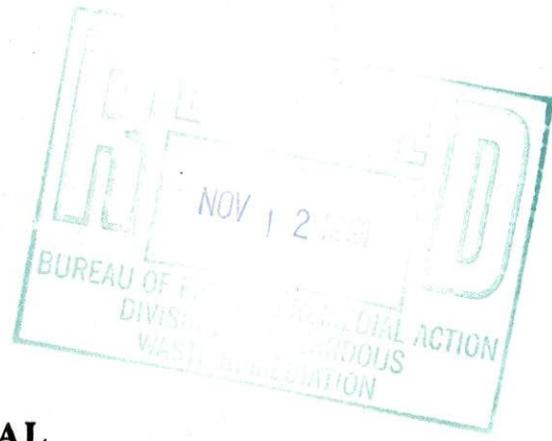


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JON



FINAL

**Remedial Investigation Report
Tronic Metal Plating Company Site
Farmingdale, New York**

OCTOBER 1991



Prepared for:

**Commerce Holding Co., Inc.
PO Box 672
Hicksville, New York 11802
in Compliance with
Administrative Order No. CERCLA II-80206**

Prepared by:

**CA Rich Consultants, Inc.
404 Glen Cove Avenue
Sea Cliff, New York 11579**

**New York State Department of Environmental Conservation****MEMORANDUM**

TO: Anthony Candela, Reg. Hazardous Waste Remediation Engineer, Region 1
FROM: Marsden Chen, Bureau of Eastern Remedial Action, DHWR
SUBJECT: Tronic Plating Site ID No. 152028 - Final Remedial Investigation Report

DATE:

NOV 14 1991

Attached is a copy of the above-referenced document for the Tronic Plating site.

Please have staff review this document and provide your written comments to Jonathan Greco, of my staff by November 27, 1991.

If you have any questions, he can be reached at (518) 457-3976.

Attachment



CA RICH CONSULTANTS, INC.

Water and Environmental Specialists
October 28, 1991

Commerce Holding Company, Inc.
P.O.Box 672
Hicksville, New York 11802

Attention: Irwin Cain, President

Re: Remedial Investigation Report
Tronic Plating Company Site
Farmingdale, New York
Administrative Order No. CERCLA II-80206

Dear Mr. Cain:

The enclosed Remedial Investigation Report summarizes all of the investigative work performed by CA Rich Consultants, Inc. at this site. In accordance with the Administrative Order, this documented will be delivered to the United States Environmental Protection Agency (EPA) on or before November 1, 1991.

The Remedial Investigation was performed in two separate phases. An initial phase was performed in the Spring of 1989 followed by an EPA-required supplemental phase performed in the Spring of 1991.

Soil below the former industrial and sanitary leaching pools contain slightly elevated levels of the metals cadmium, chromium, copper and cyanide. As these leaching pools are no longer in use, they are not viewed as a significant source of groundwater contamination.

Bottom sediments in three of the on-site storm drains surrounding the former metal plating facility contain elevated levels of cadmium, chromium and lead. In addition, one on-site storm drain north of the former metal plating operation revealed detections of volatile organic compounds. Remediation of these four storm drains should be addressed in a focused Feasibility Study (FS). The FS should be performed after the EPA completes their Risk Assessment for this site.

Groundwater below and downgradient of the property generally contained metals at levels similar to background concentrations. Cadmium, however, was detected in a shallow monitoring well 250 feet south and downgradient of the storm drains which are situated behind the former Facility. Additional monitoring wells located 700 feet downgradient of these drains revealed no detections of cadmium. Remediation of the storm drains and groundwater monitoring are recommended.

The property is located over a regional zone of volatile organic tainted groundwater as evidenced by the upgradient and downgradient monitoring well samples.

If you have any questions regarding this document, do not hesitate to call our office.

Respectfully Submitted,

CA RICH CONSULTANTS, INC.

Eric Weinstock

Eric A. Weinstock, CPG, CGWP
Senior Hydrogeologist
Project Manager

Reviewed By:

Charles A. Rich

Charles A. Rich, President



cc: Dorothy Allen, Site Manager, USEPA
John Greco, NYSDEC
Andrew Simons, Esq., Farrell Fritz Caemmerer Cleary
Barnosky & Armentano

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SECTION 1

1.0 INTRODUCTION

The following Remedial Investigation Report has been prepared by CA Rich Consultants, Inc. (hereafter referred as CA RICH) of Sea Cliff, New York, for the Commerce Holding Co., Inc. (hereafter referred as CHC) of Hicksville, New York, in accordance with Administrative Order No. CERCLA II-80206.

The Remedial Investigation described in this Report was performed in two consecutive phases. The initial phase or Phase 1 was performed in the Spring of 1989 and is summarized in a Draft Remedial Investigation Report dated February 1990 and revised May 1990. Upon review of these drafts, the United States Environmental Protection Agency (EPA), requested that a supplemental or Phase 2 investigation be performed. The field methodologies and analytical results for Phases 1 and 2 are included in this Report.

Section 2 of this Report discusses background information regarding the Tronic Plating Co. Site. Included are discussions on the site's history, condition and environmental setting.

Section 3 contains a detailed description of the specific field procedures used during the investigation. Subsections 3.2 through 3.7 describe the field activities performed during the first phase of the investigation. Activities included in the supplemental sampling phase are discussed in sections 3.8 through 3.11 of the Report. Readers interested in results of the sampling program, as opposed to the sampling methodologies, may choose to bypass this section and concentrate on Section 4 of the document.

Section 4 presents the results of the sampling program. The results for Phases 1 and 2 are both included in this section. Individual subsections addressing a geophysical survey, soil and storm drain sampling, groundwater sampling, in-situ permeability testing and a topographic survey are included.

Secton 5 includes the results of a groundwater flow and transport modeling effort performed for the Tronic Plating Co. site.

Section 6 discusses the nature and extent of contamination detected during this investigation.- Subsections addressing the former on-site industrial & sanitary leaching pools, on-site storm drains and groundwater are included.

Sections 7 and 8 of the report describe conclusions and recommendations, respectively.

SECTION 2

2.0 BACKGROUND

Section 2 of this report discusses the following topics:

- site location
- site history
- site conditions
- environmental setting

2.1 Site Location

The Tronic Plating Company Site (hereafter referred as the Site) is located at 168 Central Avenue in Farmingdale, in the Town of Babylon, Suffolk County, Long Island, New York. A regional and site-specific locator map for the Tronic Plating Company Site is provided on Plate 1 (attached).

The north-south oriented CHC building is physically situated on Commerce Drive, which is a secondary north-south driveway adjacent to the building and perpendicular to Central Avenue. The 48,000 square foot building is contiguous with the structure 'fronting' on Central Avenue which maintains the street address of 162-168 Central Avenue.

The Tronic Plating Company historically occupied the southeast portion of the building property, an area of approximately 7,200 ft² acres within the 117,000 ft² acre lot. The CHC lot is situated approximately 1.5 miles east of the Nassau/Suffolk County Line.

2.2 Site History

The Tronic Plating Company (also referred to as Tronics) operated an electroplating and metal anodizing facility at 168 Central Avenue from July 1968 to March 1984. The facility was serviced by four (4) industrial and one (1) sanitary septic leaching pools and one (1) dry well.

The four industrial pools are located within, and below the front lawn of the property, with the sanitary pool located in the driveway adjacent to the front lawn. The dry well is located to the rear of the former Tronic facility. During 1983, the CHC building was tied into the Suffolk County municipal sewer system and in March-April 1984, Tronics moved out of Suffolk and over to 37 Potter Street, Farmingdale, in Nassau County.

Between 1972 and 1982, the Suffolk County Department of Health Services (SCDHS) tested waste material (effluent) in the leaching pools and detected the presence of copper, silver, iron, zinc, lead, cadmium, chromium (total and hexavalent), and cyanide. The results of the analyses performed on various process flow and waste streams at the Tronic Plating Company facility are given in Table 2-1. In addition to chemical constituents found in the leaching pools, heavy metal contamination was confirmed in a nearby storm drain located northeast of the Tronics office (SCDHS, 1979).

Chemical analyses of fluid collected from Tronic Plating Company's industrial discharges, as well as from the on-site leaching pools, and the on-site storm drain, indicated that the samples contained hazardous substances. Sample concentrations were reported to be as high as 29 parts per million (ppm) of cyanide and 17.4 ppm of copper in Tronic Plating Company's industrial discharges; and 3.2 ppm of lead, 10 ppm of cadmium, 12 ppm of zinc, 11 ppm of silver, and 170 ppm of iron (a common ion in Long Island groundwater) in the leaching pools. The presence of these particular metals are characteristic of typical waste streams generated by the electroplating industry.

Approximately 1.25 million gallons of wastewater was produced by Tronics each year, based upon the Wastewater Treatment System Report for the Tronic Plating Company (Benson & Burns, 1974). The apparent source(s) of these wastes were rinse waters from their electroplating, anodizing, and etching processes. An undetermined volume of these liquid wastes were discharged into the on-site leaching pools from the Tronics plating operation.

The Suffolk County Department of Environmental Control (SCDEC) contacted the Tronic Plating Company on several occasions regarding their unpermitted releases of industrial waste. Administrative Orders on Consent were issued to Tronics by both the Suffolk County Department of Health Services and the New York State Department of Environmental Conservation (NYSDEC), and in March 1984, The Tronic Plating Company moved out of the building without signing the Orders. A review of the SCDHS files indicates that the owner, CHC, Inc. was never notified of these violations or Administrative Orders.

SCDHS records indicate that in November 1983, Tronic Plating Company arranged for the pump-out and cleaning of the industrial leaching pools by the firm Chemical Management, Inc. No records exist regarding pump-out or cleaning of the sanitary leaching pool or the storm drains.

In September 1984, a Preliminary Inspection of the former Tronics facility and Site environs was performed by NYSDEC. In March 1985, the Site was proposed for CERCLA status (Superfund) by the United States Environmental Protection Agency (EPA).

On July 10, 1987, EPA contracted EBASCO Services Inc. (EBASCO) to prepare a Work Plan for the performance of a Remedial Investigation and Feasibility Study (RI/FS) at the Tronic Plating Company Site. A review of sampling events at the Tronic Plating Company Site, as presented on Table 2-1, was prepared by the EPA with reference to sampling date, sampling location, specific chemical analyses, and the specific governmental entity which initiated the sampling event.

In January, 1988, CHC, Inc. was first notified that, as the owner of the property, they would be held responsible for investigative and remedial costs under the CERCLA regulations. This was the first time CHC, Inc. was made aware of the discharge violations and Administrative Orders regarding their former tenant. In May, 1988, CHC, Inc. entered into an Administrative Order with the EPA (order No. CERCLA II-80206).

The Owner of the Site property at Commerce Drive, the Commerce Holding Company, subsequently retained CA Rich Consultants, Inc. (CA RICH) to perform the RI/FS. In March 1989, CA RICH provided a Final Project Operations Plan (POP) which was approved by the EPA, and in January 1989, the on-site RI/FS field work began. This was followed by a second, supplemental Phase which began in April, 1991.

2.3 Site Conditions

The Tronic Plating Company facility was situated on a rectangular flat, commercially developed property with an average slope less than 3% to the south-southeast.

With the exception of a 50 by 75 ft. landscaped front lawn, the area surrounding the building portion of the Site is paved both for parking and shipping access purposes. The landscaped front lawn area is situated in the front of the building. The southern boundary of the Site is the southern edge of the front lawn adjacent to Central Avenue.

The existing exterior conditions at the Tronic Plating Company Site are similar to those present at the time of Tronic Plating's tenancy. The four leaching pools below the front lawn have been pumped out and backfilled with clean material. The materials from the leaching pool area were reportedly disposed of by the Tronic Plating Company. Wastewater from the building is presently discharged directly to the municipal treatment plant servicing the area.

SCDHS records indicate Tronic Plating Company was cited for unauthorized dumping of potentially hazardous wastewater into two storm drains. These drains are both located 33 to 40 feet from the northern rear door of the former plating operation. A Facility Plan is included on Figure 2-1.

The interior building conditions at 164-168 Commerce Drive (Tronic) have been modified to suit the current tenants. EPA reports (Ebasco, 1988) indicate that during Tronic's tenancy certain tanks and fixtures were

added, moved, and/or removed. In the time since Tronic vacated the building, modifications to the building's interior have been made to suit the needs of the existing tenants.

Only fragmentary information is available concerning the actual modifications, relocations or removals of the tanks, and plumbing-related fixtures used during Tronic's tenancy. Since this work was performed directly by the tenant, Tronic Plating Co., the owner does not have records of these modifications. A partial list of the primary fixtures and appurtenant piping that were removed or affected was developed by EBASCO (1988) in their RI/FS Work Plan for the Site.

- a) two 4,000 gallon above ground holding tanks located at the northwestern corner of Tronic Plating (now 164 Central Avenue);
- b) a below grade sump/pit/tank (capacity and location unknown) somewhere in the area presently occupied by the Farralane Lighting & Audio Company;
- c) an array of anodizing, plating and rinsing tanks whose locations varied, and were presumably moved about to accommodate cooling water supply, discharge and plant efficiency;
- d) below grade outfall piping for both sanitary and process coolant waste (location undetermined).
- e) possible floor drains (location uncertain).

The present owner, Mr. Irwin Cain, President of Commerce Holding Co., Inc. (CHC), has stated that all above ground tanks and metal plating related equipment were removed by the tenant when they vacated the building. The modifications performed by CHC, Inc., after Tronic vacated the building, consisted of repairs to the roof and construction of dividing

walls. CHC, Inc. is not aware of the location of any below grade sump/pit tank, underground tanks or floor drains used by Tronic at this property.

Under the Freedom of Information Law (FOIL), file searches of both the SCDHS and the Town of Babylon (TOB) Building Department were performed. No drawings describing the location of above ground holding tanks, below grade sump/pit/tanks or underground pipes were identified pertaining to the Tronic Plating Co. tenancy.

2.4 Environmental Setting

The present-day environmental setting of the Tronic Plating Company is described in this Section. Topics included are generalized land use, an industrial violations survey, local geology and hydrology, and water supply.

2.4.1 Land Use

Tronics occupied approximately 7,200 ft² of building space of a 116,654 ft² lot (building, lawn & paving) in a commercialized, light industrial, suburban portion of southwestern Suffolk County. On-site, the Tronics Plating Company occupied the southeast portion of the building which has, as of March 1984, been reconstructed and improved to accommodate the current tenants. The current commercial occupants of the building and their generalized business activities are:

162 Oakland Supply - supplier of industrial abrasives & tools;

164 EFS Marketing - supplier of novelty items;

166 Farralane Lighting & Audio - audio & lighting equip.; and

168 Infrared Optics, Inc. - lens manufacturers.

The remaining business occupants on Commerce Drive are comprised of commercial and light industrial facilities. Site environs consist of

light industrial businesses to the north, west, and northeast, and Pinelawn Cemetery to the south and southeast. The land area immediately to the south of Central Avenue, between the building directly opposite Commerce Drive (Doral Fabrics) and the Cemetery, is also owned by Pinelawn Cemetery, and is heavily wooded. The street numbers and individual occupant names for the properties in proximity to the Tronic Study Area are given in Table 2-2.

2.4.2 Industrial Violations Survey

An industrial violations survey was conducted by CA RICH to identify those facility sources outside of the CHC, Inc. property which may have an effect upon groundwater quality beneath the area due to illegal discharges. The names and addresses of the surrounding facilities were compiled by performing a windshield inventory of the area within, and bordered by Central Avenue, Marcus Avenue, New Highway and Wellwood Avenue. The results are listed on Table 2-3.

A file inspection, using the Suffolk County Department of Health Service's (SCDHS) Freedom Of Information Law (FOIL) assisted in facilitating inspection of the agency file's for the surrounding properties in this Survey. Copies of the records of illegal discharges recorded around the Tronic Site study area were obtained and reviewed. The following nine firms were identified in the survey of discharge violations:

- Astro Electroplating
- Sherwood Packing Corporation
- Kinemotive Corporation
- Island Lithoplate Services, Inc.
- Bucknell Press
- Opti-Ray
- P&V Circuit
- Cantor Bros.
- Lincoln Graphic Arts, Inc.

The locations of those facilities documented to be dischargers of contaminants to the ground and/or underlying ground water are depicted on Plate 1. The Astro-Electroplating facility is situated adjacent to and immediately east of the Tronics Site. A summary of the recorded violations for each of the above-listed firms is presented in Appendix A.

In addition to the industrial violations searches performed in the study area, two NYSDEC Inactive Hazardous Waste Sites are located upgradient of the Tronic Site. These are the I.W. Industries and McGovern Sod Farm sites. A map locating these sites is included on Figure 6-1 of Section 6.3.

It is also noteworthy that of the industries presently located in Farmingdale, only approximately 40% are connected to the Southwest Sewer District (SWSD) Treatment Plant. In addition to this, the SWSD's service area extends only as far north as Smith Street. Therefore, virtually all of the lower Melville's industry (the area between the Long Island Expressway and Smith Street) discharge to septic systems.

2.4.3 Site Geology

The Tronic Plating Company Site is situated upon glacial outwash plain soil deposits south of the Ronkonkoma recessional moraine. These deposits, consisting of a mixture of coarse sand and gravel, constitute the unconsolidated sediments of the Upper Glacial Aquifer.

There are three major aquifers underlying the Site. These are: one) the unconfined Upper Glacial aquifer; two) the semi-confined Magothy aquifer; and three) the deeper confined Lloyd aquifer. They are Pleistocene and Late Cretaceous in age. The total thickness of these three aquifers is approximately 1,200 feet. The two aquifers of major environmental concern for this study are the Upper Glacial and the Magothy. The Lloyd Sand aquifer is deeply confined, and, at this location, occurs at a depth of approximately 1,000 feet. Therefore, it is not of concern in this investigation. Previous studies have indicated that the Upper Glacial and Magothy aquifers may be hydrologically connected under the Site.

The following sections on local geology for the Site are derived from information reported by Jenson and Soren, (1974); Pluhowski and Kantrowitz, (1964); and McClymonds and Franke, (1972).

A generalized geological cross-section trending north to south across this part of Long Island is given on Figure 2-2. This section illustrates the southward sloping wedge of unconsolidated deposits unconformably overlying the deeper crystalline bedrock below (comprised of metamorphic and igneous rocks).

Upper Cretaceous Series

Raritan Formation

The Raritan Formation of Late Cretaceous age is the deepest geologic formation of unconsolidated deposits at the Site. It rests directly on crystalline bedrock and is unconformably overlain by the Magothy Formation. The Raritan Formation occurs beneath the entire area of Long Island but does not outcrop, or 'daylight' anywhere near Tronics or within Suffolk County. Formation thickness ranges from 300 to 600 feet and is approximately 415 feet thick beneath the Site. The Raritan Formation is divided into a lower unit (the Lloyd Sand member) and an upper unit (the Raritan Clay).

The Clay member functions as an aquiclude (confining unit), successfully separating, for the purposes of this investigation, ground water occurring within the deep Lloyd sand member from the ground water occurring within the overlying Magothy. Beneath the Site, the relatively tight and impermeable Raritan clay is approximately 175 feet thick.

The Lloyd Sand is approximately 200 to 300 feet thick under the Tronics Site. It is composed of fine to coarse sand and gravel of inherently high permeability. Pumped groundwater withdrawals from the Lloyd aquifer are restricted to the barrier islands considerably to the south of the Tronic Plating Co. Site.

Magothy Formation

The Magothy Formation is a thick sequence of non-marine sediments of Late Cretaceous age which were deposited upon the sediments comprising the underlying Raritan Formation. The Magothy is overlain directly by the more recent Pleistocene deposits which comprise the laterally continuous Upper Glacial aquifer. The lower boundary or 'formation contact' of the Magothy is referred to as a geological erosional unconformity, and can best be recognized by either a gradational or fairly rapid change from the gravelly beds characteristic of the bottom of the Magothy to the presence of clays or silty sands and silty clays that are characteristic for the top of the deeper Raritan Formation. The upper contact of the Magothy Formation, separating the Magothy from the Pleistocene deposits of the Upper Glacial aquifer has historically been characterized and distinguished by differences and gradations in sediment color, texture and composition.

Studies indicate that the historical paleosurface of the Magothy was a gently sloping coastal plain, moderately to highly dissected by streams flowing south and southwest.

In response to interfingering of coarse and fine-grained depositional sediments, the permeability of the Magothy can best be generalized as greatest in a direction parallel to bedding with considerably lower permeability perpendicular to bedding. At Tronics, the Magothy Formation is approximately 700 feet thick.

Pleistocene Upper Glacial Deposits

Permeable outwash deposits comprise the bulk of the Pleistocene Upper Glacial deposits. These sediments rest unconformably upon the Magothy Formation at an elevation equivalent to mean sea level or 100 feet below grade at Tronics. The Upper Glacial deposits are approximately 100 feet thick directly under the Site. The deposit thickens toward the north in the direction of the Ronkonkoma Moraine, near the Long Island Expressway.

The saturated Upper Glacial sediments consist of horizontally stratified beds of fine to coarse sands and gravel.

2.4.4 Site Climate, Hydrology and Water Supply

Long Island is situated between 40 degrees and 42 degrees latitude. The mean annual temperature on the Island is approximately 51 degrees F (11 degrees C) which is several degrees higher than the average for all of New York State due to the tempering influence of the Atlantic Ocean and Long Island Sound. The minimum average monthly temperatures occur in February and range from 28°F (-2°C) to 32°F (0°C). The maximum average monthly temperatures occur in July and range from about 69°F (21°C) to 75°F (24°C). Average temperatures decrease from east to west, and Long Island's south shore temperatures are slightly lower than its north shore temperatures at the same longitude. The maximum and minimum temperatures of record are 103 °F (39°C) and -14°F (-26°C), respectively (Soil Conservation Service USDA, 1974). The prevailing wind direction is northwest during most of the year, except during the summer months when south and southwest winds predominate (Franke and McClymonds, 1972).

Long Island precipitation averages about 44 inches per year and is fairly well distributed throughout the year. The 30-year annual average precipitation recorded at Mineola, Long Island, New York (ref; Northeast Regional Climate Center, Ithaca, N.Y.) is 43.69 inches. Figure 2-3 shows the annual precipitation from 1959 to 1988. During 1989, annual rainfall was significant at 65.11 inches.

The direction and relatively rapid rate of shallow groundwater flow beneath the Site (at or near the water table) is southerly at approximately 2 feet per day. This information is developed from a series of water level measurements collected from the piezometers installed on-site and agrees with the generally accepted literature describing the hydrologic conditions for this area.

Ground water supplies the public and private needs of the entire population of both Nassau and Suffolk Counties. The two most commonly tapped aquifers for water supply purposes are the Upper Glacial and the Magothy. The Upper Glacial aquifer is the primary water supply source for irrigation and small commercial or industrial wells. The Magothy is the major source for the larger municipal supplies.

The Magothy Aquifer continues to be the primary source of potable drinking water in this part of Suffolk County. Wells in the immediate area are utilized for potable drinking water, industrial process flow, cooling water and fire protection purposes. The Magothy Aquifer is totally dependent upon downward percolating rainfall and recharge from the overlying Upper Glacial deposits for its subsurface replenishment.

Two water companies purvey water pumped from municipal wells to the homes and businesses in the vicinity of the Site. The East Farmingdale Water District supplies the Tronic Plating Company Site as well as areas to the north, and the Suffolk County Water Authority supplies remaining areas to the south of the Site. Each well field consists of one or more public supply wells.

Each public supply well generally supplies one million gallons or more per day when in full-scale operation. All of the local public supply wells are advanced to, and completed within, the Magothy Aquifer.

The nearest municipal well field is located 4,000 feet southwest of the Tronic Site (E.F.W.D Well 2-2). The nearest reported private well is located at 222 Central Avenue, approximately 1400 feet directly east of the Tronic Plating Company Site.

SECTION 2

TABLES

TABLE 2-1

CONTAMINANT CONCENTRATIONS
AT TRONIC PLATING COMPANY

DATE	CONCENTRATIONS IN PPM													SAMPLING LOCATION	SAMPLING ORGANIZATION		
	CN	NI	Cd	Tot.Cr	Cr ⁺⁶	pH	Cu	Fe	Pb	N	Ag	Zn					
1972																	
Dec 4	1.1	6.6	0.85	0.25	0.01	5.4	3.85	1.7	0.5		0.10	0.5	Not indicated (N/I)			Not indicated (N/I)	
1973																	
Aug 9	7.4					6.6					0.42						
Nov 28		12.5	5.0	3.8			7.0	32	0.3			0.7	N/I				Suffolk Co. Dept Env. Control (SCDEP)
Dec 10	13.4																
1974																	
Jan 28	6.0	1.6	3.14	0.94		6.85	2.25	0.9	0.21		0.33	0.7	N/I				Ecotrol
Feb 11	2.5	3.0		0.13		4.6	1.8	0.3	0.1		0.05	0.2	N/I				N/I
Mar 23		1.1	1.9	1.0		7.8	1.4	2.6	0.2		0.15	0.3					
1975																	
Nov 7		6.8	3.4	1.3	ND	6.9	14.0	4.0	ND	7.1	0.7	1.1	N/I				Tronic
13		3.8	3.7	1.5	ND	7.6	9.7	6.9	ND	2.5	0.8	1.4	N/I				Tronic
21	5.5	0.3	2.1	0.7	ND	6.6	3.0	4.2	ND	3.5	0.3	0.9	N/I				Tronic
26	12.8	6.9	6.8	4.1	ND	7.2	17.4	10.6	ND	1.5	0.1	0.52	N/I				Tronic
Dec 1	0.4	0.2	1.6	0.6	ND	6.6	1.1	1.7	ND	ND	ND	0.46	N/I				Tronic
8	29	1.4	10	1.0	ND	2.2	1.0	5.0	ND	12	ND	0.25	N/I				Tronic
16	10.7	0.8	0.9	0.53	ND	6.5	7.9	3.1	ND	3.4	0.5	0.63	N/I				Tronic
23	5.3	1.5	1.5	1.0	ND	4.3	8.1	1.7	ND	11.0	0.5	0.8	N/I				Tronic
30	7.6	4.9	2.0	4.2	0.6	6.1	2.2	2.5	ND	5.2	0.25	0.6	N/I				Tronic
1976																	
Jan 13	9.2	1.1	0.7	0.8	ND	4.0	8.3	1.2	ND	3.2	0.8	1.9	N/I				Tronic
23	11.6	4.4	1.25	0.7	ND	5.6	3.4	6.3	ND	1.2	0.65	2.0	N/I				Tronic
Feb 3	0.8	1.4	2.0	0.7	ND	3.2	5.0	1.3	ND	3.8	1.1	1.3	N/I				Tronic
10	0.3	0.3	8.0	5.0	1.0	6.1	0.9	2.0	ND	4.3	0.5	0.7	N/I				Tronic
17	ND	ND	0.4	0.3	0.3	6.6	0.35	1.6	ND	0.6	0.6	0.25	N/I				Tronic
24	3.0	0.6	2.175	2.2	0.3	3.1	10.2	2.7	ND	6.83	0.01	1.7	N/I				Tronic
Mar 2	7.7	2.9	0.5	0.6	0.2	6.4	3.6	1.3	ND	4.9	ND	1.2	N/I				Tronic
9	18.8	4.7	2.7	2.3	ND	3.2	4.2	4.7	ND	7.3	ND	1.7	N/I				Tronic
16	2.8	0.9	2.4	2.1	ND	6.6	1.1	1.6	ND	0.8	0.2	0.9	N/I				Tronic
23	8.7	4.8	3.8	1.0	ND	3.19	6.7	9.5	ND	10.0	0.2	1.8	N/I				Tronic
30	6.5	3.4	1.8	1.0	ND	8.2	1.99	6.3	ND	1.0	0.15	0.3	N/I				Tronic
Apr 8	8.2	3.8	2.4	1.3	0.1								N/I				Tronic
15	11.7	13.5	1.9	0.5	ND								N/I				Tronic
23	15.0	9.2	3.2	1.6	ND								N/I				Tronic
30	4.5	0.8	0.1	0.1	ND								N/I				Tronic
May 11/27						N=9											Tronic
						Av 7.1											

CONTAMINANT CONCENTRATIONS
AT TRONIC PLATING COMPANY

DATE	CONCENTRATIONS IN PPM											SAMPLING LOCATION	SAMPLING ORGANIZATION				
	CN	Ni	Cd	Tot. Cr	Cr ⁺⁶	Pb	Cu	Fe	Pb	N	Ag			Zn			
Jun 1/30																	
						N=16											
						Av 7.35											
7		0.48	1.13	0.12		3.4	1.4	16.0	0.1				0.3	Pipe to industrial pool(?)			SCDEC
7		0.1	0.02	0.01		7.6	0.15	0.09	0.1				0.02	Pinal anodizing rinse tank			SCDEC
7		0.1	0.02				0.1	0.05	0.1				0.05	City H ₂			SCDEC
7		1.85	1.8	0.23	0.06	3.6	2.0	16.0	0.2				2.3	Industrial leaching pool(?)			SCDEC
Jul 6/29						N=15							N/I				Tronic
Aug 2/28						Av 7.15							N/I				Tronic
Nov 1/29						N=17							N/I				Tronic
						Av 6.97							N/I				Tronic
						N=14							N/I				Tronic
1978																	
Mar 28		0.1	0.09	0.32		8.5	0.07	0.5	0.1				0.02	0.11	N/I		Tronic
1979																	
Jun 26	0.5	0.2	0.2		0.02	6.6	0.32		0.2				0.02	N/I			Tronic
Sep 9		0.4	0.69	0.07		6.0	0.31	1.1	0.2				0.02	0.43	Storm drain by rear door-blue green stain leading to drain		SCDEC
11		0.3	2.0	0.15		5.3	0.75	0.85	0.2				1.04	0.48	Old industrial pool w/more than 8.0' of liquid in pool		SCDEC
11		0.4	3.1	0.14		6.1	0.93	1.2	0.2				0.21	1.18	N/I		SCDEC
18		0.2	0.15	0.02		5.8	0.85	1.5	0.2				0.73	0.2	Pool by rear door		SCDEC
18		0.2	0.50	0.22		5.1	0.52	4.5	0.2				0.03	0.7	Cooling water pool(?)		SCDEC
18		0.2	1.17	0.07		5.35	0.45	0.7	0.2				0.06	1.0	Third industrial pool, abandoned(?), discharge noted		SCDEC
18		0.2	1.10	0.11		5.25	0.44	1.0	0.2				0.06	0.7	Fourth industrial pool, abandoned(?), no discharge noted		SCDEC
18		0.2	1.14	0.13		5.5	0.45	1.1	0.2				0.06	0.9	First industrial pool, abandoned(?), actively receiving discharge		SCDEC
18		0.2	0.72	0.18		5.1	0.47	2.6	0.2				0.04	0.5	Second industrial pool, abandoned(?), actively receiving discharge		SCDEC
Nov 14			5.4	3.6		6.5	10.0		3.0				1.0	12.0	First cooling water pool		SCDEC
1980																	
Jan 3		0.5	0.87	0.36	0.06	6.05	0.60	2.7					0.11	1.0	First cooling water pool(?)		SCDEC
May 21			0.80										0.02		#2 cooling water leaching pool - plating operation		SCDEC
Aug 5		0.18	0.93			5.1	0.48	1.1	0.2				0.02	0.1	Cooling water, first pool(?)		SCDEC
Oct 1		0.1	4.2	0.06		6.9	0.30	4.2	0.2					0.1	001 outfall to first pool		SCDEC
Dec 3		0.4	3.4	0.06			0.98	2.4	0.2				0.02	0.24	Leaching pool southside of building, closest		SCDEC

TABLE 2-1 (Cont'd)

CONTAMINANT CONCENTRATIONS
AT TRONIC PLATING COMPANY

DATE	CONCENTRATIONS IN PPM												SAMPLING LOCATION	SAMPLING ORGANIZATION		
	CN	NI	Cd	Tot.Cr	Cr ⁺⁶	pH	Cu	Fe	Pb	N	Ag	Zn				
1981																
Jun 17		1.0	0.66	0.20	0.021	7.0	0.38	0.8	0.2				0.3	Storm drain rear of Tronic, 33'-40' from north garage door	SCDEC	
17		0.5	0.65	0.06		7.0	0.74	4.1	0.2				0.2	Sanitary pool, front lawn, east series, second toward Central Ave.	SCDEC	
Aug 31		1.7	10.0	1.0	0.2	5.0	9.0	140	2.6		11.0	1.5	Sanitary pool, front lawn, east series, first pool	SCDEC		
1982																
Aug 18		0.8	2.8	2.1	0.02	7.0	8.8	170	3.2		0.1	1.0	Sanitary pool, first in-line(?) front lawn	SCDEC		
18		0.7	0.3	0.1		7.0	0.37	1.5	0.2		0.02	0.65	Storm drain NE of Tronic rear door	SCDEC		
1983																
Aug 31		0.1	0.2	0.02		5.0	0.6	0.3	0.2				0.3	Second sanitary pool, farthest from building front lawn, east leaching pool(?) grab sample	SCDEC	
Oct 5			0.076						0.048						Ecotest Labs/Tron	
Oct 6			0.20						0.016						Ecotest Labs/Tron	
Dec 7		0.1	0.02	0.02		6.0	0.05		0.2					Waste water(?) collected by Tronic East side of Tronic, 3"-4" pipe 0.2' abovegrade discharging to storm drain	SCDEC	

SOURCE: EBASCO, (1988)

TABLE 2-2

OCCUPANTS OF COMMERCE DRIVE

<u>STREET NO.</u>	<u>OCCUPANT NAME</u>
4.....	Carr Met Industries, Inc.
6.....	Carr Met Industries, Inc. IAM Sheet Metal Inc.
8.....	Diamond Fasteners Inc.
10.....	Regal Insulation Corp.
12.....	Trebor Instrument
16.....	All Seasons Air Conditioning
18.....	Set III Dental Studio
20.....	A & S Precision Specialists
22.....	Certified Copy Co.
24.....	Vendamint Corp.
26.....	D & R Computer
28.....	He-Os Optical Corp.
30.....	Pritchard Services (NY) Inc.
32.....	Superior Air Conditioning & Heating
34.....	Lawn Geni
36.....	North Shore Mechanical, Inc.
38.....	Master Porcelain Studio
40.....	Usuki International Corp.
42.....	JESCO Inc.
44.....	Afford-A-Scan
46.....	Landmark Sheet Metal Co.
48.....	Dabco Machine
50.....	Inner Circle Dental Inc.
52.....	Satellite Neon Corp.
54.....	Yours International
56.....	Sapenoff Machine Co.
58.....	Print-Tek
60.....	P.D. Photographers Ltd.
62.....	Afford-A-Scan
64.....	C.W. Urbach Co.
66.....	Modafine
68.....	Joseph Roberts Co., Inc.

Summary of Industries Within Tronic Plating Co. Study Area

<u>Name of Industry</u>	<u>Address</u>
Along Commerce Drive:	
P.D. Photographics Ltd.	60 Commerce Dr.
Print-Tek	58 Commerce Dr.
Sapenoff Machine Co.	56 Commerce Dr.
Dabco Machine	48 Commerce Dr.
Landmann Sheet Metal Co.	46 Commerce Dr.
Jesco Ind.	42 Commerce Dr.
Master Porcelain Studio	38 Commerce Dr.
HE-OS Optical Corp.	28 Commerce Dr.
Copier Place Service	22 Commerce Dr.
IAM Sheet Metal Ind.	06 Commerce Dr.
Eastern Signs	****
Along Central Hwy.:	
Astro Electroplating	170 Central Hwy.
G&G Concepts Ltd.	176-3 Central Hwy.
TNT Precision Machine Co.	176-11 Central Hwy.
Central Machining Specialty	176-12 Central Hwy.
Elliot's Vending (repair)	176-13 Central Hwy.
Sanco Litho Inc. (offset printing)	176-16 Central Hwy.
TM Printer Services	176-17 Central Hwy.
Ultra Concepts Inc.	****
Mercury Tool Mfg. Corp (oil on pavement)	148 Central Hwy.
CES Ind. Inc.	130 Central Hwy.
IDS Industrial Drug Supply	110 Central Hwy.
Sigma (big industry)	92 Central Hwy.
Imperial Ind.	66-70 Central Hwy.
Beach Maintenance Chemicals Ind. (drums in back)	****
Kinemotive Corp. (drums in back)	222 Central Hwy.
Island Lithographic Plate Services	215B Central Hwy.
Atlantic Fluid Power	215-L Central Hwy.
Halar Ind. (drums and tanks)	175 Central Hwy.
ARC Graphics Reprod. Service	****
Larabee Wire	101 Central Hwy.
King Taxidermist	7B Central Hwy.
R&J Graphics Inc.	09 Central Hwy.
JJ Born Locksmith	****
Socket Products Mfg. Corp.	****
Brodie Custom Cabinetry	55 Central Hwy.

Along Engineers Lane:

Ken Medical Products	14 Engineers Lane
Nankee Aluminum Paint Co. Inc.	****
Opti-ray	60 Engineers Lane
Shorewood Packaging Corp.	55 Engineers Lane

Along Sarah Drive:

Unitile Industries Inc.	****
Taliano Handbag	****
Weico Wire and Cable Inc.	45 Sarah Drive
Caasan Metal Products	44 Sarah Drive
Val-Hue Litho Corp.	34 Sarah Drive
Bi-County Shirt Launderers Inc.	18 Sarah Drive
Two Brothers Scrap Metal (drums)	10 Sarah Drive

Along Central Drive:

Timex Corp.	17 Central Drive
Milard Precision Corp. (MPC) (gas pump)	31 Central Drive
Rolem Press	56 Central Drive
Southshore Woodworking	54 Central Drive
Mono Plate	50 Central Drive
Creative Services Group (CSG)	20 Central Drive

Along New Highway/Republic Road:

Apex Packing and Rubber Co.	1855 New Highway
Hallmark Name Plate (drums)	1865 New Highway
Distribution Plus Inc.	1885 New Highway
Sedco (drums)	50 New Highway

Along Marcus Drive:

Gould Simulation Systems Division	****
Fala Direct Marketing	70 Marcus Drive
Genovese (drugstore factory)	****
Esprit	100 Marcus Drive
Fonar (Raymond Drackman M.D.)	110 Marcus Drive

Along Wellwood Ave./Pinelawn Road:

Beaumont Offset Corp.	2045 Wellwood Ave.
-----------------------	--------------------

Along Finn Ct.:

Maytag	100 Finn Ct.
Lincoln Graphic Arts	****
Aircraft Parts Corp.	160 Finn Ct.
Aircraft Parts Corp. Plant II	140 Finn Ct.

