
- Determine the nature and extent of groundwater contamination that may be present beneath the Cerro Conduit Site; and
- Develop and submit a final report presenting the findings of these investigations.

SECTION 3.0 - SCOPE OF WORK

3.1 - PHASE II EFFORT

The NYSDEC has required the installation of three additional groundwater monitoring wells at the Cerro Conduit Site for this Phase II hydrogeologic investigation. The locations of these wells: MW-6, MW-7 and MW-8 are shown in Figure 2 in relation to existing wells. A schematic cross-section of the monitoring wells' construction is shown in Figure 3.

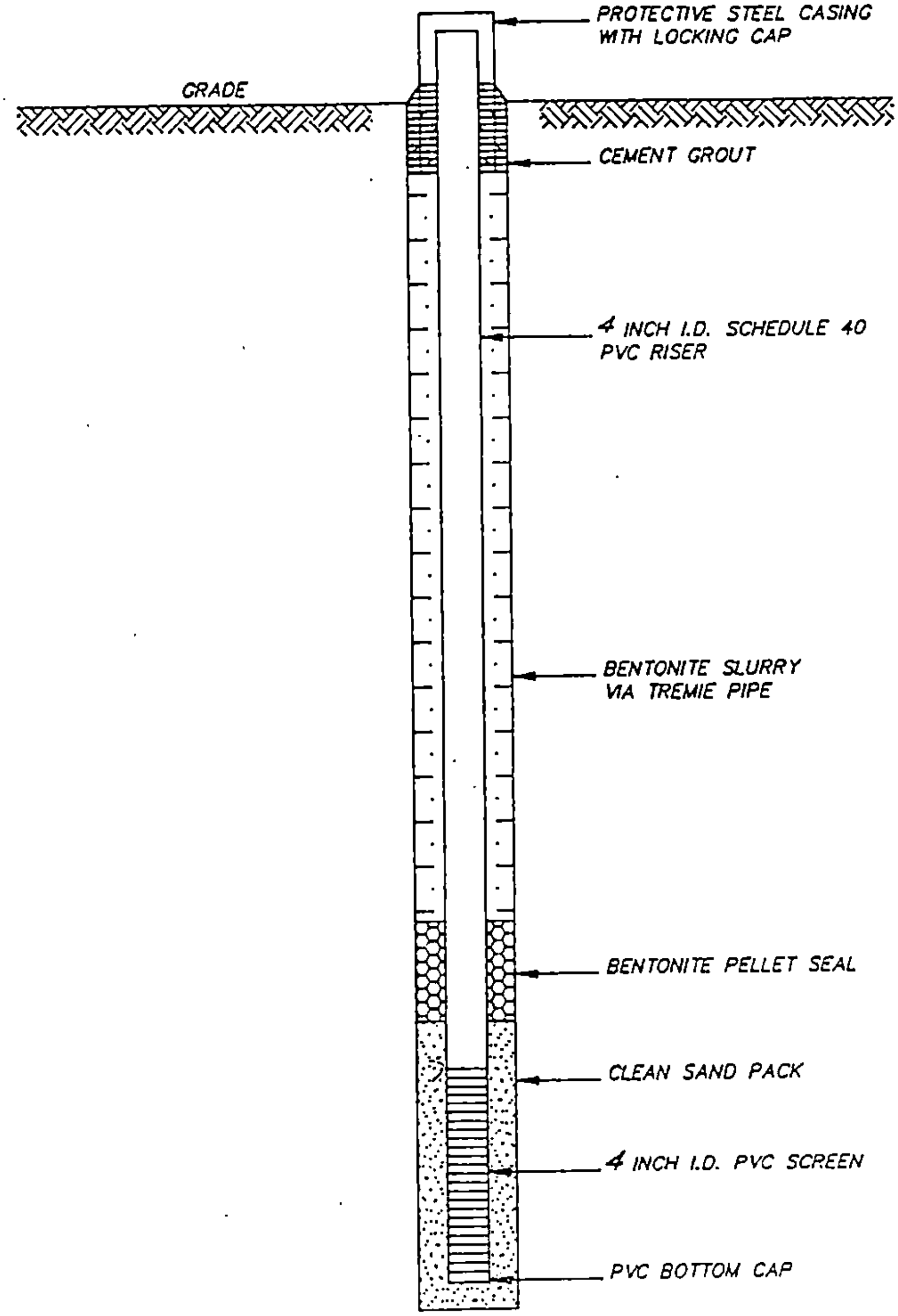
Well MW-6 was installed near Robbins Lane, midway between existing wells MW-2 and MW-3, to allow for a better definition of the variable flow direction and to provide additional groundwater quality information. MW-6 was set at 112 feet from grade in a medium sand layer.

Well MW-7 was placed 100 feet northwest of MW-3. MW-3 was implaced in a clay/silt zone (110 feet), and the water level reflects a perched condition. A greater depth was required for MW-7 to penetrate through this clay/silt zone. After drilling through a 47-foot silt/clay lens, MW-7 was set at 132 feet in a light brown, gravelly sand layer.

Well MW-8 was installed 200 feet southeast of the Cerro water tower. A Bucyrus-Erie Model 22-W cable tool rig was used to install MW-8. The well was installed at 141 feet below grade

CERRO CONDUIT

FIGURE 3



OVERBURDEN WELL
SECTION VIEW
(NO SCALE)

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in a coarse sand formation. Originally, MW-8 was to be part of a shallow and deep well couplet (MW-6 and MW-6A) near Robbins Lane. Based upon new hydrogeologic information from the site investigation at the adjacent Syosset Landfill, H2M, with NYSDEC's concurrence, relocated MW-6A (renamed MW-8) from its original proposed location to a location closer to the sludge drying basins near the northeast corner of the facility (see Figure 2).

Relocation was based on the finding of a vertical flow component much greater than previously anticipated. The velocity gradient components for horizontal and vertical flow were based upon site-specific hydraulic conductivity, porosity and slope. (See Appendix B for specific calculations.)

Well MW-8 was intended to be somewhat deeper than its final depth, but was set at 141 ft. because a dense clay layer, in excess of 20 feet thickness, was found to exist from a depth of 141 to 162 feet. As any contaminants from the site could not penetrate through such an impermeable layer, and would be intercepted at the top of the clay layer, it was determined that setting the screen at the top of the clay lense would yield a "worst case scenario" of groundwater quality beneath the site.

Procedures used in well installation followed NYSDEC monitoring well installation protocols. The monitoring well casing and screen consisted of 4-inch inner diameter, Schedule 40, flush joint, threaded PVC riser and 10 feet of #10 slot-size, 4-inch inner diameter PVC well screen. Joint compound was not used.

The open space surrounding the well screen was filled with a grade 2, quartz sand filter pack. The pack extended three feet above the screened interval. A two-foot thick seal of bentonite pellets was placed on top of the filter pack to provide an adequate reservoir. The remainder of the open space above the bentonite pellets was backfilled with a bentonite/cement grout. A cement collar was placed at grade level to help secure the protective steel casing in place.

Each well was adequately developed by pumping with a submersible pump. Wells were developed until bailed samples displayed a turbidity of 50 NTU's or less, as measured with a nephelometer. MW-8 was developed for 4.5 hours, MW-7 for 4.0 hours and MW-6 for 1.5 hours before turbidity was less than 50 NTU's.

A down-hole geophysical study was performed in the newly installed monitoring wells at the Cerro Conduit Site. Natural gamma logs were recorded through the PVC casing and served as a guide for stratigraphic correlation and permeability. See Section 5.0 for summary and conclusions of the logs.

Groundwater samples from the seven viable on-site monitoring wells were collected by H2M. Samples were not collected from the previously installed well MW-3 because this screened only a perched water condition (MW-3 was sampled for the Phase I investigation). Sampling was conducted from November 28 through December 2, 1988. Water samples were submitted for full TCL-CLP analysis, as well as TOX, cyanide and leachate indicators. All samples were unfiltered. The leachate indicator parameters are ammonia, chloride, fluoride, nitrate, sulfate, suspended solids, total dissolved solids, and hardness. Field and trip blanks were only analyzed for TCL volatile organics (summary charts are presented in Section 5.3).

The methods utilized to collect the groundwater samples are described below:

1) Plastic sheeting (poly) was placed around the well. All sampling was conducted on plastic.
2) Pre-cleaned, dedicated, stainless steel bailers were used to obtain samples.
3) All wells were purged with a submersible pump a minimum of three well volumes. Conductivity and pH readings were recorded every 15 minutes.
4) Sampling was conducted.

The bailers and all field sampling equipment were laboratory cleaned, wrapped and dedicated to a particular sampling point. Sampling equipment was cleaned and decontaminated according to the following procedures:

1) Non-phosphate detergent and tap water wash.
2) Tap water rinse.
3) Distilled water rinse.
4) Methanol rinse.
5) Distilled water rinse.
6) Total air dry.

Following this procedure, the sampling devices were wrapped in autoclaved aluminum foil, where they remained until sampling.

SECTION 4.0 - SITE HISTORY

Before the Cerro Conduit Company purchased the land in the late 1940's, the parcel and surrounding environment were used for farming Long Island crops such as potatoes, cauliflower, etc. Cerro constructed two large factory buildings designed for the manufacture of wire, cable, conduit, etc. Cerro Conduit opened its manufacturing facility in 1951. They manufactured steel electrical conduit, hot rolled copper rods, and steel strip.

Cerro's industrial processes included caustic cleaning, acid pickling, acid zinc/cyanide electroplating, and rinsing. The wastewater generated as a result of these operations was treated with caustics and chlorine to destroy the cyanide and/or treated with lime and polymers to complex heavy metals. All wastewater was then discharged to one of two clarifiers to allow precipitation of the metal hydroxide sludges.

Until 1982, the treated effluent from the clarifiers was discharged to on-site recharge basins. On April 29, 1982, the water was piped to the Cedar Creek Sewage Treatment Plant at Wantagh via a 12-inch sewer line in Robbins Lane. The sludge was dewatered and disposed of off-site at an industrial landfill. Removal of sludge and soils from the sides and bottom of the basins began in June 1984 and was completed on September 21, 1984. Approximately 70,380 yards were removed to approved industrial landfill sites in New Jersey at a cost of approximately $2.5 million (1984 $'s).

Prior to the sludge/soil removal, the effect upon the environment was considered by the United States Environmental Protection Agency (USEPA) and NYSDEC. Detailed analysis of the sludge was conducted by Cerro and submitted to the USEPA. The USEPA concluded that this sludge was an industrial, but not hazardous, solid waste.

As a result of the removal of the sludge/soil, NYSDEC assigned a Class 4 designation which means that the site was properly remediated and that only continued monitoring was required.

On July 2, 1988, the Commissioner of the New York State Department of Environmental Conservation and Sy Associates entered into an Order on Consent for additional investigation of this site. The goals of this order were to continue to develop and implement a field investigation to determine the nature of contamination, if any, present in the groundwater, and the areal extent and vertical distribution of contamination in the groundwater at the site.

SECTION 5.0 - SITE ASSESSMENT

5.1 - SITE TOPOGRAPHY AND ECOLOGY

The Cerro Wire Company is situated on a fairly level to gently sloping outwash plain. The topography is dominantly nearly level. Gently sloping areas are associated with the well-defined drainageway-like areas (meltwater channels) that originate in outwash plains. Initially, the land was nearly flat, which is typical of an outwash plain. Excavation to remove sludge and soil has altered the topography as much as 50 feet in some places.

The ecology of the Cerro property is limited due to the past usage of the property. However, small mammals common to Long Island are expected to occur here (i.e., mice, moles, rabbits). There are no unique ecosystems, critical habitats, food sources or nesting locations. No rare or endangered species of flora or fauna were noted, nor would they be expected to occur here.

5.2 - GEOLOGIC AND HYDROGEOLOGIC CHARACTERISTICS

5.2.1 - Regional Geology and Hydrogeology

The geology of the Syosset area can be described as consisting of unconsolidated deposits of late Cretaceous, Pleistocene and recent age which overlie crystalline bedrock. The bedrock is composed of rocks of pre-Cambrian age and slopes slightly to the southeast. The bedrock surface is about 1,000 feet below grade.

Directly on top of the bedrock lies the Lloyd Aquifer, which consists of beds of fine to coarse quartzose sand and gravel, generally in a clayey matrix, with interbedded lenses of sandy clay and clay. The thickness of this formation varies from 150 feet in the northwestern part of Nassau County to up to 400 feet in the southeastern region of the county. The Lloyd Aquifer is an artesian aquifer, being confined by the overlying Raritan clay, with a horizontal permeability of 500 to 1,000 gallons per day (gpd) per square foot.

The Raritan clay is approximately 150 feet thick and consists mostly of clay, sandy clay and silt. This formation has a very low permeability and acts as an effective confining layer on the Lloyd Aquifer.

On top of the Raritan clay lies the Magothy Aquifer, which consists of sand, gravel, silt and clay. The saturated thickness of the Magothy Aquifer in the vicinity of the study site is approximately 520 feet (USGS Professional Paper 627-E, 1972). Throughout the Magothy formation are lenses of clay which can locally divert groundwater flow or perch water above the clay lenses in otherwise unsaturated areas. The transmissivity of the Magothy Aquifer in the vicinity of the study area is approximately 270,400 gallons per day per foot, and the horizontal hydraulic conductivity is about 520 gallons per day per square foot ($g/d/ft.^2$). Approximately 90 percent of the water pumped for public water supply in Nassau County is from the Magothy Aquifer.

The uppermost deposits are the Upper Pleistocene deposits, which reach up to more than 100 feet thick in some areas of Nassau County. This formation is the result of the latest glaciation, and consists of stratified sand and gravel on glacial outwash. These Upper Glacial deposits, where saturated, were considered an important source of drinking water for Long Island until deteriorating water quality restricted their use in many areas.

This investigation confirms other regional studies on the hydrogeologic regime of this area that indicate that the Cerro Conduit Site is situated above a regional groundwater divide of the Magothy Aquifer. This would be an area of significant recharge to middle and lower portions of the aquifer, as well as an area characterized by variable horizontal groundwater flow direction, dependent on seasonal conditions.

5.2.2 - Natural Gamma Logging of Site Wells

Natural gamma logs are records of the amount of natural gamma radiation that is emitted by all rocks. The common gamma probe detects several radioactive elements without distinguishing them. The minerals normally found in sedimentary materials such as clay, limestone and sandstone contain small amounts of radioactive potassium-40 and decay products of uranium and thorium.

In general, the natural gamma activity of clay-bearing sediments is much higher than that of quartz sands and carbonates, due to the facts that (1) potassium-40 is abundant in feldspars and micas, which decompose readily to clay, and (2) clays concentrate the heavy radioelements due to their mineralogic structure and through the processes of ion exchange and adsorption. Clay tends to reduce the effective porosity and permeability of aquifers, and this can also be used to empirically determine the clay content in some sediments.

Shifts on gamma logs may be caused by changes in borehole media (air, water, mud), casing, hole diameter, gravel pack, grout behind the casing, or well development. Most gamma logs are measured in counts per second, because of the ease this unit affords in standardization and calibration. This unit does not have any meaning with respect to the intensity of a field of gamma radiation, except for a given measuring system or environment. Therefore, the natural gamma log does not have a unique response to lithology; the response is generally consistent within a single geohydrologic environment. Probably the most important application of natural gamma logs in groundwater hydrology is in identification of shale or clay-bearing sediments.

Three natural gamma logs were run at the Cerro Conduit Site, at monitoring wells MW-6, 7 and 8, on November 17, 1988. These logs were compared and correlated with stratigraphic cross-sections developed from the well logs taken at these locations (Appendix C). Comparison of the logs shows some obvious correlations.

The location of the clay layer near a depth of 80 feet in monitoring well 8 is clearly defined by an increase of over 40 counts per second in gamma radiation intensity. Other lithologic boundaries are indicated in the gamma logs from all three wells. The sand and gravel/sand boundary is shown as a slight increase in gamma radiation, ranging from approximately 5 counts per second for monitoring well 8 to over a 20 count per second increase in monitoring well 7. The clay lenses encountered in monitoring well 6 are shown as clearly defined peaks in the gamma log.