Along Smith Street:

Optiray Inc.	****
Instant Whip (big machines/holding tanks)	535 Smith St.
Modern Metal Specialties Co. Inc.	515 Smith St.
Long Island Transmission Co. (Subsidiary of Cangro Ind.)	495 Smith St.
Northeast Web Printing	425 Smith St.
Center Island Pennysaver	****
Venus Scientific Inc.	375 Smith St.
ERI Electrorep	380 Smith St.
Hygrade Metal Moulding	540 Smith St.
Great Neck Saw Mfrs.	550 Smith St.

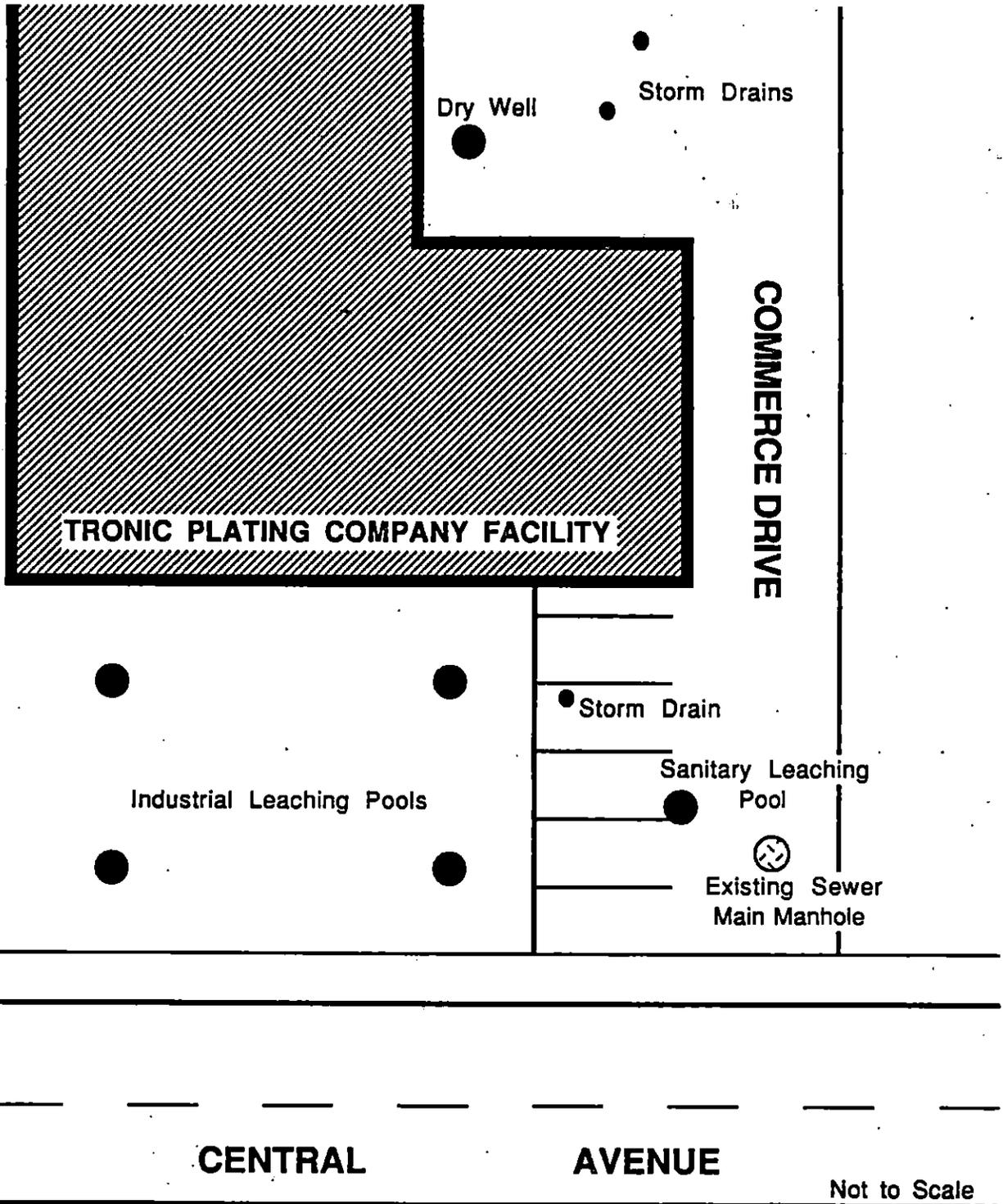
Others:

Display Presentations	****
Prototech Circuits (DME)	****
Bucknel Press Inc.	****
Deversified Manufacturing Inc.	****
P&V Circuits Inc.	****

**** Address not known

SECTION 2

FIGURES



FACILITY MAP

CA RICH CONSULTANTS, INC.
 Certified Ground-Water and Environmental Specialists

Tronic Plating Company Site
 Farmingdale, NY

Prepared By: RDH

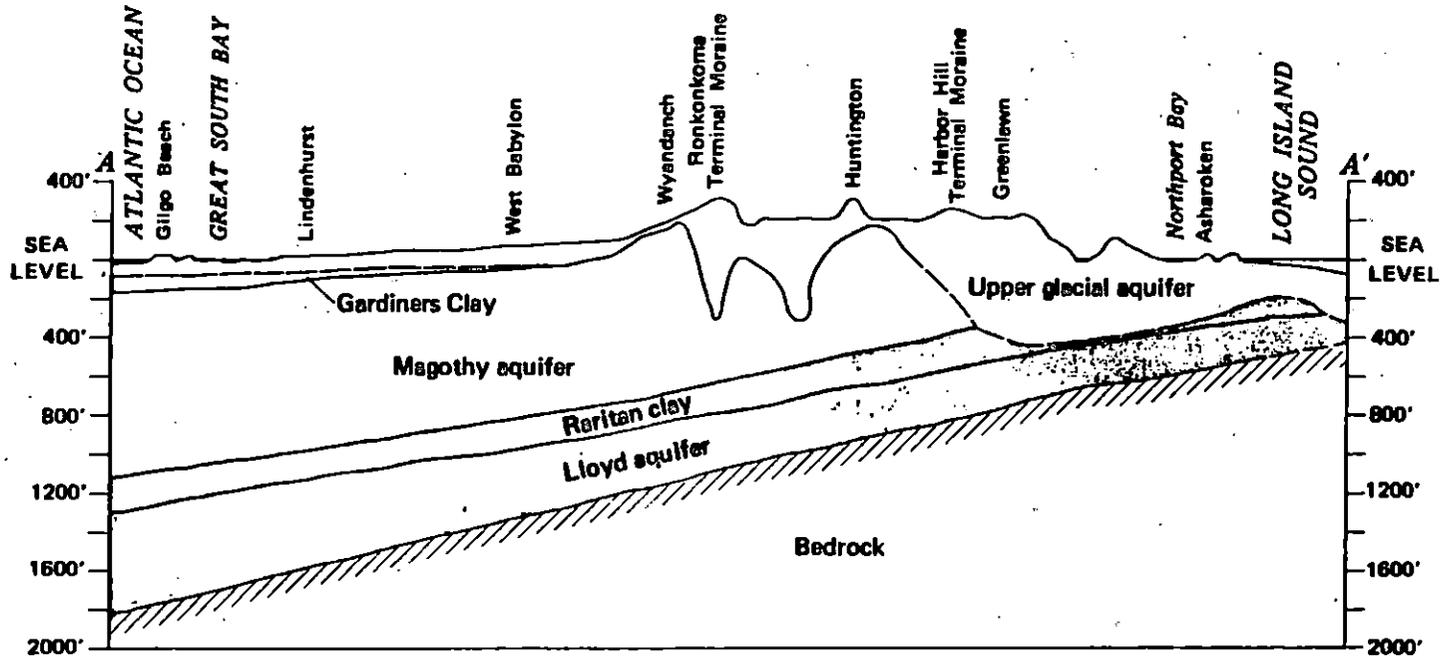
Date: September 1991

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Reviewed By: EAW

Figure: 2-1

Reference: Hydrogeology of Suffolk County, Long Island, New York
 By: M.M. Jensen and Julian Soren (1974)



(Horizontal Scale: 1 inch equals 4 miles)

GENERALIZED GEOLOGIC CROSS-SECTION

CA RICH CONSULTANTS, INC
 Certified Ground-Water and Environmental Specialists

Tronic Plating Company Site
 Farmingdale, New York

Prepared By: **EAW**

Date: **December 1989**

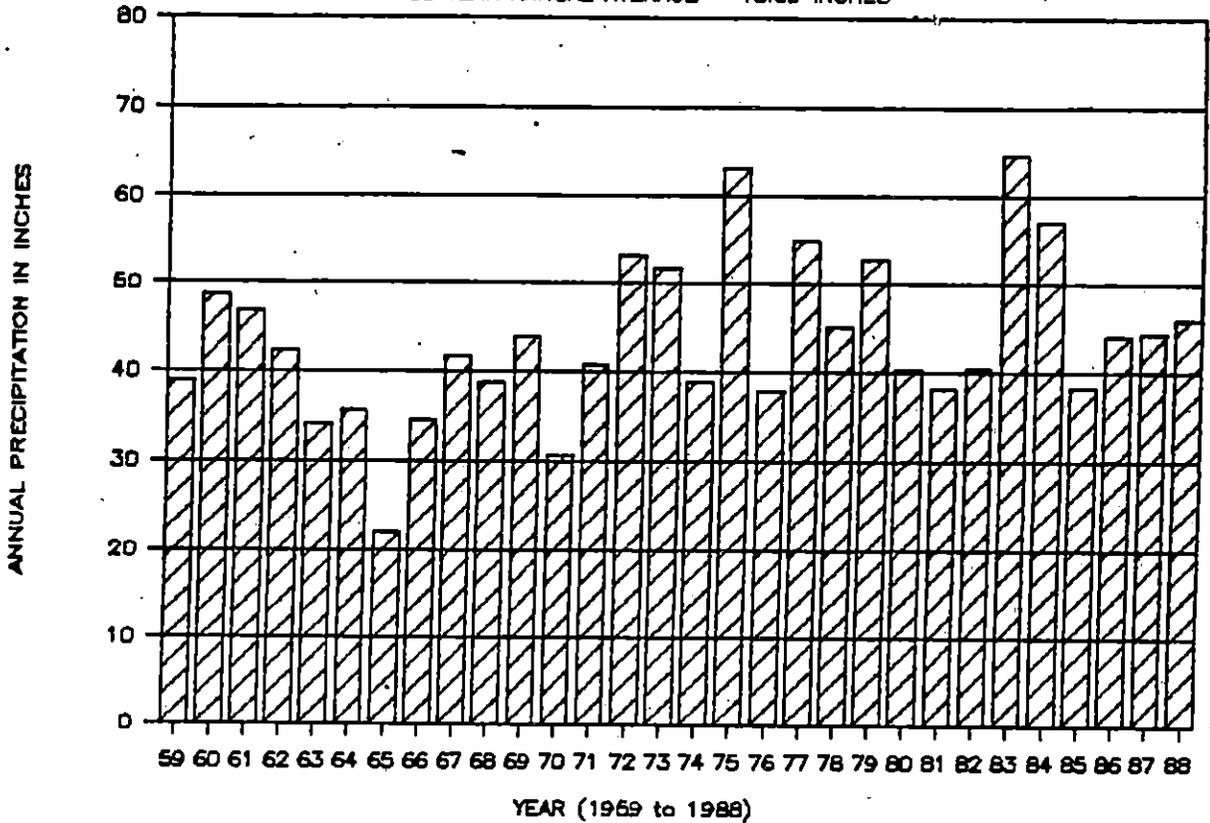
404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Reviewed By: **CAR**

Figure: **2-2**

ANNUAL PRECIPITATION FOR MINEOLA, N.Y.

30 YEAR ANNUAL AVERAGE = 43.69 INCHES



Precipitation Histogram for Mineola, NY - 1959 to 1988

CA RICH CONSULTANTS, INC.
 Certified Ground-Water and Environmental Specialists

Tronic Plating Company Site
 Farmingdale, New York

Prepared By: LDC

Date: November 1989

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Reviewed By: EAW

Figure: 2-3

SECTION 3

3.0 REMEDIAL INVESTIGATION METHODOLOGIES PHASE I AND PHASE II

3.1 General

This Section of the Remedial Investigation Report summarizes the field activities and methodologies used during this remedial field investigation. This work was performed in two phases, an initial phase (Phase I) which began in January, 1989 and a supplemental phase (Phase II) which began in April, 1991.

All of the field work conducted by CA RICH was performed in accordance with the Work Plan for this project which was approved by the United States Environmental Protection Agency. The specific field procedures and protocols employed throughout the investigation were completed in conformance with the Tronic Plating Company Site's Final Project Operations Plan (POP) for the Remedial Investigation and Feasibility Study (CA RICH, 1989).

The first phase of field activities included the following five methods of investigation as described in Sections 3.2 through 3.6.

Phase I

- Geophysical Survey
- Soil Sampling and Monitoring Well Installation
- Monitoring Well and Storm Drain Sampling
- In-situ "Slug" Type Permeability Testing
- Topographic Survey

Upon receipt and review of the validated sample data, EPA requested that a supplemental or Phase II field activity be performed. This included the following activities as described in Section 3.7 through 3.11.

Phase 2

- Additional storm drain sampling
- Borings and soil sampling around selected storm drains
- Installation of supplemental monitoring wells
- Supplemental sampling of monitoring wells
- Supplemental topographic survey

3.2 Phase I - Geophysical Survey

On January 23, 24, and 25th. 1989, CA RICH representatives, an EBASCO Services representative, and support personnel from S.A. Alsup and Associates, Inc. (subcontracted to CA RICH) conducted a terrain conductivity survey of the study area. This non-disruptive ground survey was performed to screen subsurface soil conditions within the area downgradient of the Tronic Plating Company Site to determine the presence of any zones of anomalous electrical conductivity. A discrete zone of relatively high conductivity might represent the presence of metallic ions residual within the subsurface soils and/or dissolved in shallow groundwater.

A Geonics Model EM-34-3 Terrain Conductivity meter was selected and utilized as the applicable surveying tool. Alignments were traversed with parallel profiling stations at 10, 20 and 40 meter intervals, collecting a total of 263 electromagnetic induction (EMI) readings. The locations of the survey stations are shown on Plate 2. Due to limited access, or potential electrical interference in certain areas, the alignments were positioned, confirmed and identified according to local geographic and cultural features. Readings were accumulated, calculated at each alignment, and recorded. The recorded conductivity values were examined and analyzed with the support of S.A. Alsup (Appendix B).

Detailed information regarding the instrumentation and survey field procedures is available in the Appendix B report.

3.3 Phase I - Soil Borings, Piezometers and Monitoring Well Installation Program

3.3.1 General

From April 26 to May 24, 1989, six (6) monitoring wells and soil borings were installed in selected locations of the Tronic Plating Company study area. In addition, six (6) piezometers were installed at the Tronic Plating Company Site to determine and confirm flow direction and hydraulic gradient beneath the Site.

Two drilling companies, Environmental Drilling Inc. (EDI) and Delta Well and Pump Co. (Delta), were contracted by CA RICH to properly perform the necessary drilling, sampling and well installation activities. EBASCO (representing the USEPA) was present throughout the exploration program to oversee all of the activities and to take split samples at various depth intervals. The test borings and monitoring well locations are presented in Appendix C. A summary of the samples "split" with the USEPA is included on Table 3-1.

The borings, wells and soil sample descriptions were classified by the inspecting CA RICH hydrogeologist in terms of texture, grain size, color, odor and miscellaneous observations. This information was immediately entered onto soil boring log sheets and into the dedicated field notebook. The Unified Soil Classification system was used to ensure that standard sample classifications and consistent descriptive procedures were followed. The compilation of boring logs and well construction diagrams are given in Appendix B.

Two and three-inch, rust-free, steel, split-spoon core samplers were used to collect the soil samples from the borings. Each split-spoon was driven at least 2 feet. Blow-counts were recorded during the drilling activities. Due to the cobbly nature of the upper glacial deposits, full recovery of the

split-spoon sample was not always possible. If little or no sample recovery was obtained from a given 2 foot sample interval, a subsequent 2 foot sample was collected and the soil combined to form a 4 foot sample interval. Each soil sample was placed into the appropriate sample containers, and kept on ice in a cooler at all times until shipped to Nytest Laboratories for chemical analyses. In addition, duplicate samples were taken to check the precision of both the sampling activity and the analysis conducted by the contract laboratory. Trip blanks (vials of laboratory demonstrated analyte-free water) accompanied each sample shipment and were analyzed for volatile organics.

Field blanks (laboratory demonstrated analyte-free water that is poured over the sampling equipment and collected) were collected daily and analyzed for the same parameters sampled on that day. A description of the parameters tested and analytical results are presented in Section 4.

The environmental hazard condition of the atmosphere within all of the drilling areas and the quality of any measurable vapor off-gassing from the split-spoon soil samples were continuously monitored using hand-held photoionization detectors (HNU). The HNU meter was used for health and safety purposes as well as to conduct head-space analysis on each soil sample collected from the drilling program. Head-space analysis was performed by placing a portion of the soil sample into an 8 oz. sample jar and covering it with clean aluminum foil to prevent any volatile organics from escaping into the air. Using a heated, water-filled aluminum pan the samples were warmed for approximately 3 minutes. The samples were then removed and immediately screened by HNU instrumentation for volatile organics. All resultant readings were recorded in the field log book and onto boring logs.

Level D personnel protective gear was acceptable throughout the drilling program. All drill cuttings were stored in 55-gallon drums in a dedicated fenced-in area in the rear of the Tronic Plating Company Site. All decontamination procedures were completed as specified in the POP.

On April 26 and 27, 1989, a drilling crew from EDI and representatives of CA RICH drilled soil borings Nos. LP-1, LP-2, LP-3, and LP-4 in the front lawn of the Tronic Site. The purpose of this activity was to assess subsurface conditions in the vicinity of the former leaching pit areas. The hollow-stem auger drilling method was employed, utilizing a B-61 Mobile Drill, to ensure the integrity of the collected soil samples. Split-spoon sampling was continuous from the bottom of each of the 4 leaching pits (a depth of approximately 14 ft.) to the soil/groundwater interface (encountered at approx. 38 ft. below land surface). The locations of the borings are mapped on Figure 4-1.

Upon completion of the leaching pit soil borings, each borehole was backfilled with 3% cement/bentonite grout from the bottom of the boring up to the bottom of the leaching pit. The remaining borehole was backfilled to the top of the leaching pit's concrete lid with clean fill. LP-1 and LP-2 had lower concrete covers and required clean sand backfill placed from the top of the cover up to grade.

Soil boring SP-1, immediately adjacent to the sanitary pit, was drilled by EDI under the inspection of CA RICH on May 3, 1989. Continuous split-spoons were collected at 2 foot intervals starting from the bottom of the pit and continuing to groundwater. Upon the completion of SP-1, 3% cement/bentonite grout was used to backfill the boring to grade.

DW-1/P5, drilled on May 2, 1989 was continuously sampled starting at 5 feet below grade (the bottom of the dry well) to groundwater. Upon completion, this boring was drilled an additional 10 feet and completed as a piezometer (for water level measurement purposes).

3.3.2 Phase I - Installation of Piezometers

From April 27 to May 5, 1989, EDI under the inspection of CA RICH drilled and installed six (6) piezometers on the Tronic Site. Each of these small-diameter wells were drilled using a B-61 Mobile Drill hollow-stem auger drilling rig. The locations of the piezometers and the monitoring wells are identified on Plate 3.

All six piezometers were advanced from grade to approximately 10 feet below the water table. No samples were taken from the piezometers during the first round of groundwater sampling. During the second round of sampling, piezometer P-5 was sampled to assist in determining the source of Freon detected in the soil samples.

Each piezometer is constructed of flush-threaded, 2-inch diameter, Schedule 40 PVC riser and slotted screen (0.020 inch slot size). The piezometers are gravel-packed with Morie #0 sand to approximately 2 to 4 feet above the screened interval. A two foot bentonite slurry seal was placed on top of each gravel pack. The remaining borehole was then backfilled with a 3% cement/bentonite grout to approximately 3 feet below grade. A sand pack from 3 feet to 1 foot below grade was then added to allow surface drainage during wet conditions.

Water level measurements were collected and entered into the field notebook both during and after piezometer completion. In addition, water levels were measured before, during and after the development of each piezometer. Development consisted of pumping each piezometer with a hand-held pump and polyethylene tubing or by using a stainless steel bailer and monofilament polypropylene cord. Each piezometer was developed by physically removing at least 5 times the borehole well volume or until the groundwater was clear, whichever occurred first. CA RICH geologist's were on-site to approve satisfactory development of each piezometer and to properly record the activities into the field log book.

3.3.3 Phase I - Installation of Monitoring Wells

From May 3 to May 24, 1989 a total of 6 (six) monitoring wells were drilled at Tronics by both EDI and Delta. EDI drilled and installed two shallow wells MW-1S and MW-2S to a depth of 50 feet below grade using the Mobile Drill B-61 hollow-stem auger rig. The remaining intermediate and deep wells, MW-1D, MW-2I, MW-2D, and MW-3I, were drilled and installed by Delta using a Failing F-10WT hollow-stem auger rig. Wells MW-1D and MW-2D were both advanced to 100 feet below grade. Well MW-

2I was drilled to 70 feet while well MW-3I was drilled to 80 feet below grade.

There were no split-spoon samples taken in wells MW-1S and MW-2S. However, continuous split-spoon sampling, using 2 & 3-inch split-spoon barrels, was conducted in adjacent wells MW-1D, MW-2D, and MW-2I. The split-spoons from MW-3I were taken at every 10 foot interval.

All monitoring wells are constructed of Schedule 40, flush-threaded, PVC screen and riser pipe. Each monitoring well is 4-inch diameter and screened with fifteen feet of 0.020 inch slotted screen. Clean Morie #0 filter sand was used as a gravel pack to backfill each well annulus (open space between borehole wall and well) from the bottom of the well to approximately 2 to 4 feet above the screened interval. A minimum 2 foot thick bentonite slurry seal was then placed on top of the filter pack and tamped. A 3% bentonite/cement grout was then placed over the seal to approximately 3 feet below grade. The remaining borehole was then backfilled with clean gravel pack to allow drainage during wet conditions. Each well was finished with a tamper-proof, locking steel well cap enclosed within a cemented (base and collar), flush-mounted, steel or aluminum cover. The depth to ground water, represented by accurate water level measurements collected within these wells, was recorded throughout the drilling program.

The water levels were collected using either clean steel-engraved tape and blue carpenter's chalk and/or by using an electronic Sinco slope indicator. The water levels were also monitored before, during and after the development of each well. Water level measurements were recorded to 0.01 foot accuracy.

Similar to the piezometers, the development of each monitoring well consisted of pumping at least one hour with a decontaminated submersible pump at which point the ground water ran clear of sediment -- less than 50 nephelometric turbidity units (NTU's). All development water was discharged into two, newly-drilled Purge Water Return Wells (PWRW's) as specified in the POP and as illustrated on Plate 3. The two PWRW's

consist of 10 feet of 0.060 slot screen surrounded with 10 feet of Morie #4 gravel pack. The development water from MW-3I (Pinelawn Cemetery) was discharged at least 20 feet away from the well head.

3.4 Phase I - Monitoring Well and Storm Drain Sampling

3.4.1 Soil Sampling Program

Soil samples taken from the borings for the monitoring wells were obtained using decontaminated 2 and 3-inch rust-free split-spoon samplers. A hand-held photoionization meter (HNU) was on-site to determine the presence of any volatiles in or around the drilling area. Soil samples collected from the storm drains were collected by hand using a decontaminated stainless steel hand auger with extension rods.

No soil samples were obtained from MW-1S and MW-2S because samples were collected, instead, from their immediately adjacent sister wells; MW-1D and MW-2D. The MW-1D and MW-2D deeper wells were drilled by Delta on May 8, 1989 and May 11, 1989, respectively and were continuously sampled every 2.5 feet from grade to the water table.

Below the water table, soil samples were at 10 foot depth intervals down to a final depth of 100 feet below grade (i.e. 60 feet below the water table) at both cluster well locations. One additional sample was collected from the MW-1D borehole at 55 feet below grade.

Most of the upper soil materials that were encountered were comprised of light brown, to brown-orange medium to coarse-grained sand and gravel that graded into a medium to fine-grained sand near the lower portion of the well.

Monitoring wells MW-2I and MW-3I were also drilled by Delta on May 17, 1989 and May 22, 1989. In MW-2I, soil samples were collected every 2.5 feet from grade to the soil/groundwater interface. Below the water table, sample frequency was then every 10 foot down to the finished depth of 70 feet below grade. The MW-3I soil samples were collected by driving the

split-spoon sampler 2.5 feet from 2.5 to 5 feet below grade, then at every 10 foot interval starting at 10 feet to a final depth of 80 feet below grade. All of the soil samples were classified by CA RICH supervisory field geologists familiar with Long Island geology. The soil descriptions, sampling intervals and collection methodologies were all observed and recorded in the boring logs and in the field log book. All soil samples were placed in their appropriate sample containers, labeled and preserved as specified in the POP.

CA RICH performed storm drain soil sampling by hand on June 8, 1989 using a cleaned, stainless steel hand auger. The hand auger was decontaminated using an Alconox solution followed by two potable water rinses, a nitric acid and acetone rinse, and a final lab-grade deionized water rinse. This procedure was completed between each storm drain sampling event. The two storm drains sampled at the Site are shown on Figure 4-2.

The soil samples were obtained by first, removing the protective steel drain cover (both were intact), then lowering the hand auger into the bottom of the drain. The hand auger was turned in a clockwise direction filling the auger head with sediment. The hand auger was carefully lifted out of the storm drain. The sample was then removed using a pre-cleaned stainless steel spoon and placed in its appropriate sample container.

All soil samples retrieved for chemical analytical purposes were kept on ice in a dedicated cooler and were sent to Nytest Laboratory for analyses within 24 hours of their collection. For quality control and assurance purposes, trip blanks, field blanks, and duplicate samples were collected as detailed in the POP. Chain-of-custody forms were properly completed and maintained throughout the sample custody process for recordkeeping purposes.

3.4.2 Water Sampling Program

Ground water samples were collected from the 4-inch monitoring wells at the Tronic Site, and also at existing United States Geological Survey (USGS) well UG-1806 on two occasions during the first phase of field activities. The sampling was performed from June 7 to 9, 1989 and again on August 15 through 17, 1989. The UG-1806 well is located in Pinelawn, approximately 3400 feet south-southeast of the Site. All pumping and sampling equipment was decontaminated prior to any purging or sampling of the wells, and between the sampling of each well - as specified in the POP. All sampling activities have been recorded into the field log notebook.

Prior to well purging, water level measurements were collected using a steel tape and blue carpenter's chalk and recorded. Calculations were made to determine the volume of groundwater in each monitoring well. At least 3 to 5 times the volume of water in each well was removed. Pumping continued until the discharge was free of sediment. A 3-3/4 inch-diameter stainless steel submersible pump and polyethylene tubing was used to purge and withdraw the well water.

A portable generator provided the source of electricity to operate the submersible pump. Dedicated monofilament polypropylene rope was used to manually raise and lower the submersible pump inside each monitoring well. The USGS well UG-1806 was purged using a stainless steel 2-inch diameter bailer and monofilament polypropylene rope. Approximately 7 gallons of water was removed from this well.

While purging each monitoring well, measurements of specific conductance ($\mu\text{mhos/cm}$), temperature ($^{\circ}\text{F}$), and pH were obtained and recorded in the field log book. These measurements were used to determine when the readings had stabilized and when representative groundwater had entered the well. All purged water was discharged into the PWRW's, with the exception of monitoring wells MW-3I and UG-1806, which were discharged approximately 20 feet from each well.

All samples were then collected by lowering a 3-3/4 or 1-3/4 inch-diameter stainless steel bailer into the well. The bailers were decontaminated with an Alconox wash, deionized water, nitric acid and acetone. The bailers were lowered into the well using new and dedicated monofilament polypropylene rope. Each groundwater sample was placed in an appropriate sample container, labeled and recorded, and analyzed for those parameters specified in the POP. For dissolved Target Compound List (TCL) metals analyses, a borosilicate glass filtering device was used on-site to filter the water samples prior to their preservation and analysis.

Water from the 2 storm drains at the Tronic site was collected using a 2-inch diameter stainless steel bailer and dedicated polypropylene rope. Before sampling, the bailer was cleaned with an Alconox solution wash, followed by a nitric acid rinse and acetone rinse, and a final laboratory grade deionized water rinse. The water samples were placed in a proper sample container as specified in the POP. The sample which required dissolved TCL metals analysis was filtered with the borosilicate glass filtering device.

Upon collection, all ground water samples were placed in coolers and kept on ice. Samples requiring preservatives were preserved in the field. All samples were sent with proper chain-of-custody forms to Nytest Environmental for chemical analyses either on the same day as their collection, or within 24 hours of sampling. Trip blanks, field blanks, and duplicate samples were collected as specified in the POP.

At the conclusion of the Tronics RI/FS groundwater and storm drain sampling program, a round of water levels was collected from the six (6) piezometers installed at the Tronic Plating Company Site. A steel tape and carpenter's chalk were used to collect this data. The ground water levels were recorded in the field notebook and reduced and tabulated in Section 4 of this RI Report.

3.5 Phase I - In-situ "Slug" Type Permeability Testing

The "slug" test is a field method for measuring the hydraulic conductivity of the saturated unconsolidated sediments beneath the Tronic Plating Company Site. Specifically, it is a series of short-term well tests that yields information relative to the actual, as-built, flow conditions near each monitoring well. When combined and evaluated, such test data can be used to provide important interpretative information on the flow characteristics under the Site.

CA RICH conducted slug tests in all 4-inch diameter monitoring wells on June 6, 1989. The slug test equipment included a 2-inch by 10 foot length of PVC pipe filled with clean gravel sealed at each end, a dedicated monofilament polypropylene rope, an electronic Sinco water level indicator with an audible signal, and a stopwatch. The 2-inch diameter slug was decontaminated between each well using an Alconox solution wash, with two potable water rinses and a final lab-grade deionized water rinse. The first 10 feet of monofilament polypropylene rope was discarded between each well test.

Water level measurements were taken and recorded in the field book to note well conditions before the slug tests. As the "slug" was introduced, the falling head of the well water within the well was measured and timed. The slug was then removed from the water in one continuous, instantaneous motion. The rate of rising head was then measured using the electronic water level indicator and stop watch. The measured values and compiled hydrographs (water level vs time) for each slug test are presented in Appendix D.

3.6 Phase I - Topographic Survey

A topographic survey was conducted at the Tronic Plating Site to determine the exact elevation of all monitoring wells. The survey was performed by Jerome D'Amaro, P.E. and L.S. Co., a New York State registered land surveyor on May 5, 1989 and June 6, 1989. The Surveyors'

elevations are presented in Section 4. Permanent well mark measuring points have been located on each well to ensure that any future water level measurements continue to be taken from the same location marked on each well head. Level D protective gear was worn during this activity.

3.7 Phase II - Supplemental Storm Drain Sampling

All field work performed during the Phase II supplemental sampling activity was overseen by a representative of Alliance Technology Corporation, EPA's oversight contractor.

Sediments overlying the bottoms of eight on-site storm drains were sampled on April 18, 1991 using a decontaminated stainless steel hand auger. The hand auger was decontaminated using an Alconox solution followed by two potable water rinses, a nitric acid and acetone rinse, and a final demonstrated analyte-free deionized water rinse. This procedure was completed between each storm drain bottom sampling event. The locations of the drains sampled are shown on Figure 4-2.

The samples were obtained by removing the protective steel grates, lowering the hand auger down to the bottom of the drain and rotating the auger in a clockwise direction filling the auger head with sediment. The sample was then removed using a decontaminated stainless steel sampling scoop, mixed in a stainless steel bowl and placed in appropriate sample containers. The VOC containers were filled before mixing the sample.

Storm drains SD-1 & 2 were sampled during the first phase of field activities and analyzed for VOC's, TCL metals and cyanide. During the second phase of field activities, sediments from these two drains were analyzed for semivolatile organics. Sediments from storm drains SD-3 thru 8 were collected and analyzed for VOC's, semivolatile organics, TCL metals and cyanide.

The first phase of sampling revealed elevated level of metals and organics in storm drains SD-1 & 2. Therefore, sediments from storm drains SD-1, 2 and adjacent storm drain SD-3 were also analyzed using the TCLP.

methodology to evaluate waste disposal alternatives during the Feasibility Study.

The following is an excerpt of the log for sediments collected from storm drains SD-1 thru 8:

Storm Drain #	Depth	Description of Sediments
SD-1	11 ft.	Black sand, silt and organic debris with oil sheen
SD-2	11 ft.	Black clay, silt and organic debris with mild odor
SD-3	13 ft.	Black fine to coarse sand, gravel and organic debris, no odor
SD-4	12 ft.	Brown sand, silt and gravel, no odor
SD-5	11 ft.	Black fine to coarse sand and gravel, no odor
SD-6	11 ft.	Dk. brown to black med. to coarse sand, gravel, cobbles and organic debris
SD-7	13 ft.	Black med. to coarse sand, gravel, cobbles and organic debris
SD-8	11 ft.	Dk. brown to black med. to coarse sand, gravel, and cobbles

3.8 Phase II - Storm Drain Remediation Borings and Soil Sampling

From April 15th thru 23rd, a total of eight borings were performed. A location map of these borings is presented on Figure 4-2. Delta Well & Pump Co. performed the Phase II drilling services using a George E. Failing Model No. F-7 drill rig and hollow stem augers. All of the downhole drilling equipment was steam cleaned before beginning the drilling program and between each boring. Soil samples were collected using properly decontaminated two-inch and three-inch diameter, rust-free steel split-spoon core samplers. The sampler was lowered through the augers on steam-cleaned sampling rods and driven into the ground ahead of the augers with a 140 pound sampling hammer.

VOC sample containers were filled immediately upon opening the sampler using a pre-cleaned stainless steel sampling scoop. The remaining samples were collected by placing the soil into a pre-cleaned stainless steel bowl, mixing the sample and placing it into an appropriate sample container using a sampling scoop. The containers were then placed in iced coolers and prepared for shipment to the analytical laboratory.

Soil borings were drilled directly into storm drains SD-1, 2 & 3 with samples collected at three depths between the bottom of the drains and the water table. Each of these samples were analyzed for VOC's, TCL Metals and cyanide. The bottoms of the three drains each contained approximately one foot of a black sand, silt or clay mixture with organic debris. This was in turn followed by fine to coarse sand and gravel of the Upper Glacial formation. Logs for the borings are included in Appendix C.

An additional five remediation or "R" borings designated as R-1 thru R-5 were drilled around the storm drains to determine the lateral extent of metals contamination that may have migrated away from the storm drains. Soil samples were collected at depths of 9 to 11 feet, 19 to 21 feet and 29 to 31 feet in each of the five "R" borings. An additional sample was collected from 1 to 3 feet in boring R-4. The soil samples from the "R"

borings were each analyzed for the RCRA list of metals plus copper, nickel, zinc and cyanide.

3.9 Phase II - Installation of Supplemental Monitoring Wells

Three additional monitoring wells - MW-4S, MW-4I and WM-5S - were installed during the second phase of sampling to obtain water quality data directly downgradient of the storm drains located in the rear of the former plating facility. Wells MW-4S and 5S were drilled to a depth of 45 feet and completed with 4-inch diameter PVC screens set from 30 to 45 feet below grade. Well MW-4I was drilled to a depth of 70 feet adjacent to MW-4S with 4-inch diameter PVC screens set from 60 to 70 feet below grade. A map showing the locations of these wells is presented on Plate 3.

Soil samples were collected within the screened intervals of each of the borings and analyzed for Total Organic Carbon (TOC), VOC's, semivolatile organics, TCL metals and cyanide. Each well was completed with 4-inch PVC casing to grade, gravel pack, bentonite seal, cement/bentonite grout and locking covers. Development of the wells was performed using a 3-inch diameter submersible pump. Each well was pumped for 1 to 2 hours with the pump lifted up and down to "surge" the formation and remove the fines from the gravel pack. Samples of the discharge water were collected upon completion of the development process and tested for turbidity at the CA RICH office in nearby Sea Cliff. The results of these tests are presented below. Construction details for each well are included in Appendix C.

Well Number Turbidity of Discharge Water Upon Development

MW-4S	1.5 NTUs
MW-4I	0.76 NTUs
MW-5S	4.0 NTUs

3.10 Phase II - Supplemental Sampling of Monitoring Wells

During May 13 through 16, 1991, a complete round of groundwater samples were collected from all of the monitoring wells installed at this site. Well 1806 UG, an unlocked USGS observation well, was deleted from the monitoring well network due to excessive turbidity and replaced by the nearby cooling water well at the Pinelawn Cemetery Office was selected as a suitable substitute for sampling purposes. Designated as well number PLCWW-1, this well is constructed of six-inch casing with screens from 60 to 65 feet below grade.

Water level measurements were collected from all of the wells and piezometers on-site on the morning of May 13th using a chalked steel tape. Calculations were then performed to determine the volume of water in each well. All pumping and sampling equipment was decontaminated in accordance with the POP prior to purging or sampling the wells. At least 3 to 5 casing volumes of groundwater were purged from each well using a 3-3/4 inch diameter stainless submersible pump and polyethylene tubing. A potable generator provided the source of electricity to operate the pump. Dedicated monofilament polypropylene rope was used to manually raise and lower the pump inside the well. Prior to sampling the Pinelawn cooling water well, the well was allowed to run for 30 minutes. Samples for VOC's, TCL metals, cyanide, hexavalent chromium and TOC analysis were collected directly from the pump discharge.

While purging each well, the discharge was monitored for pH, specific conductance, temperature and turbidity. The wells were purged until the turbidity was consistently below 50 NTU's and the other readings were stabilized. Before turning off the pump, water samples were collected for TCL metals, cyanide, hexavalent chromium and TOC analysis directly from the pump discharge.