Elevation of the water table is not so easily correlated, with the exception of monitoring well 7.

5.2.3 - Geologic Fence Diagram

A geologic fence diagram was developed for the Cerro Conduit Site using well logs (Figure 4). The diagram illustrates the lithologies of the formations encountered and their correlative properties.

Ground elevations at the well locations average about 182 feet. Well logs collected by H2M range from depths of 87 to 162 feet. Supply Wells N-3569 and N-6741, installed in 1951 and 1959 respectively, have logs of 360 and 423 feet, respectively.

The fence diagram gives a clear, visual representation of what was discovered in the field. From the northwest to south-east areas of the site, the lithology remains fairly uniform. Clay encountered in MW-8, which necessitated screening the well in a shallower zone (to 141 ft.), was easily correlated to the clay found at approximately the same depth in well N-3569.

In the southwestern corner of the site, the lithologies become more complex. A perched water table condition exists at monitoring well 3, and this is shown clearly, as the elevation of the water table is located in a thickening silt and clay unit.

5.2.4 - Stratigraphic Cross-Section

A stratigraphic cross-section was developed across the Cerro Conduit Site to and through the adjacent Syosset Landfill (Figures 5 and 6). Well logs of MW-6 and 8 were used to develop sections on the Cerro site; existing well logs for off-site wells SY-5 and SY-2 were used for sections on the Syosset Landfill. The line of section trends from the southwest/central area of the Cerro site to the northeast/central area of the Syosset Landfill.

The groundwater divide is located in the vicinity of the mutual border with the Syosset Landfill. According to consultants working at the Syosset Landfill, groundwater at the landfill flows to the northeast; while at the Cerro Site, groundwater generally flows to the southwest. This is confirmed when observing the slopes of the formations. Stratigraphic continuity is evident when correlating the cross-sections, despite the shallower logs of SY-5 and SY-2, and the non-differentiation of the sand and gravel unit with the sand unit in the Syosset Landfill logs. Average ground elevation at the section locations is 185 feet; depths of the cross-sections are

GEOLOGIC FENCE DIAGRAM
CERRO CONDUIT SITE
SYOSSET, NEW YORK

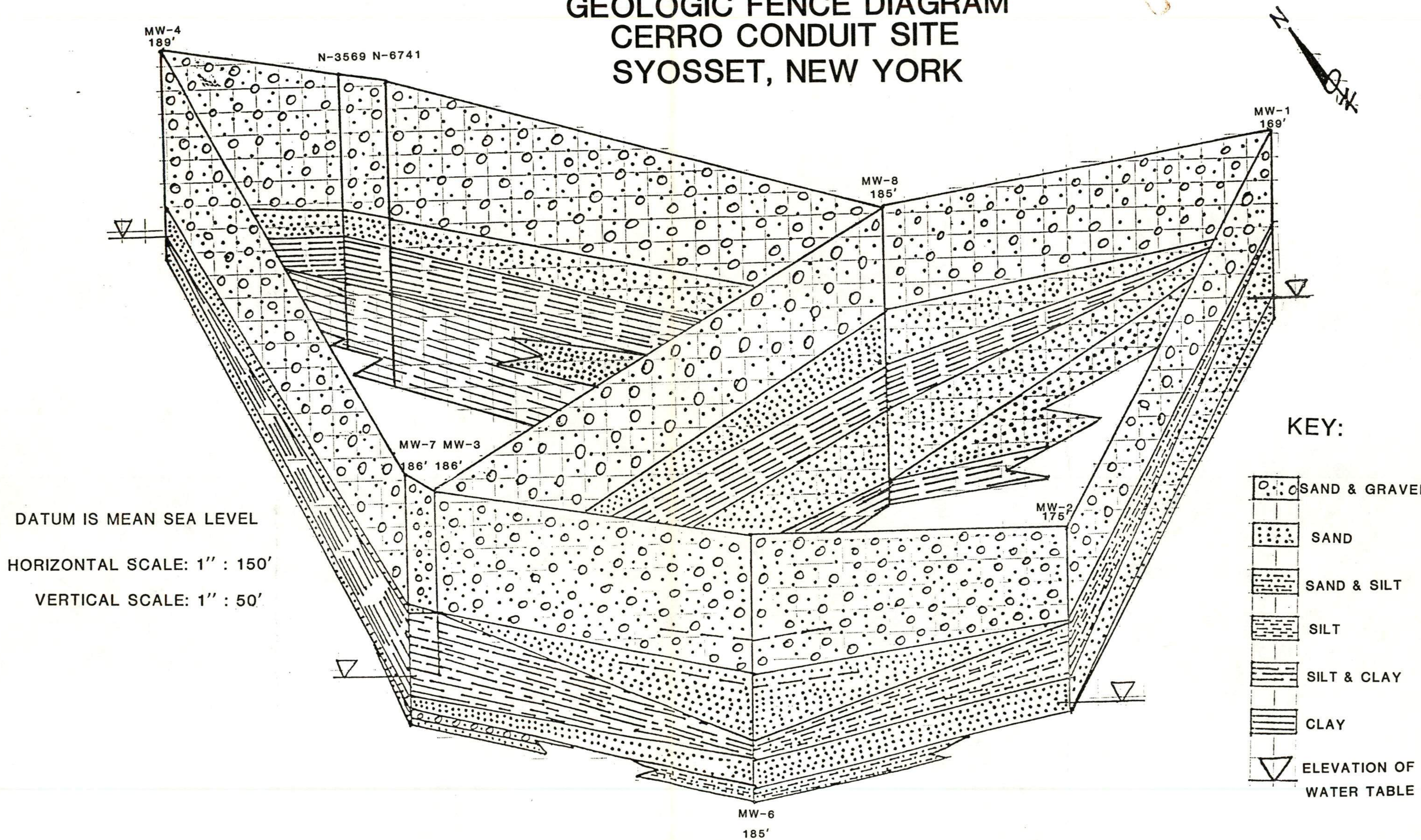

FIGURE 5

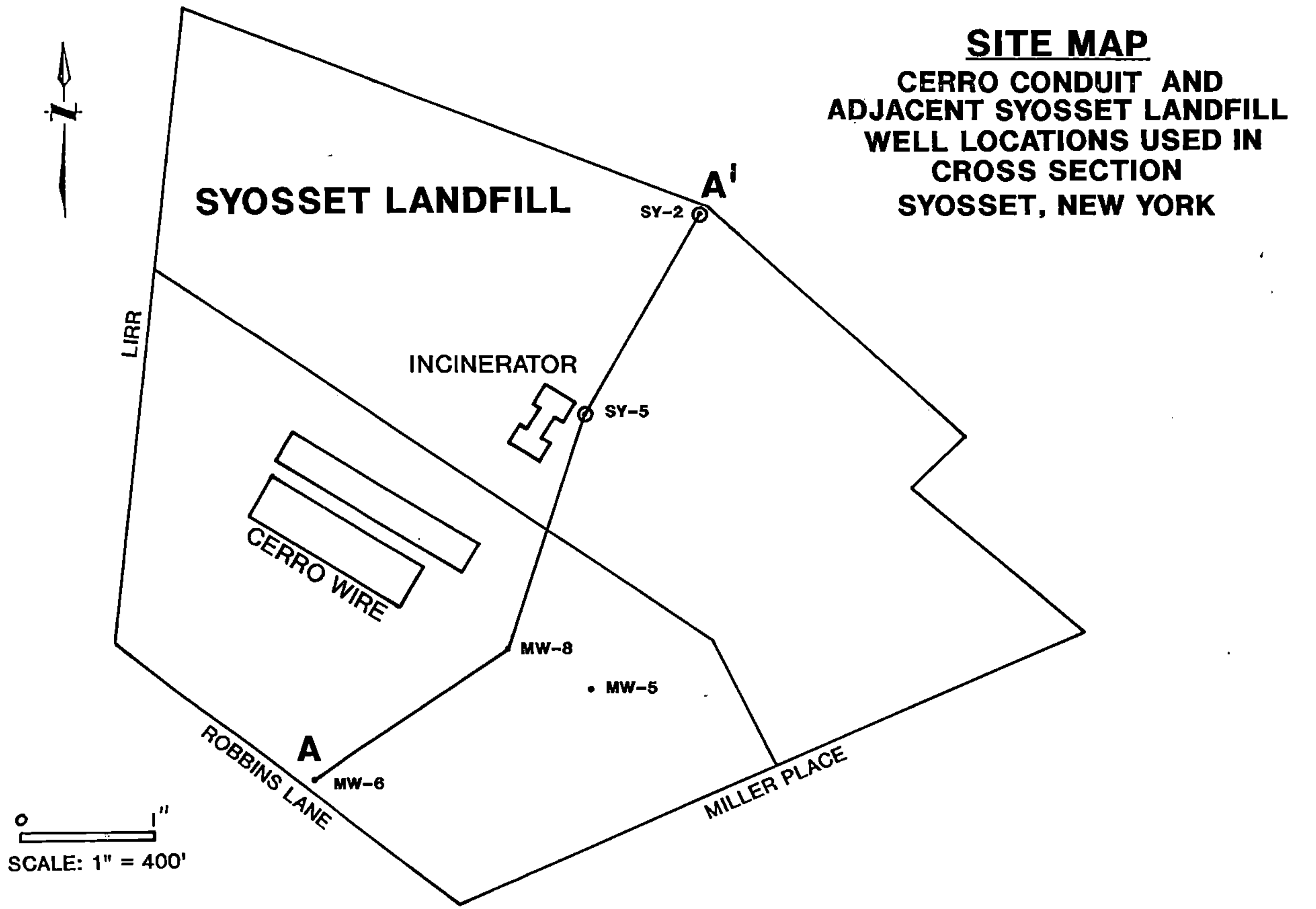

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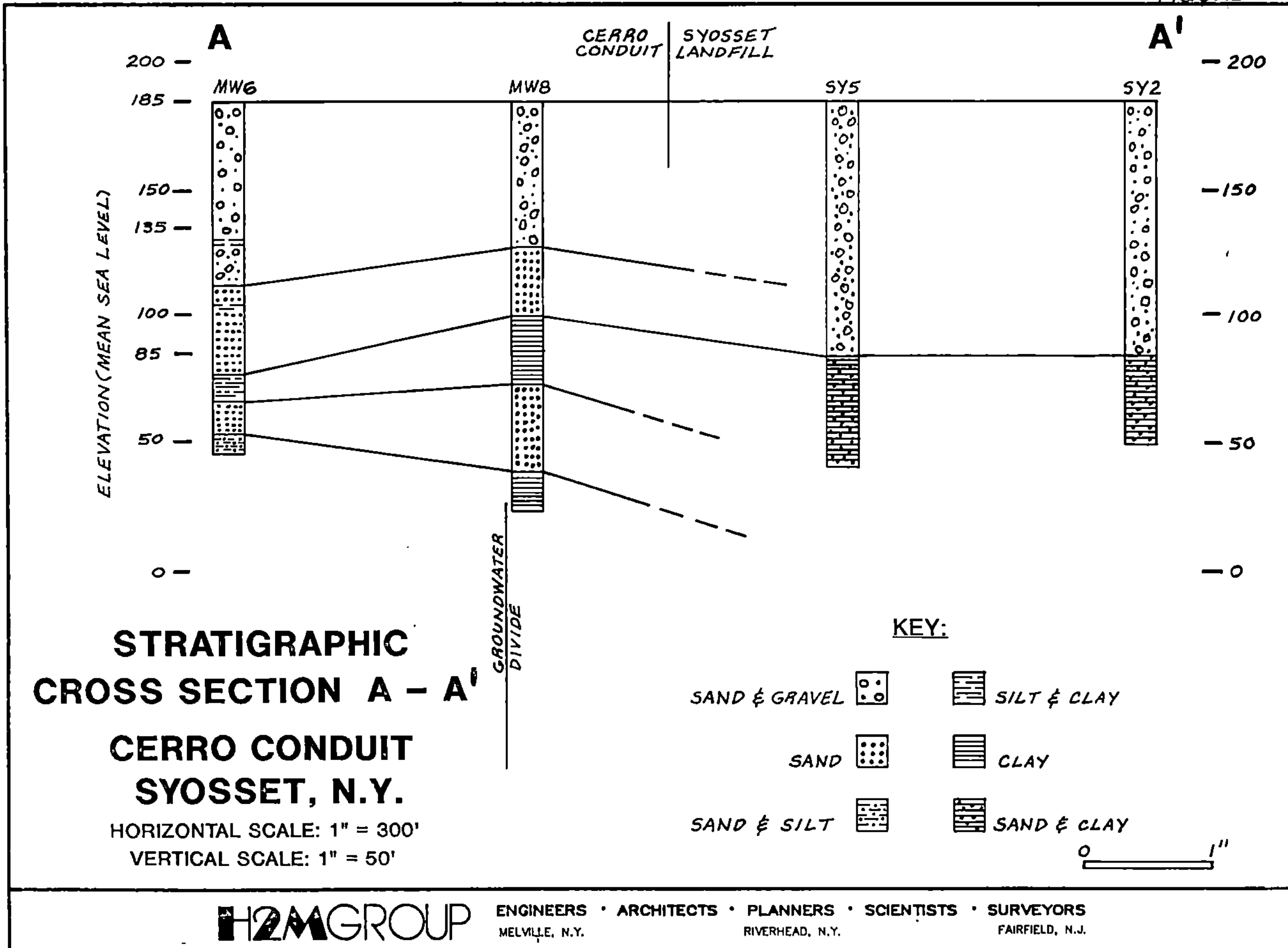
FIGURE 6



A
A'
CERRO CONDUIT
SYOSSET LANDFILL
200
185
150
135
100
85
50
0
ELEVATION (MEAN SEA LEVEL)
MW6
MW8
SY5
SY2
GROUNDWATER DIVIDE
STRATIGRAPHIC CROSS SECTION A – A'
CERRO CONDUIT
SYOSSET, N.Y.
HORIZONTAL SCALE: 1" = 300'
VERTICAL SCALE: 1" = 50'
KEY:
SAND & GRAVEL
SILT & CLAY
SAND
CLAY
SAND & SILT
SAND & CLAY
0
1"
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142 feet and 160 feet for monitoring wells 6 and 8, respectively, on the Cerro Conduit Site, and 140 feet and 85 feet for wells SY-5 and SY-2, respectively, in the Syosset Landfill area.

5.2.5 - Hydrogeologic Characteristics of the Site

As indicated previously, the Cerro Conduit Site is located above a regional groundwater divide of the Magothy Aquifer. This is an area of significant recharge to middle and lower portions of the aquifer, as well as an area characterized by variable horizontal groundwater direction.

Based upon a total of eleven (11) water table monitoring events from a period starting from August 1987 through January 1989 it has been shown that, although variable, the net resultant groundwater flow direction at the site is in a westerly direction, varying between a north-westerly direction in August to a south-westerly direction in January (Figures 7-12). Therefore, contaminants, if any, originating from the locations of the previously decommissioned sludge basins would move in this westerly direction upon reaching the water table, located approximately 100 ft. below grade. Table 1 provides construction details of all monitoring wells and Table 2 provides a summary of observed water table elevations during the 1 1/2 year period it was monitored at the site.

The average horizontal component of velocity, based upon a horizontal hydraulic conductivity of 520 gpd/ft^2 is 0.16 ft./day. The vertical component of velocity may be estimated from the difference in piezometric heads from the abandoned on-site supply

TABLE 1

MONITORING WELL DETAILS

WELL NO.	DIAMETER (INCHES)	DEPTH OF SCREENED ZONE (FEET)*	GROUND ELEVATION (FEET)*	MEASURING POINT ELEVATION (FEET)*
1	4	83 - 93	170.20	171.51
2	4	95 - 105	176.61	177.81
3	4	100 - 110	187.56	188.26
4	4	113 - 123	191.36	191.85
5	4	120 - 130	181.50	182.40
191.13 6	4	102 - 112	187.62	187.67
7	4	122 - 132	188.68	188.64
8	4	131 - 141	187.75	187.84

* All elevations are in feet above mean sea level.