Immediately after the purging was completed, each monitoring well was sampled for VOC's using a 3-inch diameter stainless steel bailer with a Teflon foot valve and bottom emptying device.

The goal in the collection of the samples was to obtain sediment free groundwater for the metals analysis. To achieve this goal, water samples were collected from both the pump discharge and a bailer. In cases where the turbidity of the bailer water was less than 50 NTU's, a second set of bottles were filled for TCL metals, cyanide, hexavalent chromium and TOC analysis and the bottles collected from the pump discharge were discarded.

In cases where the bailer water that was collected immediately after purging registered 50 NTUs or greater the well was allowed to rest for two to four hours and then resampled. If the bailer water was then less than 50 NTU's, a second set of bottles were filled for TCL metals, cyanide, hexavalent chromium and TOC analysis and the bottles collected from the pump discharge were discarded. In the event that the bailer water collected from wells that had rested two to four hours was greater than 50 NTU's, the samples collected from the pump discharge were sent to the laboratory.

All of the wells sampled pumped clear water in a relatively short time. Generally, the wells with screens installed 25 or more feet below the water table produced clear water from both the pump and the bailer. However, wells that screened the water table interface pumped clear during the purging process but tended to become turbid during the process of removing the pump and lowering the bailer. A table summarizing the stabilized parameters measured during the purging operation is included in Section 4.3 of this report.

Upon collection, all samples were placed into coolers and kept on ice. Samples requiring preservatives were preserved in the field. All samples were shipped to EnviroTest Laboratories, Inc. via Federal Express on the day they were collected under chain-of-custody documentation.

3.11 Phase II - Supplemental Topographic Survey

Upon completion of the supplemental phase of field activities, a second round of topographic surveying was performed on May 14, 1991 by Al Tay, a New York State licensed land surveyor. The supplemental round of surveying included elevations for the three additional monitoring wells and a revised water table map for this site is presented on Plate 3.

SECTION 3

TABLES

Table 3-1

Phase I

Summary of Samples "Split" With the USEPA

CA RICH SAMPLE NO.	MEDIA (SOIL/WATER)	ANALYTICAL PARAMETERS
SOIL SAMPLING		
LP-4 (16-20)	Soil	Volatile Organics Semi-Volatile Organics TCL Metals Hexavalent Chromium Cyanide
DW-1/P5 (5-7)	Soil	Semi-Volatile Organics TCL Metals Hexavalent Chromium Cyanide
DW-1/P5 (37-39)	Soil	Volatile Organics Semi-Volatile Organics TCL Metals Hexavalent Chromium Cyanide
SP-1 (7-9)	Soil	Volatile Organics Semi-Volatile Organics TCL Metals Hexavalent Chromium Cyanide
MW-1D (10-12.5)	Soil	Volatile Organics Semi-Volatile Organics TCL Metals Hexavalent Chromium Cyanide

Table 3-1 (Cont.)

<u>CA RICH SAMPLE NO.</u>	<u>MEDIA (SOIL/WATER)</u>	<u>ANALYTICAL PARAMETERS</u>
MW-1D (37.5-40)	Soil	Volatile Organics Semi-Volatile Organics TCL Metals Hexavalent Chromium Cyanide
MW-2I (10-12.5)	Soil	Volatile Organics Semi-Volatile Organics TCL Metals Hexavalent Chromium Cyanide
FB 5/3 (Field Blank)	Water	Volatile Organics Semi-Volatile Organics TCL Metals Cyanide

Table 3-1 (Cont.)

<u>CA RICH SAMPLE NO.</u>	<u>MEDIA (SOIL/WATER)</u>	<u>ANALYTICAL PARAMETERS</u>
FIRST ROUND GRONDWATER SAMPLING		
FB 5/17 (Field Blank)	Water	Volatile Organics Semi-Volatile Organics TCL Metals Cyanide
MW-1S	Water	Volatile Organics Semi-Volatile Organics TCL Metals (Filtered/Unfiltered) Pesticides/PCBs Hexavalent Chromium Cyanide
MW-1D	Water	Volatile Organics Semi-Volatile Organics TCL Metals (Filtered/Unfiltered) Pesticides/PCBs Hexavalent Chromium Cyanide
SD-1	Water	Volatile Organics TCL Metals (Filtered/Unfiltered) Hexavalent Chromium Cyanide

Table 3-1 (Cont.)

<u>CA RICH SAMPLE NO.</u>	<u>MEDIA (SOIL/WATER)</u>	<u>ANALYTICAL PARAMETERS</u>
SECOND ROUND GRONDWATER SAMPLING		
MW-2D	Water	Volatile Organics TCL Metals (Filtered/Unfiltered) Hexavalent Chromium (Filtered/Unfiltered) Nitrates
MW-3I	Water	Volatile Organics TCL Metals (Filtered/Unfiltered) Hexavalent Chromium (Filtered/Unfiltered) Nitrates
UG1806	Water	Volatile Organics TCL Metals (Filtered/Unfiltered) Hexavalent Chromium (Filtered/Unfiltered) Nitrates
FB 8/16 (Field Blank)	Water	Volatile Organics TCL Metals Hexavalent Chromium Nitrates

Table 3-1 (Cont'd)**Phase 2**

CA RICH SAMPLE NO.	MEDIA (SOIL/WATER)	ANALYTICAL PARAMETERS
R-1 (29-31)	soil	TCL Metals and Cyanide
R-2 (19-21)	soil	TCL Metals and Cyanide
MW-5S (39-41)	soil	VOC, TOC, TCL Metals, Cyanide
SD-1 (Bottom)	soil	TCLP - Complete
MW-4I (64-66)	soil	VOC, TOC, Metals, Cyanide
SD-2 (Bottom)	soil	TCL Metals, Cyanide
SD-3 (Bottom)	soil	TCL Metals, Cyanide, VOA, Semi-volatiles & MS/MSD
SD-8 (Bottom)	soil	VOA, Semi-volatiles, TCL Metals, Cyanide
R-4 (1-3)	soil	TCL Metals, Cyanide, VOA
SD-1 (14-16)	soil	TCL Metals, Cyanide, VOA
MW-5S	water	TCL Metals, Cyanide, VOA, Hexavalent Chromium (duplicate)
MW-1D	water	TCL Metals, Cyanide, VOA Hexavalent Chromium, MS/MSD

SECTION 4

4.0 DATA ANALYSES AND RESULTS

This Section of the Remedial Investigation Report is provided to present the analyses and results of the data collected during the investigation at the Tronic Plating Company Site.

Section 4.0 is divided into the following five subsections:

- 4.1 Geophysical Survey
- 4.2 Soil and Storm Drain Sample Analyses - Phase 1 and 2
- 4.3 Monitoring Well Sample Analyses - Phase 1 and 2
- 4.4 In-situ "Slug" Type Permeability Analyses
- 4.5 Topographic Survey and Water Level Contours

Tables and Figures regarding the soil sample results, groundwater results and topographic survey results are inserted following Sections 4.2, 4.3 and 4.5, respectively. All Plates are included in the pocket at the rear of this report.

All laboratory analyses during the first phase of field work were performed by Nytest Environmental Laboratories, Inc. (NEI). EnviroTest Laboratories, Inc. (ELI) performed the analysis of samples collected during the second phase of field work. Both ELI and NEI were approved by the USEPA to provide the analytical services necessary for conductance of this investigation.

All of the analytical data presented in this report has undergone an extensive QA/QC data validation review in accordance with the protocols of USEPA, Region II. This data validation review was performed by Environmental Standards, Inc. of Valley Forge, Pennsylvania. Copies of the data validation reports for this project were forwarded to EPA under separate cover.

4.1 Geophysical Survey

As briefly described in Section 3.2 of this Report, subsurface soil conditions were surveyed geophysically to identify the presence of any unnatural electrical anomalies present that may be attributable to dissolved metallic ions in soil or groundwater.

The preferred survey method utilized the electromagnetic induction (EM) profiling technique. Specifically, traverses A thru E, delineated on Plate 2, were profiled in the northern wooded area of Pinelawn Cemetery. The data accumulated from each traverse was arranged so that all entries are progressing west to east and south to north. The reduced data is presented in Appendix B.

Each profiling station or 10 meter interval is identified by the corresponding traverse letter in numerical fashion (i.e. the first station of traverse A is A:0 and the last station is A:92). Every tenth station along each traverse is also identified on Plate 2.

TRAVERSE "A"

Traverse A, the southernmost traverse, revealed EMI calculated conductivity values at low levels gradually increasing at depth, with a few exceptions. These increases of conductance at A:85 to A:88 and A:19 (5 to 6 millimho/meter range), are probably due to lateral material variations or nearby obstructions or debris. Very few stations produced results that were suitable for depth calculations assuming a two-layer conductivity model.

Several relatively high conductance readings are present at shallow depths in the eastern portion of traverse A which are most likely due to the interference of the overhead telephone lines and suspected buried utility lines (A:17, A:13, and A:4). Road salt or other materials that may influence the conductivity of an electric field through subsurface media at shallow depths may have affected

the readings from stations A:0 to A:14. The westernmost portion of traverse A is heavily wooded (Plate 2).

The presence of metallic ions, or potential contaminants, was not suspected beneath traverse A on the basis of the measured and calculated conductivity values.

TRAVERSE "B"

Traverse B, the longest traverse (approximately 3500 feet in length) with easily accessible paths, revealed a subsurface characterized by conductivity gradually increasing with depth, with a few relatively higher zones of conductivity at B:1 to B:3, B:11 to B:17, and B:99 to B:100.

These zones are not considered prospective zones of contamination because of their fairly low levels of conductivity. However, individual stations (B:1 to B:3, B:11, B:18 and B:47) show unusually high conductivities probably due to localized conductors or secondary eddy current effects from induced currents in the area.

The potential for the presence of contaminants is not likely within the subsurface in the vicinity of traverse B based on the range of conductance values reported.

TRAVERSE "C"

During this portion of geophysical profiling, dense brush and vegetation was encountered. Traverse C, as depicted on Plate 2 was the most northern profile and closest to the Tronics Site.

Collection of EMI data for traverse C showed no values indicative of any zones of contamination or potential contamination, except station C:3 which showed only a slightly discernible increase of conductivity with depth.

The highest reading measured along traverse C was at the 40 foot station spacing representing a 4-fold overlap of the 10 meter spacing and is not indicative of contamination. The relatively subtle range in local conductance values is indicative of the variability in soil conditions near the profile line and may only represent localized near surface conductivity conditions.

TRAVERSE "D"

Traverse D was located along the northwest portion of Pinelawn and contained moderately wooded areas towards the western end of the traverse. The eastern end of the line was heavily wooded and the overgrowth prevented interconnection of this traverse to traverse C.

Situated directly south of station D:30 is an open pit area which contained some metal scraps and a few drums. The western end of the traverse had conductivities similar to the rest of the site (mildly increasing conductivity with depth). However, stations D:1 to D:22 contained substantial conductivities between 10 and 30 meters below grade (including the water table) which would indicate the presence of some undefined level of contamination or the possible presence of a clay or silt.

TRAVERSE E

Traverse E (not delineated on Plate 2) was performed just north of the eastern end of traverse B to examine any potential interference effects caused by any stray currents from the overhead power lines and/or road salt interferences, if any. The shallow depth interference was calculated and interpreted as being due to surficial conditions not related to the soil or groundwater from the Tronic Plating Site. Also, the instabilities measured corroborated the shallow depth interferences recorded in the eastern portions of traverses B and A.

4.1.1 Survey Conclusions

The geophysical survey performed for the Tronic Plating Site reveals mild subsurface conductivities which increase slightly with depth. These increases do not indicate any considerable anomalies that require further investigation. The exception is the zone of elevated conductivity which underlies stations D:1 to D:22. The increases here are thought to be due to the following:

- The elevated change in conductivity may be stratigraphic, suggesting clay or silt lenses and windows beneath these stations; and/or
- The direction of groundwater flow is towards the southeast. It may be possible that the industrial-type properties situated just north of traverse D (stations D:1 thru D:22) may have accidentally or incidentally discharged contaminants to the groundwater, therefore, creating higher conductivities in this part of the survey area.

It should be noted that the unsaturated soils above the water table (the upper 35 to 40 feet) in traverse D show no elevated conductivities and that the need for investigation above the water table in this area is not deemed necessary.

The profiled area at stations B:11 thru B:18 also reveals higher conductivities near the water table which may be due to the open pit area just north of these stations. The pit contains scrap metal which has rusted. Downward percolating rainfall in this area may have leached metallic ions down and onto the water table thus producing elevated conductivity readings beneath these stations.

4.2 Soil and Storm Drain Sampling Analysis

The primary objective of the soil sampling program is to define the nature and extent of contaminants, if any, which may occur beneath the Tronic Plating Company Site. Soil sampling was performed by driving decontaminated 3-inch and 2-inch diameter by two-foot long split-spoon steel samplers into the soil at various locations across the Site. Soil/sediment samples were taken in the following borings (see Figure 4-1):

- 4 leaching pools (LP-1, LP-2, LP-3, and LP-4);
- The sanitary pit (SP-1), and dry well (DW-1);
- 4 Phase 1 monitoring wells (MW-1D, MW-2I, MW-2D, & MW-3I);
- 3 Phase 2 monitoring wells (MW-4S, MW-4I and MW-5S);
- 8 storm drains (SD-1 through SD-8);
- 5 storm drain remediation borings (R-1 through R-5).

Monitoring Well MW-1D was installed north of the building occupied by Tronic Plating Company and is used for general background soil and water quality comparison purposes. Table 4-1 presents the established concentrations for inorganics at this site.

At locations LP-1, 2, 3, 4; SP-1; DW-1; MW-1D, 2D and 2I, the borings were sampled continuously from the first sample down to the water table which was typically encountered at 38 feet below land surface. An aliquot of each soil sample was placed in a dedicated laboratory-cleaned sample jar and placed in a hot water bath for 10 to 15 minutes. A vapor head space reading was then measured using a calibrated HNU meter and recorded in the bound field note book and on the boring logs presented in Appendix C. The samples with the highest HNU readings, and from the soil interface with the water table were analyzed by the laboratory.

4.2.1 Leaching Pool Sampling

Phase I Sampling

Leaching pools LP-1, LP-2, LP-3, and LP-4 are located in the front lawn area of the Tronic Plating Facility and were historically used for the disposal of industrial wastewater from the on-site plating activities.

The analytical parameters and the exact sampling horizon varied with depth in each leaching pool. All samples were collected using decontaminated split-spoon samplers. In accordance with the POP, samples were collected at:

1. six feet below grade in the fill material placed in the leaching pools;
2. at the bottom of the leaching pools (14 feet below grade);
3. at the water table; and,
4. at the depth of the highest HNU reading.

Soils encountered from the leaching pools were predominantly light brown, fine to coarse sand and gravel. The ground water interface was typically reached at approximately 38 feet below grade.

The depths from which the samples were taken for each of the leaching pools, and the corresponding concentrations of tested organic compounds and tested inorganic constituents are presented on Tables 4-2 and 4-3. Schematic cross-sections of the leaching pool area illustrating the concentrations of detected contaminants are included on Figures 4.3, A through G.

LP-1

Soil samples from LP-1 were analyzed at 6 to 10 feet, 14 to 19 feet, 18 to 20 feet, and 38 to 40 feet below grade.

The inorganic analyses of the soil collected from LP-1 revealed concentrations of total chromium at each of the four sampling depths. Estimated total chromium concentrations ranged from 2.6 milligram per kilogram (mg/kg) to 15.3 mg/kg. The highest concentration, 15.3 mg/kg, was detected at 14 to 19 feet below grade. Hexavalent chromium was detected in each of the four sampling locations.

Lead detections were observed at 6 to 10 feet below grade (2.4 mg/kg) and 14 to 19 feet below grade (4.7 mg/kg). Cyanide was detected at 14 to 19 feet below grade at a concentration of 15 mg/kg.

The volatile organic analyses of the soil revealed mild concentrations of the solvent acetone in samples collected from 14 to 19 foot, and from the 18 to 20 foot depths. However, these results are suspect since similar concentrations were also observed in field and laboratory blanks and acetone was used as a decontamination agent for the sampling equipment. No other volatile organic compounds were detected in any of the samples.

The semivolatile analyses also revealed the presence of di-n-butylphthalate, a common plasticizer, at every sampling depth. Concentrations of di-n-butylphthalate ranged from 3000 micrograms per kilogram (ug/kg) to 5100 ug/kg with the highest concentration observed at 38 to 40 feet below grade. The source of the di-n-butylphthalate could be the plasticware used in the laboratory and/or the standard laboratory gloves worn by field personnel while collecting the samples. No PCBs or pesticides were detected in any of the samples.

LP-2

LP-2 soils analyses characterized the 8 to 10 foot, 14 to 16 foot, 18 to 20 foot, and 38 to 40 foot depth horizons.

Total chromium was present at each sampling depth. The estimated total chromium concentrations ranged from 2.8 to 12.0 mg/kg. The highest concentration was again detected at 14 to 16 feet below grade (12.0 mg/kg). Hexavalent chromium was present at each of the four sampling depths.

Lead was detected at 8 to 10 feet below grade at 2.1 mg/kg. Cyanide was detected at all of the sampling depths and concentrations ranged from 0.34 to 46.9 (estimated) mg/kg. The highest cyanide concentration, an estimated value, was reported in the 14 to 16 foot depth. Cadmium was detected at 14 to 16 foot, and at 18 to 20 foot at estimated concentrations of 3 mg/kg and 8.2 mg/kg, respectively.

No volatile organics were present, with the singular exception of acetone. Acetone was detected in the laboratory blanks.

Di-n-butylphthalate, a semivolatile compound, was detected in concentrations ranging from 94 (estimated) to 570 mg/kg. The highest concentration was reported at the 38 to 40 foot depth. Two pesticides, 4,4'-DDE and 4,4'-DDT, were detected at the 14 to 19 foot horizon at 72 and 37 ug/kg, respectively.

LP-3

Soils from LP-3 were analyzed at 5 to 9 feet, 14 to 16 feet, 18 to 20 feet, and 38 to 40 feet below grade.

As with LP-2, total chromium was reported at each sampling depth except at 38 to 40 feet. Estimated total chromium concentrations

ranged from 4.9 to 6.1 mg/kg. These levels are similar to the background levels established in MW-1D. The highest estimated concentration was again detected at the 18 to 20 foot depth (6.1 mg/kg). Hexavalent chromium was detected at each sampling depth. Cyanide was detected at 14 to 16 and 18 to 20 feet below grade. Cyanide concentrations were 0.43 and 0.86 mg/kg, respectively.

Volatile organics were not detected. Di-n-butylphthalate was detected from the 18 to 20 foot, and from the 38 to 40 foot depth. The di-n-butylphthalate concentrations were 1200 mg/kg and 1900 ug/kg, respectively. No pesticides were detected.

LP-4

Soil samples from LP-4 were analyzed at the 5 to 9 foot, 14 to 16 foot, 16 to 20 foot, and 38 to 40 foot horizons.

Total chromium is present at each sampling depth but at estimated concentrations ranging from 3.1 to 3.7 mg/kg. The highest concentration was reported from the shallow 5 to 9 foot sampling interval below grade. However, these levels, are lower than the background concentrations established in MW-1D.

Lead was detected in samples collected from 14 to 16 and 16 to 20 foot depths. Estimated concentrations were approximately 3 mg/kg. Cyanide was not detected at a detection level of 0.2 mg/kg.

Volatile organics were not present. Again, di-n-butylphthalate was detected at depth, from the 38 to 40 foot sampling interval and at a concentration of 3600 ug/kg. Di-n-butylphthalate was also reported from the 14 to 16 and 16 to 20 foot intervals at estimated concentrations. No pesticides were reported in LP-4.

4.2.2 Sanitary Pit and Dry Well Sampling

Phase 1 Sampling

Sanitary flow from the bathroom facilities at Tronics were piped to a separate cesspool located below Commerce Drive. Boring SP-1 was placed at this location to determine the presence of any residual contamination from the cesspool and if present, whether it had migrated into subsurface soils.

A dry well also existed at the rear of the Tronic Plating Company facility. Boring DW-1 was placed adjacent to this location. This boring was converted into a piezometer and labeled P-5, once the soil samples had been collected.

SP-1

Soil samples were collected at 7 to 9, 19 to 21, and 37 to 39 feet. The material encountered at this location was predominantly sand with the water table intercepted at the 37 to 39 foot sampling depth horizon. A summary of the analytical results are presented on Tables 4-2 and 4-3. A schematic cross-section of the parking area which includes boring SP-1 and concentrations of detected contaminants are provided on Figures 4-4, A through G.

The inorganics analyses indicated metals concentrations similar in magnitude to the established background levels with the exception of chromium and copper. Chromium was detected at estimated levels of 56.9 and 62.6 mg/kg in the 19 to 21 and 37 to 39 foot samples. Copper was detected at 12.3 and 11.3 mg/kg at these same depths.

No detections of the identified organics listed on the Target Compound List were recorded from any of these sampling depths. Varying concentrations of unknown volatiles were revealed during

the library search. Phthalates were detected during the semivolatile scan, however, these are probably attributable to interference from plasticware used in the laboratory.

DW-1

The dry well samples were collected at 5 to 7, 19 to 21, and 37 to 39 feet. The materials encountered were predominantly sand with the water table intercepted at the 37 to 39 foot sampling depth, similar to SP-1.

Metals were reported but at concentrations similar in magnitude to the established background levels.

No detections of organic compounds listed on the Target Compound List were recorded. The library search revealed estimated concentrations of Freon 113 ranging from 7.9 to 42 ug/kg. The origin of the Freon 113 is unknown as it is not a product typically used in the metal plating industry. A sample of the ice from the local distributor used for this project was melted and tested. Fluid in the sanitary waste line located below Commerce Drive was also analyzed in the event a leak may have been the source of Freon. In both cases Freon was not detected. It is possible that Freon is an artifact, being introduced in the laboratory, as it is used during the extraction procedure for oil & grease analysis.

Phthalates were detected during the semivolatile scan, and are attributed to plasticware in the laboratory.

4.2.3 Monitoring Well Soil Sampling

Phase 1 Sampling

Soils were analyzed during the installation of monitoring wells MW-1D, MW-2D, MW-2I, and MW-3I, the monitoring wells installed during

the first phase of field work. A discussion of the results from the sampling program is presented below.

MW-1D

MW-1D is located north of the Tronic Plating Company site and away from the previous activities of this facility. As such, the three soil samples collected above the water table in the boring for MW-1D have been used to establish the "background" range of concentrations for residual metals in this area. Soils from MW-1D were analyzed at depths of 10 to 12 1/2 feet, 25 to 27 1/2 feet and 37 1/2 to 40 feet.

Chemical analyses are presented on Tables 4-2 and 4-3. In addition, Table 4-1 presents the average and maximum concentrations for comparison and interpretative purposes.

Chloroform was detected in the 10 to 12 1/2 foot sample and the 25 to 27 1/2 foot sample at 9 and 8 ug/kg, respectively. The 10 to 12 1/2 foot sample also contained 9.2 ug/kg of unknown volatile organics (library search). The semivolatile scan revealed numerous detections of the class of compounds referred to as the phthalates as well as unknowns from the library search.

MW-2D

During the drilling of MW-2D, soils were collected and analyzed from the 10 to 12 foot, 20 to 22 foot, and 37 to 40 foot horizons.

Chromium is present in the 10 to 12 foot sample and the 20 to 22 foot sample at 9.4 and 13.1 mg/kg, respectively (estimated levels). Copper was also present at these same depths at 26.9 and 15.9 mg/kg, respectively. Cyanide was detected at 1.9 and 0.32 mg/kg. Remaining metals were of a similar magnitude to the background levels established at MW-1D.

The analyses for organics again revealed detections of phthalates and unknown semivolatiles during the library search.

MW-2I

Soils in MW-2I were analyzed at 10 to 12 1/2 feet, 22 1/2 to 25 feet, and 37 1/2 to 40 feet.

There were no metals detections above established background. The only volatile organics detected were acetone and methylene chloride, common laboratory solvents. As in the previous borings, the semivolatile analyses revealed detections of phthalates and unknown semivolatile organics during the library search.

MW-3I

Soils from the MW-3I boring were collected at 10 to 12 feet, 32 to 35 feet and 75 to 77 1/2 feet.

Metals levels were of a similar magnitude as the established background with the exception of lead. The 10 to 12.5 foot sample and the 32 to 35 foot sample revealed the presence of lead at 47.1 and 69.2 mg/kg, respectively (estimated).

Phthalates were detected as well as numerous unknown volatile and semivolatile organics recorded during the library search.

Phase 2 Sampling

During the second phase of field work, soil samples were collected and analyzed from the screened zones of monitoring wells MW-4S, MW-4I and MW-5S. The results of these analysis are presented on Table 4-4 and 4-5.

MW-4S

The soil sample collected at 39 to 41 feet below grade at MW-4S revealed no detections of volatile organic compounds. Inorganics analysis of this sample were generally of the same concentration range as the established background samples.

Total organic carbon analysis was performed as requested by EPA, on each of the soil samples collected in the Phase 2 program of monitoring well installations, as shown below.

MW-4I

No organic compounds were detected in the soil sample collected from this boring. The inorganics analysis of this sample were generally of the same level of concentration as the established background levels.

MW-5S

No organic compounds were detected in the soil sample collected from this boring. The inorganic compounds were detected at levels of the same concentration as the established background levels.

Total Organic Carbon

<u>Well Number</u>	<u>Depth (ft)</u>	<u>Concentration (mg/kg)</u>
MW-4S	39-41	1662
MW-4I	64-66	1780
MW-5S	39-41	2552

4.2.4 Storm Drain Sampling

Phase 1 Storm Drain Sampling

During the first round of sampling both fluid and sediment samples were collected from the two storm drains on-site and analyzed for volatile organics. SD-1 is located in a parking area between the front of the building and Central Avenue and SD-2 is located in Commerce Drive near the rear of the former Tronics facility (see Figure 4-1 and 4-2). Analytical results are summarized on Tables 4-6 and 4-7.

Organics in Storm Drain Water and Sediments

With the exception of acetone, no volatile organics were detected in the fluid from either storm drain or from the sediment in SD-1. The sediment in SD-2 contained 13 ug/l of methylene chloride, 30 ug/l of ethylbenzene and a total of 4080 ug/l of unknowns identified during the library scan. These unknowns all have retention times of between 30 and 43 minutes. As such, they most likely are of a petroleum origin, probably the results of runoff from cars and trucks using the roadway or parking area.

Unfiltered Inorganics in Storm Drain Water and Sediments

SD-1

The sampled fluid from storm drain SD-1 contained cadmium at 24.7 ug/l, lead at 138 ug/l (estimated), nickel at 32 ug/l and vanadium at 15.8 ug/l (estimated). Both chromium and copper results failed the QA/QC validation review with concentrations of 47.6R ug/l and 166R ug/l, respectively. The R indicates that these values are unreliable and should be viewed as maximum concentrations. The analyte, however, may or may not be present.

The sediment collected from this storm drain contained cadmium at 84.8 mg/kg, chromium at 143 mg/kg (estimated), and lead at 1190 mg/kg (estimated). Cyanide was also detected at 1.1 mg/kg.

SD-2

The fluid in storm drain SD-2 contained cadmium at 8,270 ug/l, lead at 14,100 ug/l (estimated), nickel at 11,900 ug/l and vanadium at 797 ug/l. Chromium, copper and zinc results failed the QA/QC validation review with concentrations of 10,300 R ug/l, 11,700 R ug/l and 13,400 R ug/l.

Analysis of the sediment collected from SD-2 indicated that it contained cadmium at 1,130 mg/kg, chromium at 1,580 mg/kg (estimated), lead at 2,290 mg/kg (estimated). Cyanide was detected at 92 mg/kg (estimated). Copper, nickel and zinc results failed QA/QC review with 1900 R mg/kg, 1610 R mg/kg and 2060 R mg/kg, respectively.

Filtered Inorganics in Storm Drain Water

SD-1

As expected, the metals concentrations in the filtered fluid from the storm drain were considerably lower than the levels in the unfiltered sample reported above. The filtered fluid from SD-1 contained cadmium at 5.8 ug/l, copper at 14.8 ug/l, and zinc at 54.9 ug/l. Lead, mercury, nickel, and vanadium were not detected. Chromium results failed QA/QC review.

SD-2

The filtered fluid from SD-2 contained cadmium at 7.3 ug/l, nickel at 187 ug/l and zinc at 21.2 ug/l. Chromium, lead, mercury, copper, and vanadium were not detected.

Phase 2 Storm Drain Sampling

Sediment samples were collected from eight on-site storm drains during the second phase of field work (see Figure 4-2 for locations). Storm drains SD-3 through SD-8, drains not sampled during Phase I, were sampled and analyzed for TCL metals, cyanide, VOCs and semivolatiles. Semivolatile analysis was performed on samples from SD-1 and SD-2. In addition, the complete Toxic Characteristics Leaching Procedure (TCLP) analysis was performed on sediments from SD-1, SD-2 and SD-3 to determine how these sediments could be disposed. Results of these storm drain samples are presented on Tables 4-4 and 4-5.

Organics in Storm Drain Sediments

Storm drains SD-3 through SD-8 generally did not reveal detections of volatile organics. Acetone, a cleaning agent used to decontaminate the sampling equipment, was detected in some of the drains. SD-5 contained concentrations of several chlorinated and aromatic volatile organics at levels between 20 and 180 ug/kg.

Compounds included in the polynuclear aromatic hydrocarbons (PAH) fraction of the semivolatile scan were detected in several of the storm drains. These compounds included typical motor oil derivatives or weathering by-products such as pyrene, fluoranthene, fluorene and naphthalene. The origin of these are most likely drippings from car engines or by-products of asphalt pavement and are typical of this type site drainage. Several phthalate compounds, plasticizers commonly found in labware, were also detected in several of the storm drains.

Inorganics in Storm Drain Sediments

The sediment samples collected from storm drains SD-3 through SD-8 revealed concentrations of numerous metals, as would be expected in sediments of this origin. Cadmium concentrations ranged from 2.0 to 73 mg/kg (estimated); chromium ranged from 16.7 to 126 mg/kg (estimated); copper ranged from 87.9 to 4560 mg/kg; nickel ranged from 11.3 to 138 mg/kg; and zinc ranged from 181 to 3200 mg/kg (estimated).

TCLP Analysis of Storm Drains

To evaluate alternatives for remediation of the storm drain sediments, the Toxicity Characteristics Leachate Procedure (TCLP) was performed on sediment samples from storm drains SD-1, SD-2 and SD-3, which are the three drains closest to the former Tronic Facility. The analysis revealed no detections of herbicides, pesticides or semivolatiles organics. Tetrachloroethylene and 2-butanone (MEK) were detected at levels significantly below the mandated regulatory levels. Of the eight metals included in the analysis -- arsenic, barium, cadmium, chromium and lead were detected in all three drains. Lead exceeded the regulatory level in storm drain SD-1 and cadmium exceeded the regulatory level in storm drain SD-2.

TCLP Results of Storm Drain Sediments

<u>Compound</u>	<u>SD-1</u> ug/L	<u>SD-2</u> ug/L	<u>SD-3</u> ug/L	<u>Regulatory</u> <u>Level</u> ug/L
Inorganics				
Arsenic	17.7	83.9	18.8	5,000
Barium	578	623	634	100,000
Cadmium	950	3,340*	844	1,000
Chromium	30.6	29.4	44.1	5,000
Lead	9,300*	1,460	3,500	5,000
Mercury	0.2 U	0.2 U	0.2 U	200
Selenium	1.0 U	1.0 U	1.0 U	1,000
Silver	5.0 U	5.0 U	5.0 U	5,000
Volatiles				
2-Butanone	7.8	11	4	200,000
Tetrachloroethene	1	5 U	5 U	700
Semi-volatiles	No Detections			
Pesticides	No Detections			
Herbicides	No Detections			

*Detection exceeds regulatory level.

4.2.5 Storm Drain Remediation Borings

Phase 2 Sampling

During the second phase of field activities, borings were drilled directly into storm drains SD-1, SD-2 and SD-3. Further, an additional five borings were installed to evaluate the lateral and

vertical extent of any contaminants that may have migrated away from the drains. Analytical results for these analyses are included on Tables 4-8.

Schematic cross-sections with concentrations of selected metals are illustrated on Figures 4-4 , A through G and 4-5, A through G.

Organics

With the exception of acetone, a cleaning agent used to clean the sampling equipment, and one detection of carbon disulfide at an estimated level of 22 ug/kg, the soil samples collected below the storm drain borings did not reveal accumulations of volatile organics.

Inorganics

The general trend of inorganics detected beside and below the storm drains indicate that these contaminants are present at levels close to the established background levels. The samples collected directly below the bottom of the drains displayed slightly elevated levels, however, these generally decreased with distance from the drain bottom sediments. Concentrations of cadmium below SD-2 ranged from a high of 8.3 mg/kg to a low of 2.6 mg/kg at the interface with the water table.

4.2.6 Additional Parameters for Analyses of Soils

The additional soil testing parameters specified in the POP include grain size analyses, cation exchange capacity (CEC), organic content and moisture content. The samples, sampling depths, and the corresponding analytical results by parameter are summarized on Table 4-9 and graphed on Figure 4-6.

Grain size curves indicate that the on-site soils are coarse to fine sand with a low silt and clay content (as determined by the number

200 sieve). Typical of the Upper Glacial deposits, the sand contains an increasing percentage of fines with depth. These grain size curves correlate well with the permeabilities measured for these materials during the field slug testing program.

The values for the percent organic content in the soil samples collected during the installation of monitoring well MW-2D range from .25 to .63 percent. The CEC of soil samples collected at this location ranged from 0.10 to 1.90. The ability of metals to "bond" to soil is a function of the organic content of the soil, the CEC, and the pH of the soil/water solution. SCDHS records indicate that the pH of Tronic's wastewater effluent was generally in the 5 to 7 range. Based on this, and on the values presented on Table 4-9, the potential for metals to bond to these soils is considered to be low.

4.2.7 Evaluation and Summary of Detections in Soil

An evaluation and summary of the detections of all of the soil samples from both Phases 1 and 2 that passed the data validation review are included in this Section.

Inorganics

Table 4-10 presents a summary of the detections of inorganics in soil samples collected during this investigation. This table includes the number of times tested, number and percent of detections, range of detections and an evaluation with respect to the established background concentrations of each organic constituent that was detected.

Common metallic ions, such as aluminum, calcium, iron, magnesium, and sodium were detected in most, if not all, of the samples analyzed. Approximately 25% to 50% of these detections were above established background levels in the areas of the former leaching pools and the storm drains. The levels detected

significantly above background, were generally limited to the storm drain sediments.

Metallic ions such as barium, cadmium, chromium, copper, cyanide, lead, and zinc were generally detected at or near established background levels, with the exception of the detections reported in the storm drain bottom sediment samples. As these seven metals were detected above background in numerous tests, cross-sections illustrating the subsurface distribution of these compounds are included on Figures 4-3, 4-4 and 4-5. The distribution of these metals in groundwater are illustrated on Figure 4-8.

Organics

Table 4-11 summarizes the organics detections in soil samples collected for this investigation. Acetone, a cleaning agent used to decontaminate field equipment and labware, was detected in 29% of the samples. Methylene chloride, also a common laboratory cleaning agent, was detected in 12% of the samples. As the locations of the detections are distributed fairly uniformly throughout the site, their occurrence is believed to be an artifact of either the cleaning of field equipment or labware. Freon 113, detected in 5% of the samples, is also believed to have been introduced as a laboratory artifact.

During the semi-volatile scan, several phthalate compounds, a common plasticizer, were detected in approximately 40% of the samples. The origin of these is believed to be either the vinyl gloves used in the collection of the samples or an artifact of the labware used in the analysis.

Numerous PAH compounds were detected in storm drains SD-2, 3, 5, 6 and 7 consisting of approximately 5 to 15% detections. The origin of these PAH's is most likely drippings of engine oil from vehicles in the parking lot or by-products of the asphalt pavement.

Two pesticides, 4,4'DDE and 4,4'DOT were each detected one time in leaching pool LP-2 at levels of less than 100 ug/kg. These pesticides were not detected in the monitoring well samples.

SECTION 4.2

TABLES

TABLE 4-1

TRONIC PLATING CO. SITE
FARMINGDALE, N.Y.