TABLE 2: WATER TABLE ELEVATIONS
(ALL ELEVATIONS ARE IN FEET)

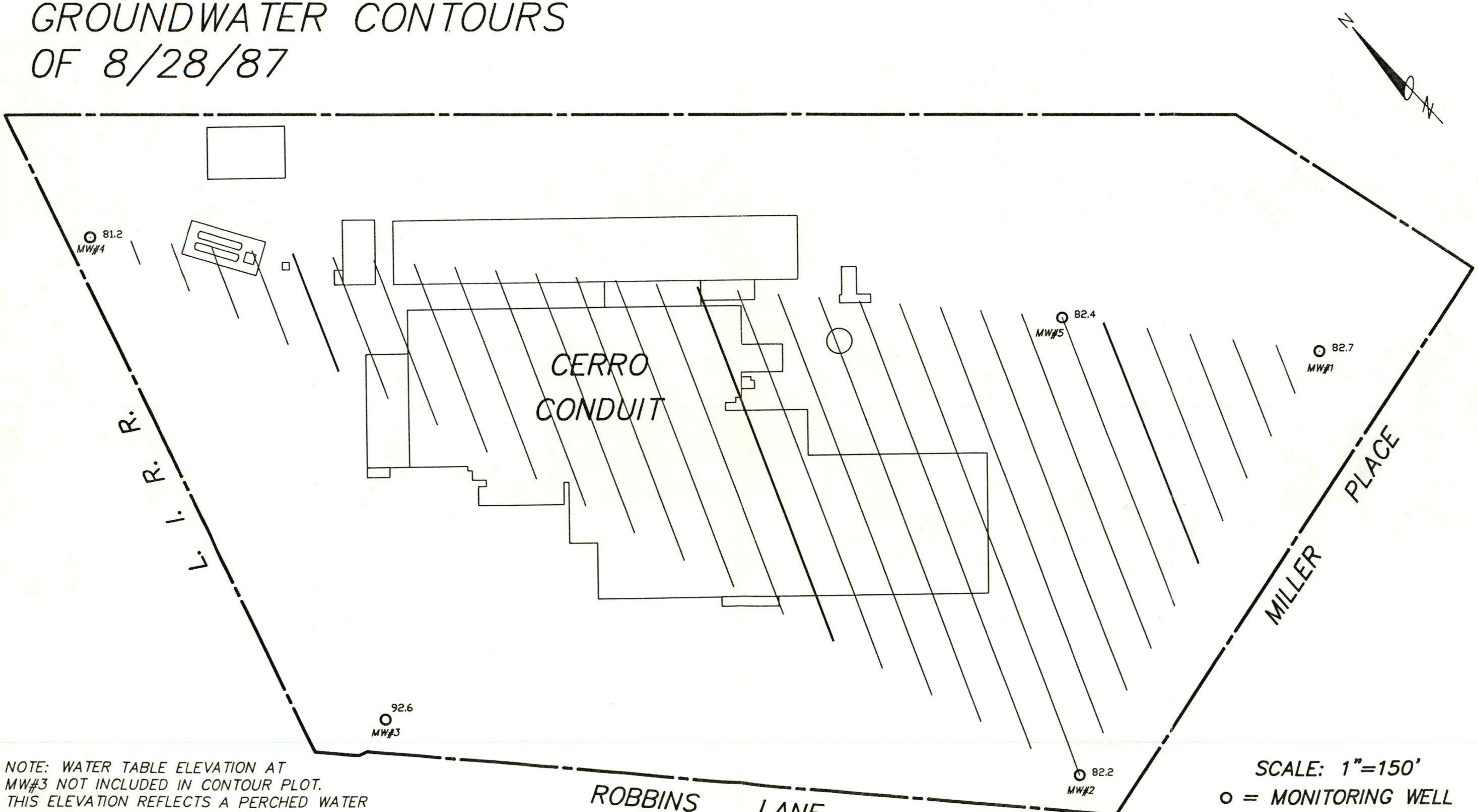
WELL NO.	DATE: REFERENCE ELEVATION	8/21/87 DEPTH TO WATER	8/21/87 WATER TABLE ELEVATION	8/28/87 DEPTH TO WATER	8/28/87 WATER TABLE ELEVATION	9/14/87 DEPTH TO WATER	9/14/87 WATER TABLE ELEVATION	9/28/87 DEPTH TO WATER	9/28/87 WATER TABLE ELEVATION	10/29/87 DEPTH TO WATER	10/29/87 WATER TABLE ELEVATION	12/2/87 DEPTH TO WATER	12/2/87 WATER TABLE ELEVATION	12/14/87 DEPTH TO WATER	12/14/87 WATER TABLE ELEVATION
1	171.55	88.72	82.83	88.85	82.7	89.06	82.49	89.20	82.35	89.60	81.95	90.03	81.52	90.13	81.42
2	177.85	95.44	82.41	95.61	82.24	95.79	82.06	95.86	81.99	96.22	81.63	96.65	81.20	96.74	81.11
4	191.8	110.75	81.05	110.69	81.11	109.52	82.28	109.65	82.15	109.86	81.94	109.65	82.15	109.97	81.83
5	182.61	99.89	82.72	100.02	82.59	100.15	82.46	100.32	82.29	100.60	82.01	100.99	82.62	101.02	81.59
6	187.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	188.64	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	188.84 187.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 2: WATER TABLE ELEVATIONS (CONT'D)
(ALL ELEVATIONS ARE IN FEET)

WELL NO.	DATE: REFERENCE ELEVATION	11/28/88 DEPTH TO WATER	11/28/88 WATER TABLE ELEVATION	1/18/89 DEPTH TO WATER	1/18/89 WATER TABLE ELEVATION	2/2/89 DEPTH TO WATER	2/2/89 WATER TABLE ELEVATION
1	171.55	92.14	79.41	92.36	79.19	92.39	79.16
2	177.85	98.98	78.87	99.03	78.82	99.14	78.71
4	191.8	112.53	79.27	112.49	79.31	112.50	79.30
5	182.61	103.45	78.16	103.37	79.24	103.34	79.27
6	187.67	108.95	78.72	109.10	78.57	109.13	78.54
7	188.64	109.72	78.92	109.67	78.97	109.66	78.98
8	188.84 187.84	108.90	78.94	108.56	79.28	108.53	79.31

FIGURE 7

MAGOTHY AQUIFER GROUNDWATER CONTOURS OF 8/28/87

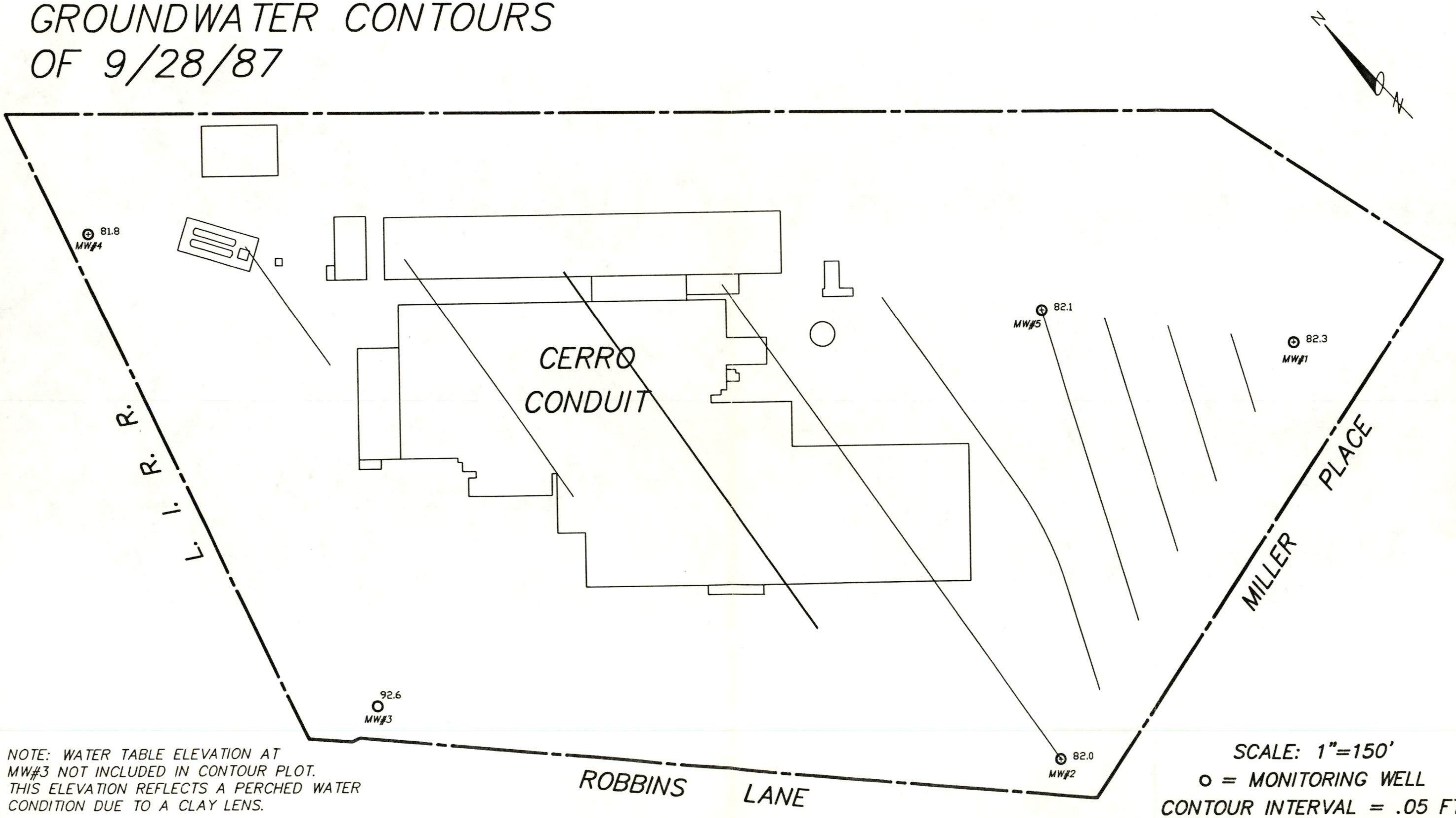


NOTE: WATER TABLE ELEVATION AT MW#3 NOT INCLUDED IN CONTOUR PLOT. THIS ELEVATION REFLECTS A PERCHED WATER CONDITION DUE TO A CLAY LENS.

SCALE: 1"=150'
O = MONITORING WELL
CONTOUR INTERVAL = .05 FT

MAGOTHY AQUIFER GROUNDWATER CONTOURS OF 9/28/87

FIGURE 9

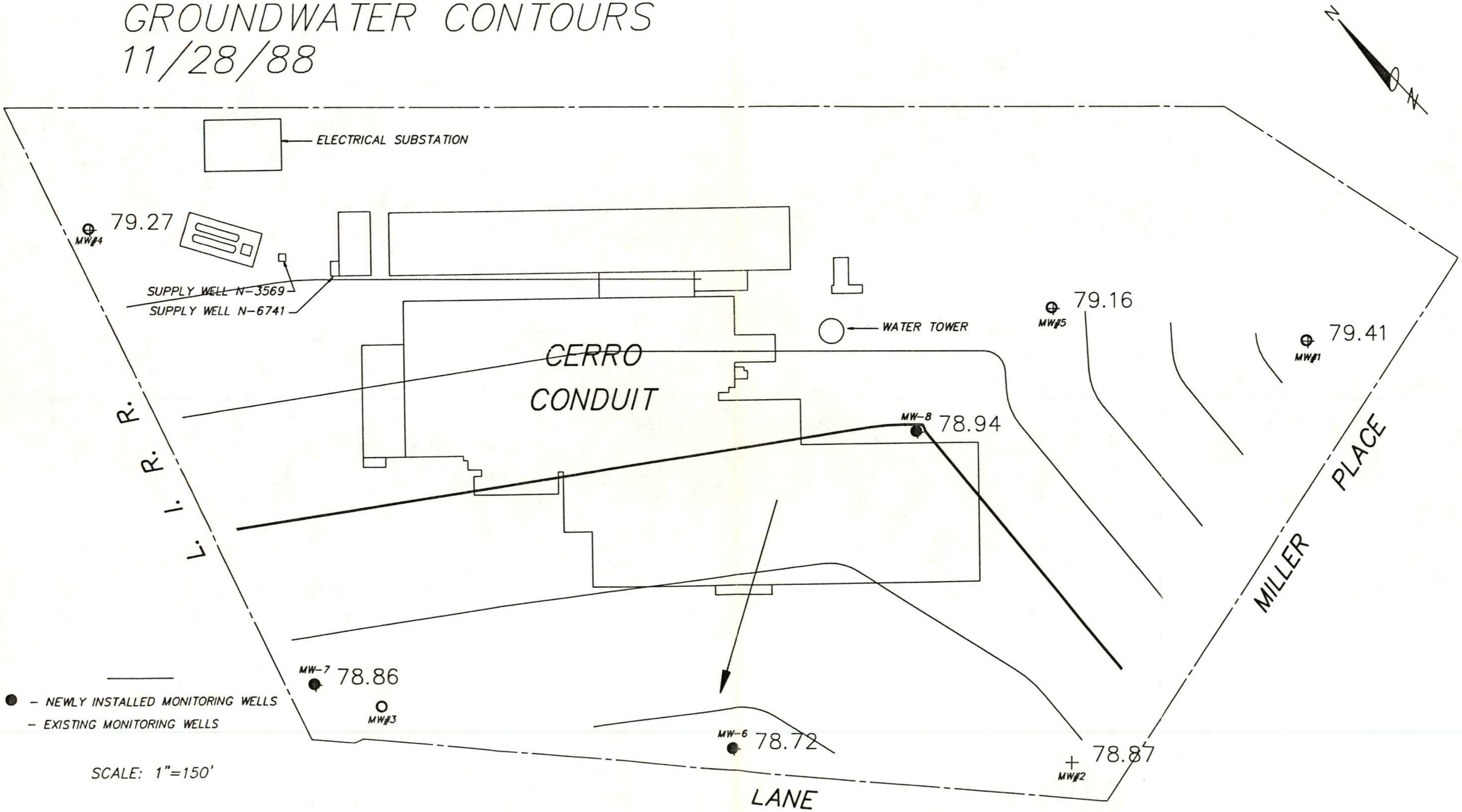


NOTE: WATER TABLE ELEVATION AT MW#3 NOT INCLUDED IN CONTOUR PLOT. THIS ELEVATION REFLECTS A PERCHED WATER CONDITION DUE TO A CLAY LENS.