SUMMARY OF BACKGROUND CONCENTRATIONS

INORGANICS - SOIL ANALYSIS BORING MW-1D
BACKGROUND CONCENTRATIONS IN MG/KG (PPM)

PARAMETERS	MW-1D(10-12.5)	MW-1D(25-27.5)	MW-1D(37.5-40)	AVERAGE	MAXIMUM
ALUMINUM	1140	863	651	884.67	1140
ANTIMONY	10.2 UL	10.3 UL	10.4 UL	10.30 UL	--
ARSENIC	1 U	1 U	1 U	1.00 U	--
BARIUM	10.2 U	10.3 U	10.4 UL	10.30 UL	--
BERYLLIUM	1 U	1 U	1 U	1.00 U	--
CADMIUM	1 UL	1 UL	1 UL	1.00 UL	--
CALCIUM	493 B	513 B	538 B	514.67 B	538 B
CHROMIUM	3.7 J	6.9 J	5.3 J	5.30 J	6.9 J
COBALT	2 U	2.6 B	3.3 B	--	3.3 B
COPPER	7.2	6.4	4 B	5.87 B	7.2
IRON	2460 J	3790 J	1740 J	2663.33 J	3790 J
LEAD	1 U	1.1 J	1 U	-- J	1.1
MAGNESIUM	322 BJ	311 BJ	247 BJ	293.33 BJ	322 B
MANGANESE	62.6	52.6	74.5	63.23	74.5
MERCURY	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	--
NICKEL	4.1 UL	4.1 UL	4.1 UL	4.10 UL	--
POTASSIUM	-- R	-- R	-- R	-- R	-- R
SELENIUM	1 UL	1 UL	1 UL	1.00 UL	--
SILVER	-- R	-- R	-- R	-- R	-- R
SODIUM	85.6 B	75.3 B	65.8 B	75.57 B	85.6 B
THALLIUM	1 UL	1 UL	1 UL	1.00 UL	--
VANADIUM	2.5 B	4.5 B	4.1 B	3.70 B	4.5 B
ZINC	12.5	8.9	8.3	9.90	12.5
CYANIDE	0.2 U	0.2 U	0.2 U	0.20 U	--
HEX CHROM	0.5 U	0.5 U	0.5 U	0.50 U	--

SEE TABLE 4-2 FOR EXPLANATION OF DATA QUALIFIERS

INORGANIC ANALYSIS SUMMARY FOR SOILS
BORING LP-1
Tronic Plating Co. Site
Farmingdale, New York

PARAMETER	BORING No.:	LP-1	LP-1	LP-1	LP-1	FB 4/26
	DEPTH (ft):	(6-10)	(14-19)	(18-20)	(38-40)	N/A
	DATE:	26-Apr-89	26-Apr-89	26-Apr-89	26-Apr-89	26-Apr-89
	UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	UG/L
ALUMINUM		2680	611	488	343	100.0 U
ANTIMONY		10.1 UL	10.3 UL	10.9 UL	10.7 UL	50.0 UL
ARSENIC		1.2 B	1.0 U	1.1 U	1.1 U	5.0 U
BARIUM		10.1 B	10.3 U	10.9 U	10.7 U	50.0 U
BERYLLIUM		1.0 U	1.0 U	1.1 U	1.1 U	5.0 U
CADMIUM		1.0 UL	2.5 J	1.1 UL	1.1 UL	5.0 UL
CALCIUM		497 B	503 B	479 B	403 B	264 B
CHROMIUM		4.3 J	15.3 J	2.6 J	3.6 J	5.0 UL
COBALT		2.4 B	2.1 U	2.2 U	2.1 U	10.0 U
COPPER		4.2 B	38.00	9.6	4.2 B	10.0 U
IRON		5070	1670	1660	2030	10.0 U
LEAD		2.4 J	4.7 J	1.1 U	1.1 U	5.0 U
MAGNESIUM		292 BJ	231 BJ	194 BJ	141 BJ	20.0 U
MANGANESE		67.7 J	17.7 J	19 J	7.5 J	10.0 U
MERCURY		0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.2 U
NICKEL		4.0 UL	13.8 J	4.3 UL	5.6 BJ	20.0 UL
POTASSIUM		80.8 U	82.1 U	86.9 U	85.2 U	400.0 U
SELENIUM		1.0 U	1.0 U	1.1 U	1.1 U	5.0 U
SILVER		R	R	R	R	R
SODIUM		67.3 B	63.8 B	66.8 B	58.7 B	5.0 U
THALLIUM		1.0 UL	1.0 UL	1.1 UL	1.1 UL	5.0 U
VANADIUM		6 B	2.1 U	2.2 U	2.1 U	10.0 U
ZINC		12.8	15.6	7.5	6.9	20.0 U
CYANIDE		0.2 U	15	0.89	0.2 U	10.0 U
HEXAVALENT CHROMIUM		19.2 *	23.44 *	20.46 *	17.49 *	5.0 U

- * - Hexavalent Chromium results are possibly suspect due to sample matrix which may contain inorganic salts, thus effecting the final results.
- B - This reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.
- U - The analyte was not detected at the reported concentration.
- J - Quantitation is approximate due to limitations indentified during the data validation.
- R - Unreliable result - analyte may or may not be present in the sample.
- L - The detection limit is possibly higher due to a low bias identified during the quality assurance review.
- MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)
- UG/L - Micrograms per Liter (equivalent to parts per billion)

INORGANIC ANALYSIS SUMMARY FOR SOILS
BORING LP-2
Tronic Plating Co. Site
Farmingdale, New York

PARAMETER	BORING No.:	LP-2	LP-2	LP-2	LP-2	FB 4/26
	DEPTH (ft):	(8-10)	(14-16)	(18-20)	(38-40)	N/A
	DATE:	26-Apr-89	26-Apr-89	26-Apr-89	26-Apr-89	26-Apr-89
	UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	UG/L
ALUMINUM		1100	1010	716	403	100.0 U
ANTIMONY		10.5 UL	10.3 UL	10.5 UL	10.6 UL	50.0 UL
ARSENIC		1.0 U	1.0 U	1.0 U	1.1 U	5.0 U
BARIUM		10.5 U	10.3 U	10.5 U	10.6 U	50.0 U
BERYLLIUM		1.0 U	1.0 U	1.1 U	1.1 U	5.0 U
CADMIUM		1.0 UL	3 J	8.2 J	1.1 UL	5.0 UL
CALCIUM		516 B	531 B	634 B	502 B	264 B
CHROMIUM		2.8 J	12 J	5.8 J	4.7 J	5.0 UL
COBALT		3 B	2.1 U	2.1 U	2.1 U	10.0 U
COPPER		3.6 B	30.9	35.1	7.4	10.0 U
IRON		3980	2240	1630	2060	10.0 U
LEAD		2.1 J	1.0 U	1.0 U	1.1 U	5.0 U
MAGNESIUM		177 BJ	466 BJ	313 BJ	153 BJ	20.0 U
MANGANESE		33.5 J	85.1 J	24.8 J	9.7 J	10.0 U
MERCURY		0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.2 U
NICKEL		4.2 UL	6.3 BJ	4.2 UL	4.2 UL	20.0 UL
POTASSIUM		83.8 U	82.6 U	84.1 U	84.8 U	400.0 U
SELENIUM		1.0 U	1.0 U	1.0 U	1.1 U	5.0 U
SILVER		R	3.6 J	R	R	R
SODIUM		73.9 B	86.7 B	101 B	67.4 B	50.0 U
THALLIUM		1.0 UL	1.0 UL	1.0 UL	1.1 UL	5.0 U
VANADIUM		4.3 B	2.3 B	2.1 U	2.1 U	10.0 U
ZINC		10.6	14.2	9.8	7	20.0 U
CYANIDE		6.6	46.9 J	4.9	0.34	10.0 U
HEXAVALENT CHROMIUM		22.6 *	20.2 *	0.97	0.64	5.0 U

- * - Hexavalent Chromium results are possibly suspect due to sample matrix which may contain inorganic salts, thus effecting the final results.
- B - This reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.
- U - The analyte was not detected at the reported concentration.
- J - Quantitation is approximate due to limitations indentified during the data validation.
- R - Unreliable result - analyte may or may not be present in the sample.
- L - The detection limit is possibly higher due to a low bias identified during the quality assurance review.
- MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)
- UG/L - Micrograms per Liter (equivalent to parts per billion)

INORGANIC ANALYSIS SUMMARY FOR SOILS
BORING LP-3
Tronic Plating Co. Site
Farmingdale, New York

PARAMETER	BORING No.:	LP-3	LP-3	LP-3	LP-3	FB 4/27
	DEPTH (ft):	(5-9)	(14-16)	(18-20)	(38-40)	N/A
	DATE:	27-Apr-89	27-Apr-89	27-Apr-89	27-Apr-89	27-Apr-89
	UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	UG/L
ALUMINUM		3780	814	2010	377	100.0 U
ANTIMONY		10.6 UL	10.2 UL	10.3 UL	11.0 U	50.0 UL
ARSENIC		1.7 B	1.0 U	1.0 U	1.1 U	5.0 U
BARIUM		14.5 B	10.2 U	10.3 U	11.0 U	50.0 U
BERYLLIUM		1.1 U	1.0 U	1.0 U	1.1 U	5.0 U
CADMIUM		1.1 UL	2.1 J	1.0 UL	1.1 UL	5.0 UL
CALCIUM		749 B	524 B	541 B	402 B	286 B
CHROMIUM		5.5 J	4.9 J	6.1 J	1.1 UL	5.0 UL
COBALT		3.9 B	2.0 U	2.1 U	2.2 U	10.0 U
COPPER		10.1	14	9.8	2.9 B	10.0 U
IRON		6040	2600	4190	1180	10.0 U
LEAD		6.7 J	1.1 J	4.9 J	1.1 U	5.0 U
MAGNESIUM		445 BJ	390 BJ	444 BJ	120 BJ	20.0 U
MANGANESE		97.2 J	42.5 J	60.5 J	11.8 J	10.0 U
MERCURY		0.02 UJ	0.02 UJ	0.02 UJ	0.06 J	0.2 UL
NICKEL		6.1 BJ	4.1 UL	4.1 UL	4.4 UL	20.0 UL
POTASSIUM		R	R	R	88.3 U	400.0 U
SELENIUM		1.1 U	1.0 U	1.0 U	1.1 U	5.0 U
SILVER		R	R	R	R	R
SODIUM		77.5 B	74.3 B	77.4 B	56.8 B	50.0 U
THALLIUM		1.1 UL	1.0 UL	1.0 UL	1.1 UL	5.0 U
VANADIUM		9.8 B	2.0 U	5.7 B	2.2 U	10.0 U
ZINC		21.2	10.5	11.1	6.8	34
CYANIDE		0.2 UL	0.43	0.86	0.2 U	10.0 UL
HEXAVALENT CHROMIUM		12.2 *	13.2 *	0.5 U	0.5 U	5.0 U

- * - Hexavalent Chromium results are possibly suspect due to sample matrix which may contain inorganic salts, thus effecting the final results.
- B - This reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.
- U - The analyte was not detected at the reported concentration.
- J - Quantitation is approximate due to limitations indentified during the data validation.
- R - Unreliable result - analyte may or may not be present in the sample.
- L - The detection limit is possibly higher due to a low bias identified during the quality assurance review.
- MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)
- UG/L - Micrograms per Liter (equivalent to parts per billion)

INORGANIC ANALYSIS SUMMARY FOR SOILS
BORING LP-4
Tronic Plating Co. Site
Farmingdale, New York

PARAMETER	BORING No.:	LP-4	LP-4	LP-4	LP-4	FB 4/27
	DEPTH (ft):	(5-9)	(14-16)	(16-20)	(38-40)	N/A
	DATE:	27-Apr-89	27-Apr-89	27-Apr-89	27-Apr-89	27-Apr-89
	UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	UG/L
ALUMINIUM		2240	688	333	476	100.0 U
ANTIMONY		10.2 UL	10.2 UL	10.3 UL	11.5 UL	50.0 U
ARSENIC		1.0 U	1.0 U	1.0 U	1.2 U	5.0 U
BARIUM		10.2 U	10.2 U	10.3 U	11.5 U	50.0 U
BERYLLIUM		1.0 U	1.0 U	1.0 U	1.2 U	5.0 U
CADMIUM		1.3 J	1.0 UL	1.0 UL	1.2 UL	5.0 UL
CALCIUM		510 B	442 B	407 B	546 B	286 B
CHROMIUM		3.7 J	3.4 J	3.3 J	3.1 J	5.0 UL
COBALT		2.0 U	2.0 U	2.1 U	2.3 U	10.0 U
COPPER		8.5	4.6 B	4.8 B	6.3	10.0 U
IRON		5280	3810	1480	1600	10.0 U
LEAD		1.0 U	3.3 J	3 J	1.2 U	5.0 U
MAGNESIUM		288 BJ	257 BJ	146 BJ	202 BJ	20.0 U
MANGANESE		60.3 J	30.2 J	16.4 J	13.8 J	10.0 U
MERCURY		0.02 J	0.02 UJ	0.02 UJ	0.02 UJ	0.2 UL
NICKEL		4.1 UL	4.1 UL	4.1 UL	4.6 UL	20.0 UL
POTASSIUM		R	81.9 U	R	92.1 U	400.0 U
SELENIUM		1.0 U	1.0 U	1.0 U	1.2 U	5.0 U
SILVER		R	R	R	R	R
SODIUM		55.5 B	51.8 B	51.5 B	109 B	50.0 U
THALLIUM		1.0 UL	1.0 UL	1.0 UL	1.2 UL	5.0 U
VANADIUM		7.7 B	2.0 U	2.1 U	2.3 U	10.0 U
ZINC		13.6	5.5	5.1	11.2	34.00
CYANIDE		0.2 U	0.2 U	0.2 UL	0.2 UL	10.0 UL
HEXAVALENT CHROMIUM		6.9 *	0.5 U	0.5 U	0.5 U	5.0 U

- * - Hexavalent Chromium results are possibly suspect due to sample matrix which may contain inorganic salts, thus effecting the final results.
- B - This reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.
- U - The analyte was not detected at the reported concentration.
- J - Quantitation is approximate due to limitations identified during the data validation.
- R - Unreliable result - analyte may or may not be present in the sample.
- L - The detection limit is possibly higher due to a low bias identified during the quality assurance review.
- MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)
- UG/L - Micrograms per Liter (equivalent to parts per billion)

**INORGANIC ANALYSIS SUMMARY FOR SOILS
BORING SP-1
Tronic Plating Co. Site
Farmingdale, New York**

PARAMETER	BORING No.:	SP-1	SP-1	SP-1	SP-2	FB-5/3
	DEPTH (ft):	(7-9)	(19-21)	(37-39)	(37-39)	N/A
	DATE:	3-May-89	3-May-89	3-May-89	3-May-89	3-May-89
	UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	UG/L
ALUMINUM		712	983	506	466	100 U
ANTIMONY		10.2 UL	10.2 UL	10.7 UL	10.6 UL	50.0 UL
ARSENIC		1.0 U	1.0 U	1.1 U	1.1 U	5.0 U
BARIUM		10.2 U	10.2 U	10.7 U	10.6 U	50.0 U
BERYLLIUM		1.0 U	1.0 U	1.1 U	1.1 U	5.0 U
CADMIUM		1.0 UL	3.9 J	3.3 J	2 J	5.0 UL
CALCIUM		489 B	466 B	538 B	374 B	273 BJ
CHROMIUM		1.6 BJ	56.9 J	62.6 J	44.1 J	10.3 J
COBALT		2.0 U	2.0 U	2.1 U	2.1 U	10.0 U
COPPER		3.5 B	12.3	11.3	8.3	10.0 U
IRON		2270 J	2680 J	2240 J	3870 J	10.0 U
LEAD		1.0 U	1.0 U	1.1 U	1.1 U	5.0 U
MAGNESIUM		251 BJ	232 BJ	220 BJ	137 B	47.6 BJ
MANGANESE		36.1	16.7	6.9	7.1 J	10.0 U
MERCURY		0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.2 U
NICKEL		4.1 UL	4.1 UL	4.3 UL	4.2 UL	20.0 UL
POTASSIUM		81.3 U	R	85.7 U	R	765 B
SELENIUM		1.0 UL	1.0 UL	1.1 UL	1.1 UL	5.0 UL
SILVER		R	R	R	R	R
SODIUM		97.7 B	95.5 B	102 B	62.8 B	60.4 BJ
THALLIUM		1.0 UL	1.0 UL	1.1 UL	1.1 UL	5.0 U
VANADIUM		2.0 U	2.4 B	3.3 B	3.7 B	10.0 U
ZINC		8.1	9.6	7.8	5.9	32.7 J
CYANIDE		0.2 UL	0.45 J	2.2 J	2.4	10.0 U
HEXAVALENT CHROMIUM		0.5 U	9.2	7.6	7.4	5.0 U

SP-2 is a duplicate sample for SP-1.

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U - The analyte was not detected at the reported concentration.

J - Quantitation is approximate due to limitations identified during data validation.

R - Unreliable result - analyte may or may not be present in this sample.

MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)

UG/L - Micrograms per Liter (equivalent to parts per billion)

INORGANIC ANALYSIS SUMMARY FOR SOILS
BORING DW1/P5 & E.F.W.D HYDRANT
Tronic Plating Co. Site
Farmingdale, New York

PARAMETER	BORING No.:	DW1/P5	DW1/P5	DW1/P5	H-1	FB 5/2
	DEPTH (ft):	(5-7)	(19-21)	(37-39)	HYDRANT	N/A
	DATE:	2-May-89	2-May-89	2-May-89	10-May-89	2-May-89
	UNITS:	MG/KG	MG/KG	MG/KG	UG/L	UG/L
ALUMINUM		1460	728	500	100 U	100 U
ANTIMONY		10.3 UL	10.2 UL	10.7 UL	50 UL	50.0 U
ARSENIC		R	1.0 U	1.1 UL	5.0 U	5.0 U
BARIUM		10.3 U	10.2 U	10.7 U	50.0 U	50.0 U
BERYLLIUM		1.0 U	1.0 U	1.1 U	5.0 U	5.0 U
CADMIUM		1.0 U	1.0 UL	1.1 UL	5.0 U	5.0 UL
CALCIUM		470 B	511 B	456 B	6320 J	316 BJ
CHROMIUM		2.6 J	2.8 J	2.2 J	5.0 UL	6.4 BJ
COBALT		2.1 U	2.0 U	2.1 U	10.0 U	10.0 U
COPPER		5.5	4.8 B	4.1 B	10.0 U	10.0 U
IRON		5780 J	1990 J	1510 J	76 BJ	10.0 U
LEAD		1.4 J	4.7 J	1.1 U	5.0 U	5.0 U
MAGNESIUM		364 BJ	271 BJ	239 BJ	1410 BJ	58.6 BJ
MANGANESE		102	47.5	18.4	10.0 U	10.0 U
MERCURY		0.02 UJ	0.02 UJ	0.02 UJ	0.2 U	0.2 U
NICKEL		4.1 UL	4.1 UL	4.3 UL	20.0 U	20.0 UL
POTASSIUM		R	R	85.7 U	R	400 U
SELENIUM		1.0 UL	1.0 UL	1.1 UL	5.0 UL	5.0 UL
SILVER		R	R	R	R	R
SODIUM		79.4 B	75.3 B	64.8 B	844 BJ	50.6 BJ
THALLIUM		1.0 UL	1.0 UL	1.1 UL	5.0 U	5.0 U
VANADIUM		5.3 B	2.5 B	2.1 U	10.0 U	10.0 U
ZINC		10.3	11.8	6.1	26.1 J	34.8 J
CYANIDE		0.2 UL	0.2 UL	0.2 UL	10.0 UL	10.0 UL
HEXAVALENT CHROMIUM		0.5 U	0.5 U	0.5 U	R	5.0 U

B - This reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.

U - The analyte was not detected at the reported concentration.

J - Quantitation is approximate due to limitations identified during data validation.

R - Unreliable result - analyte may or may not be present in this sample.

L - The detection limit is possibly higher due to a low bias identified during the quality assurance review.

MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)

UG/L - Micrograms per Liter (equivalent to parts per billion)

**INORGANIC SUMMARY OF SOIL SAMPLING ANALYSIS
WELL BORING MW-1D
Tronic Plating Co. Site
Farmingdale, New York**

PARAMETER	BORING No.:	MW-1D	MW-1D	MW-1D	FB 5/9
	DEPTH (ft):	(10-12.5)	(25-27.5)	(37.5-40)	N/A
	DATE:	9-May-89	9-May-89	9-May-89	9-May-89
	UNITS:	MG/KG	MG/KG	MG/KG	UG/L
ALUMINUM		1140	863	651	100.0 U
ANTIMONY		10.2 UL	10.3 UL	10.4 UL	50.0 UL
ARSENIC		1.0 U	1.0 U	1.0 U	5.0 U
BARIUM		10.2 U	10.3 U	10.4 UL	50.0 U
BERYLLIUM		1.0 U	1.0 U	1.0 U	5.0 U
CADMIUM		1.0 UL	1.0 UL	1.0 UL	5.0 UL
CALCIUM		493 B	513 B	538 B	174 BJ
CHROMIUM		3.7 J	6.9 J	5.3 J	5.6 BJ
COBALT		2.0 U	2.6 B	3.3 B	10.0 U
COPPER		7.2	6.4	4 B	10.0 U
IRON		2460 J	3790 J	1740 J	10.0 UL
LEAD		1.0 U	1.1 J	1.0 U	5.0 U
MAGNESIUM		322 BJ	311 BJ	247 BJ	36.6 BJ
MANGANESE		62.6	52.6	74.5	10.0 U
MERCURY		0.02 UJ	0.02 UJ	0.02 UJ	0.2 U
NICKEL		4.1 UL	4.1 UL	4.1 UL	20.0 UL
POTASSIUM		R	R	R	400.0 U
SELENIUM		1.0 UL	1.0 UL	1.0 UL	5.0 UL
SILVER		R	R	R	R
SODIUM		85.6 B	75.3 B	65.8 B	50.0 U
THALLIUM		1.0 UL	1.0 UL	1.0 UL	5.0 U
VANADIUM		2.5 B	4.5 B	4.1 B	10.0 U
ZINC		12.5	8.9	8.3	20.0 U
CYANIDE		0.2 U	0.2 U	0.2 U	10.0 U
HEXAVALENT CHROMIUM		0.5 U	0.5 U	0.5 U	5.0 U

- B - This reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.
- U - The analyte was not detected at the reported concentration.
- J - Quantitation is approximate due to limitations identified during the quality control review (data validation).
- R - Unreliable result - analyte may or may not be present in this sample.
- L - The detection limit is possibly higher due to a low bias identified during the quality assurance review.
- MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)
- UG/L - Micrograms per Liter (equivalent to parts per billion)

INORGANIC SUMMARY OF SOIL SAMPLING ANALYSIS
WELL BORING MW-2D
Tronic Plating Co. Site
Farmingdale, New York

PARAMETER	BORING No.:	MW-2D	MW-2X	MW-2D	MW-2D	FB 5/12
	DEPTH (ft):	(10-12.5)	(10-12.5)	(20-22.5)	(37.5-40)	N/A
	DATE:	12-May-89	12-May-89	12-May-89	12-May-89	12-May-89
	UNITS:	MG/KG	MG/KG	MG/KG	MG/KG	UG/L
ALUMINUM		911	777	781	296	100.0 U
ANTIMONY		10.9 BJ	10.3 UL	11.0 UL	11.7 UL	50.0 UL
ARSENIC		1.0 U	1.0 U	1.1 U	1.2 U	5.0 U
BARIUM		10.4 U	10.3 U	11.0 U	11.7 U	50.0 U
BERYLLIUM		1.0 U	1.0 U	1.2 U	1.2 U	5.0 U
CADMIUM		3.6 J	3.7 J	1.4 J	1.2 UL	5.0 UL
CALCIUM		511 B	594 B	685 B	560 B	193 BJ
CHROMIUM		8.6 J	9.4 J	13.1 J	3.5 J	6.4 BJ
COBALT		2.1 U	2.1 U	2.2 U	2.3 U	10.0 U
COPPER		23.3	26.9	15.9	5 B	10.0 U
IRON		1780 J	1970 J	2860 J	781 J	10.0 UJ
LEAD		2 J	1.1 J	1.1 U	1.2 U	5.0 U
MAGNESIUM		277 BJ	261 BJ	337 BJ	154 BJ	20.0 UJ
MANGANESE		23	29.5	45.7	13	10.0 U
MERCURY		0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.2 U
NICKEL		7.9 BJ	4.2 BJ	4.4 UL	4.7 UL	24.8 BJ
POTASSIUM		R	R	R	93.8 U	626 B
SELENIUM		1.0 UL	1.0 UL	1.1 UL	1.2 UL	5.0 UL
SILVER		R	R	R	R	R
SODIUM		70 B	83.1 B	105 B	74.8 B	50.0 U
THALLIUM		1.0 UL	1.0 UL	1.1 UL	1.2 UL	5.0 U
VANADIUM		3.9 B	4.1 B	2.5 B	2.3 U	10.0 U
ZINC		9.1	10.4	9.8	6.8	20.0 U
CYANIDE		1.9	1.9	0.32	0.2 U	10.0 U
HEXAVALENT CHROMIUM		2.8	2	2.6	0.53	5.0 U

MW -2X (10-12) is a duplicate sample of MW-2D (10-12).

B - This reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.

U - The analyte was not detected at the reported concentration.

J - Quantitation is approximate due to limitations identified during the quality control review (data validation).

R - Unreliable result - analyte may or may not be present in this sample.

L - The detection limit is possibly higher due to a low bias identified during the quality assurance review.

MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)

UG/L - Micrograms per Liter (equivalent to parts per billion)

INORGANIC SUMMARY OF SOIL SAMPLING ANALYSIS
WELL BORING MW-2I
Tronic Plating Co. Site
Farmingdale, New York

PARAMETER	BORING No.:	MW-2I	MW-2I	MW-2I	FB 5/17
	DEPTH (ft):	(10-12.5)	(22.5-25)	(37.5-40)	N/A
	DATE:	17-May-89	17-May-89	17-May-89	17-May-89
	UNITS:	MG/KG	MG/KG	MG/KG	UG/L
ALUMINUM		682 J	584 J	475 J	100.0 U
ANTIMONY		10.4 UL	10.3 UL	10.8 UL	50.0 UL
ARSENIC		1.0 U	1.0 U	1.1 U	5.0 U
BARIUM		10.4 U	10.3 U	10.8 U	50.0 U
BERYLLIUM		1.0 U	1.0 U	1.1 U	5.0 U
CADMIUM		1.0 UL	1.0 UL	1.1 UL	5.0 UL
CALCIUM		626 B	439 B	518 B	235 B
CHROMIUM		1.8 JB	4.9 J	3.2 J	5.6 BJ
COBALT		2.1 U	2.1 U	2.2 U	10.0 U
COPPER		4.9 B	4.4 B	3.9 B	10.0 U
IRON		1750	4520	1990	10.0 U
LEAD		1.0 UL	1.5 J	1.1 UL	5.0 U
MAGNESIUM		256 B	162 B	193 B	33 B
MANGANESE		24 J	58.5 J	37.3 J	10.0 U
MERCURY		0.02 UJ	0.02 UJ	0.02 UJ	0.2 U
NICKEL		4.1 UL	4.1 UL	4.3 UL	20.0 UL
POTASSIUM		R	R	R	846 B
SELENIUM		1.0 U	1.0 U	1.1 U	5.0 U
SILVER		R	R	R	R
SODIUM		99 B	65.4 B	86.6 B	50.0 U
THALLIUM		1.0 U	1.0 U	1.1 U	5.0 U
VANADIUM		2.3 B	6.1 B	3.3 B	10.0 U
ZINC		R	R	R	46.2
CYANIDE		0.2 U	0.2 U	0.2 U	10.0 U
HEXAVALENT CHROMIUM		0.5 U	0.5 U	2.6	5.0 U

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- U - The analyte was not detected at the reported concentration.
- J - Quantitation is approximate due to limitations identified during the quality control review (data validation).
- R - Unreliable result - analyte may or may not be present in this sample.
- L - The detection limit is possibly higher due to a low bias identified during the quality assurance review.
- MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)
- UG/L - Micrograms per Liter (equivalent to parts per billion)

INORGANIC SUMMARY OF SOIL SAMPLING ANALYSIS
WELL BORING MW-31
Tronic Plating Co. Site
Farmingdale, New York

PARAMETER	BORING No.:	MW-31	MW-31	MW-31	FB 5/22
	DEPTH (ft):	(10-12.5)	(32.5-35)	(75-77.5)	N/A
	DATE:	22-May-89	22-May-89	22-May-89	22-May-89
	UNITS:	MG/KG	MG/KG	MG/KG	UG/L
ALUMINUM		697 J	878 J	578 J	100.0 U
ANTIMONY		10.3 UL	10.7 UL	11.4 UL	50.0 UL
ARSENIC		1.0 U	1.1 U	2.1	5.0 U
BARIUM		10.3 U	10.7 U	11.4 U	50.0 U
BERYLLIUM		1.0 U	1.1 U	1.1 U	5.0 U
CADMIUM		1.0 UL	1.1 UL	1.1 UL	5.0 UL
CALCIUM		517 B	503 B	542 B	176 B
CHROMIUM		1.6 BJ	2.5 J	5.1 J	5.0 UL
COBALT		2.1 U	2.1 U	2.3 U	10.0 U
COPPER		5 B	4.6 B	4.3 B	10.0 U
IRON		1120	932	4680	10.0 U
LEAD		47.1 J	69.2 J	2.5 J	5.0 U
MAGNESIUM		245 B	160 B	136 B	20.0 U
MANGANESE		12.2 J	32.5 J	16.2 J	10.0 U
MERCURY		0.02 UJ	0.02 UJ	0.02 UJ	0.2 U
NICKEL		4.1 UL	4.3 UL	4.6 UL	20.0 UL
POTASSIUM		R	R	R	400.0 U
SELENIUM		1.0 U	1.1 U	1.1 U	5.0 U
SILVER		R	R	R	R
SODIUM		67.6 B	72.9 B	85.4 B	50.0 U
THALLIUM		1.0 U	1.1 U	1.1 U	5.0 U
VANADIUM		2.4 B	2.1 U	5.9 B	10.0 U
ZINC		R	R	R	21.6
CYANIDE		0.2 U	0.2 U	0.2 U	10.0 U
HEXAVALENT CHROMIUM		0.5 U	0.5 U	0.5 U	5.0 U

B - This reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.

U - The analyte was not detected at the reported concentration.

J - Quantitation is approximate, due to limitations identified during the quality control review (data validation).

R - Unreliable result - analyte may or may not be present in this sample.

L - The detection limit is possibly higher due to a low bias identified during the quality assurance review.

MG/KG - Milligrams per kilogram, dry weight (equivalent to parts per million)

UG/L - Micrograms per Liter (equivalent to parts per billion)

**ORGANIC ANALYSIS SUMMARY FOR SOILS
BORINGS LP-1 TO LP-4
Tronic Plating Company
Farmingdale, New York**

PARAMETER	BORING No.: DEPTH (ft): DATE:	LP-1 (6-10) 26-Apr-89	LP-1 (14-19) 26-Apr-89	LP-1 (18-20) 26-Apr-89	LP-1 (38-40) 26-Apr-89	FB 4/26 N/A 26-Apr-89
VOLATILE						
ACETONE		ND	26	26	ND	ND
SEMI-VOLATILE						
DI-N-BUTYLPHthalate		4100	4300	3000	5100	ND
BIS(2-ETHYLHEXYL)PHthalate		270	160	180	240	ND
TOTAL UNKNOWNNS		400 JN	1040 JN	ND	ND	ND
PESTICIDE/PCB		ND	NA	NA	NA	NA

PARAMETER	BORING No.: DEPTH (ft): DATE:	LP-2 (8-10) 26-Apr-89	LP-2 (14-16) 26-Apr-89	LP-2 (18-20) 26-Apr-89	LP-2 (38-40) 26-Apr-89	FB 4/26 N/A 26-Apr-89
VOLATILE						
ACETONE		ND	ND	95	30	ND
SEMI-VOLATILE						
DI-N-BUTYLPHthalate		94 J	ND	380	570	ND
BIS(2-ETHYLHEXYL)PHthalate		2800	680	770	130	ND
TOTAL UNKNOWNNS		390 JN	270 JN	580 JN	980 JN	ND
PESTICIDES/PCB's						
4,4'-DDE		ND	72	NA	NA	NA
4,4'-DDT		ND	37	NA	NA	NA

PARAMETER	BORING No.: DEPTH (ft): DATE:	LP-3 (5-9) 27-Apr-89	LP-3 (14-16) 27-Apr-89	LP-3 (18-20) 27-Apr-89	LP-3 (38-40) 27-Apr-89	FB 4/27 N/A 27-Apr-89
VOLATILE						
ACETONE		ND	41	74	ND	ND
SEMI-VOLATILE						
DI-N-BUTYLPHthalate		ND	ND	1200	1900	ND
BIS(2-ETHYLHEXYL)PHthalate		1400	ND	450	190 J	ND
TOTAL UNKNOWNNS		200 JN	R	170 JN	770 JN	ND
PESTICIDES/PCB's		ND	ND	NA	NA	ND

PARAMETER	BORING No.: DEPTH (ft): DATE:	LP-4 (5-9) 27-Apr-89	LP-4 (14-16) 27-Apr-89	LP-4 (16-20) 27-Apr-89	LP-4 (38-40) 27-Apr-89	FB 4/27 N/A 27-Apr-89
VOLATILE						
ACETONE		ND	ND	ND	ND	ND
SEMI-VOLATILE						
DI-N-BUTYLPHthalate		ND	150 J	1600 J	3600	ND
BIS(2-ETHYLHEXYL)PHthalate		160 J	ND	ND	ND	ND
TOTAL UNKNOWNNS		150 JN	ND	540 JN	1030J	ND
PESTICIDES/PCB's		ND	ND	NA	NA	ND

All concentrations expressed in parts per billion (ppb).

J = Quantitation is approximate due to limitations identified during the quality control review.

N = Identification is suspect due to limitations identified in the quality assurance review.

R = Unreliable result - analyte may or may not be present in this sample.

ND = Indicates Not Detected. NA = Indicates Not Analyzed.

**ORGANIC ANALYSIS SUMMARY FOR SOILS
BORINGS DW1/P5 & SP-1
Tronic Plating Company
Farmingdale, New York**

PARAMETER	BORING No.: DEPTH (ft): DATE:	DW1/P5 (5-7) 2-May-89	DW1/P5 (19-21) 2-May-89	DW1/P5 (37-39) 2-May-89	FB 5/2 N/A 2-May-89
VOLATILES					
METHYLENE CHLORIDE		14	20	ND	ND
FREON 113		7.9 J	15 J	42 J	ND
SEMIVOLATILES					
BIS(2-ETHYLHEXYL)PHTHALATE		420 U	460 U	350 U	26
TOTAL UNKNOWNNS		ND	410 JN	570 JN	ND
PESTICIDE/PCB's					
		ND	ND	NA	NA

PARAMETER	BORING No.: DEPTH (ft): DATE:	SP-1 (7-9) 3-May-89	SP-1 (19-21) 3-May-89	SP-1 (37-39) 3-May-89	SP-2 (37-39) 3-May-89	FB 5/3 N/A 3-May-89
VOLATILE						
ACETONE		ND	ND	50	65	ND
METHYLENE CHLORIDE		11	ND	ND	8	ND
TOTAL UNKNOWNNS		46 JN	172 JN	135 JN	52 JN	ND
SEMIVOLATILE						
BIS(2-ETHYLHEXYL)PHTHALATE		ND	2000 U	360 U	ND	ND
DI-N-OCTYL PHTHALATE		ND	77 J	ND	ND	ND
TOTAL UNKNOWNNS		ND	12500 JN	ND	ND	ND
PESTICIDE/PCB's						
		ND	ND	NA	NA	ND

All concentrations expressed in parts per billion (ppb).

SP-2 is a duplicate sample of SP-1.

J = Quantitation is approximate due to limitations identified during the quality control review.

N = Identification is suspect due to limitations identified in the quality assurance review.

U = The analyte was not detected at the reported concentration.

ND = The analyte was Not Detected at the concentration reported in the corresponding Form I.

NA = Indicates Not Analyzed.

ORGANIC ANALYSIS SUMMARY FOR SOILS
WELL BORINGS MW-1D & MW-2D
 Tronic Plating Company
 Farmingdale, New York

PARAMETER	BORING No.:	MW-1D	MW-1D	MW-1D	FB 5/9
	DEPTH (ft):	(10-12.5)	(25-27.5)	(37.5-40)	N/A
	DATE:	9-May-89	9-May-89	9-May-89	9-May-89
VOLATILE					
ACETONE		74	ND	ND	ND
CHLOROFORM		9	8	ND	ND
TOTAL UNKNOWNNS		9.2 J	ND	ND	ND
SEMI-VOLATILE					
DI-N-BUTYLPHthalATE		5200	6200	5200	ND
BUTYLBENZYLPHthalATE		47	230	820	ND
BIS(2-ETHYLHEXYL)PHthalATE		340 U	350 U	ND	ND
DIETHYLPHthalATE		ND	ND	150	ND
TOTAL UNKNOWNNS		830 JN	2240 JN	2120 JN	ND
PESTICIDE/PCB					
		ND	NA	NA	ND

PARAMETER	BORING No.:	MW-2D	MW-2X	MW-2D	MW-2D	FB 5/12
	DEPTH (ft):	(10-12)	(10-12)	(20-22)	(37-40)	N/A
	DATE:	12-May-89	12-May-89	12-May-89	12-May-89	12-May-89
VOLATILE						
METHYLENE CHLORIDE		11 U	22 B	5 U	6 U	ND
ACETONE		24 U	23 B	16 U	19 U	ND
TOTAL UNKNOWNNS		ND	ND	ND	ND	ND
SEMI-VOLATILE						
DI-N-BUTYLPHthalATE		ND	91 B	140	230	ND
BIS(2-ETHYLHEXYL)PHthalATE		1900 U	1700 B	4300 U	2600 U	3100 J
TOTAL UNKNOWNNS		400 JN	ND	880J / 410 B	630 JN	120 J
PESTICIDE/PCB						
		ND	ND	NA	NA	ND

All concentrations expressed in parts per billion (ppb).

MW-2X is a duplicate sample of MW-2D.

J = Quantitation is approximate due to limitations identified during the quality control review.

N = Identification is suspect due to limitations identified during the quality assurance review.

U = The analyte was not detected at the reported concentration.

ND = The analyte was Not Detected at the concentration reported in the corresponding Form I.

NA = Indicates Not Analyzed.

ORGANIC ANALYSIS SUMMARY FOR SOILS
WELL BORINGS MW-2I & MW-3I
Tronic Plating Company
Farmingdale, New York

PARAMETER	BORING No.:	MW-2I	MW-2I	MW-2I	FB 5/17
	DEPTH (ft):	(10-12.5)	(22.5-25)	(37.5-40)	N/A
	DATE:	17-May-89	17-May-89	17-May-89	17-May-89
VOLATILE					
METHYLENE CHLORIDE		ND	ND	20 U	ND
ACETONE		6 U	150 B	11 U	ND
TOTAL UNKNOWNNS		ND	ND	ND	ND
SEMI-VOLATILE					
DI-N-BUTYLPHTHALATE		2600	2300 U	1600 U	360 BD
BUTYLBENZYLPHTHALATE		ND	ND	ND	10 DJ
BIS(2-ETHYLHEXYL)PHTHALATE		1200 U	2400 U	4800 U	140 BD
TOTAL UNKNOWNNS		140 JN	R	180 JN	159 J
PESTICIDES/PCB		ND	NA	NA	ND

PARAMETER	BORING No.:	MW-3I	MW-3I	MW-3I	FB 5/22
	DEPTH (ft):	(10-12)	(32-35)	(75-77.5)	N/A
	DATE:	22-May-89	22-May-89	22-May-89	22-May-89
VOLATILE					
METHYLENE CHLORIDE		5 U	6 U	9 U	ND
ACETONE		14 U	110 U	32 U	ND
TOTAL UNKNOWNNS		R	R	R	ND
SEMI-VOLATILE					
DI-N-BUTYLPHTHALATE		340 U	130	2300	ND
BIS(2-ETHYLHEXYL)PHTHALATE		360 U	920 U	680 U	69 D
TOTAL UNKNOWNNS		ND	880 JN	790 JN	ND
PESTICIDES/PCB		ND	NA	NA	ND

All concentrations expressed in parts per billion (ppb).