SCALE: 1"=150'
o = MONITORING WELL
CONTOUR INTERVAL = .05 FT

FIGURE 11

MAGOTHY AQUIFER GROUNDWATER CONTOURS 11/28/88



● – NEWLY INSTALLED MONITORING WELLS

– EXISTING MONITORING WELLS

SCALE: 1"=150'

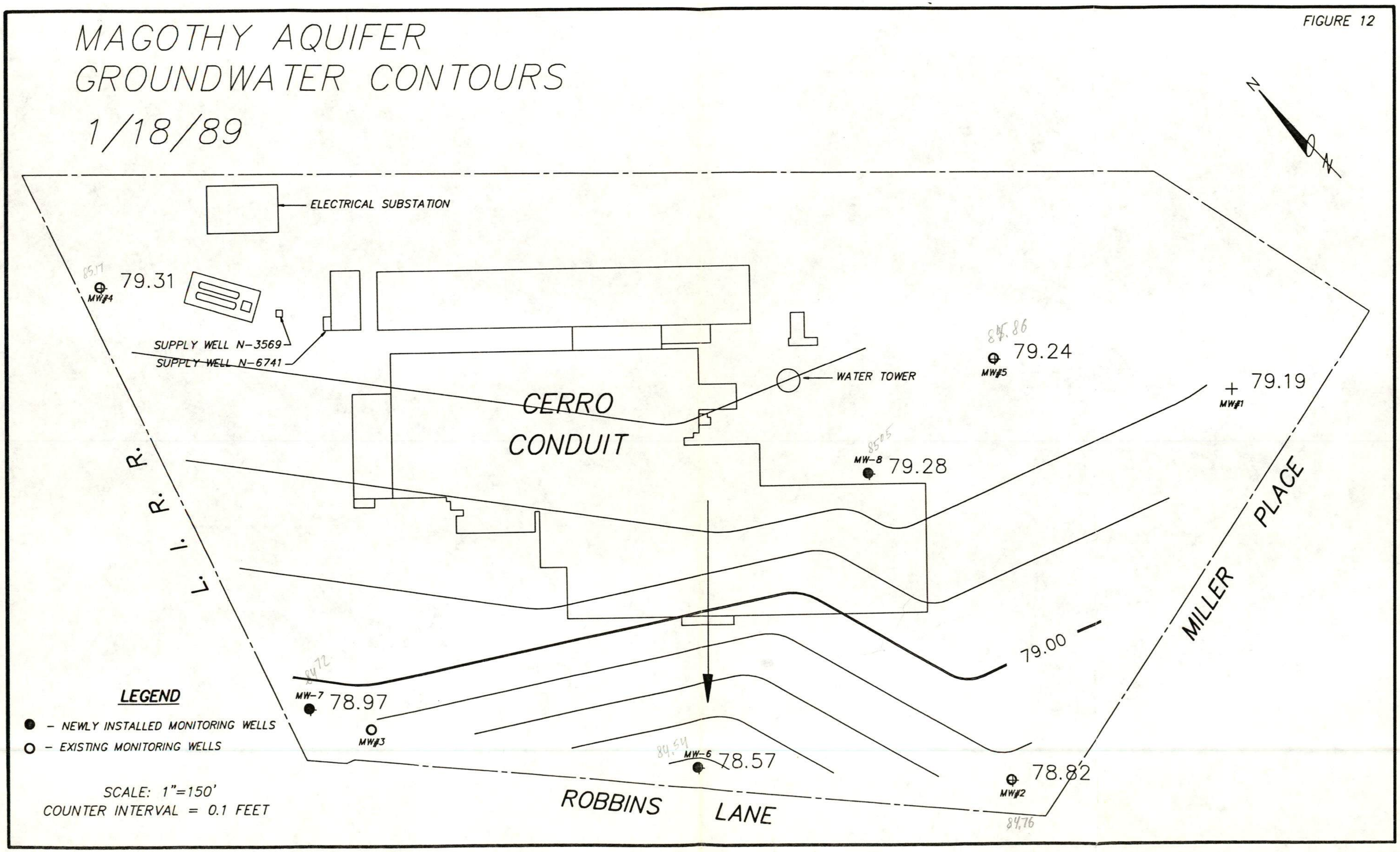


FIGURE 12
MAGOTHY AQUIFER
GROUNDWATER CONTOURS
1/18/89
N
ELECTRICAL SUBSTATION
79.31
MW#4
SUPPLY WELL N-3569
SUPPLY WELL N-6741
WATER TOWER
79.24
MW#5
79.19
MW#1
CERRO
CONDUIT
MW-8
79.28
L. I. R. R.
MILLER PLACE
79.00
LEGEND
- NEWLY INSTALLED MONITORING WELLS
- EXISTING MONITORING WELLS
MW-7
78.97
MW#3
MW-6
78.57
78.82
MW#2
SCALE: 1"=150'
COUNTER INTERVAL = 0.1 FEET
ROBBINS LANE

well N-6741 (423 ft. depth) and on-site water table monitoring wells (approx. 100 ft. deep) along with an average vertical hydraulic conductivity of 13 gpd/ft^2. Therefore, the vertical component of groundwater velocity is computed to be 0.03 ft./day.

5.3 - GROUNDWATER QUALITY

5.3.1 - Phase I Groundwater Sampling

For the Phase I Hydrogeologic Investigation presented in the December 1987 report, groundwater samples were collected on three separate occasions: August 28, October 29 and December 2, 1987.

The first round of groundwater samples was collected from each of the four monitoring wells (MW-1, 2, 3 and 4) on August 28, 1987. These samples, along with quality assurance/quality control (QA/QC) trip and field blank samples, were analyzed for USEPA Target Compound List (TCL) metals, volatile organic compounds and Total Organic Halides (TOX).

The data indicates that groundwater at these wells have not been affected by volatile organic contamination. Acetone, associated with decontamination of the sampling bailer, was found in the samples from all monitoring wells at concentrations ranging from 0.017 to 0.061 ppm. However, it was also found in the field and trip QA/QC blanks, as well as in the method blank.

In addition to acetone, laboratory equipment indicated the presence of trace levels of methylene chloride and trichloroethane in three of the monitoring wells, but below the quantification limit, which is well below applicable standards.

Groundwater samples from each of the four monitoring wells were also analyzed for total organic halides (TOX). TOX includes the volatile organic halogens (POX), such as chlorinated organic solvents and the trihalomethanes, as well as the non-purgeable organic halogens, such as pesticides, semi-volatiles, etc. The highest TOX value was observed in MW-1 at 0.904 parts per million (ppm). The field blank had a value of 0.023 ppm. These data would appear to indicate the presence of non-TCL volatile organics, or higher molecular weight organics (semi-volatiles) in these wells.

The total metal data developed from the August 1987 sampling episode were from unfiltered groundwater samples of unknown turbidity and, therefore, represent the concentrations of metals in suspended soil particles, as well as metals dissolved in the groundwater. It also included results from the sampling of MW-3 which was perched water as previously described, and not truly indicative of aquifer quality.

This early data indicated that iron, lead, manganese and mercury were found at concentrations above either New York State Ambient Water Quality Standards or Guidelines. However, it was suspected that the elevated levels of metals were attributable to suspended fine clay and silt particles found in the groundwater samples. The second round of groundwater samples, obtained on October 29, 1987 confirmed this.

Because of the concentration of TOX found in MW-1 during the August sampling event, the October sampling event included an analysis for base neutral/acid extractable organic contaminants. For this event, samples were collected from each of the four monitoring wells (MW-1, 2, 3 and 4), and from the pre-existing monitoring well (MW-5). These samples were also analyzed for volatile halogenated and non-halogenated organics, chloride, cyanide, fluoride, hardness, ammonia, nitrate, sulfate, suspended solids and total dissolved solids. In addition, samples from MW-1 and MW-3, where the highest TOX values were previously detected, were analyzed for base neutral/acid extractables.

The results of the laboratory analyses indicated that no volatile organics were detected in the five monitoring wells or in the trip and field blank. Furthermore, with acetone eliminated from the decontamination protocol, none was found in the groundwater. In addition, no base neutral/acid extractable organic contaminants were detected in MW-1 or MW-3.

None of the parameters tested for in this first phase of sampling exceed applicable state or federal groundwater quality standards for those parameters in which standards are promulgated.

Another round of sampling was conducted on December 2, 1987. Samples were collected from all five monitoring wells and analyzed for dissolved metals, including cadmium, chromium, copper, iron, manganese, and lead. These samples were filtered prior to preservation and analysis. Therefore, unlike previous rounds of samples, these results are more representative of metals dissolved in the groundwater. The only parameter which exceeds groundwater standards was the iron concentration of 0.38 ppm found in MW-3. This concentration only barely exceeds the limit, and is assumed to be naturally occurring in the soils. Additionally, MW-3 reflects perched water and is not indicative of the water in the aquifer.

To summarize, previous sampling events, three prior rounds of sampling indicated that priority pollutant organic compounds are not present in quantifiable concentrations at the wells, and that the concentrations of metals detected in the first round of samples are attributed primarily to turbidity due to fine, naturally occurring sediments such as silt and clay.

Supply Well Sampling Results

Appendix A includes a summary table that presents data on the quality of water that was pumped from the two high capacity (1,000 gpm) supply wells also located within the Cerro site (see Figure 2 for locations). The shallower well, N-3569, located approximately 200 feet south of the landfill, has an intake zone of 198 to 349 feet below grade. The deeper well, N-6741, is located approximately 220 feet south of the landfill and has an intake zone of 373 to 423 feet below grade.

The levels of chloride, iron, magnesium, calcium, total nitrogen, conductivity, total solids and pH detected in the shallower Cerro well during the February 13, 1986, sampling by the Nassau County Department of Health were elevated in comparison to the deeper well. Each of the aforementioned parameters is a characteristic indicator of leachate contamination generated by shallow land burial of municipal wastes (Brunner and Carnes, 1974). It is therefore likely that the Upper Magothy groundwater in the vicinity of the intake zones of these supply wells has been impacted by leachate generated at the Syosset Landfill. The vertical and areal extent of contamination generated by the Syosset Landfill are currently being investigated by the Town of Oyster Bay, under the direction of the USEPA.

5.3.2 - Phase II Groundwater Sampling

After completion of the newly installed monitoring wells (MW-6, MW-7 and MW-8), a complete groundwater analysis of all seven wells was conducted. Sampling was conducted from November 28, 1988, through December 2, 1988. Groundwater samples were analyzed for full TCLP analysis, as well as TOX, cyanide and leachate indicators. This last analysis utilized USEPA Contract Laboratory Program (CLP) analysis and reporting protocols as requested by NYSDEC. All of these samples were unfiltered. The leachate indicator parameters are ammonia, chloride, fluoride, nitrate, sulfate, suspended solids, total dissolved solids and hardness. The following subsections summarize each class of parameters quantified in the groundwater analysis. Tables 3 to 6 summarize the extensive data packages generated by the CLP laboratory analyses. For a more complete representation of the analyses, the raw data is submitted as a five volume set of laboratory data packages (Exhibits 1-5).

Metal Compounds Quantified in Groundwater

The total metals data are from unfiltered groundwater samples and, therefore, represent the concentrations of metals in any suspended soil particles, as well as metals dissolved in groundwater. As summarized in Table 3 and similar to the previous rounds of groundwater samples, groundwater was found to be generally not impacted. However, from a relative standpoint, upgradient well MW-1 shows the highest levels of metal concentration. There are trace amounts of copper and chromium in this well, although substantially below the drinking water standards. As is typically found in Long Island's drinking water, iron, lead, and magnesium levels were found to be slightly above the New York State Water Quality Standards/Guidance Values.

The only other well with parameters found above the New York State Water Quality Standard is MW-7. Again, iron was found at a concentration of 0.58 ppm and manganese with a concentration of 1.65 ppm. All of the other wells show that metals are present, but the concentrations are significantly below drinking water standards. The iron and manganese found are naturally occurring in Long Island's soils. However, very high concentrations of iron are also linked to indicators of leachate generated by municipal landfills.

TABLE 3

CERRO CONDUIT WIRE

METAL COMPOUNDS QUANTIFIED IN GROUNDWATER (PPM)

Parameter	MW-1	MW-2	MW-4	MW-5	MW-6	MW-7	MW-8	NYS Water Quality Guidance(a)	NYSDEC Standards(b)	EPA MCL(c)	NYS HD Drinking Water (d)
Aluminum	1.42	-	-	-	.299	-	-	--	--	--	--
Antimony	-	-	-	-	-	-	-	.003	--	--	--
Arsenic	-	-	-	-	.013	-	-	--	.025	.050	.10
Barium	-	-	-	-	-	-	-	--	1.0	--	1.0
Beryllium	-	-	-	-	-	-	-	.003	--	--	--
Cadmium	-	-	-	-	-	-	-	--	.01	.01	.01
Calcium	7.26	2.878	9.01	37.67	43.22	21.6	47.2	--	--	--	--
Chromium	.013	-	-	-	-	-	-	--	.50	.50	.50
Cobalt	-	-	-	-	-	-	-	--	--	--	--
Copper	.312	.069	-	.026	-	-	.049	--	1.0	--	1.0
Iron	1.709	-	.28	.30	.302	.584	.123	--	.3	--	.3
Lead	.056	-	-	.005	-	-	-	--	.025	.050	.05
Magnesium	63.82	-	-	10.0	-	6.33	12.78	35.0	--	--	--
Manganese	.065	.083	.087	.02	.028	1.65	.017	--	.3	--	.3
Mercury	-	-	-	-	-	-	-	--	.002	.002	.005
Nickel	-	-	-	-	-	-	-	--	--	--	--
Potassium	-	-	-	-	-	-	-	--	--	--	--
Selenium	-	-	-	-	-	-	-	--	.02	.01	.01
Silver	-	-	-	-	-	-	-	--	.05	.05	.05
Sodium	7.953	-	6.640	24.2	84.8	64.2	65.00	--	--	--	--
Thallium	-	-	-	.067	-	-	-	.004	--	--	--
Vanadium	--	-	-	-	.015	-	-	--	--	--	--
Zinc	.198	.092	-	-	.026	.871	.100	--	5.0	--	5.0

Notes:

a = New York State Ambient Water Quality Guidance Values; Revised July 24, 1985

b = New York State Department of Environmental Conservation; Groundwater classifications, Quality Standards, Title 6 Part 703, Sept. 1, 1978

c = United States Environmental Protection Agency - Maximum Contaminant Levels

d = Part 72 New York State Health Department Drinking Water Standards Adopted 12/31/74

-- = No established value

\- = Analyte below detection limit

Volatile Organics Quantified in Groundwater

The data as summarized in Table 4 shows that the groundwater beneath the Cerro facility was found to be generally not impacted by volatile organics. None of the wells have concentrations above the New York State Ambient Water Quality Guidance Values or Groundwater Quality Standards. The trace amounts of methylene chloride, acetone, toluene, 2-butanone and 1,1-trichloroethane found in the wells were also present in the method blank, field blank and trip blank at equivalent or higher concentrations than found in the well samples. This indicates that these contaminants are probably not present in the groundwater, but actually introduced by the laboratory or from the decontamination of sampling equipment. Additionally, however, monitoring well MW-8 was found to have trichloroethane and chloroform (0.005 and 0.013 ppm, respectively) well below the New York State Water Quality Standards.

Semi-Volatile Organics and Pesticides

The data for the monitoring wells show that, except for one parameter probably introduced by the laboratory, semi-volatile organics are not present above detection limits. The compound, bis (2-ethylhexyl) phthalate, was found in samples from all seven wells on site along with the laboratories method blanks. The concentrations as shown in Table 5 range from 0.008 ppm to 0.082 ppm.

TABLE 4

Volatile Organics Quantified In Groundwater (ppm)

Compound	MW-1	MW-2	MW-4	MW-5	MW-6	MW-7	MW-8	Method Blank	Field Blank	Trip Blank	NYS Water Quality (a)	NYS Health Dept. (b)
Methylene Chloride	.008 B	---	.013 B	.024 B	.026 B	.007 B	.029 B	.018	.023 B	.025 B	.050 (2)	.005
Acetone	.020 B	---	.013 B	.029 B	.035 B	.019 B	.027 B	.028	.079	.045 B		.005
Chloroform	---	---	---	---	.005	---	.013	---	---	---	.10 (1)	.005
2-Butanone	---	---	---	---	.011 B	.011 B	.011 B	.010	.041 B	.021 B		.005
1,1,1-Trichloroethane	---	---	---	.028 B	.018 B	---	.034 B	.004 J	.016 B	.024 B	.050 (1)	.005
Toluene	---	---	.018 B	.039 B	.028 B	.028 B	.030 B	.024	.030 B	.035 B	.050 (2)	.005
Trichloroethene	---	---	---	---	---	---	.005	---	---	---	.010 (1)	.005

Notes:

a = New York State Ambient Water Quality Standards and Guidance Values; Revised July 24, 1985
(1) = Standard Value
(2) = Guidance Value

b = New York State Health Department, Drinking Water Standards; January 9, 1989

B = Analyte found in all three (3) Blank Samples

J = Estimated Value

--- = Analyte below detection limit

TABLE 5

PESTICIDE ORGANICS AND SEMIVOLATILE ORGANICS QUANTIFIED IN GROUNDWATER (PPM)

Pesticide Organics

Compound	MW-1	MW-2	MW-4	MW-5	MW-6	MW-7	MW-8	Method Blank	NYS Water Quality (a) Standard
4,4 - DDT	-	-	-	-	.00022	.00007	.00041	-	Not Detectable
4,4'- DDD	-	-	-	-		-	.00008	-	Not Detectable

Semivolatile Organics

Compound	MW-1	MW-2	MW-4	MW-5	MW-6	MW-7	MW-8	Method Blank 429	Method Blank 430	Method Blank 436	NYS Water Quality (a) Standard
bis (2-Ethylhexyl) phthalate	.012B	.010 JB	.074 B	.082 B	.008 JB	.014 B	.053 B	.014	.027	.007 J	4.2

Notes:

a = New York State Ambient Water Quality Standards and Guidance Values; Revised July 24, 1985

B = Analyte found in Method Blank(s) Samples

J = Estimated Value

\- = Analyte Below Detection Limit

TABLE 6

CYANIDE AND LEACHATE INDICATOR COMPOUNDS

QUANTIFIED IN GROUNDWATER (PPM)

Compound	MW-1	MW-2	MW-4	MW-5	MW-6	MW-7	MW-8	NYSDEC Standards (a)	US EPA MCL (b)
Cyanide	.062	<.010	<.010	.028	<.010	<.010	<.010	.2	--
Ammonia	<.2	<.2	<.2	<.2	<.2	<.2	<.2	--	--
Chloride	<2.0	<2.0	2.0	25.0	86.0	98.0	92.0	250.0	--
Fluoride	.25	<.10	<.10	.53	1.40	.14	2.0	1.5	1.41 to 2.4
Nitrate	2.0	1.6	1.4	5.90	9.90	5.60	10.3	10.0	10.0
Sulfate	205.0	13.0	21.0	75.0	105.0	75.0	115.0	250.0	--

Notes:

a = New York State Department of Environmental Conservation; Groundwater classification, quality standards, Title 6 Part 703, September 1, 1978.

b = United State Environmental Protection Agency maximum contaminant levels for drinking water

-- = No established value

Of the pesticides tested for, only 4,4-DDD and 4,4'-DDT were present in trace concentration in the groundwater. The pesticide 4,4-DDD was quantified at a concentration of 0.00008 ppm. Concentrations of 4,4-DDT found in MW-6, 7 and 8 ranged from 0.00007 ppm to 0.00041 ppm. These pesticides are probably associated with farming on Long Island and are probably not related to prior activities at Cerro.

Cyanide and Leachate Indicator Compounds

The leachate indicator compounds analyzed for included ammonia, chloride, fluoride, nitrate and sulfate. None of these parameters were found above NYSDEC standards or EPA maximum contaminant levels for drinking water.

Cyanide was quantified in two wells (MW-1 and MW-5) above the detection limit of 0.01 ppm at concentrations of 0.062 ppm and 0.028 ppm, respectively. However, these concentrations are well below the NYSDEC standard of 0.2 ppm.

5.3.3 Groundwater Quality Summary

The previous data reported in the December 1987 "Hydrogeologic Investigation Report" along with the new data developed for this Phase II Investigation indicates that groundwater at the Cerro Conduit Site is generally not impacted at concentrations above New York State or USEPA standards. Compounds considered indigenous to Long Island's groundwater including iron, manganese and trace concentrations of pesticides used in farming have been detected, but are not attributed to

Cerro Conduit's previous operations. As indicated by these findings and supported by the resulting HRS score (see Appendix D) of only 8 on USEPA Mitre Model, this site, from a hydrogeologic standpoint, should be reclassified to be taken off the NYS Inactive Hazardous Waste Site List.

APPENDIX A

CONCENTRATIONS OF TARGET COMPOUND LIST (TCL) METALS AND TOTAL ORGANIC HALIDES (TOX) QUANTIFIED IN ROUND ONE GROUNDWATER SAMPLES (ppm)

PARAMETER	MW#1	MW#2	MW#3	MW#4	FIELD BLANK	TRIP BLANK	NEW YORK STATE GROUNDWATER STANDARD (a)	USEPA MCL (b)
A.	2.340	.490	.990	.210	-	-	-	-
As	.005	-	.007	-	-	-	0.025	0.05
Ba	.270	.390	.300	.320	-	-	1.0	1.0
Be	.003	.003	.004	.004	-	-	-	-
Cd	.003	.006	.004	.004	-	-	0.01	0.01
Ca	8.600	4.710	9.280	9.410	.070	.110	-	-
Co	-	.010	.011	-	-	-	-	-
Cu	.210	.535	.406	.043	-	-	1.0	-
Fe	1.087	.395	1.166	.623	-	-	.3	-
Pb	.058	.128	.047	.025	.021	.004	0.025	0.05
Mg	88.400	1.490	3.890	1.750	-	-	-	-
Mn	.093	.102	.601	.171	-	-	.3	-
Hg	.0015	.0025	-	-	-	-	0.002	0.002
K	2.810	.769	2.403	.707	-	-	-	-
Na	13.500	8.540	26.770	7.350	.130	.140	-	-
V	.250	-	.420	.990	.090	.080	-	-
Zn	.180	.262	.189	.226	.007	.004	5.0	-
TOX	.904	.238	.380	.296	.023	-	-	-
CONDUCTIVITY	750	80	250	105	*	*		
pH	7.33	5.97	7.16	5.05	*	*		

NOTE : * = NOT MEASURED.
- = NOT DETECTED.
(a) = N.Y.S. GROUNDWATER QUALITY STANDARDS, 6 NYCRR 703.
(b) = USEPA MAXIMUM CONTAMINANT LEVELS FOR DRINKING WATER.

CONCENTRATIONS OF INORGANIC COMPOUNDS QUANTIFIED IN ROUND TWO GROUNDWATER SAMPLES (ppm)

PARAMETER	DATE	MW#1	MW#2	MW#3	MW#4	MW#5	NEW YORK STATE GROUNDWATER STANDARD (a)	USEPA MCL (b)
UNFILTERED Ag	OCT. 29	<	<	<	<	<	0.05	0.05
" As	"	.013	.008	.011	.007	.005	0.025	0.05
" Be	"	<	<	<	<	<	-	-
" Ca	"	8.9	5.4	11.7	9.4	53.7	-	-
" Cd	"	<	<	.015	<	<		
FILTERED Cd	DEC. 2	<	<	<	<	<	0.01	0.01
UNFILTERED Cr	OCT. 29	<	<	.15	<	<		
FILTERED Cr	DEC. 2	<	<	<	<	<	-	0.05
UNFILTERED Cu	OCT. 29	.36	.51	3.49	.10	.08		
FILTERED Cu	DEC. 2	.03	.07	<	.05	<	1.00	-
UNFILTERED Fe	OCT. 29	2.68	2.74	24.0	1.17	.40		
FILTERED Fe	DEC. 2	<	<	.38	.14	.03	.3	-
UNFILTERED Hg	OCT. 29	.0008	<	<	<	<	0.002	0.002
" Mg	"	95	1.8	9.6	2.0	11.4	-	-
" Mn	"	.07	.14	4.91	.19	<		
FILTERED Mn	DEC. 2	<	.06	.02	.10	.03	.3	-
UNFILTERED Na	OCT. 29	19.4	10.8	31.5	12.0	67.3	-	-
" Ni	"	<	<	.14	<	<	-	-
" Pb	"	.015	.032	.110	.008	.007		
FILTERED Pb	DEC. 2	<	<	<	<	<	0.025	0.05
UNFILTERED Sb	OCT. 29	<	<	<	<	<	-	-
" Se	"	<	<	<	<	<	0.02	0.01
" Tl	"	<	<	<	<	<	-	-
" Zn	"	.11	.20	.95	.20	.09	5.00	-
CHLORIDE	OCT. 29	51	6	5	18	4	250.0	-
CYANIDE	"	.090	.010	<	<	.194	.2	-
FLUORIDE	"	.16	<	<	<	.36	1.5	1.4 TO 2.4
HARDNESS	"	411.75	20.88	68.61	31.70	180.99	-	-
AMMONIA	"	<	<	.05	.20	<	-	-
NITRATE	"	7.8	3.3	1.2	1.9	1.2	10.0	10.0
SULFATE	"	80	10	15	15	20	250.0	-
SUSP. SOLIDS	OCT. 29	2580	1440	5570	600	100		
TOT. DISS. SOLIDS	"	460	80	250	90	400		
pH	"	6.94	5.64	6.66	5.61	7.94		
SPEC. CONDUCTIVITY	"	784	84	177	108	641		
pH	DEC. 2	7.02	5.69	6.64	5.44	7.31		
SPEC. CONDUCTIVITY	"	690	86	140	130	630		

NOTE : < = BELOW DETECTION LIMIT.
(a) = N.Y.S. GROUNDWATER QUALITY STANDARDS, 6 NYCRR 703.
(b) = USEPA MAXIMUM CONTAMINANT LEVELS FOR DRINKING WATER.

CONCENTRATIONS OF INORGANIC COMPOUNDS QUANTIFIED IN ON-SITE WATER SUPPLY WELLS (ppm)
(SOURCE : NASSAU COUNTY DEPARTMENT OF HEALTH)

	2/18/82		4/22/83		2/13/86	
PARAMETER	N-3569	N-6741	N-3569	N-6741	N-3569	N-6741
Ag	<	<	<	<	<	<
As	<	<	<	<	<	<
Ba	<	<	<	<	<	<
Ca	37.5	8.5	17.2	18.4	41.5	29.5
Cd	<	<	<	.002	<	<
Cr (tot.)	<	<	<	<	<	<
Cu	<	<	<	<	<	.06
Fe (tot.)	.3	.66	11	.3	14.6	.64
Hg	<	<	-	-	-	-
K	2.1	.8	.8	.8	3.4	1.5
Mg	16.5	2.7	5.5	5.6	15.3	8.4
Mn	<	<	.16	<	.21	<
Na	82	11	31	32	110	49
Pb	<	<	<	<	.01	.03
Se	<	<	<	<	<	<
Zn	-	-	-	-	.18	.75
ALKALINITY	13	5	8	6	72	12
CHLORIDE	93.7	17.8	37.8	37.4	140	60.6
CO2 (tot.)	20	10	16	23	22	29
FLUORIDE	<	<	<	<	<	<
HARDNESS (Ca)	94	21	43	46	104	74
HARDNESS (tot.)	162	34	85	70	193	109
MBAS	.04	<	<	<	-	-
AMMONIA	.75	.02	.34	.03	3.8	.47
NITRITE	.07	.002	.085	.006	.233	.03
NITRATE	7.63	2.64	3.18	4.12	4.08	6.97
pH	6.1	6	6	5.7	6.8	5.9
SPEC. CONDUCTIVITY	732	147	295	291	965	498
SiO2	10.3	7.0	6.7	7.9	5.1	6.5
SULFATE	16	26	50	48	150	82
TOTAL SOLIDS	301	89	179	172	546	277

NOTE : < = BELOW DETECTION LIMIT
- = NOT ANALYZED FOR
DEPTH OF WELL N-3569 = 350 FT
DEPTH OF WELL N-6741 = 423 FT

APPENDIX B

APPENDIX C

H2M GROUP
HOLZMACHER, McLENDON & MURRELL, P.C.
Consulting Engineers, Architects
Planners and Scientists

JOB: SYAS 8802 RP
SHEET NO. 1 OF 1
CALCULATED BY: M. Gentils DATE: February 16,
CHECKED BY: MLA DATE: 2/16/89
SCALE:

VERTICAL FLOW COMPONENTS FOR MAGOTHY AQUIFER IN REGARD TO CERRO WELLS

$$V_{hv} = \frac{K_h}{n}\frac{dh}{dl_h} + \frac{K_v}{n}\frac{dh}{dl_v}$$

Magothy Aquifer (Hydraulic Conductivity)
(Site Specific) $K_h = 78$ ft./day
$K_v = 2$ ft./day

$$V_h = \frac{78\text{ft.}}{.3}(.0006) = .156 \text{ ft./day} = 56.9 \text{ ft./year}$$

$$V_v = \frac{2\text{ft.}}{.3}(.0048) = .032 \text{ ft./day} = 11.7 \text{ ft./year}$$

Maximum vertical gradient considering precipitation

40 in/year or 3.33 ft/year

$$\frac{3.33 \text{ ft./year}}{.3} = 11 \text{ ft./year or } .03 \text{ ft/day}$$

AT 600 ft. from the source area

$$\frac{600}{x} = \frac{.156}{.03}$$ $x = 115$ ft. below water table

unsaturated zone = 110 ft.

110' + 115' = 225'

At 150' (actual distance from sludge basins to MW-8) the well depth would need to be ___ ? ft below grade

$$\frac{150'}{x} = \frac{0.156}{.03}$$

x = depth below W.T.
x = 29 ft.
29' + 110' = 139 ft

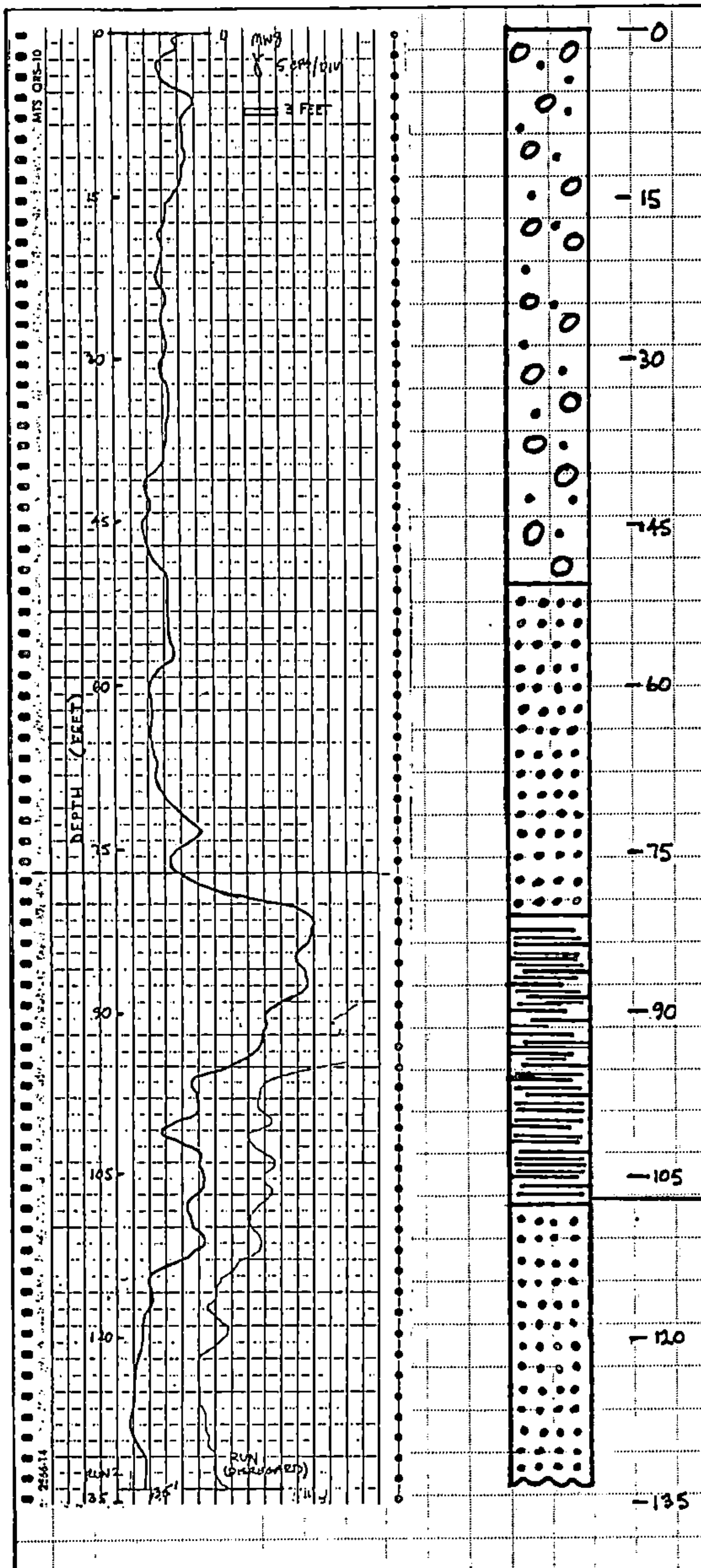
H2M GROUP
HOLZMACHER, McLENDON & MURRELL, P.C.
Consulting Engineers, Architects
Planners and Scientists

JOB SYAS 8802 RP CERRO WIRE
SHEET NO. 1 OF 3
CALCULATED BY KEN COTTRELL DATE 12-21-88
CHECKED BY ________ DATE ________
SCALE 19/20" = 15' vert.