J = Quantitation is approximate due to limitations identified in the quality control review.

N = Identification is suspect due to limitations identified during the quality assurance review.

U = The analyte was not detected at the reported concentration.

R = Unreliable result - analyte may or may not be present in this sample.

B = The reported value is qualitatively suspect since the compound/constituent was detected at a level at least 5 or 10 times lower than the reported concentration.

ND = The analyte was Not Detected at the reported concentration in the corresponding Form I.

NA = Indicates Not Analyzed.

TABLE 4-4

VOLATILE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS															
CA Rich Sample Number	MS-SS (39-41)	FD 4/17	TD 4/17	SO-1 (14-16)	SO-1 (21-23)	SDD-1 (21-23)	SO-1 (31-33)	FD 4/22	TD 4/22	FD 4/20	TD 4/20	FD 4/19	MS-4S (39-41)	SO-3 (17-19)	SO-3 (23-25)
Laboratory Sample Number	90316-015	90316-016	90316-017	90476-001	90476-002	90476-003	90476-004	90476-005	90476-007	90429-005	90429-006	90429-007	90429-008	90429-009	90429-010
Remarks		Field Blank	Trip Blank			Duplicate of SO-1 (21-23)		Field Blank	Trip Blank	Field Blank	Trip Blank	Field Blank			
Units		ug/kg	ug/L	ug/L	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/kg	ug/kg	ug/kg
VOLATILE COMPOUNDS	Quant. Limit														
cis-1,3-Dichloropropene	5														
Bromoform	5														
2-Hexanone	10														
4-Methyl-2-Pentanone	10														
Tetrachloroethene	5														
Toluene	5														
Chlorobenzene	5														
Ethylbenzene	5														
Styrene	5														
Total Xylenes	5														
1,1,2-Trichloro-2,2,1-trifluoroethane	5														
Quantitation Limit Multiplier	1.10	1.00	1.00	1.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.11	1.10	1.11
Date of Sample Collection	4/17/91	4/17/91	4/17/91	4/22/91	4/22/91	4/22/91	4/22/91	4/22/91	4/22/91	4/20/91	4/20/91	4/19/91	4/20/91	4/20/91	4/20/91
Date Sample Received by Laboratory	4/18/91	4/18/91	4/18/91	4/23/91	4/23/91	4/23/91	4/23/91	4/23/91	4/23/91	4/22/91	4/22/91	4/22/91	4/22/91	4/22/91	4/22/91
Date of Sample Analysis	4/22/91	4/19/91	4/19/91	4/29/91	4/29/91	4/29/91	4/29/91	4/29/91	4/29/91	4/24/91	4/24/91	4/24/91	4/25/91	4/25/91	4/25/91
Instrument Used for Analysis	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-2	MS-96-2	MS-96-2	MS-96-2	MS-96-2

- NOTES:
- Compound was not detected.
 - 0 This compound should be considered "not detected" since it was detected in a blank at a similar level.
 - 0 Unreliable result - Compound may or may not be present in this sample.
 - 3 Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
 - 03 This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

TABLE 4-4

CLP - TENTATIVELY IDENTIFIED COMPOUNDS		ESTIMATED CONCENTRATIONS						ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS								
CA Rich Sample Number	MU-55 (39-01)	FD 4/17	TD 4/17	SD-1 (14-16)	SD-1 (21-23)	SDO-1 (21-23)	SO-1 (31-33)	FD 4/22	TD 4/22	FD 4/20	TD 4/20	FD 4/19	MU-45 (39-01)	SO-3 (17-19)	SO-3 (23-25)	
Laboratory Sample Number	90316-015	90316-016	90316-017	90476-001	90476-002	90476-003	90476-004	90476-005	90476-007	90429-005	90429-006	90429-007	90429-008	90429-009	90429-010	
Remarks		Field Blank	Trip Blank			Duplicate of SD-1 (21-23)		Field Blank	Trip Blank	Field Blank	Trip Blank	Field Blank				
Units	ug/kg	ug/L	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/kg	ug/kg	ug/kg	
COMPOUNDS																
VOLATILE COMPONENTS																
Blank Contamination	UG R	69 (2) R	26 (2) R	25 R	7 R	54 R	13 R	15 R	14 R	52 (3) R	7 R	6 R	26 R	10 R	21 (2) R	
Unknown													S J			

- NOTES:
- Compound was not detected.
 - U This compound should be considered "not detected" since it was detected in a blank at a similar level.
 - R Unreliable result - Compound may or may not be present in this sample.
 - J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
 - UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

TABLE 4-4

VOLATILE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS															
CA Rich Sample Number	SD-3 (31-33)	SD-2 (21-23)	SD-2 (14-16)	SD-2 (21-23)	SD-2 (31-33)	MS-41 (64-66)	FB 4/18	SD-4 (Bottom)	SD-5 (Bottom)	SD-6 (Bottom)	SD-7 (Bottom)	SD-8 (Bottom)	NAFB 4/18	TB 4/18	SD-3 (Bottom)
Laboratory Sample Number	98429-011	98429-012	98429-013	98429-014	98429-015	98370-001	98370-002	98370-007	98370-008	98370-009	98370-010	98370-011	98370-012	98370-013	98370-016
Remarks		Duplicate of SD-2 (21-23)					Field Blank						Field Blank	Trip Blank	
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/kg
VOLATILE COMPOUNDS	Quant. Limit														Analyzed Twice
cis-1,3-Dichloropropene	5														
Bromoform	5														
2-Hexanone	10														U/UJ
4-Methyl-2-Pentanone	10														U/UJ
Tetrachloroethene	5														UJ/2 J
Toluene	5								36						7 J/6 J
Chlorobenzene	5														UJ/UJ
Ethylbenzene	5								21						UJ/6 J
Styrene	5														UJ/6 R
Total Xylenes	5								65			1 J			UJ/18 J
1,1,2-Trichloro-2,2,1-trifluoroethane	5														
Quantitation Limit Multiplier	1.06	1.09	1.09	1.10	1.12	1.24	1.00	1.19	3.39	1.56	1.38	1.46	1.00	1.00	2.53
Date of Sample Collection	4/20/91	4/20/91	4/20/91	4/20/91	4/20/91	4/18/91	4/18/91	4/18/91	4/18/91	4/18/91	4/18/91	4/18/91	4/18/91	4/18/91	4/18/91
Date Sample Received by Laboratory	4/22/91	4/22/91	4/22/91	4/22/91	4/22/91	4/19/91	4/19/91	4/19/91	4/19/91	4/19/91	4/19/91	4/19/91	4/19/91	4/19/91	4/19/91
Date of Sample Analysis	4/25/91	4/25/91	4/26/91	4/26/91	4/26/91	4/24/91	4/22/91	4/24/91	4/24/91	4/26/91	4/25/91	4/25/91	4/22/91	4/22/91	4/24 & 4/25
Instrument Used for Analysis	MS-96-2	MS-96-2	MS-96-2	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1	MS-96-1

- NOTES:
- Compound was not detected.
 - U This compound should be considered "not detected" since it was detected in a blank at a similar level.
 - R Unreliable result - Compound may or may not be present in this sample.
 - J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
 - UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

TABLE 4-4

CLP - TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS															
CA Rich Sample Number	SD-3 (31-33)	SDO-2 (21-23)	SD-2 (14-16)	SD-2 (21-23)	SD-2 (31-33)	MW-41 (64-66)	FB 4/18	SD-4 (Bottom)	SD-5 (Bottom)	SD-6 (Bottom)	SD-7 (Bottom)	SD-8 (Bottom)	NAFB 4/18	TB 4/18	SD-3 (Bottom)
Laboratory Sample Number	98429-011	98429-012	98429-013	98429-014	98429-015	98370-001	98370-002	98370-007	98370-008	98370-009	98370-010	98370-011	98370-012	98370-013	98370-016
Remarks		Duplicate of SD-2 (21-23)					Field Blank						Field Blank	Trip Blank	
Units	ug/kg	ug/L	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/kg	ug/kg	ug/kg
COMPOUNDS															
VOLATILE COMPONENTS															
Blank Contamination	8 R		9 R	22 R	17 R	16 R	43 R	31 R	120 R	60 R	38 R	45 R	9 R		18 R/46 R
Isomer of Dimethylhexane, C ₈ H ₁₈									14 J				5 J		-
Isomer of Ethylmethylbenzene, C ₈ H ₁₂									120 (2) J						-
Isomer of 1,1'-(methylene)bis cyclohexane									74 J						-
Isomer of Ethylmethylpentane, C ₈ H ₁₈															53 J/540 (2) J
Isomer of Methyl-(methylene)cyclohexane															73 (2) J/330 J
Isomer of Methylnonane, C ₁₀ H ₂₀									580 (10) J						160 J/-
Chlorofluoromethane, CAS 875-45-6			15 J												
Unknown															460 (9) J/1460 (10) J

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SPEEDS REPORTED ON A DRY WEIGHT BASIS									
CD Rich Sample Number Laboratory Sample Number			SD-2 (Bottom) SD370-005	SD-4 (Bottom) SD370-007	SD-5 (Bottom) SD370-008	SD-6 (Bottom) SD370-009	SD-7 (Bottom) SD370-010	SD-8 (Bottom) SD370-011	SD-1 (Bottom) SD370-014
Remarks			Duplicate of SD-2 (Bottom)						
Units			ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SEMI-VOLATILE COMPOUNDS	Quantitation Limit (Aq.)	Quantitation Limit (Sol.)	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice
Phenol	10	330							
bis(2-Chloroethyl)ether	10	330							
2-Chlorophenol	10	330							
1,3-Dichlorobenzene	10	330							
1,4-Dichlorobenzene	10	330							
Benzyl Alcohol	10	330							
1,2-Dichlorobenzene	10	330							
2-Methylphenol	10	330							
bis(2-Chloroisopropyl)ether	10	330							
4-Methylphenol	10	330							
N-Nitroso-di-n-Propylamine	10	330							
Hexachloroethane	10	330							
Nitrobenzene	10	330							
Isophorane	10	330							
2-Nitrophenol	10	330							
2,4-Dimethylphenol	10	330	1200 B/-						
Benzoic Acid	50	1650							
bis(2-Chloroethoxy)methane	10	330							
2,4-Dichlorophenol	10	330							
1,2,4-Trichlorobenzene	10	330							
Naphthalene	10	330	7000 J/6300 J		900 J/910 J				
0-Chloroaniline	10	330							
Hexachlorobutadiene	10	330							
6-Chloro-3-Methylphenol	10	330						03/03	
2-Nethylnaphthalene	10	330	24000 J/24000 J		2000 J/2100 J	1400 J/1500 J			

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS									
CR Rich Sample Number Laboratory Sample Number			SO-2 (Bottom) 98370-005	SO-4 (Bottom) 98370-007	SO-5 (Bottom) 98370-008	SO-6 (Bottom) 98370-009	SO-7 (Bottom) 98370-010	SO-8 (Bottom) 98370-011	SO-1 (Bottom) 98370-014
Remarks			Duplicate of SO-2 (Bottom)						
Units			ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SEMI-VOLATILE COMPOUNDS	Quantitation Limit (Aq.)	Quantitation Limit (Sol.)	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice
Hexachlorocyclopentadiene	10	330	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
2,4,6-Trichlorophenol	10	330	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
2,4,5-Trichlorophenol	50	1650	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
2-Chloronaphthalene	10	330	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
2-Nitroaniline	50	1650	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
Dimethylphthalate	10	330	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
1-naphthylene	10	330	1300 J/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
3-Nitroaniline	50	1650	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
1-naphthrene	10	330	1400 J/1700 J	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
2,4-Dinitrophenol	50	1650	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
4-Nitrophenol	50	1650	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
Dibenzofuran	10	330	ND/2200 J	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
2,4-Dinitrotoluene	10	330	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
2,6-Dinitrotoluene	10	330	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
Diethylphthalate	10	330	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
4-Chlorophenylphenylether	10	330	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
fluorene	10	330	2900 J/3700	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
4-Nitroaniline	50	1650	ND/-	ND/-	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
4,6-Dinitro-2-Ethylphenol	50	1650	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
N-Nitrosodiphenylamine	10	330	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
4-Bromophenylphenylether	10	330	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
Hexachlorobenzene	10	330	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
Pentachlorophenol	50	1650	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
Phenanthrene	10	330	8000 J/9500 J	ND/ND	ND/1600 J	ND/2600 J	ND/ND	ND/ND	ND/ND

TABLE 4-4

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS									
CA Rich Sample Number Laboratory Sample Number	SD-2 (Bottom) 90370-005		SD-4 (Bottom) 90370-007	SD-5 (Bottom) 90370-008	SD-6 (Bottom) 90370-009	SD-7 (Bottom) 90370-010	SD-8 (Bottom) 90370-011	SD-1 (Bottom) 90370-014	
Remarks	Duplicate of SD-2 (Bottom)								
Units	ug/kg		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
SEMIVOLATILE COMPOUNDS	Quantitation Limit (Aq.)	Quantitation Limit (Sol.)	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice
Anthracene	10	330	03/03	03/03	03/03	03/03	03/03	03/03	03/03
Di-n-Butylphthalate	10	330	03/03	03/03	03/03	03/03	03/03	03/03	03/03
Fluoranthene	10	330	1500 J/3000 J	03/03	03/1400 J	03/03	03/1700 J	03/03	03/03
Pyrene	10	330	0/4000 J	0/03	03/030 J	0/03	03/1300 J	03/03	03/03
Butylbenzylphthalate	10	330	0/03	0/03	03/03	0/03	03/03	03/03	03/03
1,3-Dichlorobenzidine	20	660	0/03	03/03	03/03	0/03	03/03	03/03	03/03
Benzo(a)anthracene	10	330	0/03	0/03	03/03	0/03	03/03	03/03	03/03
bis(2-Ethylhexyl)phthalate	10	330	0/20000 J	1200 J/2400 J	03/17000 J	0/43000 J	03/13000 J	03/2900 J	03/03
Chrysene	10	330	0/03	03-/	03/03	0/03	03/1000 J	03/03	03/03
Di-n-Octylphthalate	10	330	0/03	0/03	0/03	0/03	0/03	0/03	0/03
Benzo(b)fluoranthene	10	330	0/03	0/03	0/03	0/03	0/03	0/03	0/03
Benzo(k)fluoranthene	10	330	0/03	0/03	0/03	0/03	0/03	0/03	0/03
Benzo(a)pyrene	10	330	0/03	0/03	0/03	0/03	0/03	0/03	0/03
Indeno(1,2,3-cd)pyrene	10	330	0/03	0/03	0/03	0/03	0/03	0/03	0/03
Dibenz(a,h)anthracene	10	330	0/03	0/03	0/03	0/03	0/03	0/03	0/03
Benzo(g,b,i)perylene	10	330	0/03	0/03	0/03	0/03	0/03	0/03	0/03
Quantitation Limit Multiplier	9.04		5.09	6.04	7.00	6.00	7.27	0.43	
Date of Sample Collection	4/10/91		4/10/91	4/10/91	4/10/91	4/10/91	4/10/91	4/10/91	
Date Sample Received by Laboratory	4/19/91		4/19/91	4/19/91	4/19/91	4/19/91	4/19/91	4/19/91	
Date Sample Extracted	4/22/91		4/22/91	4/22/91	4/22/91	4/22/91	4/22/91	4/22/91	
Date of Sample Analysis	5/13 & 5/14		5/13 & 5/14	5/13 & 5/14	5/13 & 5/14	5/13 & 5/14	5/14/91	5/14/91	
Instrument Used for Analysis	GCMS-01		GCMS-01	GCMS-01	GCMS-01	GCMS-01	GCMS-01	GCMS-01	

TABLE 4-4

CLP - TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS							
CA Rich Sample Number	SD-2 (Bottom)	SD-4 (Bottom)	SD-5 (Bottom)	SD-6 (Bottom)	SD-7 (Bottom)	SD-8 (Bottom)	SD-1 (Bottom)
Laboratory Sample Number	98370-005	98370-007	98370-008	98370-009	98370-010	98370-011	98370-014
Remarks	Duplicate of SD-2 (Bottom)						
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
COMPOUNDS	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice	Analyzed Twice
SEMI-VOLATILE COMPONENTS							
Blank Contamination		1600 N/1200 R			1800 N/-	2200 N/-	
Laboratory Artifact						1200 N/1200 R	
Unknown Saturated Hydrocarbons	79000 (8)J/220000 (14)J		95000 (16)J/100000 (17)J	71000 (14)J/15000 (18)J	30000 (8)J/25000 (6)J	8700 (3)J/4400 (2)J	4300 (4)J/24000 (5)J
Unknown Unsaturated Hydrocarbons	9400 J/-			3400 J/-			
Isomer of Propylcyclohexane, C ₉ H ₁₈	30000 (2) J/9340 J						
Isomer of Ethyldimethylbenzene, C ₁₀ H ₁₄	19000 (2) J/-		4100 J/7900 (2) J	3100 J/-			
Isomer of Oxy-bis-propene, C ₈ H ₁₀	13000 J/-						
Isomer of Dimethyl-(methyl)benzene, C ₁₀ H ₁₆	8100 J/-						
Isomer of Dimethylnaphthalene, C ₁₂ H ₁₂	48200 J/90000 (2) J						
Isomer of Undecylcyclohexane, C ₁₇ H ₃₄	48200 J/-						
Isomer of Chloroethylmethylbenzene, C ₈ H ₁₀ Cl	-/5720 J						
Isomer of Octahydrohexmethylindene		990 J/190 J					
Isomer of Ethylmethylcyclopentane, C ₈ H ₁₆		3000 J/2600 J		3100 J/14000 (2) J	3200 J/2500 J	3400 J/2900 J	1800 J/3100 J
Isomer of Propenylcyclohexane, C ₉ H ₁₆				17000 J/-			
Isomer of Methylpropylcyclohexane, C ₁₀ H ₂₀				-/3100 J			
Unknown	31000 (4) J/28000 (3) J	990 J/6100 (4) J	29000 (5) J/20000 (3) J	9400 (3) J/2900 J	4400 (2) J/7800 (5) J		

TABLE 4-4

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - DRY WEIGHT BASIS				
CA Ditch Sample Number Laboratory Sample Number		SD-2 (Bottom) 98370-015	SD-3 (Bottom) 98370-016	HAFB 4/10 98370-012
Remarks				Field Blank
Units		ug/kg	ug/kg	ug/L
SEMI-VOLATILE COMPOUNDS	Quantitation	Quantitation	Analyzed Twice	Analyzed Twice
	Limit (Aq)	Limit (Sol.)		
Phenol	10	330		
bis(2-Chloroethyl)ether	10	330		
2-Chlorophenol	10	330		
1,3-Dichlorobenzene	10	330		
1,4-Dichlorobenzene	10	330		
Benzyl Alcohol	10	330		
1,2-Dichlorobenzene	10	330		
2-Methylphenol	10	330		
bis(2-Chloroisopropyl)ether	10	330		
4-Methylphenol	10	330		
N-Nitroso-di-n-Propylamine	10	330		
Hexachloroethane	10	330		
Nitrobenzene	10	330		
Isophorone	10	330		
2-Nitrophenol	10	330		
2,4-Dimethylphenol	10	330		
Benzoic Acid	50	1650		
bis(2-Chloroethoxy)methane	10	330		
2,4-Dichlorophenol	10	330		
1,2,4-Trichlorobenzene	10	330		
Naphthalene	10	330	4200 J/4300 J	
4-Chloroaniline	10	330		
Hexachlorobutadiene	10	330		
4-Chloro-3-Methylphenol	10	330		
2-Methylnaphthalene	10	330	140000 J/16000 J	5900/5

NOTES:

- Compound was not detected.
- U This compound should be considered "not detected" since it was detected in a blank at a similar level.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (date validation).
- UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

TABLE 4-4

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - DRY WEIGHT BASIS				
CA Rich Sample Number Laboratory Sample Number	SO-2 (Bottom) 98370-015		SO-3 (Bottom) 98370-016	NAFO 4/10 98370-012
Remarks				Field Blank
Units			ug/kg	ug/kg
SEMI-VOLATILE COMPOUNDS	Quantitation Limit (Aq)	Quantitation Limit (Sol.)	Analyzed Twice	Analyzed Twice
Hexachlorocyclopentadiene	10	330	UJ/UJ	UJ/UJ
2,4,6-Trichlorophenol	10	330	UJ/UJ	UJ/UJ
2,4,5-Trichlorophenol	50	1650	UJ/UJ	UJ/UJ
2-Chloronaphthalene	10	330	UJ/UJ	UJ/UJ
2-Nitroaniline	50	1650	UJ/UJ	UJ/UJ
Dimethylphthalate	10	330	2400 J/2500 J	UJ/UJ
Acenaphthylene	10	330	UJ/UJ	UJ/UJ
3-Nitroaniline	50	1650	UJ/UJ	UJ/UJ
Acenaphthene	10	330	UJ/UJ	UJ/UJ
2,4-Dinitrophenol	50	1650	UJ/UJ	UJ/UJ
4-Nitrophenol	50	1650	UJ/UJ	UJ/UJ
Dibenzofuran	10	330	UJ/UJ	UJ/UJ
2,4-Dinitrotoluene	10	330	UJ/UJ	UJ/UJ
2,6-Dinitrotoluene	10	330	UJ/UJ	UJ/UJ
Diethylphthalate	10	330	UJ/UJ	UJ/UJ
4-Chlorophenylphenylether	10	330	UJ/UJ	UJ/UJ
Fluorene	10	330	2200 J/2200 J	1700 J/1900 J
4-Nitroaniline	50	1650	UJ/UJ	UJ/UJ
4,6-Dinitro-2-Nitrophenol	50	1650	UJ/UJ	UJ/UJ
N-Nitrosodiphenylamine	10	330	UJ/UJ	UJ/UJ
4-Bromophenylphenylether	10	330	UJ/UJ	UJ/UJ
Hexachlorobenzene	10	330	UJ/UJ	UJ/UJ
Pentachlorophenol	50	1650	UJ/UJ	UJ/UJ
Phenanthrene	10	330	5300 J/5300 J	3700 J/3900 J

NOTES:

- Compound was not detected.
- U This compound should be considered "not detected" since it was detected in a blank at a similar level.
- R Verifiable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

EXTRACTABLE ORGANIC ANALYSTS - ANALYTICAL RESULTS - DRY WEIGHT BASIS				
Co Rich Sample Number		SD-2 (Bottom)	SD-3 (Bottom)	NAFO 4/18
Laboratory Sample Number		98370-015	98370-016	98370-012
Remarks				Field Blank
Units		ug/kg	ug/kg	ug/L
SEMIVOLATILE COMPOUNDS	Quantitation Limit (ug)	Quantitation Limit (Sol.)	Analyzed Twice	Analyzed Twice
Anthracene	10	330	UJ/UJ	UJ/UJ
Di-n-Butylphthalate	10	330	UJ/UJ	UJ/UJ
Fluoranthene	10	330	2500 J/1600 J	1300 J/1500 J
Pyrene	10	330	2400 J/3600 J	1600 J/1700 J
Butylbenzylphthalate	10	330	UJ/UJ	UJ/UJ
3,3'-Dichlorobenzidine	20	660	UJ/UJ	UJ/UJ
Benzo(a)anthracene	10	330	UJ/UJ	UJ/UJ
bis(2-ethylhexyl)phthalate	10	330	10000 J/UJ	11000 J/12000 J
Chrysene	10	330	UJ/UJ	UJ/720 J
Di-n-Octylphthalate	10	330	UJ/R	UJ/UJ
Benzo(b)fluoranthene	10	330	UJ/R	UJ/UJ
Benzo(k)fluoranthene	10	330	UJ/R	UJ/UJ
Benzo(a)pyrene	10	330	UJ/R	UJ/UJ
Indeno(1,2,3-cd)pyrene	10	330	UJ/R	UJ/UJ
Dibenz(a,h)anthracene	10	330	UJ/R	UJ/UJ
Benzo(g,h,i)perylene	10	330	UJ/R	UJ/UJ
Quantitation Limit Multiplier		9.00	6.30	1.00
Date of Sample Collection		4/18/91	4/18/91	4/18/91
Date Sample Received by Laboratory		4/19/91	4/19/91	4/19/91
Date Sample Extracted		4/22/91	4/22/91	4/22/91
Date of Sample Analysis		5/14 & 5/15	5/15 & 5/15	5/9/91
Instrument Used for Analysis		GCMS-D1	GCMS-D1	GCMS-D1

NOTES:

- Compound was not detected.
- U This compound should be considered "not detected" since it was in a blank at a similar level.
- R Unreliable result - Compound may or may not be present in this
- J Quantitation is approximate due to limitations identified during quality assurance review (data validation).
- UJ This compound was not detected, but the quantitation limit is higher due to a low bias identified during the quality assurance

TABLE 4-4

CLP - TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS - DRY WEIGHT BASIS			
CA Rich Sample Number	SD-2 (Bottom)	SD-3 (Bottom)	NAFB 4/18
Laboratory Sample Number	98370-015	98370-016	98370-012
Remarks			Field Blank
Units	ug/Kg	ug/Kg	ug/L
COMPOUNDS	Analyzed Twice	Analyzed Twice	
SEMI-VOLATILE COMPONENTS			
Unknown Saturated Hydrocarbon	160000(12)J/150000(13)J	170000(14)J/150000(13)J	180 (4) R
Unknown Unsaturated Hydrocarbon	21000 J/-	11000 J/-	
Isomer of Dimethylnaphthalene, C12H12	30000 J/29000(2) J	51000(2)J/58000(3)J	
Isomer of Diethylbenzene, C10H16	16000 J/-		
Isomer of Ethylmethylcyclohexane, C9H18	9200 J/10000 J	4900 J/-	
Isomer of Methyl-methylethylcyclohexane, C10H20	-/21000(2)J	6300 J/-	
Saturated Hydrocarbon Coeluting with Diethylbenzene Isomer	-/17000 J		
Unknown	65000(5)J/36000(3)J	13800(3)J/38000(6)J	

NOTES:

- Compound was not detected.
- U This compound should be considered "not detected" since it was detected in a blank at a similar level.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

CLP - TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS - DRY WEIGHT BASIS			
CA Rich Sample Number	SD-2 (Bottom)	SD-3 (Bottom)	NAFB 4/18
Laboratory Sample Number	98370-015	98370-016	98370-012
Remarks			Field Blank
Units	ug/Kg	ug/Kg	ug/L
COMPOUNDS	Analyzed Twice	Analyzed Twice	
SEMI-VOLATILE COMPONENTS			
Unknown Saturated Hydrocarbon	160000(12)J/150000(13)J	170000(14)J/150000(13)J	180 (4) R
Unknown Unsaturated Hydrocarbon	21000 J/-	11000 J/-	
Isomer of Dimethylnaphthalene, C12H12	30000 J/29000(2) J	51000(2)J/58000(3)J	
Isomer of Diethylbenzene, C10H16	16000 J/-		
Isomer of Ethylmethylcyclohexane, C9H18	9200 J/10000 J	4900 J/-	
Isomer of Methyl-methylethylcyclohexane, C10H20	-/21000(2)J	6300 J/-	
Saturated Hydrocarbon Coeluting with Diethylbenzene Isomer	-/17000 J		
Unknown			

NOTES:

- Compound was not detected.
- U This compound should be considered "not detected" since it was detected in a blank at a similar level.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

TABLE 4-5
Phase 2 Soil/Sediment Samples Inorganic Results

INORGANIC ANALYSIS		DRY WEIGHT BASIS			
C. A. Rich Sample Number			PM-SS (39-41)	FB 4/17	
Laboratory Sample Number		98316	15	16	
Percent Solids			89.6		
Units			mg/Kg	ug/l	
INORGANIC ELEMENTS		Aqueous Detection Limit	Solid Detection Limit		Field Blank
Aluminum	P	36	7.2	149	
Antimony	P	35	7.0	UJ	UJ
Arsenic	F	1.4	0.28	0.35 J	UJ
Barium	P	3.0	0.60	1.4	
Beryllium	P	2.0	0.40		
Cadmium	P	5.0	1.0		
Calcium	P	30	6.0	9.8 U	1180
Chromium	P	10	2.0	5.9 J	
Cobalt	P	10	2.0		
Copper	P	6.0	1.2	3.1	
Iron	P	9.0	1.8	218	190
Lead	P	1.0	0.20	0.30 J	
Magnesium	P	33	6.6	18.3 J	
Manganese	P	2.0	0.40	2.9	
Mercury	CY	0.20	0.04		
Nickel	P	13	2.6		
Potassium	P	90	18.0		
Selenium	F	1.0	0.20		UJ
Silver	P	5.0	1.0	UJ	UJ
Sodium	P	27	5.4	17.2 U	9400
Thallium	F	1.1	0.22	0.27 J	UJ
Vanadium	P	8.0	1.6		
Zinc	P	3.0	0.60	2.6 U	260
Cyanide	UV	5.0	1.0		

NOTES:

- Analyte was not detected.
- U This analyte should be considered "not detected" since it was detected in a blank at a similar level.
- R Unreliable result - Analyte may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This analyte was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

ANALYTICAL METHOD:

- F - Inductively Coupled Plasma
- F - Graphite Furnace Atomic Absorption
- CY - Cold Vapor Atomic Absorption
- UV - Manual Analyzer

TABLE 4-5

INORGANIC ANALYSIS - ANALYTICAL RESULTS - RESULTS REPORTED ON A DRY WEIGHT BASIS												
C.A. Rich Sample Number			MM-41 (64-66)	FB 4/11	SD-4 (Bottom)	SD-5 (Bottom)	SD-6 (Bottom)	SD-7 (Bottom)	SD-8 (Bottom)	HAFB 4/18	SD-3 (Bottom)	
Laboratory Sample Number			98370 -	1	2	7	8	9	10	11	12	16
Percent Solids			83.9	-	84.0	73.8	64.1	72.7	68.8	-	78.9	
Units			mg/Kg		mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/L	mg/Kg	
INORGANIC ELEMENTS		Aqueous Detection Limit	Solid Detection Limit		Field Blank					Hand Average Field Blank		
Aluminum	P	36	7.2	137	700	951	3300	5030	1940	3520	650	4330
Antimony	P	35	7.0	R	R	R	R	R	R	R	R	R
Arsenic	F	1.4	0.20	1.2 R	R	1.8 R	5.9 R	5.6 R	3.6 R	3.0 R	R	5.9 R
Barium	P	3.0	0.60	2.2 R	R	11.1 R	37.8 R	67.1 R	25.5 R	27.8 R	R	50.1 R
Beryllium	P	2.0	0.40									
Cadmium	P	5.0	1.0			2.0 J	12.2	12.8	4.0 J	4.2 J		73.0
Calcium	P	30	6.0	80.4 J	760	50,000 J	14,500 J	14,300 J	7420 J	4210 J	640 J	13,000 J
Chromium	P	10	2.0	UJ	UJ	28.1 J	34.7 J	60.8 J	16.7 J	29.9 J	UJ	126 J
Cobalt	P	10	2.0			3.2	5.0	6.0	3.6	5.2		3.8
Copper	P	6.0	1.2	3.1		87.9	456	502	330	330		4560
Iron	P	9.0	1.8	914		4430	5700	7750	3570	5350	360	7590
Lead	F/P	1.0/56	0.20/11.2	3.5		114/P R	520/P R	874/P R	349/P R	513/P R		760/P R
Magnesium	P	33	6.6	29.3 J		29,200 J	8560 J	8610 J	4360 J	2850 J		7740 J
Manganese	P	2.0	0.40	11.1		68.2	45.1	55.4	25.5	47.6		55.7
Mercury	CV	0.20	0.04	R	R	R	R	R	R	R	R	0.13 R
Nickel	P	13	2.6			11.3	36.1	46.0	12.6	22.4		138
Potassium	P	90	18.0	69.5 U		133 U	311 R	303 R	188 U	249 R		195 U
Selenium	F	1.0	0.20	R	R	R	R	R	R	R	R	2.5 R
Silver	P	5.0	1.0	R	R	R	R	4.6 R	3.7 R	4.6 R	R	16.2 R
Sodium	P	27	5.4	187 U	3340	154 U	165 U	166 U	145 U	145 U	2620	111 U
Thallium	F	1.1	0.22	R	R	R	R	R	R	R	R	R
Vanadium	P	0.8	1.6			13.3 J	31.4 J	46.0 J	24.4 J	31.6 J		29.5 J
Zinc	F	3.0	0.60	4.8 U	UJ	181 J	564 J	598 J	244 J	294 J	UJ	3280 J
Cyanide	CV	9.0	1.0					1.8				6.1

TABLE 4-5

INORGANIC ANALYSIS - ANALYTICAL RESULTS - RESULTS REPORTED ON A DRY WEIGHT BASIS													
C. A. Rich Sample Number			FB 4/20	FB 4/19	MW-45 (39-41)	SD-3 (17-19)	SD-3 (23-25)	SD-3 (31-33)	SD-2 (21-23)	SD-2 (14-16)	SD-2 (21-23)	SD-2 (31-33)	
Laboratory Sample Number		88429 -	5	7	8	9	10	11	12	13	14	15	
Percent Solids			-	-	90.1	91.2	90.3	94.4	91.5	91.5	90.9	89.1	
Units			ug/L	ug/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
INORGANIC ELEMENTS		Aqueous Detection Limit	Solid Detection Limit	Field Blank	Field Blank				Duplicate of SD-2 (21-23)				
		Aluminum	P	36	7.2	1140	1040	319	489	315	211	593	595
Antimony	P	35	7.0	R	R	R	R	R	R	R	R	R	R
Arsenic	F	1.4	0.28	UJ	UJ	0.73 J	0.76 J	0.36 J	0.45 J	0.61 J	0.78 J	0.66 J	0.99 J
Barium	P	3.0	0.60		88.0	4.3 U	7.4	3.3 U	3.7 U	5.9	5.24	5.3	9.3
Beryllium	P	2.0	0.40										
Cadmium	P	5.0	1.0				1.3			0.0	6.4	8.3	2.6
Calcium	P	30	6.0	1020 J	1030 J	27.2 J	147 J	30.4 J	34.9 J	171 J	155 J	151 J	111 J
Chromium	P	10	2.0				2.4	2.2	4.6	12.0	6.5	11.8	3.6
Cobalt	P	10	2.0										
Copper	P	6.0	1.2			1.5	4.4	1.9	2.9	6.7	7.3	7.1	3.0
Iron	P	9.0	1.8	414 J	1090 J	697 J	2670 J	764 J	564 J	1140 J	1220 J	1140 J	2080 J
Lead	P	1.0	0.20			0.70 J	9.0	0.67 J	0.32 J	8.2	7.6	9.6	1.4
Magnesium	P	33	6.6			76.0 J	159 J	87.7 J	57.4 J	203 J	203 J	188 J	485 J
Manganese	P	2.0	0.40	64.0	52.0	20.0	34.2	17.1	8.3	39.0	31.1	38.0	28.3
Mercury	CV	0.20	0.04							0.04		0.06	
Nickel	P	13	2.6			2.9				7.4	5.8	7.1	
Potassium	P	9.0	1.8	2380	2520	65.2 U	77.7 U	78.3 U	70.7 U	107 U	122 U	108 U	339
Selenium	F	1.0	0.20	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Silver	P	5.0	1.0										
Sodium	P	27	5.4	5200	4760	49.6 U	38.5 U	58.5 U	63.4 U	38.7 U	46.1 U	91.0 U	44.4 U
Thallium	F	1.1	0.22										
Vanadium	P	8.0	1.6			2.4	3.6		2.2	2.0	2.4	2.7	4.6
Zinc	P	3.0	0.60			4.6 J	12.3 J	4.9 J	4.3 J	14.1 J	14.1 J	13.9 J	8.8 J
Cyanide	UV	5.0	1.0							1.1 J	1.1 J	1.6 J	UJ

TABLE 4-5

INORGANIC ANALYSIS - ANALYTICAL RESULTS - RESULTS REPORTED ON A DRY WEIGHT BASIS								
C.A. Rich Sample Number				SD-1 (14-16)	SD-1 (21-23)	SD-1 (21-23)	SD-1 (31-33)	FB 4/22
Laboratory Sample Number		98476 -		1	2	3	4	5
Percent Solids				88.1	92.3	91.7	92.6	
(Units)				mg/kg	mg/kg	mg/kg	mg/kg	ug/L
INORGANIC ELEMENTS		Aqueous Detection Limit	Solid Detection Limit			Duplicate of SD-1 (21-23)		Field Blank
Aluminum	P	35	7.2	606 J	403 J	529 J	237 J	600 J
Antimony	P	35	7.0					
Arsenic	F	1.4	0.28	0.97 U	UJ	UJ		
Barium	P	3.0	0.60	7.2	2.0 U	5.3	2.8	
Beryllium	P	2.0	0.40					
Cadmium	P	5.0	1.0	3.7				
Calcium	P	30	6.0	6700 J	111 J	116 J	63.9 J	
Chromium	P	10	2.0	5.6				
Cobalt	P	10	2.0					
Copper	P	6.0	1.2	17.6	1.8	3.2		
Iron	P	9.0	1.8	1720	376 J	452 J	449	
Lead	F	1.0	0.20	54.0	0.51	1.2		
Magnesium	P	33	6.6	2710 J	37.1 J	125 J	71.5 J	UJ
Manganese	P	2.0	0.40	37.6	20.4	20.9	7.4	
Mercury	CV	0.20	0.04					
Nickel	P	13	2.6	10.6			2.9	
Potassium	P	90	18.0	110	28.0 J	97.4 J	91.0	3140
Selenium	F	1.0	0.20					
Silver	P	5.0	1.0	1.9 J	UJ	UJ	UJ	UJ
Sodium	P	27	5.4	75.7	63.3 J	48.4 J	45.6	2140
Thallium	F	1.1	0.22					
Vanadium	P	0.8	1.6	6.0 U		2.5 U		
Zinc	P	3.0	0.60	69.9 J	41.9 J	30.3 J	31.8 J	62.8 J
Znocide	UV	4.0	1.0					

NOTES:

- Analyte was not detected.
- U This analyte should be considered "not detected" since it was detected in a blank at a similar level.
- # Unreliable result - Analyte may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This analyte was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

ANALYTICAL METHOD:

- P - Inductively Coupled Plasma
- F - Graphite Furnace Atomic Absorption
- CV - Cold Vapor Atomic Absorption
- UV - Manual Analyzer

TABLE 4-6

ORGANIC ANALYSIS FOR GROUNDWATER, STORM DRAINS AND SAMPLE ICE
 Tronic Plating Company
 Farmingdale, New York

PARAMETER	ROUND # DATE	SD-1 WATER	SD-1 SED	SD-2 WATER	SD-2 SED	Melted Ice From Cooler	Wastewater from Existing Sewer Main*
		ROUND #1 8-Jun-89	ROUND #1 8-Jun-89	ROUND #1 8-Jun-89	ROUND #1 8-Jun-89	ROUND #2 21-Aug-89	ROUND #1 17-Aug-89
		VOLATILE					
ACETONE		42	30 B	1800	140	N/A	ND
TRICHLOROETHENE		ND	ND	ND	ND	N/A	1 J
1,1,1-TRICHLOROETHANE		ND	ND	ND	ND	N/A	ND
TETRACHLOROETHENE		ND	ND	ND	ND	N/A	ND
1,2-DICHLOROPROPANE		ND	ND	ND	ND	N/A	ND
METHYLENE CHLORIDE		ND	ND	ND	13	N/A	3 B
2-BUTANONE		ND	ND	ND	ND	N/A	ND
ETHYLBENZENE		ND	ND	ND	30 J	N/A	ND
TOLUENE		ND	ND	ND	ND	N/A	3 J
FREON		ND	ND	ND	ND	ND	ND
TOTAL UNKNOWNNS		ND	ND	ND	4080	N/A	ND

All concentrations expressed in parts per billion (ppb).