CORRELATION OF NATURAL GAMMA LOG WITH STRATIGRAPHIC CROSS SECTION DEVELOPED FROM WELL LOG

MONITORING WELL 8

CERRO CONDUIT SYOSSET, NEW YORK



KEY:

SAND & GRAVEL

SAND

CLAY

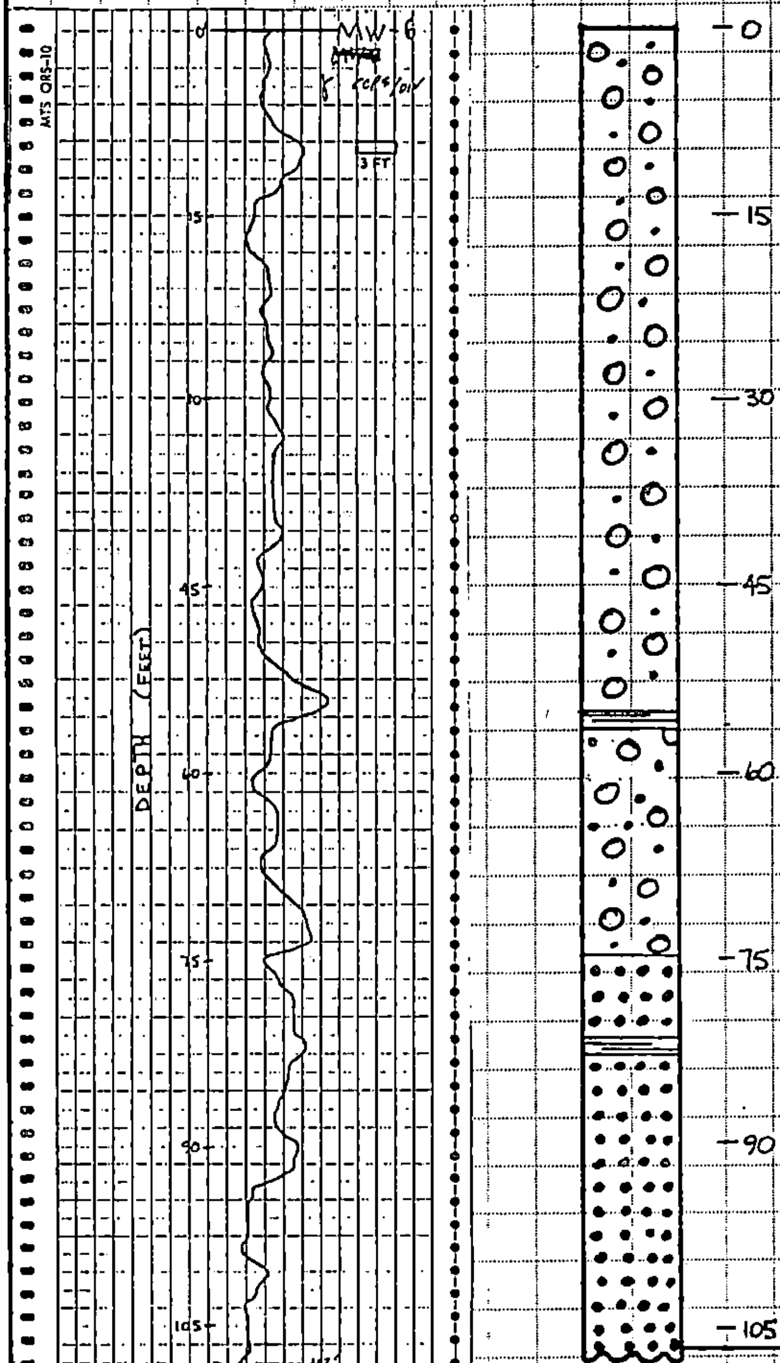
VERTICAL SCALE:

15 FEET

▽ WATER TABLE ELEVATION

H2M GROUP
HOLZMACHER, McLENDON & MURRELL, P.C.
Consulting Engineers, Architects
Planners and Scientists

JOB SYAS 8802 RP CERRO WIRE
SHEET NO. 2 OF 3
CALCULATED BY KEN COTTRELL DATE 12-21-88
CHECKED BY DATE
SCALE 19/20" = 15' vertical 5/8" = 5 ft vertical



CORRELATION OF NATURAL GAMMA LOG WITH STRATIGRAPHIC CROSS SECTION DEVELOPED FROM WELL LOG

MONITORING WELL 6

CERRO CONDUIT
SYOSSET, NEW YORK

KEY:

SAND & GRAVEL

SAND

CLAY

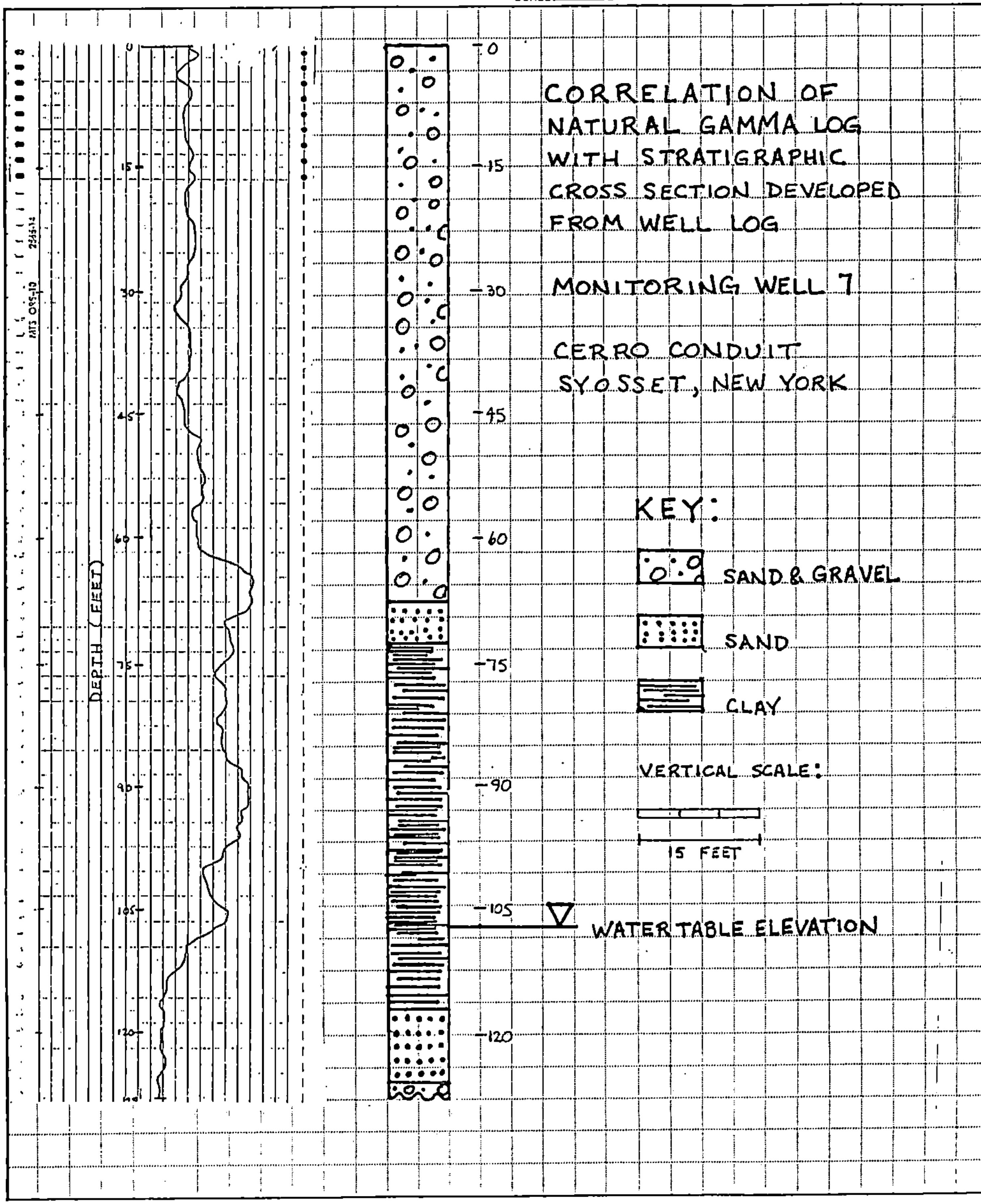
VERTICAL SCALE:

15 FEET

WATER TABLE ELEVATION

H2M GROUP
HOLZMACHER, McLENDON & MURRELL, P.C.
Consulting Engineers, Architects
Planners and Scientists

JOB: SYAS 8802 RP Cerro Wire
SHEET NO.: 3 OF: 3
CALCULATED BY: KEN COTTRELL DATE: 12-21-88
CHECKED BY: DATE:
SCALE: 19/20" = 15' vertical 5/8" = 5 ft



PRODUCT 205-1 NEBS Inc., Groton, Mass 01471 To Order PHONE TOLL FREE 1-800-225-6380

APPENDIX D

Ground Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
[1] Observed Release	0 45	1	0	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	2	6	4
Net Precipitation	0 1 (2) 3	1	2	3	2
Permeability of the Unsaturated Zone	0 1 (2) 3	1	2	3	2
Physical State	0 1 2 (3)	1	3	3	3
	Total Route Characteristics Score			15	11
[3] Containment	(0) (1) 2 3	1	1	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	0	8	
	Total Waste Characteristics Score		18	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	35	40	
	Total Targets Score		41	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]			8118	57,330	
[7] Divide line [6] by 57,330 and multiply by 100			S_{gw} = 14.16		

FIGURE 2
GROUND WATER ROUTE WORK SHEET

	s	s^2
Groundwater Route Score (S_{gw})	14.16	200.51
Surface Water Route Score (S_{sw})	0	0
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		200.51
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		14.6
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		8.18

FIGURE 10
WORKSHEET FOR COMPUTING S_M

August 16, 1982

QUALITY ASSURANCE TEAM

DOCUMENTATION RECORDS FOR HAZARD RANKING SYSTEM

INSTRUCTIONS: As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference. Include the location of the document.

FACILITY NAME: Cerro Conduit Wire

LOCATION: Robbins Lane + Miller Place, Syosset, New York

DATE SCORED: January 27, 1989

PERSON SCORING: Michael N. Gentils

PRIMARY SOURCE(S) OF INFORMATION (e.g., EPA region, state, FIT, etc.):
H2M Files, Melville, N.Y.

FACTORS NOT SCORED DUE TO INSUFFICIENT INFORMATION:
Actual hazardous waste disposed on site.

COMMENTS OR QUALIFICATIONS:

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

N/A

Rationale for attributing the contaminants to the facility:

N/A

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

Upper glacial and Magothy Aquifer
They are hydraulically connected
Magothy is the primary source of potable water on Long

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

100 feet

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

30 feet

Net Precipitation

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

~~34 inches~~ 44 inches

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

34 inches

Net precipitation (subtract the above figures):

10 inches

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Ranging from dense gray clay to Medium tan Sands typical in this formation

Permeability associated with soil type:

10^{-3} - 10^{-5} cm/sec

Physical State

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

Metal Sludges

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Surface Impoundment-

Unsound run-on diversion structure; no liner; or incompatible liner

Waste has been excavated + remedia[ted]

Method with highest score:

Surface Impoundment - has been remediated

Score = 0

No longer disposing of any waste

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Chloroform

Iron

Compound with highest score:

Chloroform - Toxicity = 3
Persistence = 3

18 score on HRS Scoring.

Hazardous Waste Quantity

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

Unknown Quantity

70,000 cubic yards of soil was taken from sludge drying basins

Score = 0

Basis of estimating and/or computing waste quantity:

* * *

5 TARGETS

Ground Water Use

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

Drinking Water

~~####~~ Alternate hook-up with minimal requirements

Distance to Nearest Well

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

There are no private wells drawing from the Magothy Aquifer within three miles of the Cerro site

Distance to above well or building:

N/A

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:

Jericho Water district

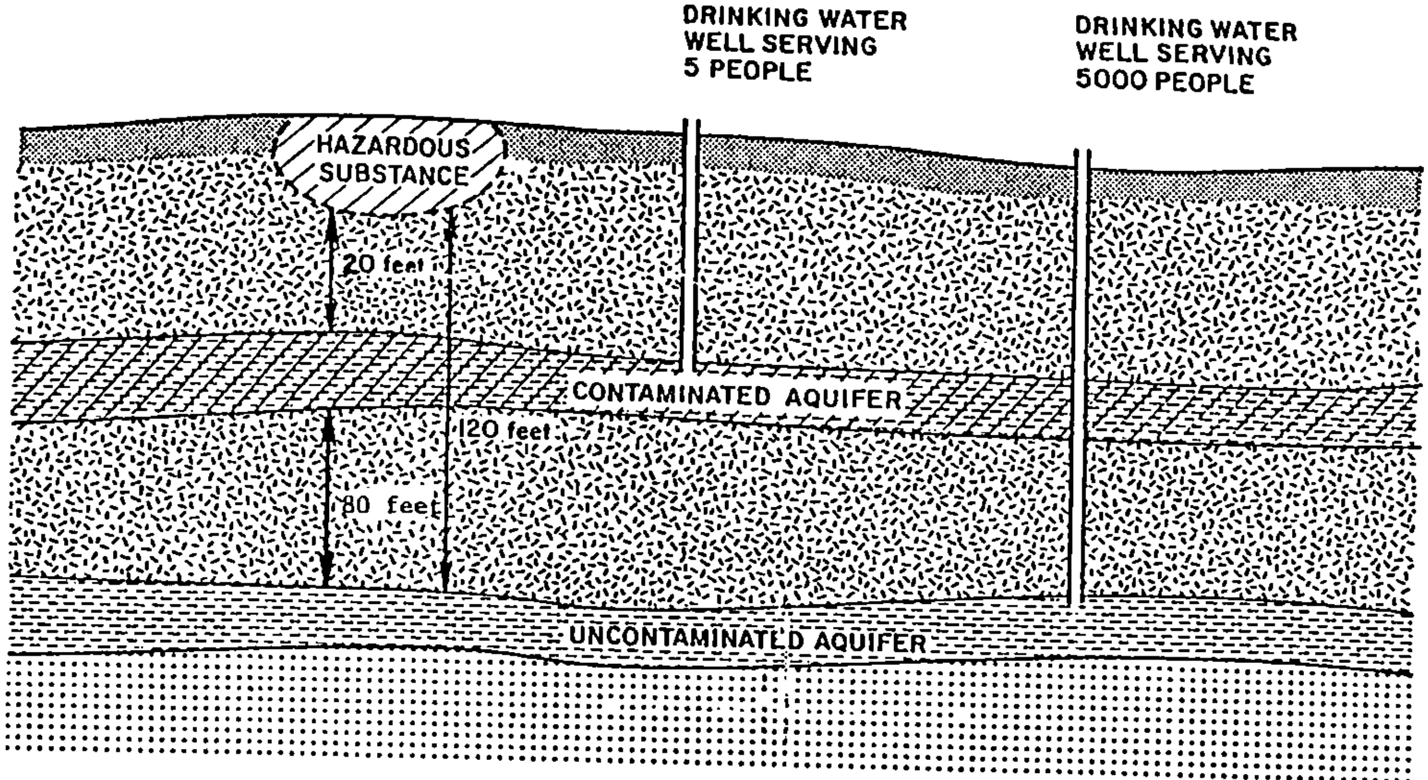
7 (seven) pump houses within a 3-mile radius serving approximately 14,000 people

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):

N/A

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

14,000



*Treat target and route characteristics factors consistently. For example, if the upper aquifer is the aquifer of concern, then the "depth to aquifer of concern" is 20 feet and the "population served" is 5 persons. If the lower aquifer is "of concern", the "depth" is 120 feet (assuming no known contamination below the indicated "hazardous substance") and the "population" is 5000 persons. If the upper aquifer is contaminated and the lower aquifer is "of concern", the "depth" would be 80 feet (vertical distance between hazardous substance and aquifer of concern) and the population would be 5000 persons.