J = Quantitation is approximate due to limitations identified in the quality control review.

B = This result is qualitatively suspect since this compound/constituent was detected in a field blank and/or laboratory blanks at a similar level.

ND = Indicates No Detection.

N/A = Indicates Not Applicable.

* = These samples were added to the sampling program to check for potential sources of Freon-113

TABLE 4-7

INORGANIC ANALYSES FOR UNFILTERED STORM DRAIN AND SANITARY PIT SAMPLES
TRONIC PLATING COMPANY
FARMINGDALE, NEW YORK

WELL I.D.	SD-1 WATER	SD-1 SED.	SD-2 WATER	SD-2 SED.	SAN. PIT 1 (Sanitary Sewer)
ROUND # DATE	ROUND #1 7-Jun-89	ROUND #1 7-Jun-89 (PPM)	ROUND #1 7-Jun-89	ROUND #1 7-Jun-89 (PPM)	ROUND #2 10-Aug-89
PARAMETER (Total)					
ALUMINUM	3140	3910 J	182000 J	21600	148 J
ANTIMONY	ND	ND	73.5	ND	ND
ARSENIC	ND	1.5 B	28.4 J	9.8	ND
BARIUM	ND	42.4 BR	2350	314 R	ND
BERYLLIUM	ND	1.3	27.5	3.5	ND
CADMIUM	24.7	84.8	8270	1130	ND
CALCIUM	20400	30200	298000	57700	11000
CHROMIUM	47.8 R	143 J	10300 R	1580 J	ND
COBALT	ND	4.8 B	183	23.4	ND
COPPER	188 R	330 R	11700 R	1800 R	59.7
IRON	4870 R	7690 R	253000 R	33800 R	1970 R
LEAD	138 J	1190 J	14100 J	2290 J	11.1 J
MAGNESIUM	4780 B	17000 J	132000	22700 J	1470 J
MANGANESE	88.3 J	54.8 R	2520 J	291 R	ND
MERCURY	ND	ND	1.1	0.31	ND
NICKEL	32.0 B	97.1 R	11000	1810 R	38.3 B
POTASSIUM	1140 B	320 B	10900 J	1440 B	23000
SELENIUM	ND	ND	0	2.4 J	ND
SILVER	ND	23.4 R	769 J	85.9 R	31.8
SODIUM	1700 B	403 B	8310 J	735 B	9450 J
THALLIUM	ND	ND	ND	ND	ND
VANADIUM	15.8 J	52.9 R	797	145 R	ND
ZINC	197 R	703 R	13400 R	2060 R	815 R
CYANIDE	ND	1.1	1.3	92	60

INORGANIC ANALYSES FOR FILTERED STORM DRAIN SAMPLES
TRONIC PLATING COMPANY
FARMINGDALE, NEW YORK

WELL I.D.	SD-1 WATER	SD-2 WATER
ROUND # DATE	ROUND #1 7-Jun-89	ROUND #1 7-Jun-89
PARAMETER (DISSOLVED)		
ALUMINUM	ND	ND
ANTIMONY	ND	ND
ARSENIC	ND	ND
BARIUM	ND	ND
BERYLLIUM	ND	ND
CADMIUM	5.6	7.3
CALCIUM	4810 B	7600 B
CHROMIUM	ND	ND
COBALT	ND	ND
COPPER	14.8 B	ND
IRON	16.6 BR	31.6 BR
LEAD	ND	ND
MAGNESIUM	730 B	1040 B
MANGANESE	17.2 J	33.9 J
MERCURY	ND	ND
NICKEL	ND	187
POTASSIUM	ND	ND
SELENIUM	ND	ND
SILVER	ND	10.9 J
SODIUM	687 B	1490 B
THALLIUM	ND	ND
VANADIUM	ND	ND
ZINC	54.9 J	21.2 J
CYANIDE	N/A	N/A

All concentrations expressed in parts per billion (ppb), unless stated otherwise.
 The sanitary pit sample was collected from the present waste water line connected into the County POTW.
 J - Quantitation is approximate due to limitations identified in the quality control review.
 B - This result is suspect since this compound/constituent was detected in a field blank and/or laboratory blanks at a similar level.
 R - Unreliable results - Analyte may or may not be present in this sample.
 ND - Indicated No Detection.
 N/A - Indicates Not Applicable.

TABLE 4-8

**Storm Drain Remediation Borings
Inorganic Results**

INORGANIC ANALYSIS - ANALYTICAL RESULTS - RESULTS REPORTED ON A DRY WEIGHT BASIS																		
C.A. Rich Sample Number				R-1 (9-11)	R-1 (19-21)	R-1 (29-31)	FB 4/15	R-2 (9-11)	R-2 (19-21)	R-2 (29-31)	R-3 (9-11)	R-3 (19-21)	R-3 (29-31)	R-5 (9-11)	R-5 (19-21)	R-5 (29-31)	FB 4/16	
Laboratory Sample Number		S8316 -		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Percent Solids				95.3	96.1	94.6	-	96.9	95.4	97.3	96.1	95.0	96.2	97.6	96.7	97.6	-	
Units				mg/Kg	mg/Kg	mg/Kg	ug/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	ug/L	
INORGANIC ELEMENTS		Aqueous Detection Limit	Solid Detection Limit				Field Blank										Field Blank	
Arsenic	F	1.4	0.20	UJ	0.64 J	0.32 J	UJ	UJ	0.30 J	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Barium	P	3.0	0.60	3.5	3.4	3.4		3.1	2.9	4.6	2.9	3.0	3.4	4.5	4.7	3.0		
Cadmium	P	5.0	1.00										2.4					
Chromium	P	10.0	2.0		6.4 J	3.8 J			2.7 J	22.7 J		4.5 J	6.8 J	2.6 J			3.4 J	
Copper	P	6.0	1.2		3.0	3.1		2.8	2.4	3.9		3.5	2.6	1.3				
Lead	F	1.0	0.2	0.79 J	0.62 J	0.62 J		1.3	0.97	1.2	0.52	0.74	0.81	0.77 J	0.67	0.48		
Mercury	CV	0.20	0.04															
Nickel	P	13	2.6							4.1								
Selenium	F	1.0	0.20				UJ											UJ
Silver	P	5.0	1.0	UJ	UJ	UJ	UJ	1.1 J	UJ	UJ	UJ	UJ	1.1 J	UJ	UJ	UJ	UJ	UJ
Zinc	P	3.0	0.60	4.7 U	7.9 U	8.1 U	230	10.4	11.0	7.6 U	4.0 U	4.8 U	0.3 U	10.0	4.7 U	3.4 U	156	
Cyanide	UV	5.0	1.0									1.1	1.0					

NOTES:

- Analyte was not detected.
- U This analyte should be considered "not detected" since it was detected in a blank at a similar level.
- U Unreliable result - Analyte may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This analyte was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

ANALYTICAL METHOD:

- P - Inductively Coupled Plasma
- F - Graphite Furnace Atomic Absorption
- CV - Cold Vapor Atomic Absorption
- UV - Manual Analyzer

TABLE 4-8 (Cont'd)

INORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL RESULTS REPORTED ON A DRY WEIGHT BASIS							
C.A. Rich Sample Number			R-4 (1-3)	R-4 (9-11)	R-4 (19-21)	R-4 (29-31)	
Laboratory Sample Number		98429 -	1	2	3	4	
Percent Solids			89.0	97.3	96.4	94.9	
Units			mg/Kg	mg/Kg	mg/Kg	mg/Kg	
INORGANIC ELEMENTS		Aqueous Detection Limit	Solid Detection Limit				
Arsenic	F	1.4	0.20	0.97 J	0.98 J	UJ	0.52 J
Barium	P	3.0	0.60	15.6	5.5	3.5 U	4.5
Cadmium	P	5.0	1.00				
Chromium	P	10.0	2.0	5.1	2.7	3.9	7.5
Copper	P	6.0	1.2	3.0	2.7	1.7	2.3
Lead	F	1.0	0.2	5.2	1.2	1.2	1.3
Mercury	CV	0.2	0.04				
Nickel	P	13.0	2.6				
Selenium	F	1.0	0.20	UJ	UJ	UJ	UJ
Silver	P	5.0	1.0	1.2	1.2		
Zinc	P	3.0	0.60	12.8 J	4.4 J	5.2 J	6.8 J
Cyanide	UV	5.0	1.0				1.9

NOTES:

- Analyte was not detected.
- U This analyte should be considered "not detected" since it was detected in a blank at a similar level.
- R Unreliable result - Analyte may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This analyte was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

ANALYTICAL METHOD:

- P - Inductively Coupled Plasma
- F - Graphite Furnace Atomic Absorption
- CV - Cold Vapor Atomic Absorption
- UV - Manual Analyzer

TABLE 4-9

PHYSICAL CHARACTERISTICS OF SOILS
Tronic Plating Company Site
Farmingdale, New York

PARAMETER UNITS	MOISTURE CONTENT (Percent)	CATION EXCHANGE CAPACITY (Milliequivalent per 100 gm of soil)	ORGANIC CONTENT (Percent)	GRAIN SIZE (Percent Retained)					
				1" 25.4 mm	3/8" 9.53 mm	# 10 Mesh 2.00 mm	# 40 Mesh .420 mm	# 200 Mesh .074 mm	PAN <.074 mm
SAMPLE I.D. DEPTH									
MW-1D (50-52)	30.3	0.5	13.3	0	4.2	30.8	45.6	18.7	0.7
MW-1D (90-92)	---	---		0	0	0.23	24.1	68.7	7
MW-2I (60-62)	---	---		0	10	18.9	24.3	42.9	3.9
MW-2D (20-22)	2.5	0.3		0	32.2	25.1	29.2	12.7	0.8
MW-2D (50-52)	9.6	---		---	---	---	---	---	---
MW-2X (50-52)	11.3	---		---	---	---	---	---	---
MW-2D (52-55)	---	1.19	0.63	---	---	---	---	---	---
MW-2X (52-55)	---	0.1	0.25	---	---	---	---	---	---
MW-2D (57-60)	---	---		0	0	8.1	50.2	39.4	3.3
MW-2X (57-60)	---	---		0	0	8.3	47.5	42.5	1.7
MW-2D (90-92)	---	---		0	0	0.4	5.2	83.7	10.7
MW-3I (75-77)	---	---		0	0	10.2	11.4	71.4	7

NOTES:

MW-2X is a duplicate sample of MW-2D.

--- Indicates not measured.

TABLE 4-10

Tronic Plating Co. Site
 Summary of Detections of Inorganic Compounds
 in Soil Samples (mg/kg)

Compound	# of Times Tested	# of Times Detected	% Detected	Range		Background Average	# of Detections Above Background
				High	Low		
Aluminum	59	59	100	21600	139	884.67	20
Antimony	66	1	2	10.9 BJ	-	10.3	1
Arsenic	66	20	30	9.8	0.32 J	1 U	5
Barium	65	26	40	15.6	1.4	10.3 UL	25
Beryllium	58	2	3	3.5	1.3	1 U	2
Cadmium	74	26	35	1130	1.3	1 UL	26
Calcium	58	57	98	57700	27.2 J	514.67 B	25
Chromium	74	63	85	1580	1.6 BJ	5.3 J	28
Cobalt	58	13	22	23.4	2.4 B	-	13
Copper	71	66	93	4560	1.3	5.83 B	30
Iron	56	56	100	7750	218	2663.33 J	20
Lead	68	48	71	2290	0.3	-	48
Magnesium	58	58	100	29200	7.4	293.33	17
Manganese	56	56	100	102	6.9	63.23	6
Mercury	67	5	7	0.06	0.02 J	0.02 UJ	5
Nickel	72	19	26	138	2.9	4.1 UL	19
Potassium	37	7	19	1440 B	28	-	7
Selenium	67	0	0	ND	ND	1 UL	0
Silver	29	6	21	3.1 J	1.1 J	-	6
Sodium	58	42	72	735 B	45.6	75.57 B	18
Thallium	51	1	2	0.27 J	-	1 UL	1
Vanadium	55	31	56	46 J	2	3.7 B	19
Zinc	66	55	83	3200 J	4.4 J	9.9	31
Cyanide	74	25	34	92 J	0.32	0.2 U	25

Table 4-10 (cont'd)

Tronic Plating Co. Site
 Summary of Detections of Inorganic Compounds
 in Soil Samples (mg/kg)

Compound	Locations of Detections in Soil Samples	Locations of Detections in Soil Samples Above Background Levels
Aluminum	LP-1, 2, 3, 4; SP-1; DW-1; MW-2D; SD-1, 2, 3, 4, 5, 6, 7, 8	LP-1, 2, 3, 4; SP-1; DW-1; MW-2D; SD-1, 2, 3, 4, 5, 6, 7, 8
Antimony	MW-2D	MW-2D
Arsenic	LP-1, 3; MW-3I; SD-1, 2	LP-1, 3; MW-3I; SD-1, 2
Barium	LP-3; R-1, 2, 3, 4, 5; MW-5S; SD-1, 2, 3	LP-3; R-1, 2, 3, 4, 5; MW-5S; SD-1, 2, 3
Beryllium	SD-1, 2	SD-1, 2
Cadmium	LP-1, 2, 3, 4; SP-1; MW-2D; R-3; SD-1, 2, 3, 4, 5, 6, 7, 8,	LP-1, 2, 3, 4; SP-1; MW-2D; R-3; SD-1, 2, 3, 4, 5, 6, 7, 8,
Calcium	LP-2, 3, 4; SP-1; MW-2D, 2I, 3I; SD-1, 2, 3, 4, 5, 6, 7, 8	LP-2, 3, 4; SP-1; MW-2D, 2I, 3I; SD-1, 2, 3, 4, 5, 6, 7, 8
Chromium	LP-1, 2, 3; SP-1; MW-1D, 2D; SD-1, 2, 3, 4, 5, 6, 7, 8; R-1, 2, 3, 4	LP-1, 2, 3; SP-1; MW-2D; SD-1, 2, 3, 4, 5, 6, 7, 8; R-1, 2, 3, 4
Cobalt	LP-1, 2, 3; MW-1D; SD-1, 2, 3, 4, 5, 6, 7, 8	LP-2, 3; SD-1, 2, 3, 4, 5, 6, 7, 8
Copper	LP-1, 2, 3, 4; SP-1; DW-1; MW-1D, 2D; SD-1, 2, 3, 4, 5, 6, 7, 8	LP-1, 2, 3, 4; SP-1; MW-2D; SD-1, 2, 3, 4, 5, 6, 7, 8
Iron	LP-1, 2, 3, 4; SP-1; DW-1; MW-1D, 2D, 2I, 3I; SD-3, 4, 5, 6, 7, 8	LP-1, 2, 3, 4; SP-1; DW-1; MW-2D, 2I, 3I; SD-3, 4, 5, 6, 7, 8
Lead	LP-1, 2, 3, 4; DW-1; MW-1D, 2D, 2I, 3I, 4S, 4I, 5S; SD-1, 2, 3; R-1, 2, 3, 4, 5	LP-1, 2, 3, 4; DW-1; MW-2D, 2I, 3I, 4S, 4I, 5S; SD-1, 2, 3
Magnesium	LP-2, 3; DW-1; MW-1D; SD-1, 2, 3, 4, 5, 6, 7, 8	LP-2, 3; DW-1; SD-1, 2, 3, 4, 5, 6, 7, 8
Manganese	LP-1, 2, 3; DW-1; MW-1D; SD-4	LP-1, 2, 3; DW-1; SD-4
Mercury	LP-3, 4; SD-2	LP-3, 4; SD-2
Nickel	LP-1, 2, 3; MW-2D; SD-1, 2, 3, 4, 5, 6, 7, 8; R-2	LP-1, 2, 3; MW-2D; SD-1, 2, 3, 4, 5, 6, 7, 8; R-2
Potassium	SD-1, 2	SD-1, 2
Selenium		
Silver	LP-2; SD-1; R-2, 3, 4	LP-2; SD-1; R-2, 3, 4
Sodium	LP-1, 2, 3, 4; SP-1; DW-1; MW-1D, 2D, 2I, 3I; SD-1, 2	LP-1, 2, 3, 4; SP-1; DW-1; MW-2D, 2I, 3I; SD-1, 2
Thallium	MW-5S	MW-5S
Vanadium	LP-1, 3, 4; DW-1; MW-1D, 2D, 2I, 3I; SD-2, 4, 5, 6, 7, 8	LP-1, 3, 4; DW-1; MW-2D, 2I, 3I; SD-2, 4, 5, 6, 7, 8
Zinc	LP-1, 2, 3, 4; DW-1; MW-1D, 2D; SD-1, 2, 3, 4, 5, 6, 7, 8; R-2, 4, 5	LP-1, 2, 3, 4; DW-1; MW-2D; SD-1, 2, 3, 4, 5, 6, 7, 8; R-2, 4, 5
Cyanide	LP-1, 2, 3; SP-1; MW-2D; SD-1, 2	LP-1, 2, 3; SP-1; MW-2D; SD-1, 2

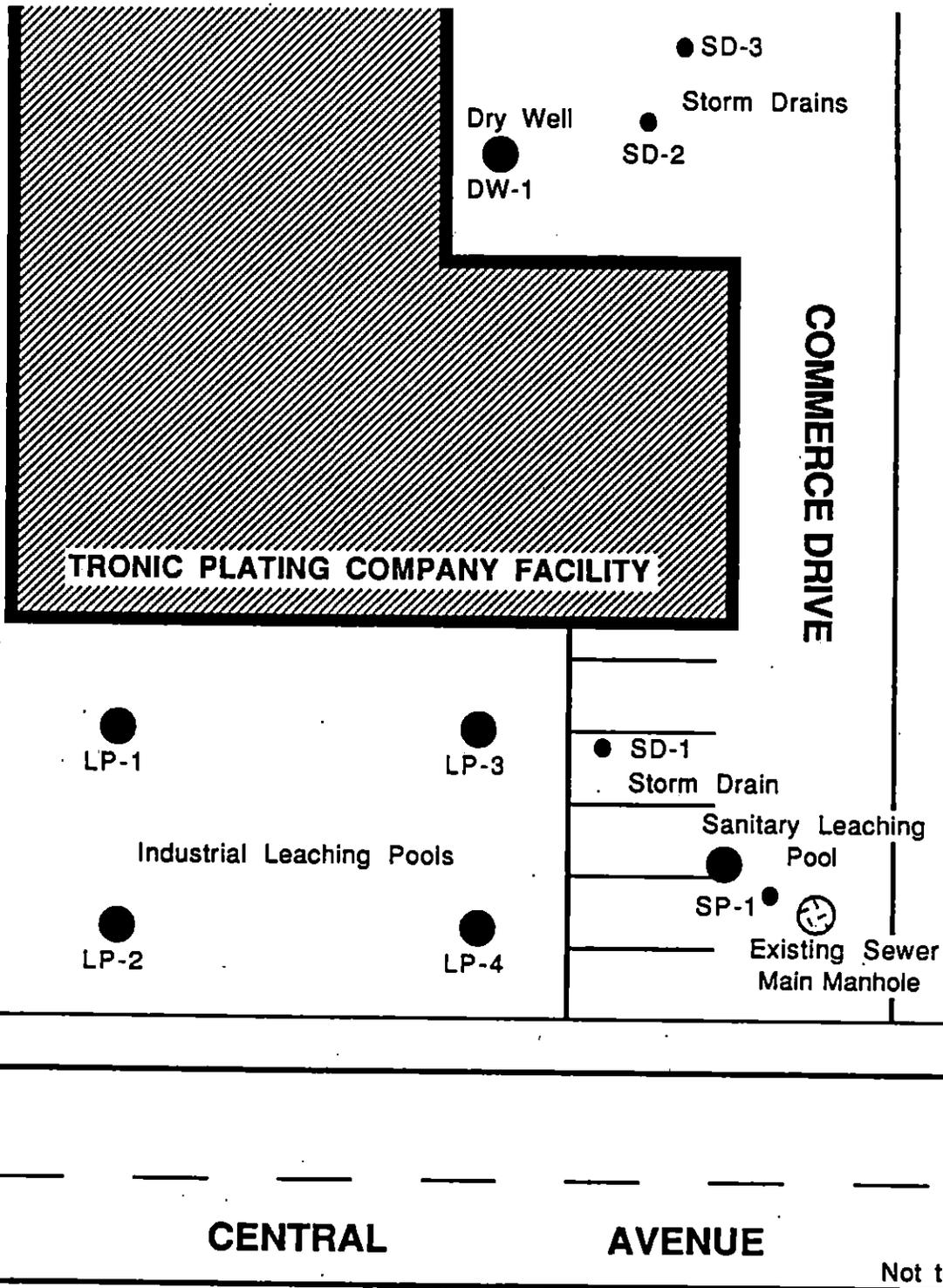
TABLE 4-11

Tronics Plating Co. Site
Summary of Volatile Organic Compounds
in Soil Samples (ug/kg)

Compound	# of Times Tested	# of Times Detected	% Detected	Range		Locations of Detections of Organics in Soil	
				High	Low		
Volatile Organics							
Acetone	58	17	29	150	2 J	LP-1, 2, 3; SP-1; MW-1D, 2D, 2I; SD-1, 5, 6 DW-1; SP-1; MW-2D; SD-2, 3 DW-1 SP-1; MW-1D, 4S; SD-2, 3	
Methylene Chloride	58	7	12	22	8		
Freon 113	58	3	5	42 J	7.9 J		
Total Unknowns	58	8	14	4080	5 J		
Semivolatile Organics							
Bis(2-ethylhexyl)phthalate	45	21	47	43000 J	130	LP-1, 2, 3, 4; MW-2D; SD-2, 3, 4, 5, 6, 7, 8 LP-1, 2, 3, 4; MW-1D, 2D, 2I, 3I SD-1 SD-2 SD-2 SD-2 SD-2 SD-2 SD-2, 3 SD-2, 3, 5, 6 SD-2, 3, 5, 7 SD-2, 3, 5, 7 SD-3, 7	
DI-n-butylphthalate	45	20	44	6200	91 B		
DI-n-octylphthalate	39	1	3	77	77		
Naphthalene	45	4	9	7000 J	4200J		
2-Methylnaphthlene	45	4	9	140000	16000 J		
Acenaphthylene	45	2	4	1300 J	UJ		
Acenaphthene	45	2	4	1700 J	1400 J		
Dibenzofuran	45	1	2	1200 J	1200 J		
Fluorene	45	4	9	3700	1700 J		
Phenathrene	45	6	13	8800 J	1600 J		
Fluoranthene	45	8	18	3000 J	1300 J		
Pyrene	45	7	16	4800 J	930 J		
Chrysene	44	2	5	1000 J	720 J		
Pesticides/PCB's							
4,4'DDE	17	1	6	72	72		LP-2
4,4'DDT	17	1	6	37	37		LP-2

SECTION 4.2

FIGURES



FACILITY MAP AND BORING LOCATIONS

CA RICH CONSULTANTS, INC.
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Tronic Plating Company Site
 Farmingdale, NY

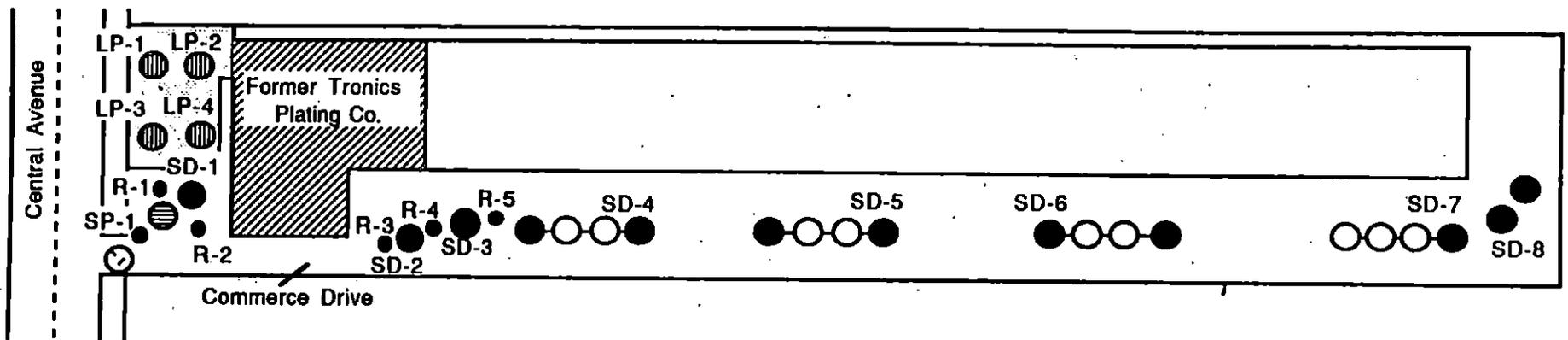
Prepared By: RDH

Date: September 1991

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Reviewed By: EAW

Figure: 4-1



-  Former Leaching Pool
-  Storm Drain
-  Storm Drain Overflow Catch Basin
-  Former Sanitary Leaching Pool
-  Existing Sewer Main Manhole

Not to Scale

STORM DRAIN MAP AND BORING LOCATIONS

CA RICH CONSULTANTS, INC
Certified Ground-Water and Environmental Specialists

Tronic Plating Company Site
Farmingdale, NY

Prepared By: RDH

Date: September 1991

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Reviewed By: EAW

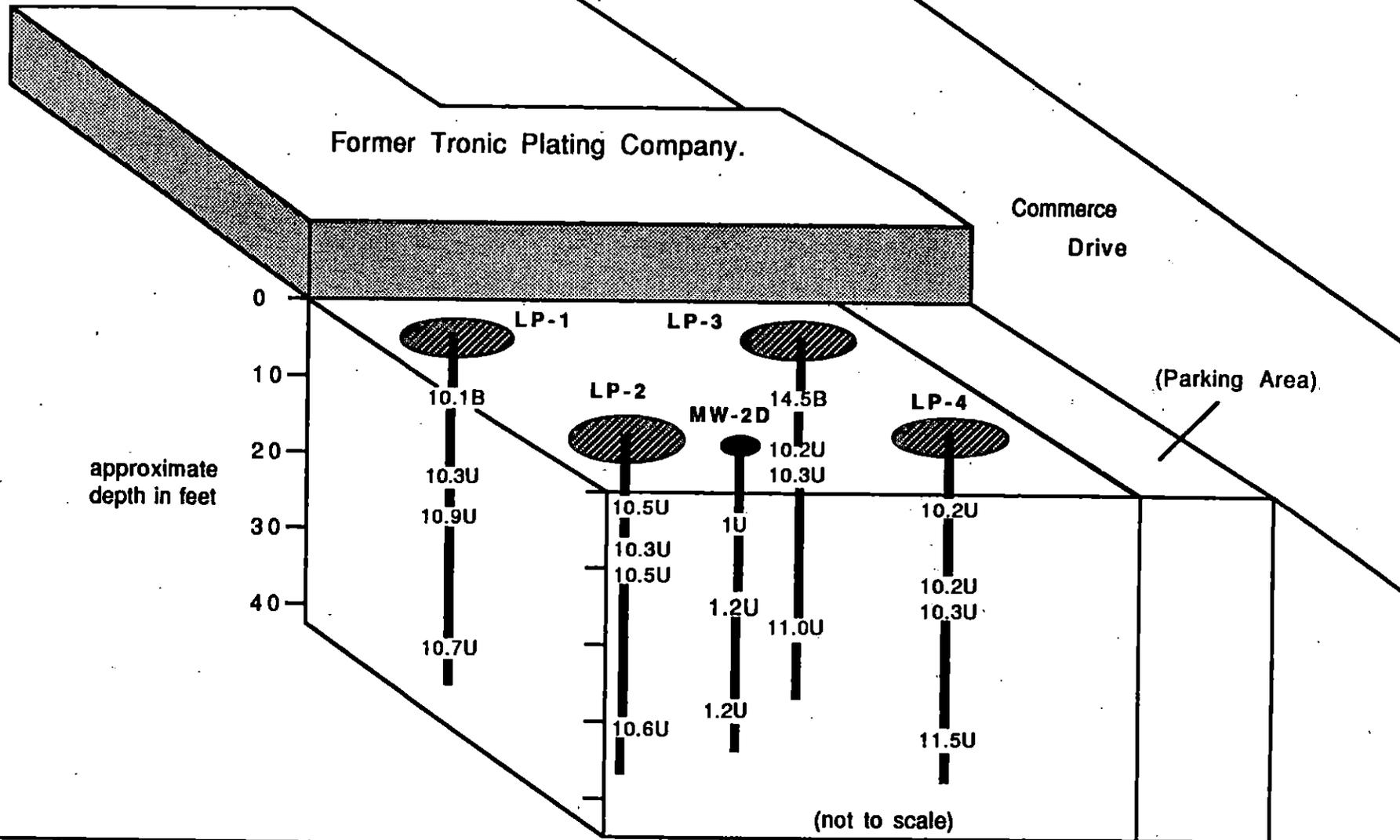
Figure: 4-2

Notes for Figures 4-3, 4-4 and 4-5

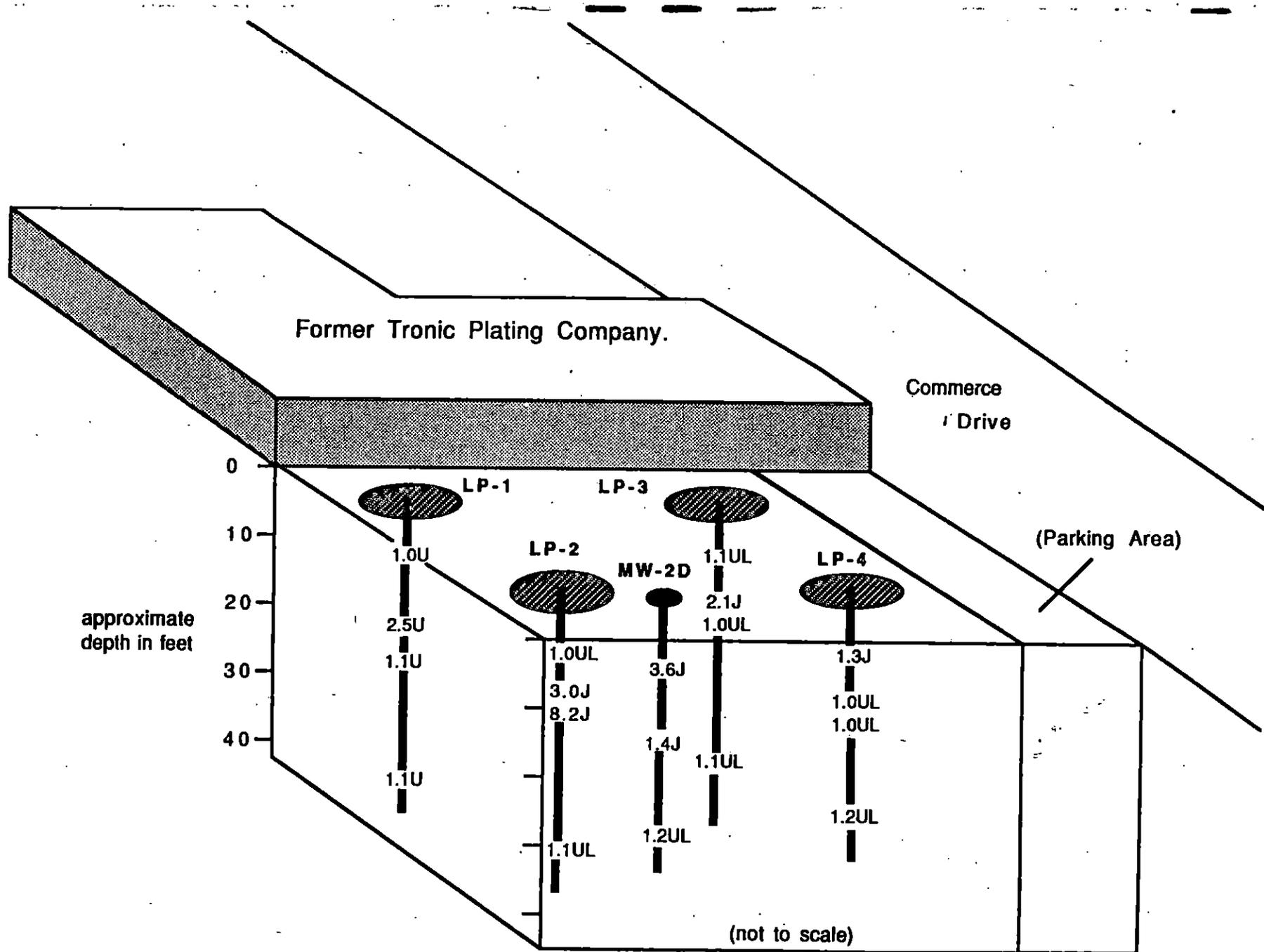
- U - Undetected at the reported concentration
- B - Less than the CRDL but greater than the IDL
- J - Quantitation is approximate due to limitations identified during the quality assurance review
- L - Detection limit higher due to low bias
- R - Unreliable, analyte may or may not be present

Soil analysis in mg/kg (dry weight).

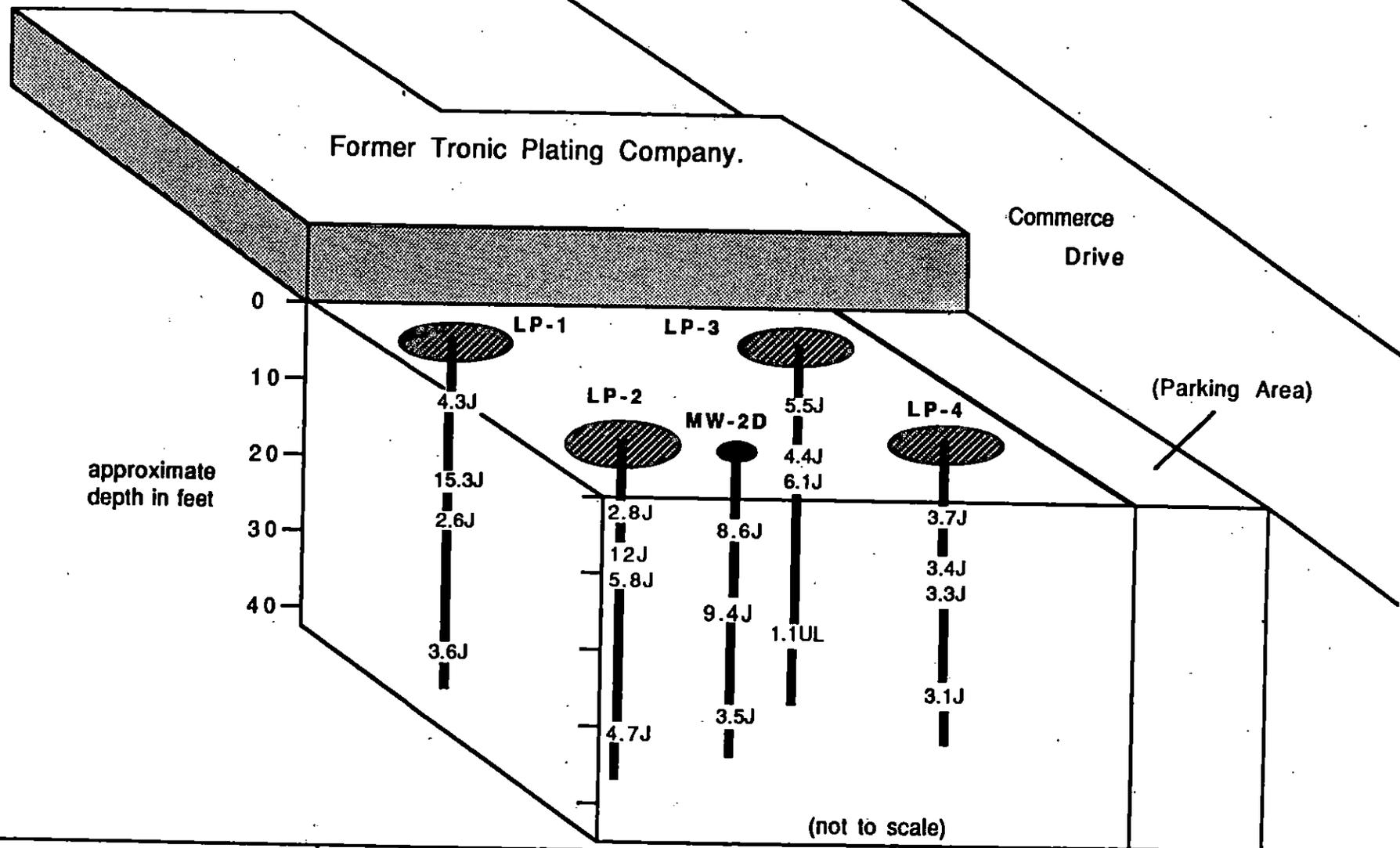
Storm drains and leaching pools are typically 8 feet in diameter and approximately 14 feet deep.