FIGURE 3
DEPTH TO AQUIFER OF CONCERN*

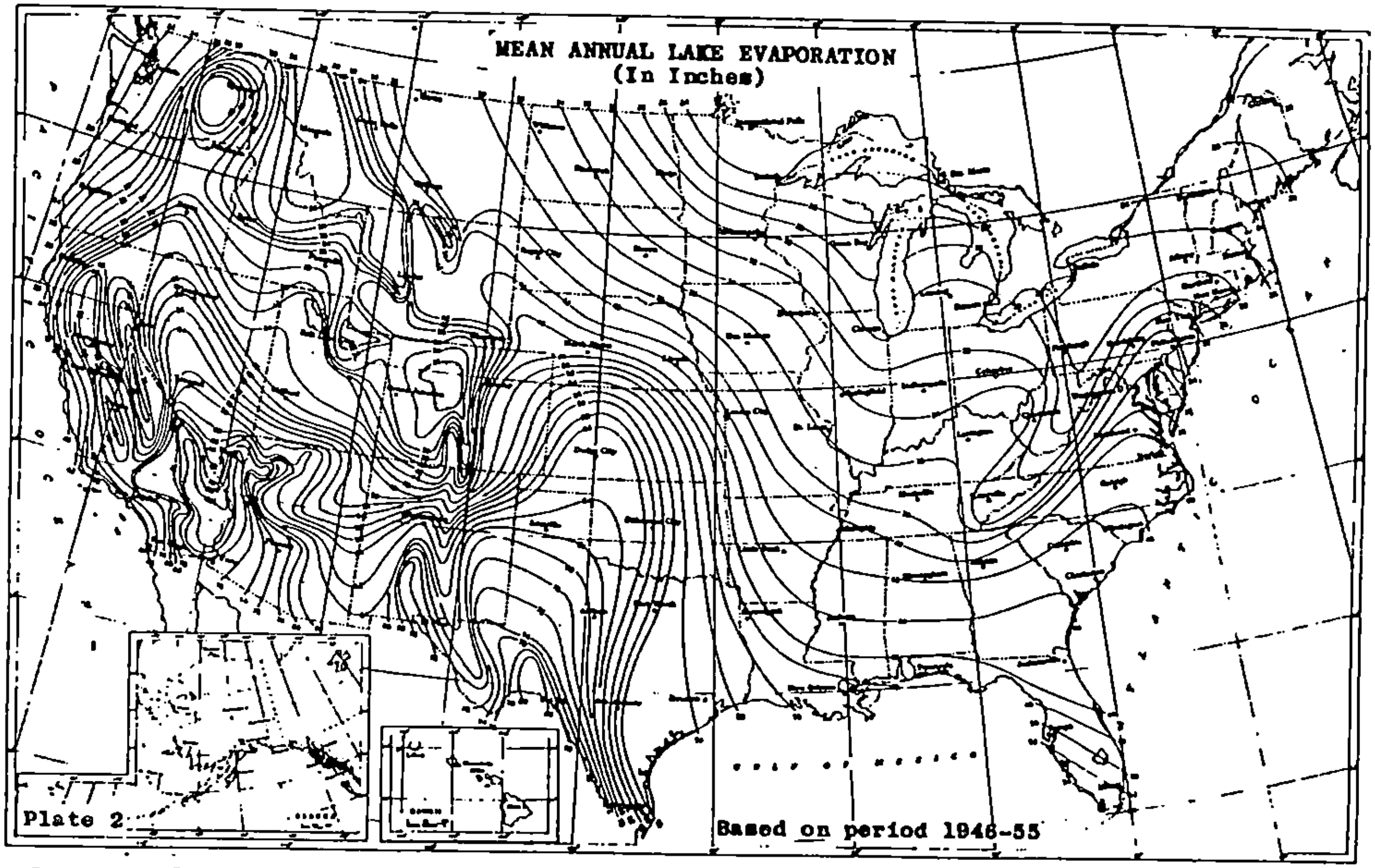
Distance	Assigned Value
>150 feet	0
76 to 150 feet	1
21 to 75 feet	2
0 to 20 feet	3

Net precipitation (precipitation minus evaporation) indicates the potential for leachate generation at the facility. Net seasonal rainfall (seasonal rainfall minus seasonal evaporation) data may be used if available. If net precipitation is not measured in the region in which the facility is located, calculate it by subtracting the mean annual lake evaporation for the region (obtained from Figure 4) from the normal annual precipitation for the region (obtained from Figure 5). EPA Regional Offices will have maps for areas outside the continental U.S. Assign a value as follows:

Net Precipitation	Assigned Value
<-10 inches	0
-10 to +5 inches	1
+5 to +15 inches	2
>+15 inches	3

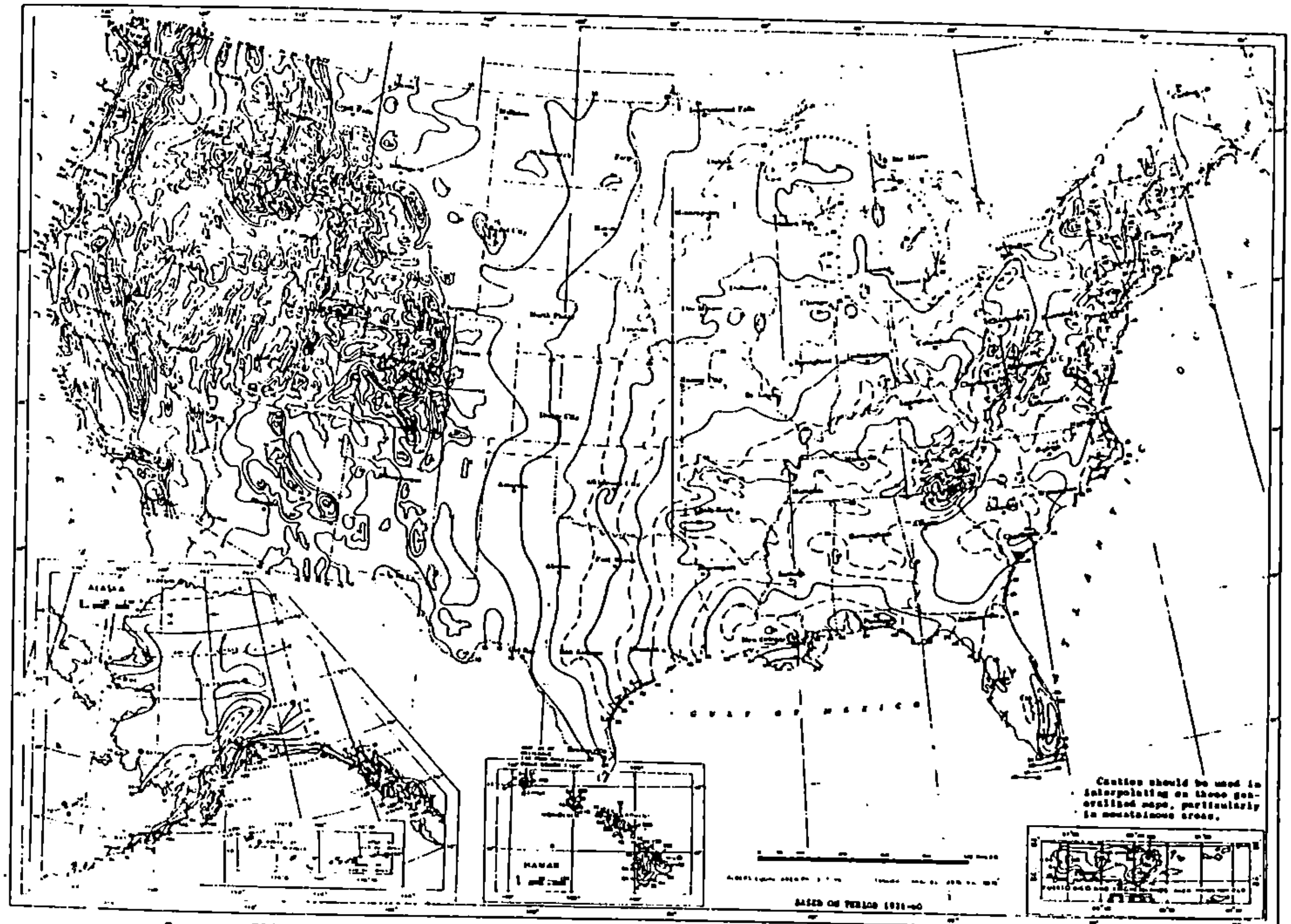
Permeability of unsaturated zone (or intervening geological formations) is an indicator of the speed at which a contaminant could migrate from a facility. Assign a value from Table 2.

Physical state refers to the state of the hazardous substances at the time of disposal, except that gases generated by the hazardous substances in a disposal area should be considered in rating this factor. Each of the hazardous substances being evaluated is assigned a value as follows:



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

FIGURE 4
MEAN ANNUAL LAKE EVAPORATION
(IN INCHES)



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

FIGURE 5
NORMAL ANNUAL TOTAL PRECIPITATION (INCHES)

TABLE 2

PERMEABILITY OF GEOLOGIC MATERIALS*

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

*Derived from:

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

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

Physical State	Assigned Value
Solid, consolidated or stabilized	0
Solid, unconsolidated or unstabilized	1
Powder or fine material	2
Liquid, sludge or gas	3

3.3 Containment

Containment is a measure of the natural or artificial means that have been used to minimize or prevent a contaminant from entering ground water. Examples include liners, leachate collection systems, and sealed containers. In assigning a value to this rating factor (Table 3), consider all ways in which hazardous substances are stored or disposed at the facility. If the facility involves more than one method of storage or disposal, assign the highest from among all applicable values (e.g., if a landfill has a containment value of 1, and, at the same location, a surface impoundment has a value of 2, assign containment a value of 2).

3.4 Waste Characteristics

In determining a waste characteristics score, evaluate the most hazardous substances at the facility that could migrate (i.e., if scored, containment is not equal to zero) to ground water. Take the substance with the highest score as representative of the potential hazard due to waste characteristics. Note that the substance that may have been observed in the release category can differ from the

TABLE 3

CONTAINMENT VALUE FOR GROUND WATER ROUTE

Assign containment a value of 0 if: (1) all the hazardous substances at the facility are underlain by an essentially non permeable surface (natural or artificial) and adequate leachate collection systems and diversion systems are present; or (2) there is no ground water in the vicinity. The value "0" does not indicate no risk. Rather, it indicates a significantly lower relative risk when compared with more serious sites on a national level. Otherwise, evaluate the containment for each of the different means of storage or disposal at the facility using the following guidance.

A. Surface Impoundment

	Assigned Value
Sound run-on diversion structure, essentially non permeable liner (natural or artificial) compatible with the waste, and adequate leachate collection system	0
Essentially non permeable compatible liner with no leachate collection system; or inadequate freeboard	1
Potentially unsound run-on diversion structure; or moderately permeable compatible liner	2
Unsound run-on diversion structure; no liner; or incompatible liner	3

B. Containers

	Assigned Value
Containers sealed and in sound condition, adequate liner, and adequate leachate collection system	0
Containers sealed and in sound condition, no liner or moderately permeable liner	1
Containers leaking, moderately permeable liner	2
Containers leaking and no liner or incompatible liner	3

C. Piles

	Assigned Value
Piles uncovered and waste stabilized; or piles covered, waste unstabilized, and essentially non permeable liner	0
Piles uncovered, waste unstablized, moderately permeable liner, and leachate collection system	1
Piles uncovered, waste unstabilized, moderately permeable liner, and no leachate collection system	2
Piles uncovered, waste unstablized, and no liner	3

D. Landfill

	Assigned Value
Essentially non permeable liner, liner compatible with waste, and adequate leachate collection system	0
Essentially non permeable compatible liner, no leachate collection system, and landfill surface precludes ponding	1
Moderately permeable, compatible liner, and landfill surface precludes ponding	2
No liner or incompatible liner; moderately permeable compatible liner; landfill surface encourages ponding; no run-on control	3

substance used in rating waste characteristics. Where the total inventory of substances in a facility is known, only those present in amounts greater than the reportable quantity (see CERCLA Section 102 for definition) may be evaluated.

Toxicity and Persistence have been combined in the matrix below because of their important relationship. To determine the overall value for this combined factor, evaluate each factor individually as discussed below. Match the individual values assigned with the values in the matrix for the combined rating factor. Evaluate several of the most hazardous substances at the facility independently and enter only the highest score in the matrix on the work sheet.

	Value for Persistence			
Value for Toxicity	0	1	2	3
0	0	0	0	0
1	3	6	9	12
2	6	9	12	15
3	9	12	15	18

Persistence of each hazardous substance is evaluated on its biodegradability as follows:

Substance	Assigned Value
Easily biodegradable compounds	0
Straight chain hydrocarbons	1
Substituted and other ring compounds	2
Metals, polycyclic compounds and halogenated hydrocarbons	3

more specific information is given in Tables 4 and 5.

Toxicity of each hazardous substance being evaluated is given a value using the rating scheme of Sax (Table 6) or the National Fire Protection Association (NFPA) (Table 7) and the following guidance:

Toxicity	Assigned Value
Sax level 0 or NFPA level 0	0
Sax level 1 or NFPA level 1	1
Sax level 2 or NFPA level 2	2
Sax level 3 or NFPA level 3 or 4	3

Table 4 presents values for some common compounds.

Hazardous waste quantity includes all hazardous substances at a facility (as received) except that with a containment value of 0. Do not include amounts of contaminated soil or water; in such cases, the amount of contaminating hazardous substance may be estimated.

On occasion, it may be necessary to convert data to a common unit to combine them. In such cases, 1 ton = 1 cubic yard = 4 drums and for the purposes of converting bulk storage, 1 drum = 50 gallons. Assign a value as follows:

Tons/Cubic Yards	No. of Drums	Assigned Value
0	0	0
1-10	1-40	1
11-62	41-250	2
63-125	251-500	3
126-250	501-1000	4
251-625	1001-2500	5
626-1250	2501-5000	6
1251-2500	5001-10,000	7
>2500	>10,000	8

TABLE 4
WASTE CHARACTERISTICS VALUES FOR SOME COMMON CHEMICALS

CHEMICAL/COMPOUND	TOXICITY [1]	PERSISTENCE [2]	IGNITABILITY [3]	REACTIVITY [3]
Acetaldehyde	3	0	3	2
Acetic Acid	3	0	2	1
Acetone	2	0	3	0
Aldrin	3	3	1	0
Ammonia, Anhydrous	3	0	1	0
Aniline	3	1	2	0
Benzene	3	1	3	0
Carbon Tetrachloride	3	3	0	0
Chlordane	3	3	0*	0*
Chlorobenzene	2	2	3	0
Chloroform	3	3	0	0
Cresol-O	3	1	2	0
Cresol-M&P	3	1	1	0
Cyclohexane	2	2	3	0
Endrin	3	3	1	0
Ethyl Benzene	2	1	3	0
Formaldehyde	3	0	2	0
Formic Acid	3	0	2	0
Hydrochloric Acid	3	0	0	0
Isopropyl Ether	3	1	3	1
Lindane	3	3	1	0
Methane	1	1	3	0
Methyl Ethyl Ketone	2	0	3	0
Methyl Parathion in Xylene Solution	3	0Δ	3	2
Naphthalene	2	1	2	0
Nitric Acid	3	0	0	0
Parathion	3	0Δ	1	2
PCB	3	3	0Δ	0Δ
Petroleum, Kerosene (Fuel Oil No. 1)	3	1	2	0
Phenol	3	1	2	0
Sulfuric Acid	3	0	0	2
Toluene	2	1	3	0
Trichlorobenzene	2	3	1	0
α-Trichloroethane	2	2	1	0
Xylene	2	1	3	0

[1] Sax, N. I., Dangerous Properties of Industrial Materials, Van Nostrand Rheinhold Co., New York, 4th ed., 1975. The highest rating listed under each chemical is used.