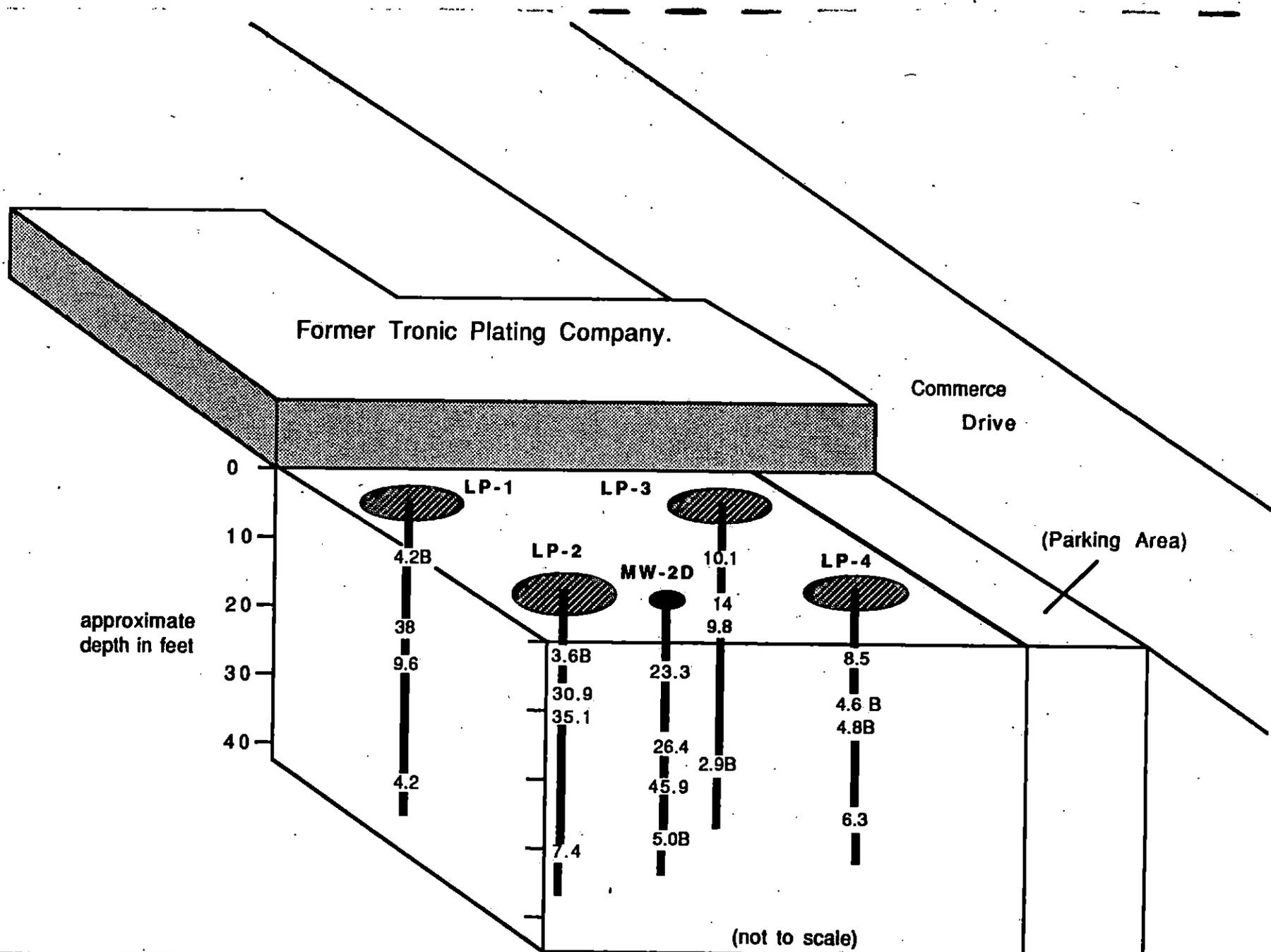
Barium Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-3 A



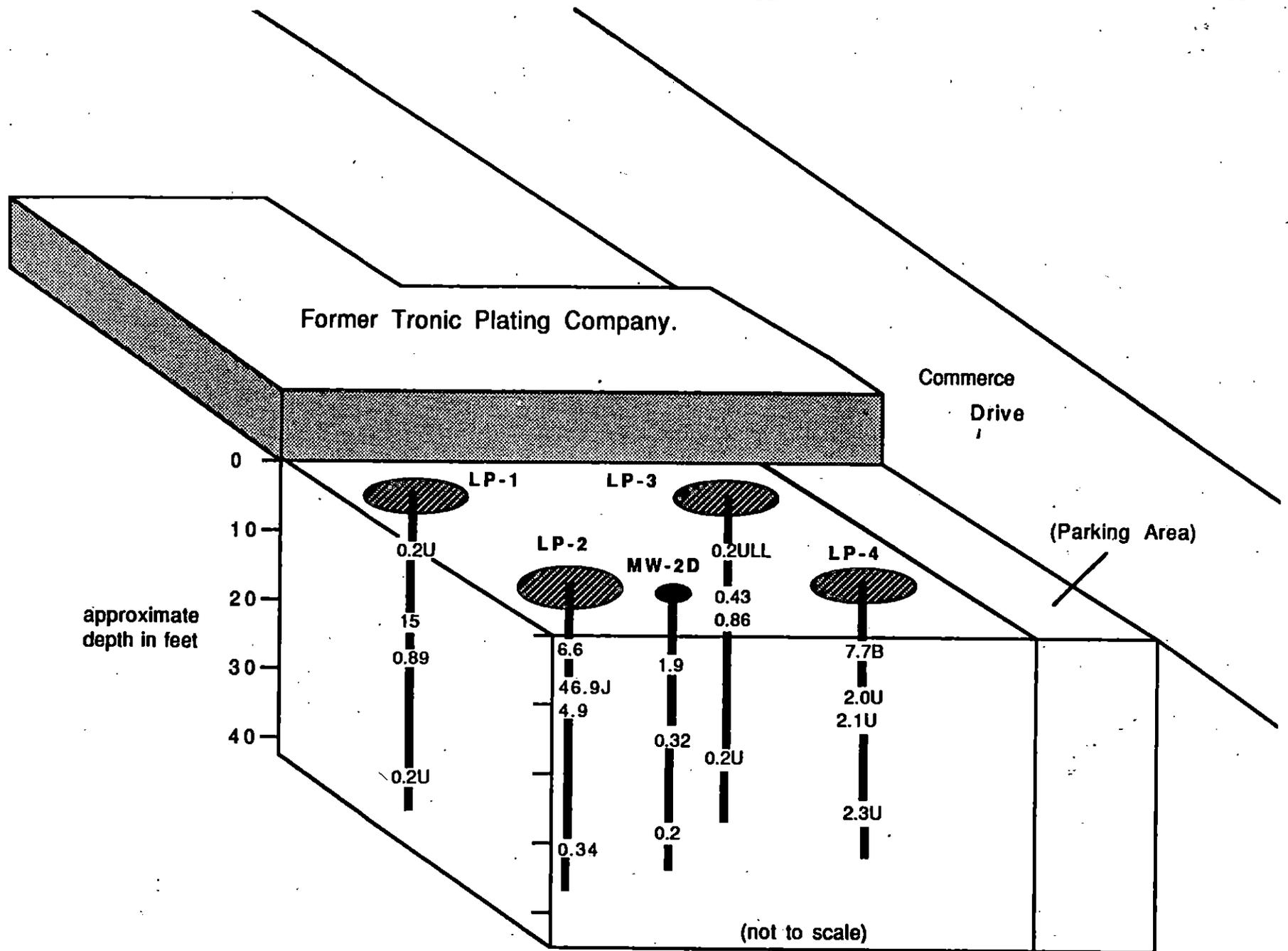
Cadmium Concentrations In Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-3 B



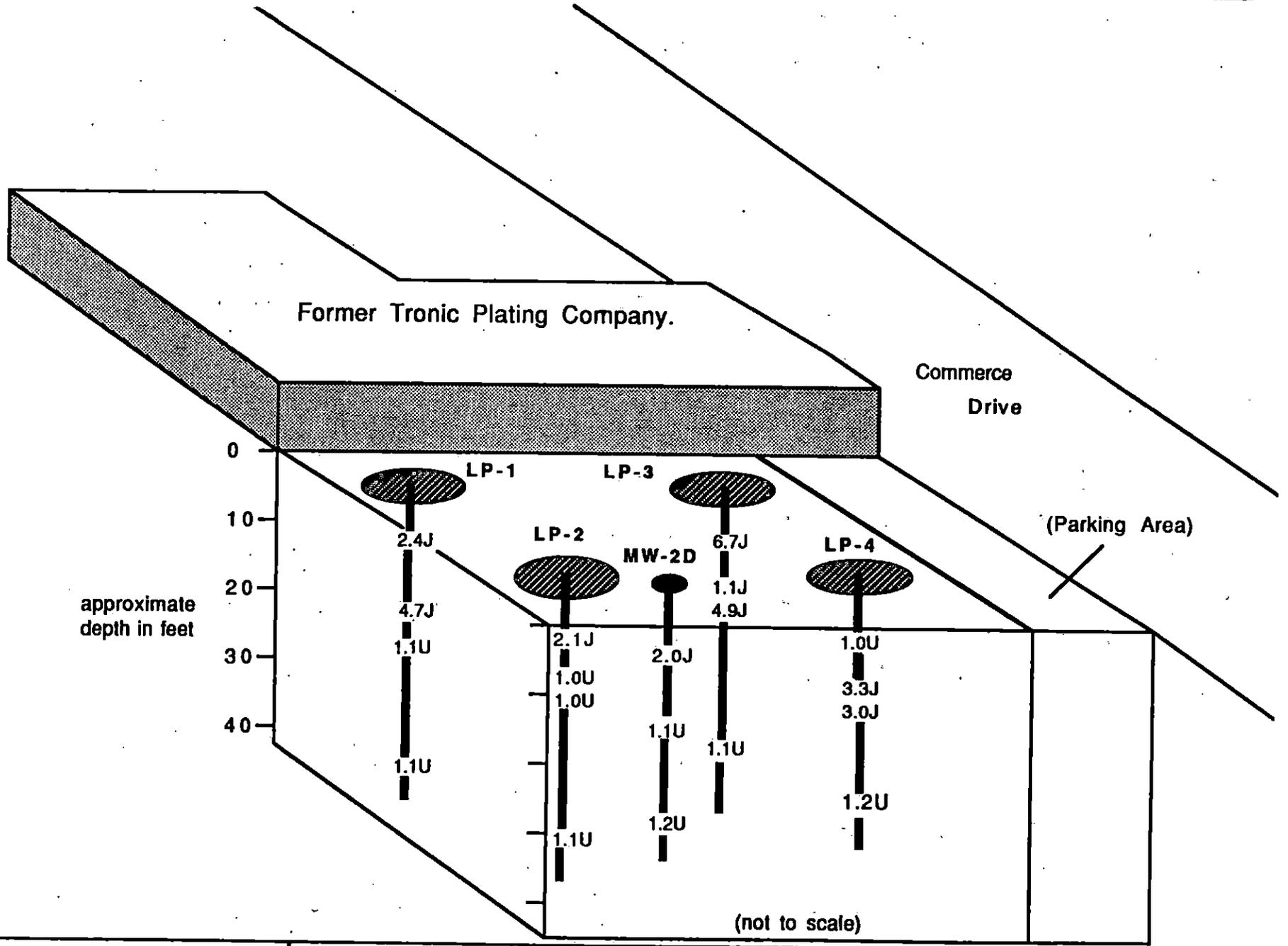
Chromium Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-3 C



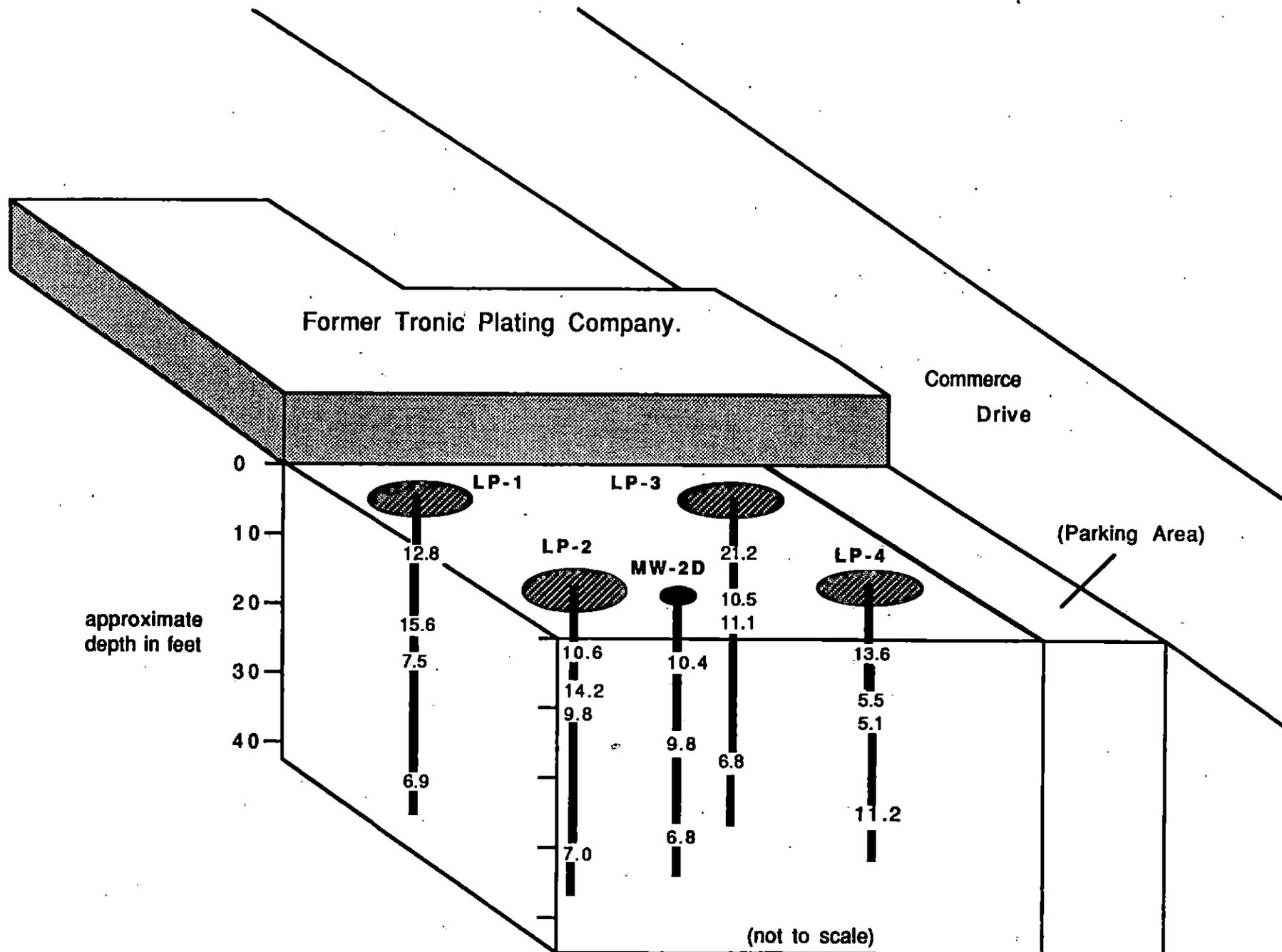
Copper Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-3 D



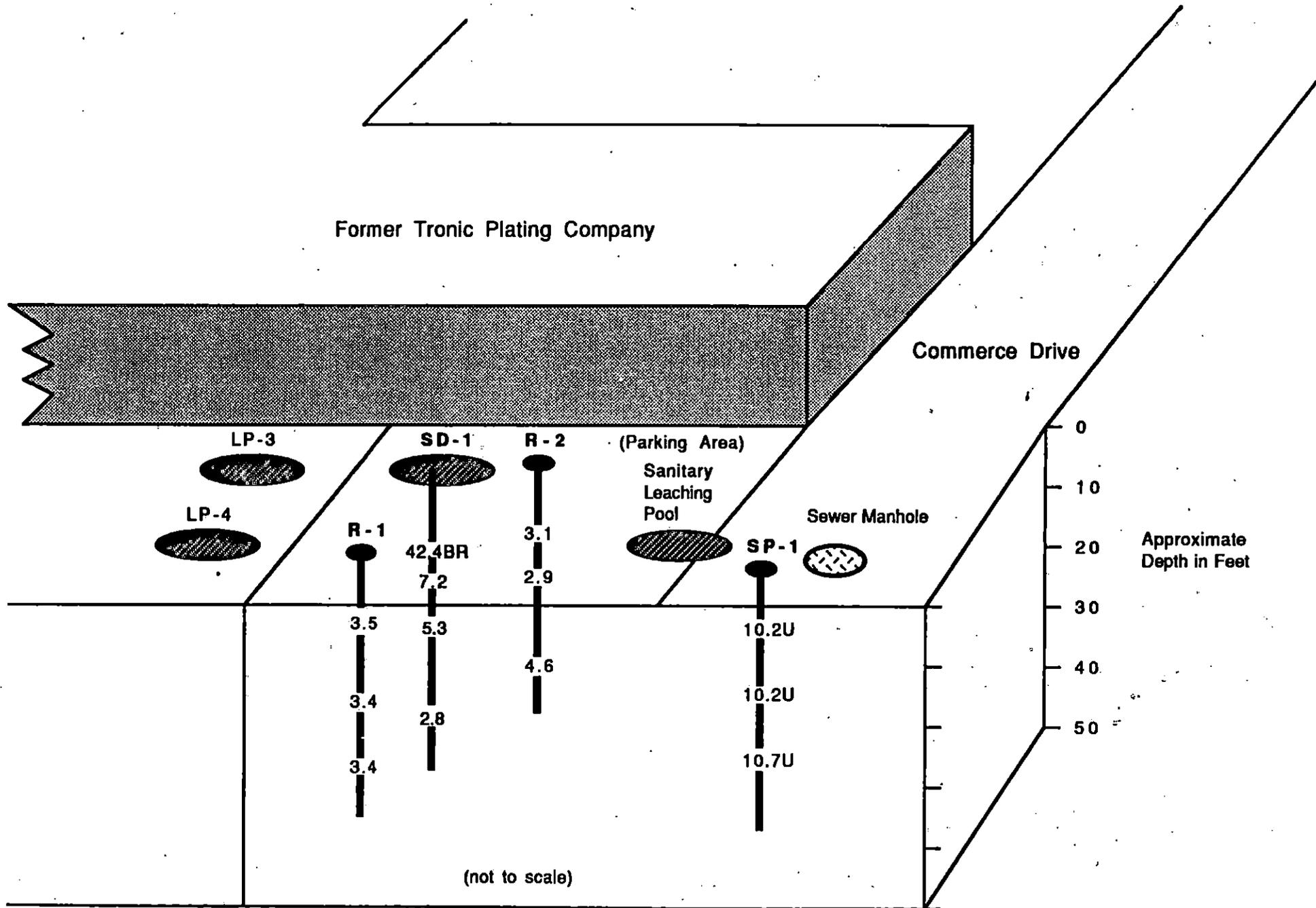
Cyanide Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-3 E



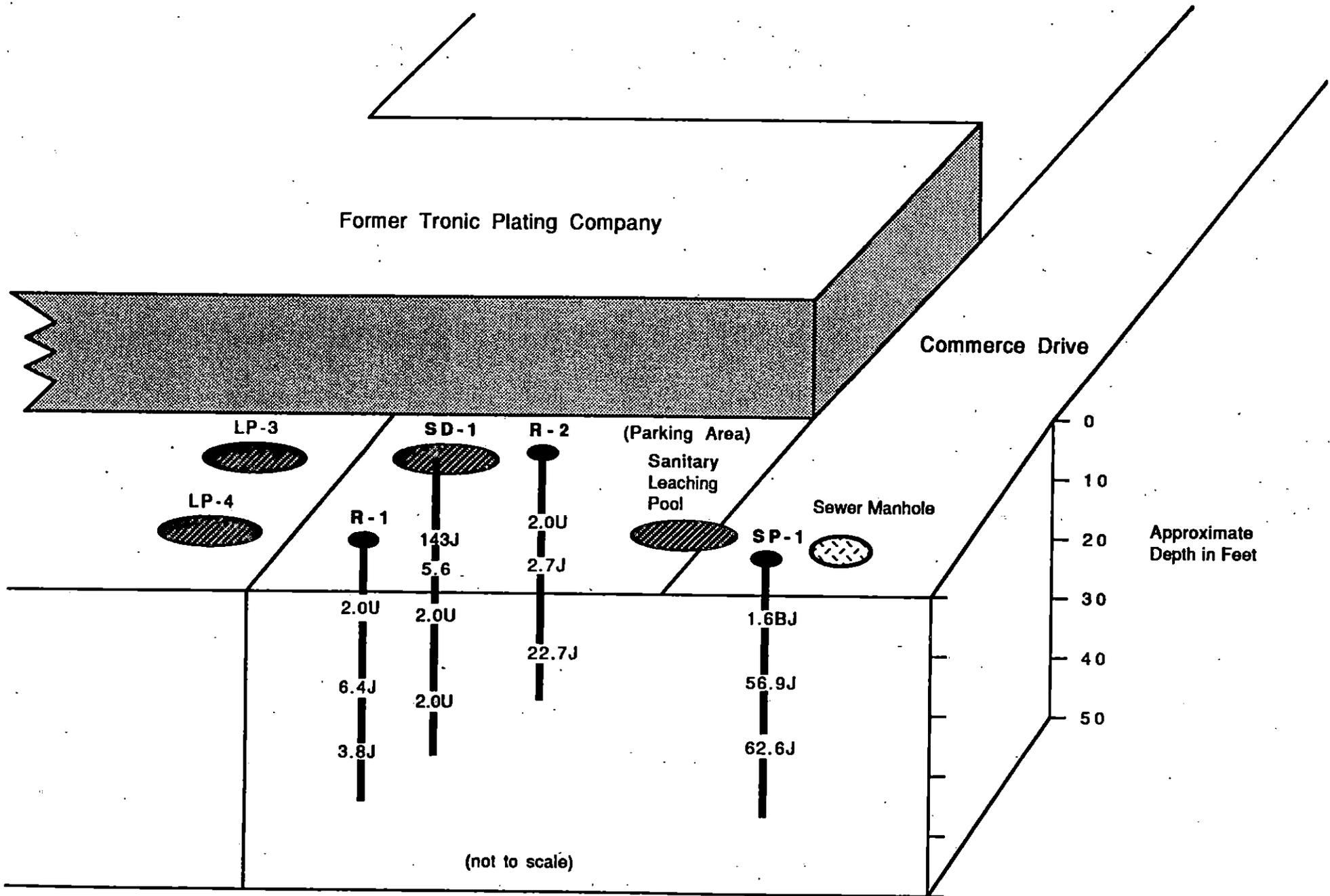
Lead Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-3 F



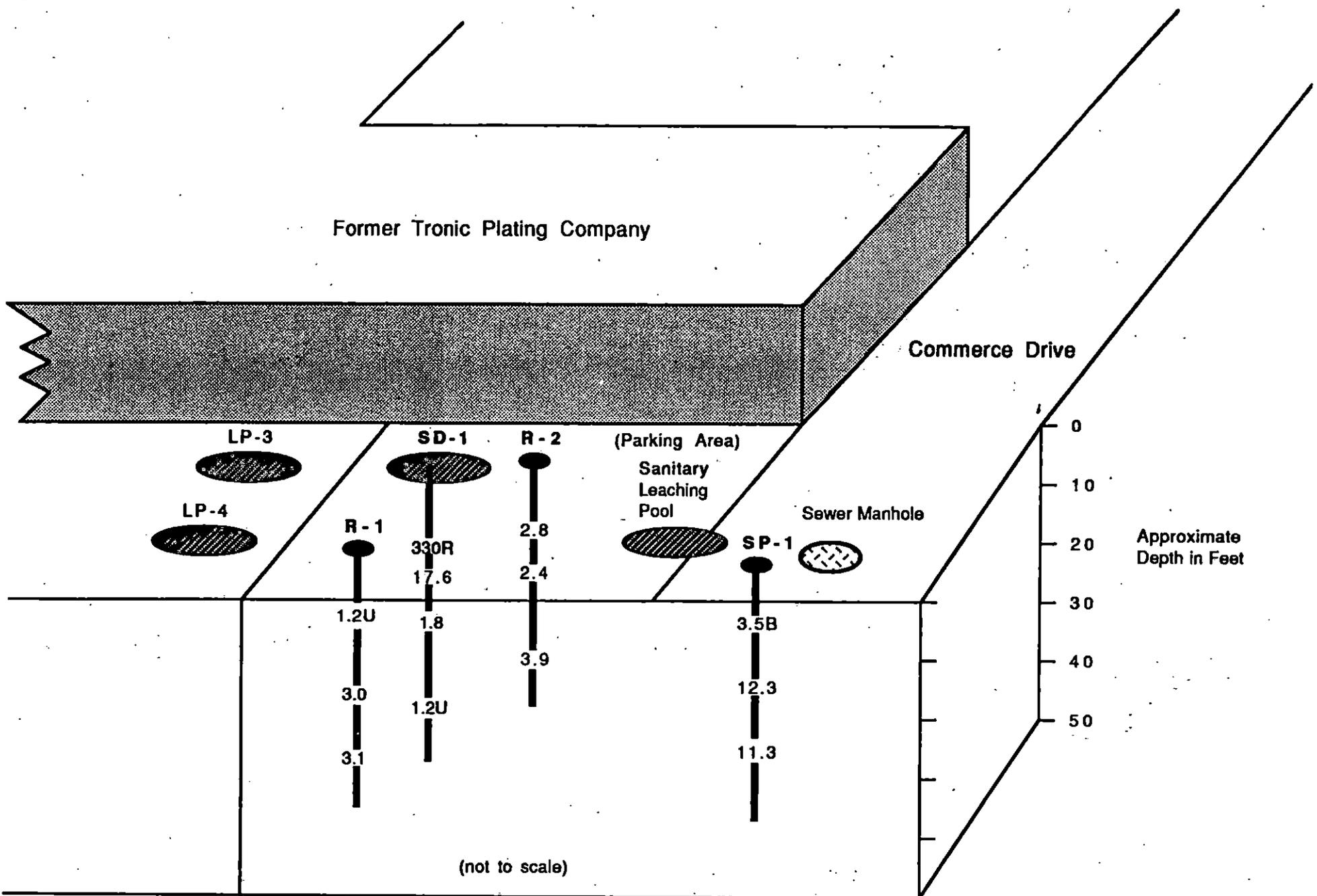
Zinc Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-3 G



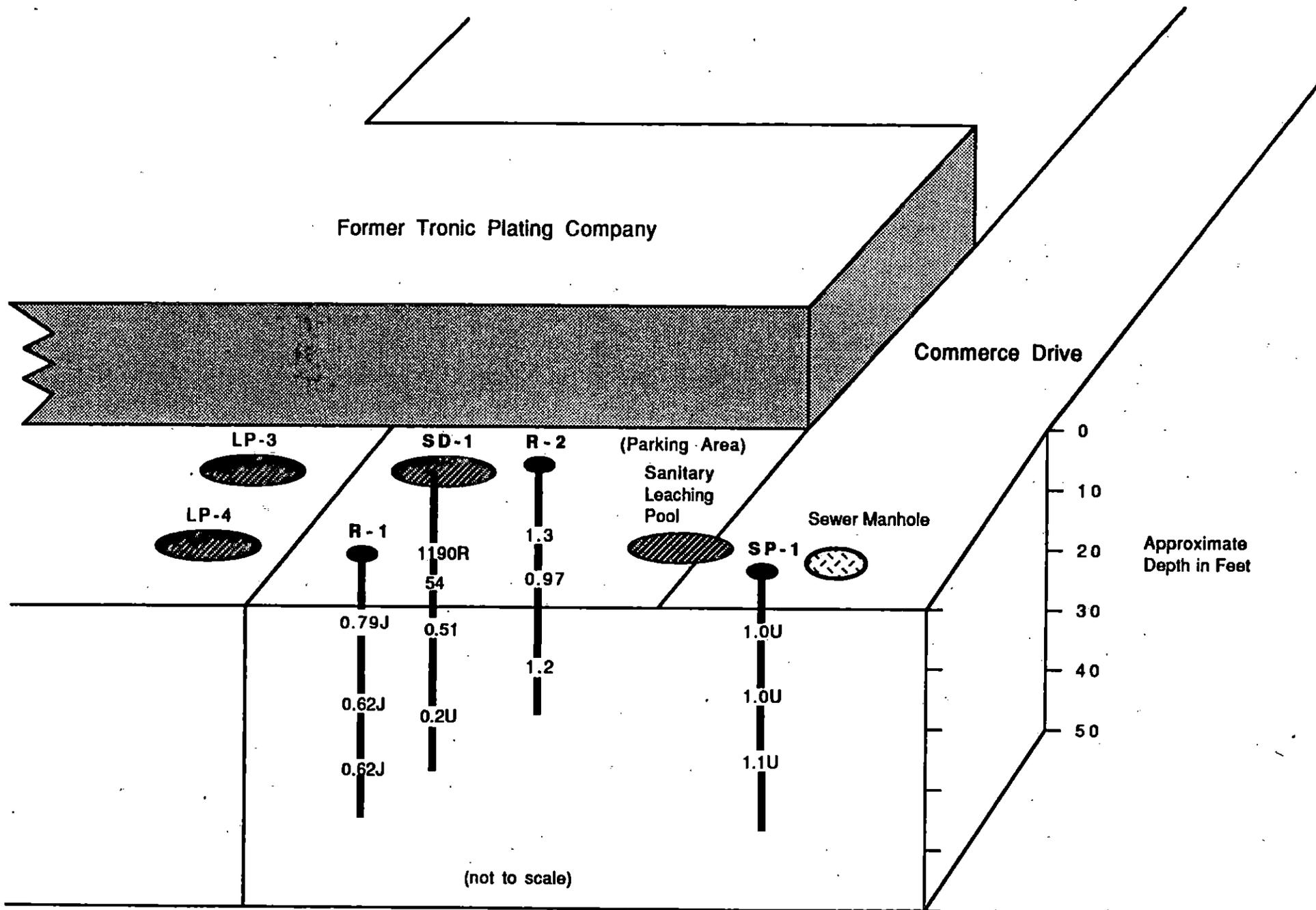
Barium Concentrations In Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-4 A



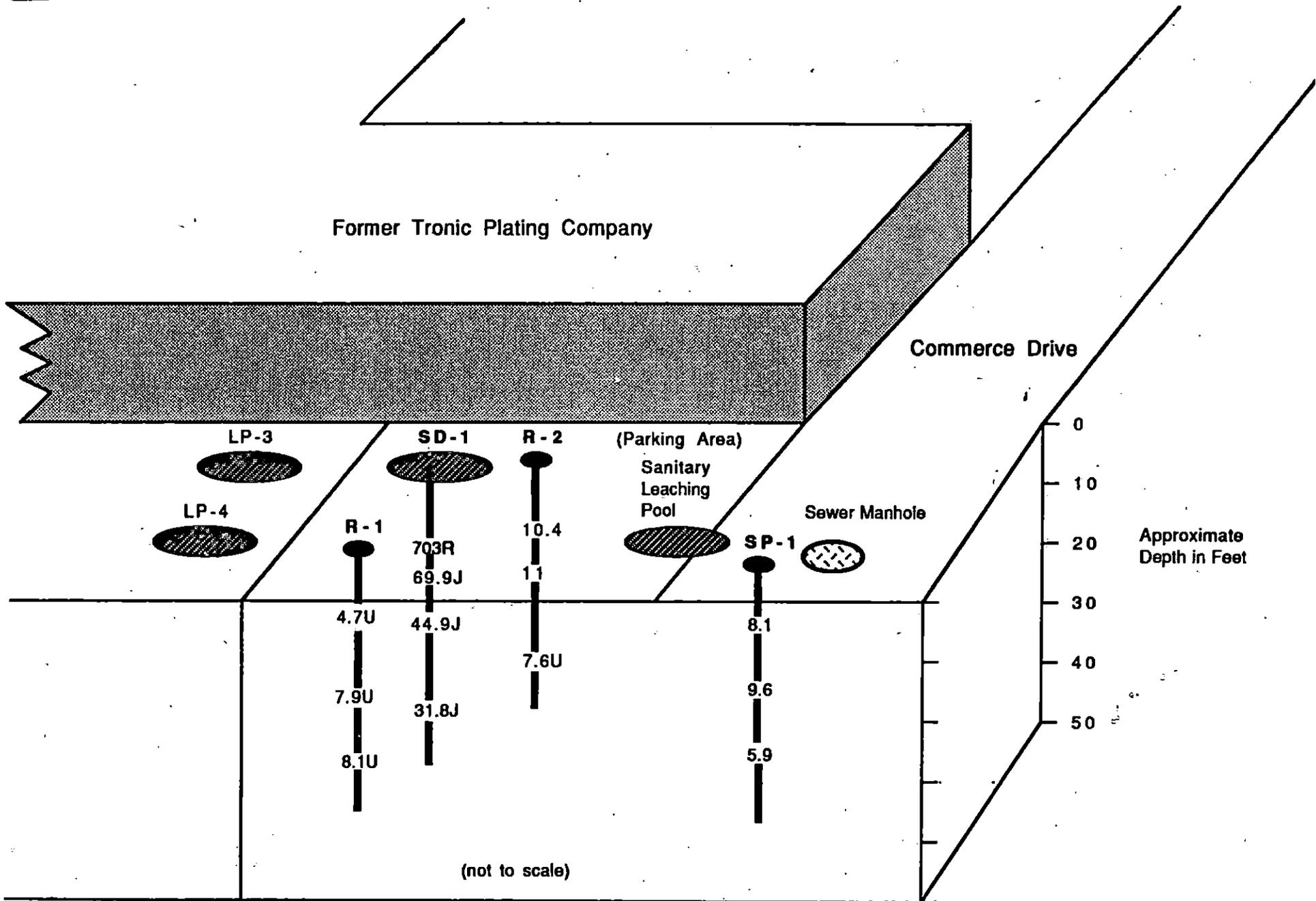
Chromium Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-4 C



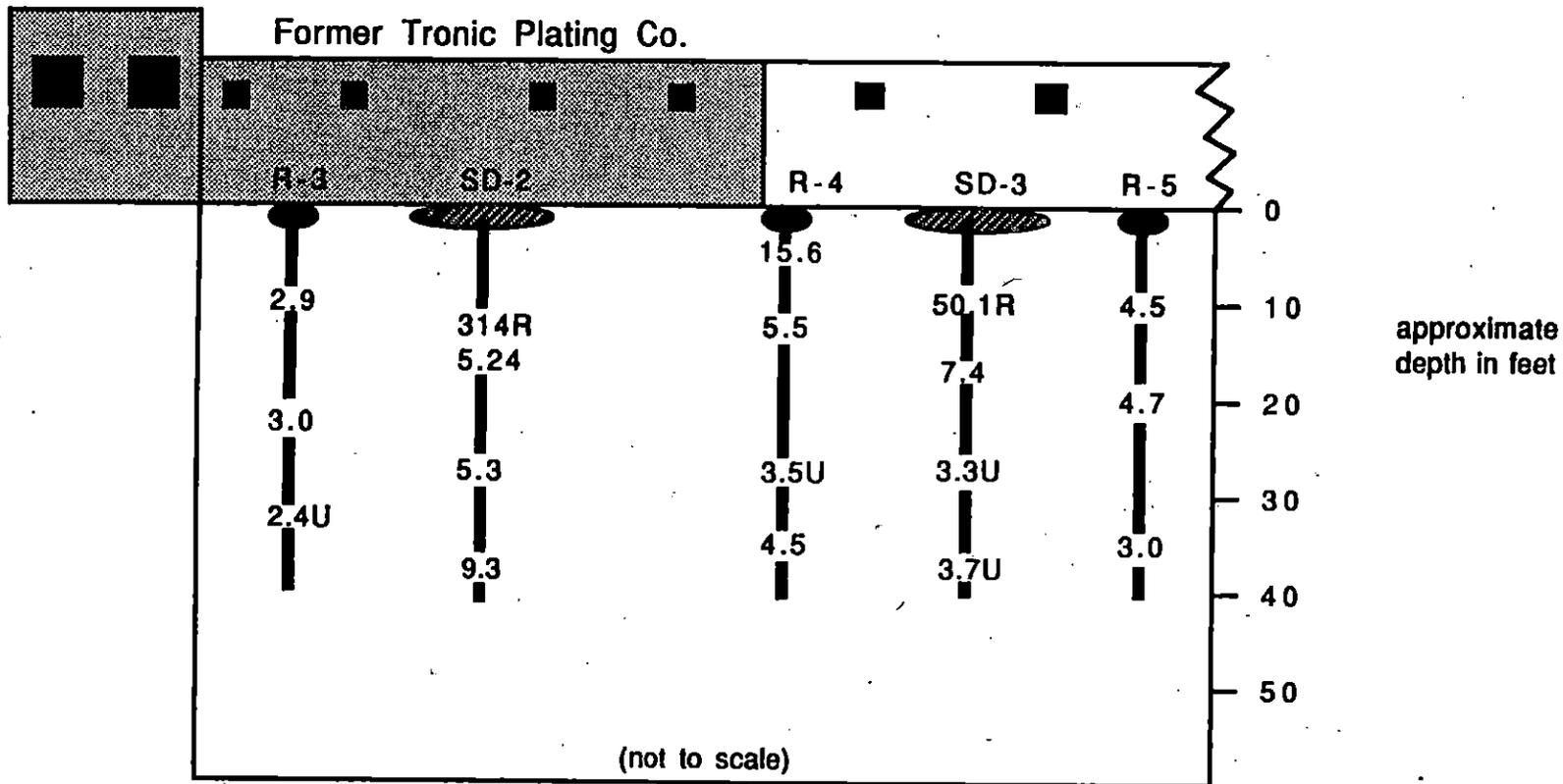
Copper Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-4 D