[2] JRB Associates, Inc., Methodology for Rating the Hazard Potential of Waste Disposal Sites, May 5, 1980.

[3] National Fire Protection Association, National Fire Codes, Vol. 13, No. 49, 1977.

* Professional judgment based on information contained in the U.S. Coast Guard CHRIS Hazardous Chemical Data, 1978.

Δ Professional judgment based on existing literature.

TABLE 5

PERSISTENCE (BIODEGRADABILITY) OF SOME ORGANIC COMPOUNDS*

VALUE = 3 HIGHLY PERSISTENT COMPOUNDS	
aldrin	heptachlor
benzopyrene	heptachlor epoxide
benzothiazole	1,2,3,4,5,7,7-heptachloronorbornene
benzothiophene	hexachlorobenzene
benzyl butyl phthalate	hexachloro-1,3-butadiene
bromochlorobenzene	hexachlorocyclohexane
bromoform butanal	hexachloroethane
bromophenyl phyntl ether	methyl benzothiazole
chlordane	pentachlorobiphenyl
chlorohydroxy benzophenone	pentachlorophenol
bis-chloroisoprophyl ether	1,1,3,3-tetrachloroacetone
m-chloronitrobenzene	tetrachlorobiphenyl
DDE	thiomethylbenzothiazole
DDT	trichlorobenzene
dibromobenzene	trichlorobiphenyl
dibutyl phthalate	trichlorofluoromethane
1, 4-dichlorobenzene	2,4,6-trichlorophenol
dichlorodifluoroethane	triphenyl phosphate
dieldrin	bromodichloromethane
diethyl phthalate	bromoform
di(2-ethylhexyl)phthalate	carbon tetrachloride
dihexyl phthalate	chloroform
di-isobutyl phthalate	chloromochloromethane
dimethyl phthalate	dibromodichloroethane
4,6-dinitro-2-aminophenol	tetrachloroethane
dipropyl phthalate	1,1,2-trichloroethane
endrin	

VALUE = 1 SOMEWHAT PERSISTENT COMPOUNDS	
acetylene dichloride	limonene
behenic acid, methyl ester	methyl ester of lignoceric acid
benzene	methane
benzene sulfonic acid	2-methyl-5-ethyl-pyridine
butyl benzene	methyl naphthalene
butyl bromide	methyl palmitate
e-caprolactam	methyl phenyl carbinol
carbon-disulfide	methyl stearate
o-cresol	naphthalene
decane	nonane
1,2-dichloroethane	octane
1,2-dimethoxy benzene	octyl chloride
1,3-dimethyl naphthalene	pentane
1,4-dimethyl phenol	phenyl benzoate
dioctyl adipate	phthalic anhydride
n-dodecane	propylbenzene
ethyl benzene	1-terpineol
2-ethyl-n-hexane	toluene
o-ethyltoluene	vinyl benzene
isodecane	xylene
isoprophyl benzene	

VALUE = 2 PERSISTENT COMPOUNDS	
acenaphthylene	cis-2-ethyl-4-methyl-1,3-dioxolane
atrazine	trans-2-ethyl-4-methyl-1,3-dioxolane
(diethyl) atrazine	guaiacol
barbital	2-hydroxyadiponitrile
borneol	isophorone
bromobenzene	indene
camphor	isoborneol
chlorobenzene	isopropenyl-r-isopropyl benzene
1,2-bis-chloroethoxy ethane	2-methoxy biphenyl
b-chloroethyl methyl ether	methyl biphenyl
chloromethyl ether	methyl chloride
chloromethyl ethyl ether	methylindene
3-chloropyridine	methylene chloride
di-t-butyl-p-benzoquinone	nitroanisole
dichloroethyl ether	nitrobenzene
dihyrocarvone	1,1,2-trichloroethylene
dimethyl sulfoxide	trimethyl-triozo-hexahydro-triazine isomer
2,6-dinitrotoluene	

VALUE = 0 NONPERSISTENT COMPOUNDS	
acetaldehyde	methyl benzoate
acetic acid	3-methyl butanol
acetone	methyl ethyl ketone
acetophenone	2-methylpropanol
benzoic acid	octadecane
di-isobutyl carbinol	pentadecane
docosane	pentanol
eicosane	propanol
ethanol	propylamine
ethylamine	tetradecane
hexadecane	n-tridecane
methanol	n-undecane

TABLE 6

SAX TOXICITY RATINGS

0 - No Toxicity* (None)**

This designation is given to materials which fall into one of the following categories:

(a) Materials which cause no harm under any conditions of normal use.

(b) Materials which produce toxic effects on humans only under the most unusual conditions or by overwhelming dosage.

1 - Slight Toxicity* (Low)**

(a) *Acute local.* Materials which on single exposures lasting seconds, minutes, or hours cause only slight effects on the skin or mucuous membranes regardless of the extent of the exposure.

(b) *Acute systemic.* Materials which can be absorbed into the body by inhalation, ingestion, or through the skin and which produce only slight effects following single exposures lasting seconds, minutes, or hours, or following ingestion of a single dose, regardless of the quantity absorbed or the extent of exposure.

(c) *Chronic local.* Materials which on continuous or repeated exposures extending over periods of days, months, or years cause only slight and usually reversible harm to the skin or mucous membranes. The extent of exposure may be great or small.

(d) *Chronic systemic.* Materials which can be absorbed into the body by inhalation, ingestion, or through the skin and which produce only slightly usually reversible effects extending over days, months, or years. The extent of the exposure may be great or small.

In general, those substances classified as having "slight toxicity" produce changes in the human body which are readily reversible and which will disappear following termination of exposure, either with or without medical treatment.

2 - Moderate Toxicity* (Mod)**

(a) *Acute local.* Materials which on single exposure lasting seconds, minutes, or hours cause moderate effects on the skin or mucous membranes. These effects may be the result of intense exposure for a matter or seconds or moderate exposure for a matter of hours.

(b) *Acute systemic.* Materials which can be absorbed into the body by inhalation, ingestion, or through the skin and produce moderate effects following single exposures lasting seconds, minutes, or hours, or following ingestion of a single dose.

(c) *Chronic local.* Materials which on continuous or repeated exposures extending over periods of days, months, or years cause moderate harm to the skin or mucous membranes.

(d) *Chronic systemic.* Materials which can be absorbed into the body by inhalation, ingestion, or through the skin and which produce moderate effects following continuous or repeated exposures extending over periods of days, months, or years.

Those substances classified as having "moderate toxicity" may produce irreversible as well as reversible changes in the human body. These changes are not of such severity as to threaten life or to produce serious physical impairment.

3 - Severe Toxicity* (High)**

(a) *Acute local.* Materials which on single exposure lasting seconds or minutes cause injury to skin or mucous membranes or sufficient severity to threaten life or to cause permanent physical impairment or disfigurement.

(b) *Acute systemic.* Materials which can be absorbed into the body by inhalation, ingestion, or through the skin and which can cause injury of sufficient severity to threaten life following a single exposure lasting seconds, minutes, or hours, or following ingestion of a single dose.

(c) *Chronic local.* Materials which on continuous or repeated exposures extending over periods of days, months, or years can cause injury to skin or mucous membranes of sufficient severity to threaten life or cause permanent impairment, which disfigurement, or irreversible change.

(d) *Chronic systemic.* Materials which can be absorbed into the body by inhalation, ingestion or through the skin and which can cause death or serious physical impairment following continuous or repeated exposures to small amounts extending over periods of days, months, or years.

*Sax, N.I., Dangerous Properties of Industrial Materials, Van Nostrand Rheinhold Company, New York, 4th Edition, 1975.
**Sax, N.I., Dangerous Properties of Industrial Materials, Van Nostrand Rheinhold Company, New York, 5th Edition, 1979.

TABLE 7

NFPA TOXICITY RATINGS*

0	Materials which on exposure under fire conditions would offer no health hazard beyond that of ordinary combustible material.
1	Materials only slightly hazardous to health. It may be desirable to wear self-contained breathing apparatus.
2	Materials hazardous to health, but areas may be entered freely with self-contained breathing apparatus.
3	Materials extremely hazardous to health, but areas may be entered with extreme care. Full protective clothing, including self-contained breathing apparatus, rubber gloves, boots and bands around legs, arms and waist should be provided. No skin surface should be exposed.
4	A few whiffs of the gas or vapor could cause death, or the gas, vapor, or liquid could be fatal on penetrating the fire fighters' normal full protective clothing which is designed for resistance to heat. For most chemicals having a Health 4 rating, the normal full protective clothing available to the average fire department will not provide adequate protection against skin contact with these materials. Only special protective clothing designed to protect against the specific hazard should be worn.

*National Fire Protection Association. National Fire Codes, Vol. 13, No. 49, 1977.

3.5 Targets

Ground water use indicates the nature of the use made of ground water drawn from the aquifer of concern within 3 miles of the hazardous substance, including the geographical extent of the measurable concentration in the aquifer. Assign a value using the following guidance:

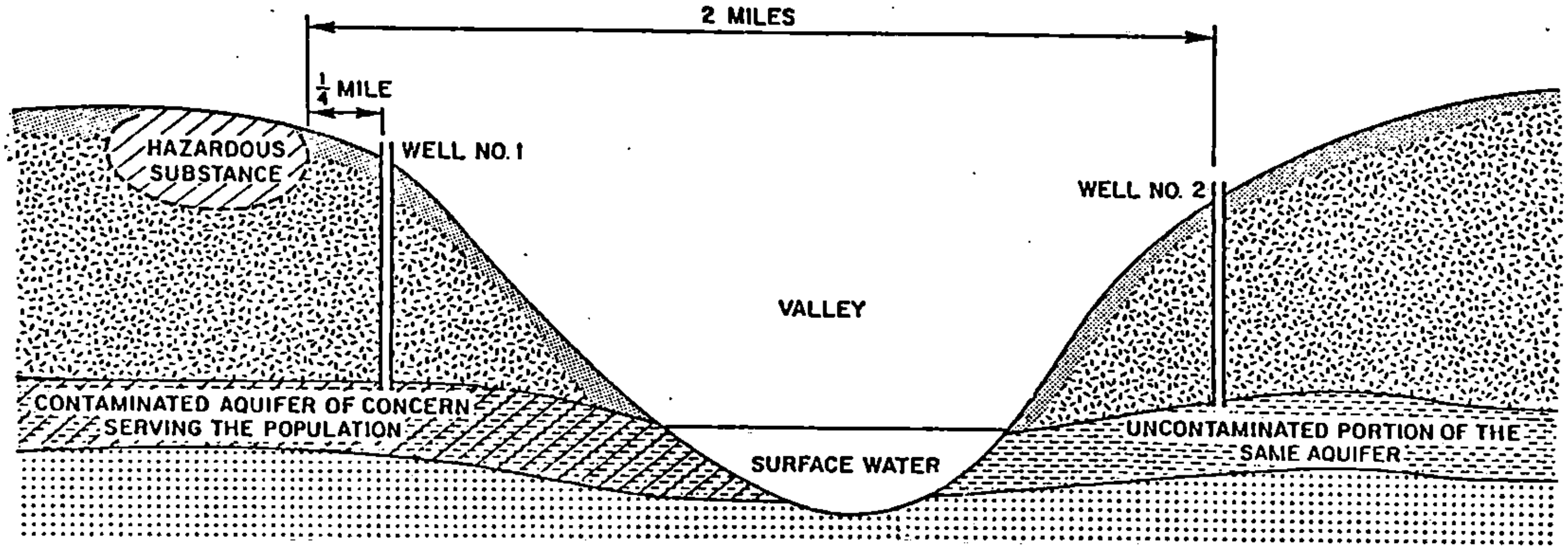
Ground Water Use	Assigned Value
Unusable (e.g., extremely saline aquifer, extremely low yield, etc.)	0
Commercial, industrial or irrigation and another water source presently available; not used, but usable	1
Drinking water with municipal water from alternate unthreatened sources presently available (i.e., minimal hookup requirements); or commercial, industrial or irrigation with no other water source presently available	2
Drinking water; no municipal water from alternate unthreatened sources presently available	3

Distance to nearest well and population served have been combined in the matrix below to better reflect the important relationship between the distance of a population from hazardous substances and the size of the population served by ground water that might be contaminated by those substances. To determine the overall value for this combined factor, score each individually as discussed below. Match the individual values assigned with the values in the matrix for the total score.

Value for Population Served	Value for Distance to Nearest Well 0	1	2	3	4
0	0	0	0	0	0
1	0	4	6	8	10
2	0	8	12	16	20
3	0	12	18	24	30
4	0	16	24	32	35
5	0	20	30	35	40

<u>Distance to nearest well</u> is measured from the hazardous substance (not the facility boundary) to the nearest well that draws water from the aquifer of concern. If the actual distance to the nearest well is unknown, use the distance between the hazardous substance and the nearest occupied building not served by a public water supply (e.g., a farmhouse). If a discontinuity in the aquifer occurs between the hazardous substance and all wells, give this factor a score of 0, except where it can be shown that the contaminant is likely to migrate beyond the discontinuity. Figure 6 illustrates how the distance should be measured. Assign a value using the following guidance:

Distance	Assigned Value
>3 miles	0
2 to 3 miles	1
1 to 2 miles	2
2001 feet to 1 mile	3
< 2000 feet	4



In the situation depicted above, the distance between the hazardous substance and the nearest well (No. 1) is ¼ mile. If well No. 1 did not exist, the distance to well No. 2 would be immaterial since there is a discontinuity in the aquifer (surface water) between it and the hazardous substance. Under such circumstances, the factor score would be "0". However, if it could be demonstrated that the contaminent had bridged the discontinuity, then the distance to the nearest well would be 2 miles (assuming well No. 1 does not exist).

FIGURE 6
DISTANCE TO NEAREST WELL

Population served by ground water is an indicator of the population at risk, which includes residents as well as others who would regularly use the water such as workers in factories or offices and students. Include employees in restaurants, motels, or campgrounds but exclude customers and travelers passing through the area in autos, buses, or trains. If aerial photography is used, and residents are known to use ground water, assume each dwelling unit has 3.8 residents. Where ground water is used for irrigation, convert to population by assuming 1.5 persons per acre of irrigated land. The well or wells of concern must be within three miles of the hazardous substances, including the area of known aquifer contamination, but the "population served" need not be. Likewise, people within three miles who do not use water from the aquifer of concern are not to be counted. Assign a value as follows:

Population	Assigned Value
0	0
1-100	1
101-1,000	2
1,001-3,000	3
3,001-10,000	4
>10,000	5

H2M GROUP
HOLZMACHER, McLENDON & MURRELL, P.C.
Consulting Engineers, Architects
Planners and Scientists

JOB Cerro Conduit Wire
SHEET NO. 1 OF 1
CALCULATED BY M. Gentils DATE 1/25/89
CHECKED BY ______ DATE ______
SCALE ______

TELECON NOTE

CONVERSATION BETWEEN Kevin McMahon, Engineer, Jericho Water District, and Michael N. Gentils, Hydrogeologist, H2M Group.

Date: January 25, 1989

I called Kevin to find out the exact locations of the public water supply pump houses. I also wanted to know the number of people supplied by each pump house.

There are a total of eight (8) pump houses with-in a 3-mile radius of the Cerro Facility.

2 - Split Rock Road - Supplies Water to Syosset
1 - Tobie Lane - Supplies Water to Jericho
3 - Merry Lane - Supplies Water to Muttontown and Jericho
2 - On the property of the Jericho Water District

The wells are pumped from approximately 250'-350'
the total district supplies potable water to approximately 14,000 people

Michael N. Gentils
1/25/89