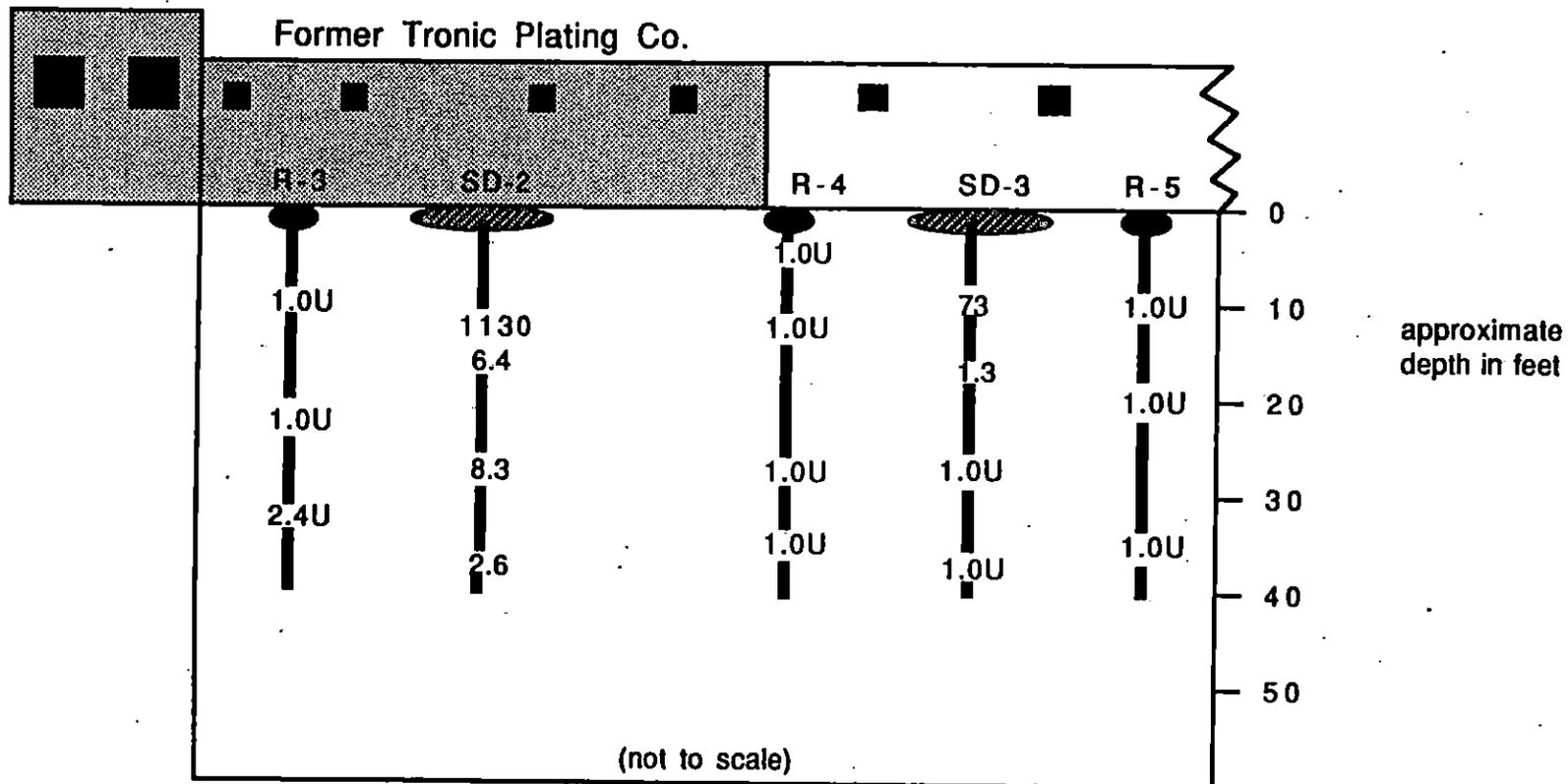
Lead Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-4 F



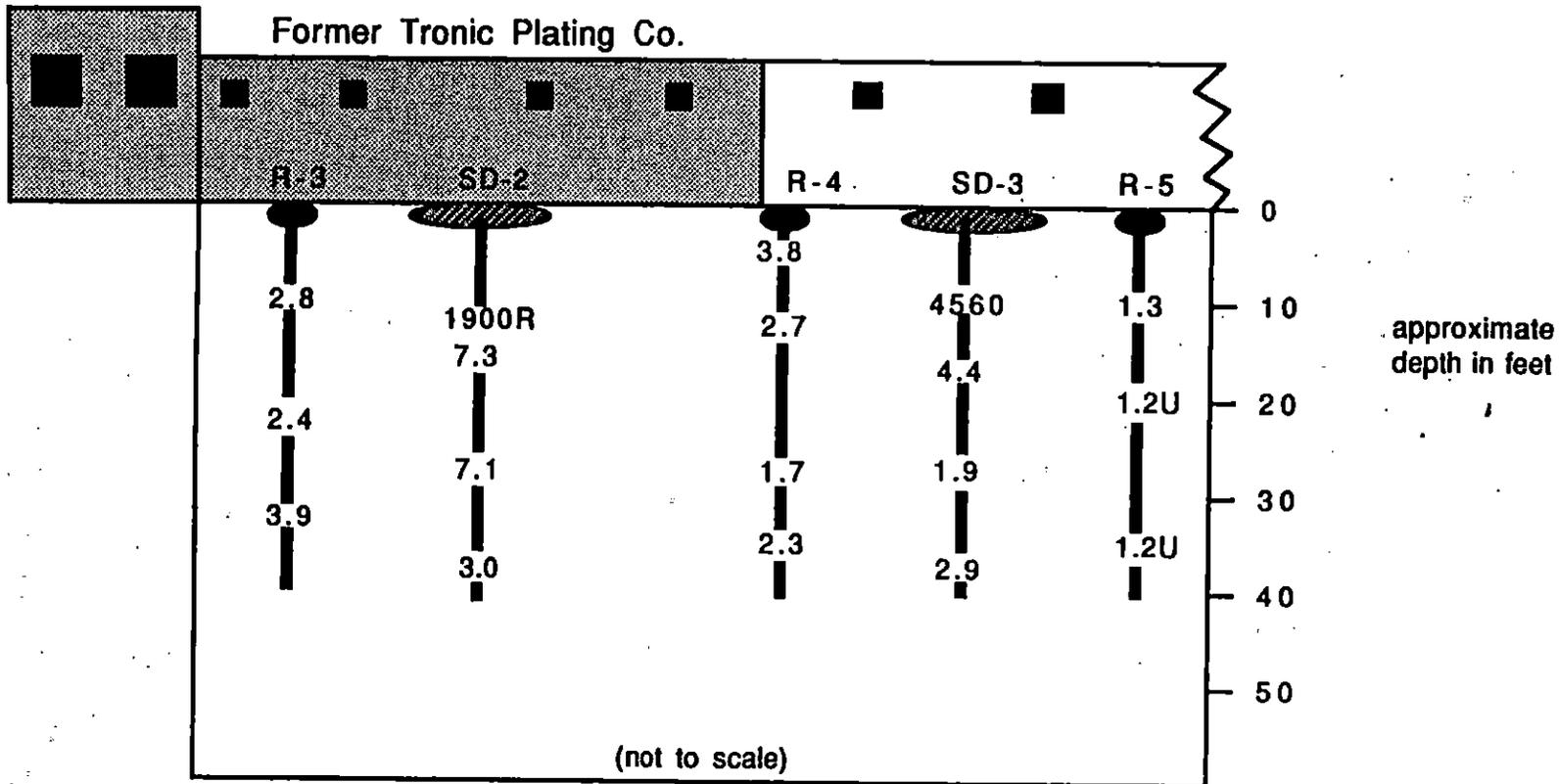
Zinc Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-4 G



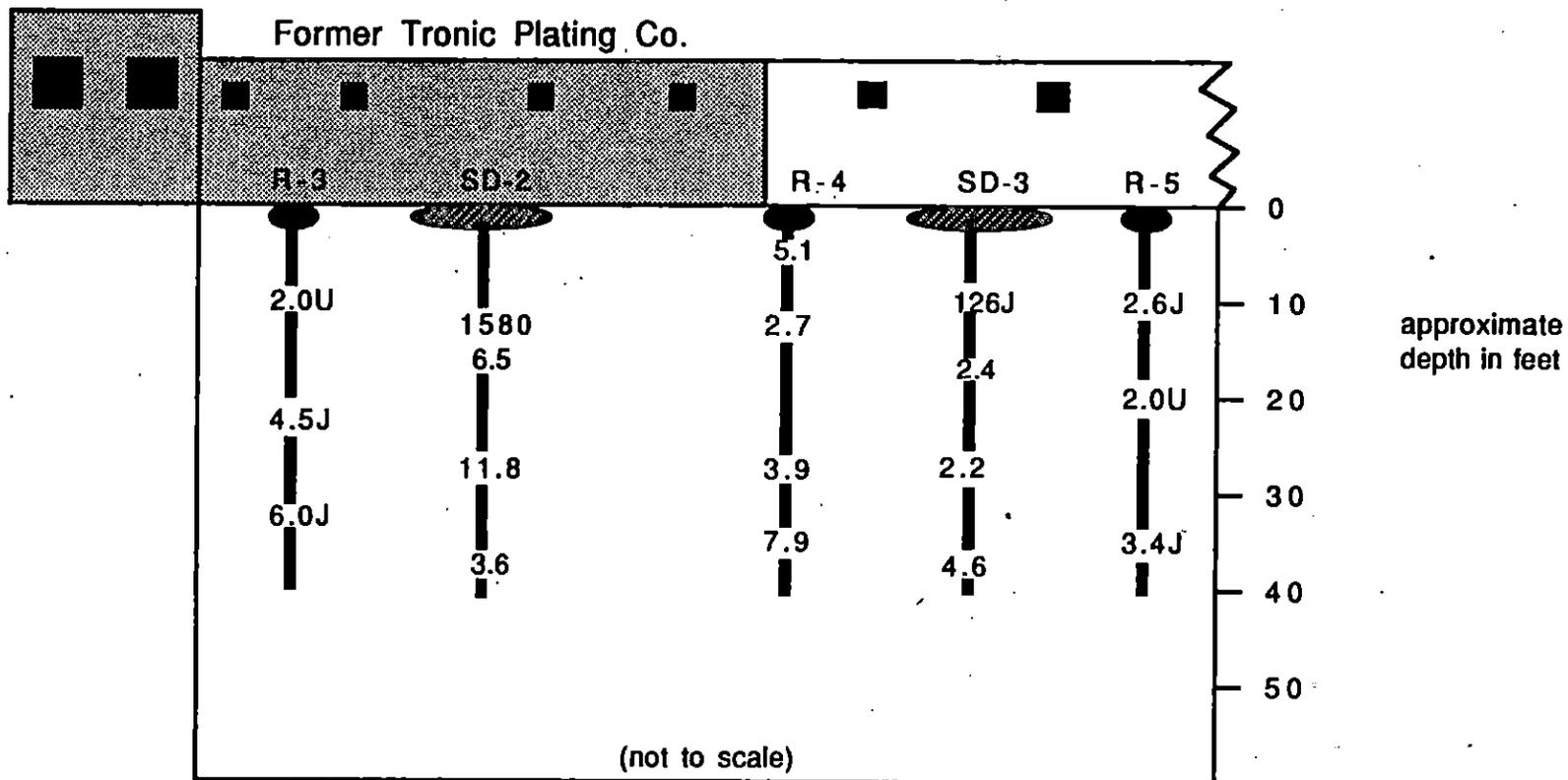
Barium Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-5 A



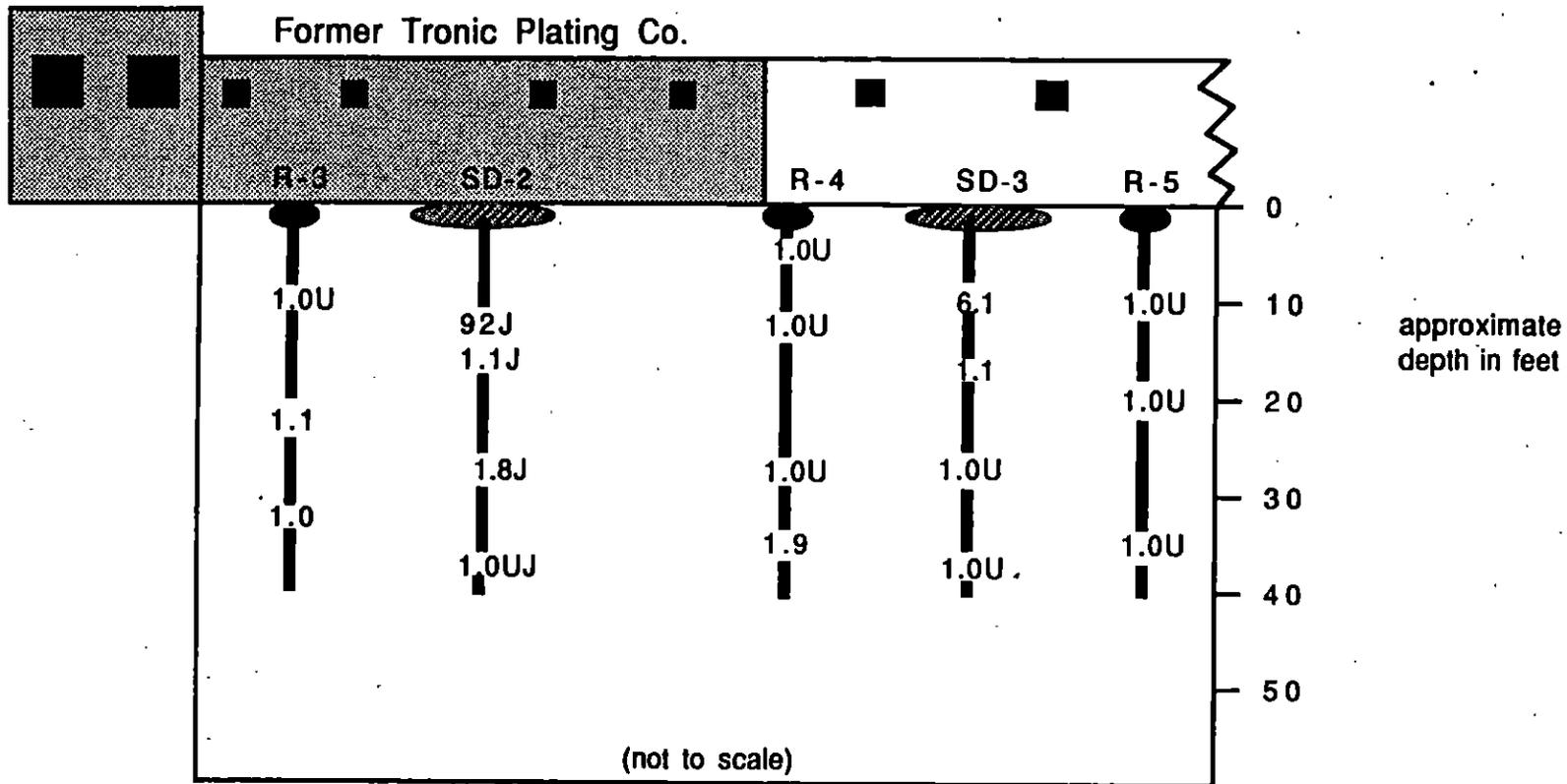
Cadmium Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-5 B



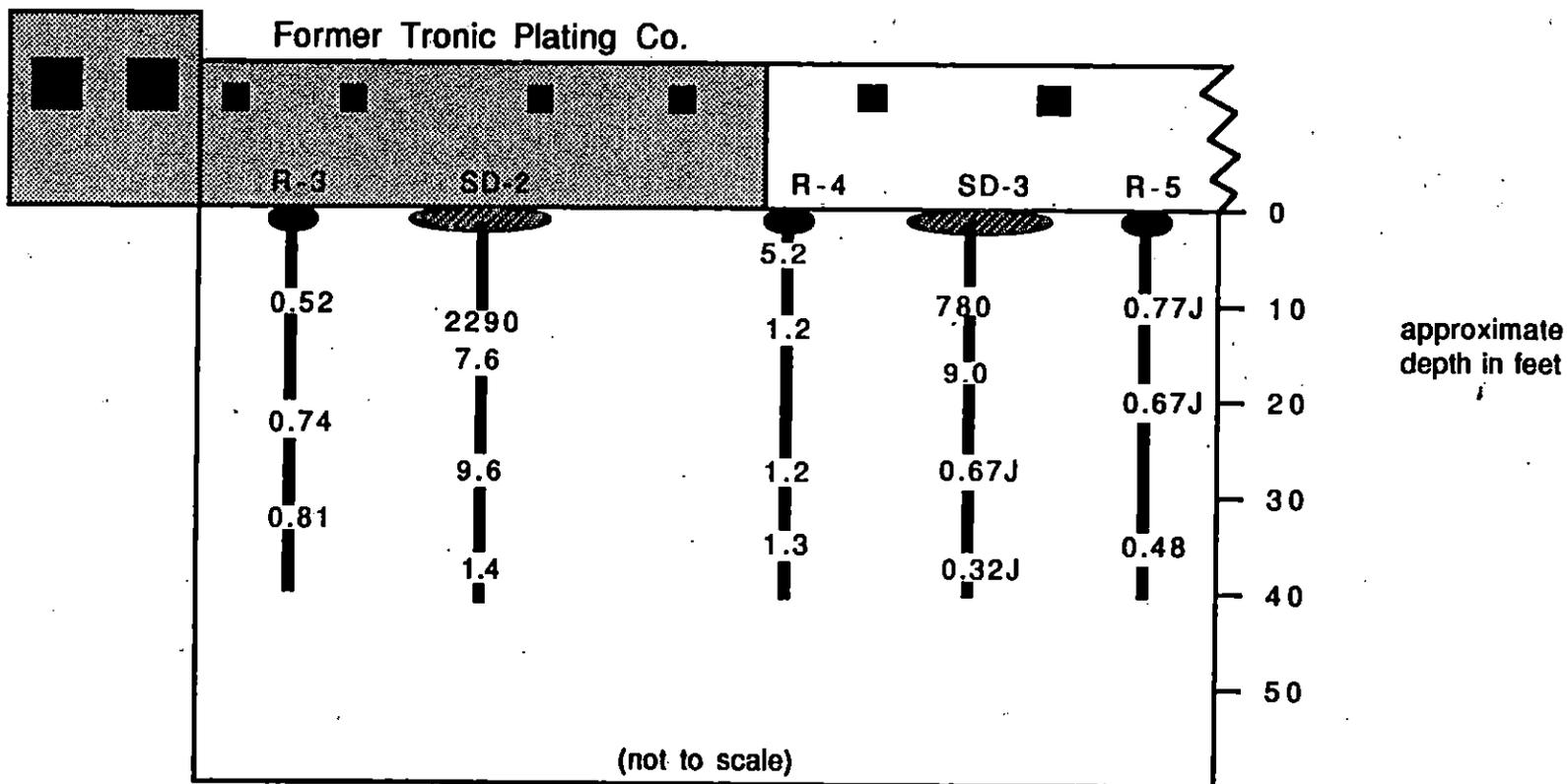
Copper Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-5 c



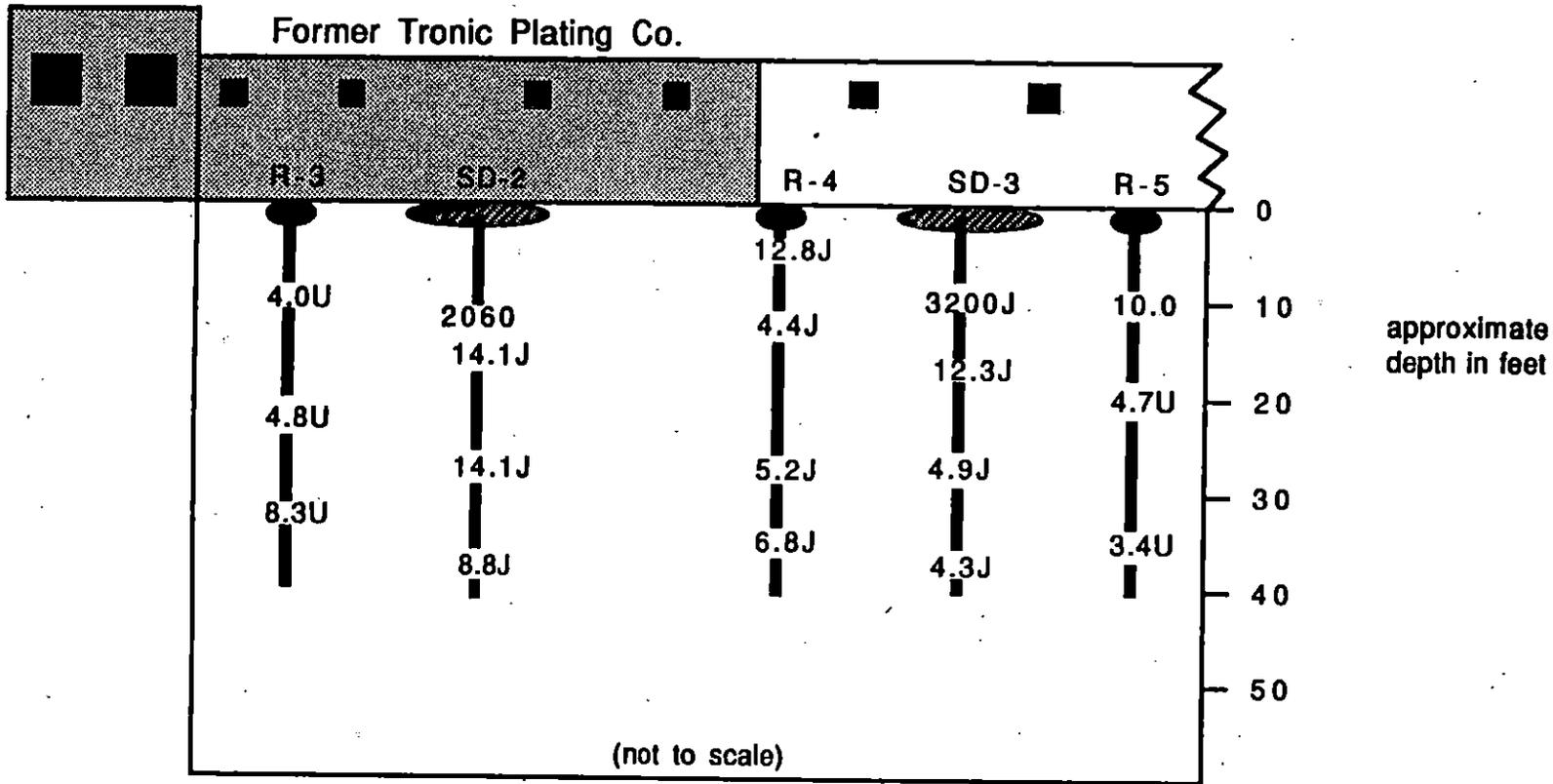
Chromium Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-5 D



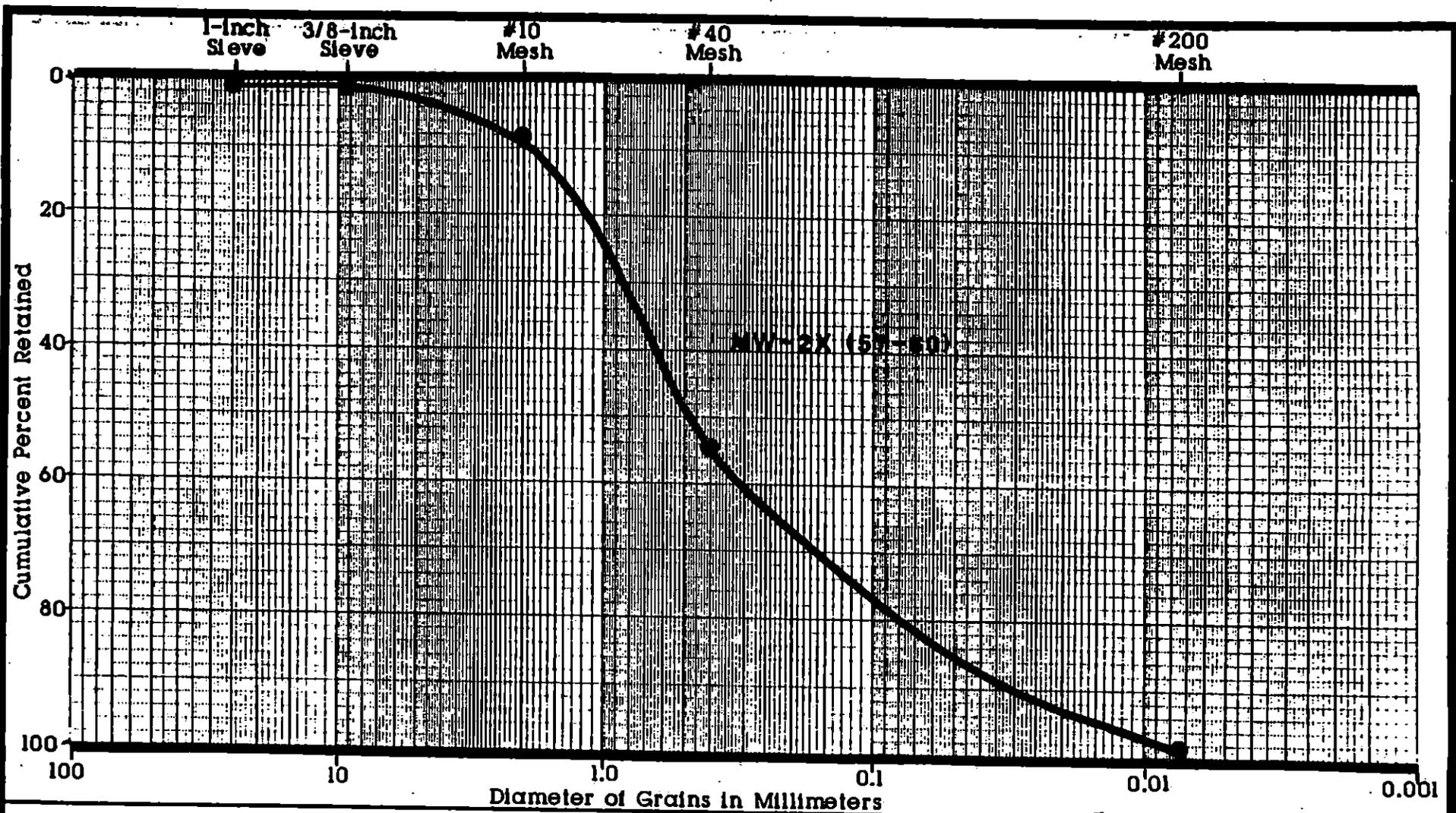
Cyanide Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-5 E



Lead Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-5 F



Zinc Concentrations in Subsurface Soil (mg/kg)	Tronic Plating Company Site	Prepared By: RDH	Date: August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-5 G



Grain Size Distribution Graphs

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Tronics Plating Company
 Farmingdale, N.Y.

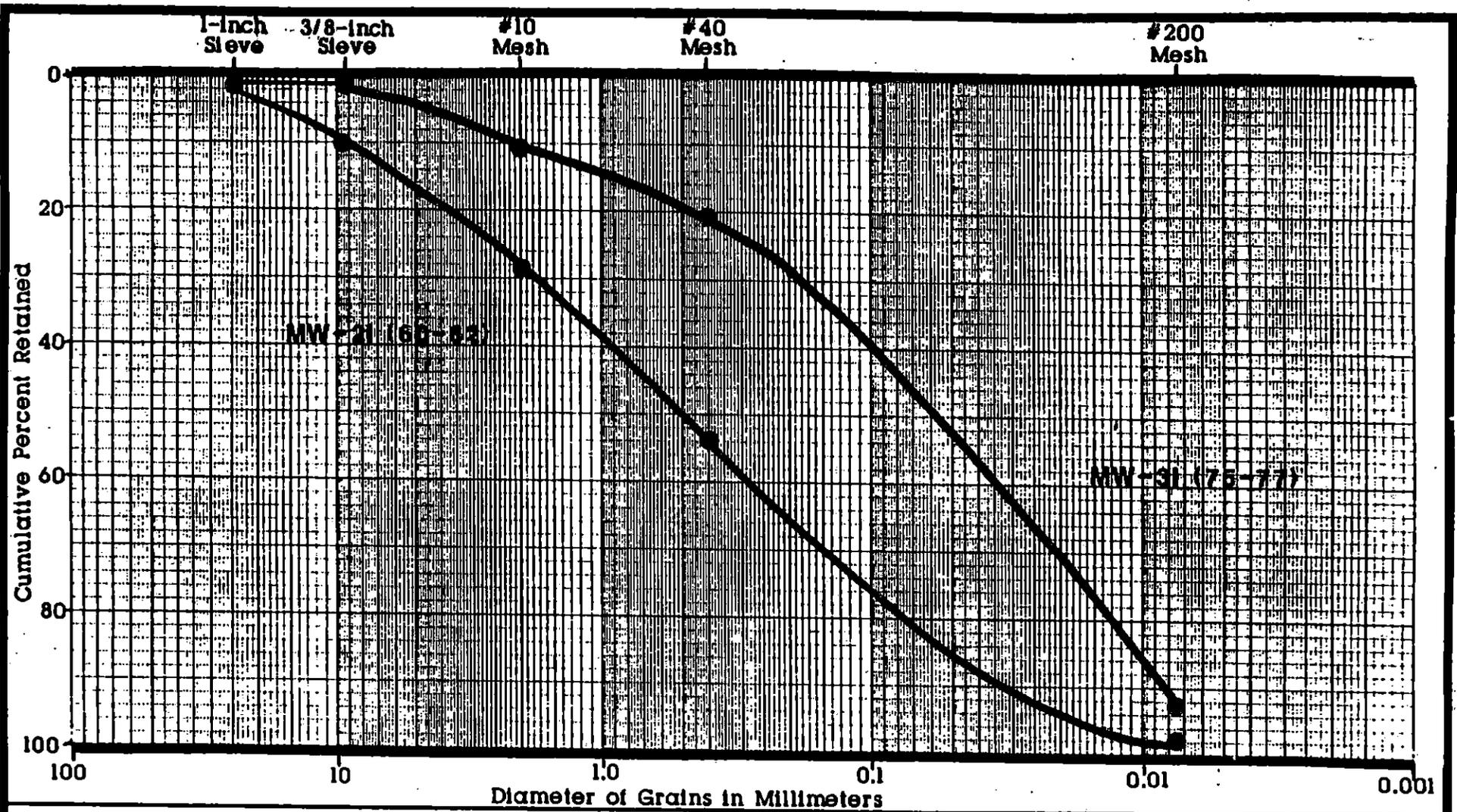
Prepared By: STS

Date: November 1989

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Reviewed By: EAW

Figure: 4-6



Grain Size Distribution Graphs

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 Certified Ground-Water and Environmental Specialists

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

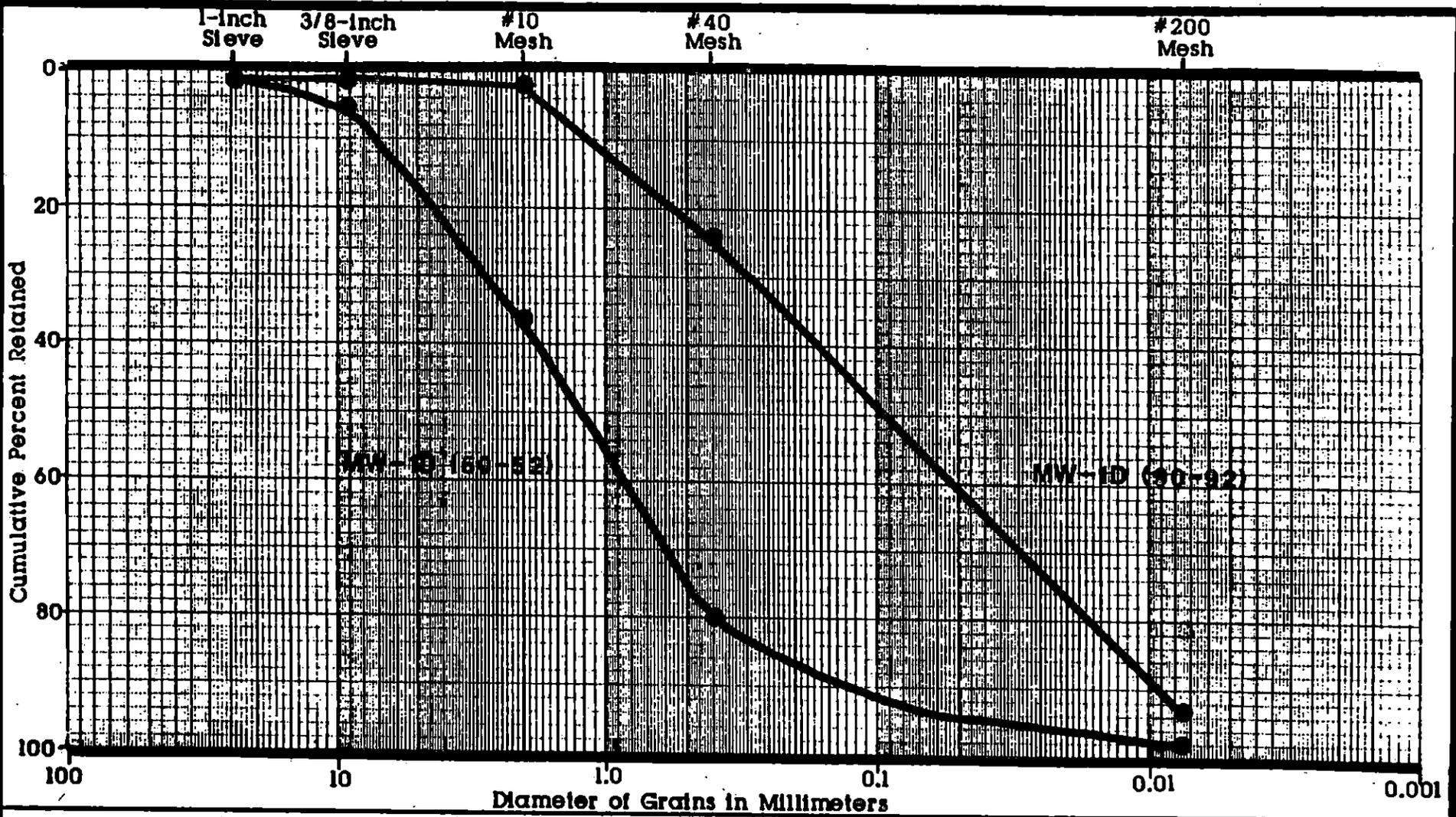
Tronics Plating Company
 Farmingdale, N.Y.

Prepared By: STS

Date: November 1989

Reviewed By: EAW

Figure: 4-6



Grain Size Distribution Graphs

CA RICH CONSULTANTS, INC
 Certified Ground-Water and Environmental Specialists

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Tronics Plating Company
 Farmingdale, N.Y.

Prepared By: STS

Date: November 1989

Reviewed By: EAW

Figure: 4-6

4.3 Groundwater Sampling

Phase 1 Sampling

Two (2) rounds of groundwater samples were collected from the six newly-installed monitoring wells and from one pre-existing well UG1806 during the first phase of field work. The initial round was performed during the week of June 5, 1989 followed by a second sampling round during the week of August 14, 1989.

Prior to sampling, a minimum of three casing volumes of well water was removed from each well to ensure representative formation groundwater. The wells were pumped at a rate of approximately 5 gallons per minute (gpm).

During Phase I, Well UG1806 was hand-bailed as opposed to pumped due to the unknown construction of the well and the high turbidity content of the water within the well. This well was not resampled during the second phase of sampling. In addition, the unfiltered results from UG1806 are not considered to be representative due to their high turbidity level. The unfiltered sample data from #UG1806 was, therefore, presented on the data summary tables, but not used in the data evaluation process.

Measurements of pH, specific conductance, temperature and turbidity were collected regularly while purging the wells. Pumping continued until the pH, specific conductance and temperature measurements stabilized. Once these parameters stabilized, pumping continued until the well water flowed clear and/or measured less than 50 NTU's on a field turbidity meter. The stabilized Phase I field measurements are presented on Table 4-12. The elevated pH levels measured in well MW-31 may have been caused by a minor intrusion of the cement grout into the gravel pack and not an indication of regional water quality.

In certain cases, during the process of removing the purge pump and lowering the sampling bailer into the well, a small amount of sediment from within and around the well was disturbed - thus increasing the turbidity of the sample. This is a problem that is typical of monitoring groundwater quality in the Upper Glacial on Long Island. However, by collecting both unfiltered and filtered water samples, the effects that any slight turbidity may have upon water chemistry (metals) are determined.

During the month of May, 1989, five on-site water table monitoring wells were installed at the Astro Electroplating Co. NYSDEC Class II site (Astro) -- located adjacent to the former Tronic Facility. A map including the Tronic and Astro well locations is presented on Figure 4-7. The results of these analyses are presented along with the results of the Tronic Phase 2 sampling program on Figures 4-8, A through J.

Phase 2 Sampling

During the week of May 13, 1991, the complete network of monitoring wells were sampled for volatile organics and inorganics. The cooling water well at Pinelawn Cemetery was substituted for the turbid UG1806. During this sampling event, only unfiltered samples were collected. To ensure a turbidity of less than 50 NTU's, the metals samples were collected either from the pump discharge or after the wells had been purged and allowed to rest for 2 to 4 hours. All organics samples were collected immediately after purging using a bailer. The stabilized field measurements for Phase 2 groundwater samples are presented on Figure 4-13. Once again, the pH levels at well MW-31 were elevated.

4.3.1 Organics

Phase 1 Results

During the first round of sampling, each of the monitoring wells were sampled and analyzed for both volatile and semivolatile organics (including pesticides and PCBs) as well as TCL metals.

The second round of sampling again included all of the Phase I monitoring wells, however, this second round consisted only of volatile organics and TCL metals analysis.

To achieve the lower volatile organics detection limits requested by EPA, Method 624 was modified by increasing the volume analyzed, and thus provided greater sensitivity. The Modified Method 624 (Method 624M) was used at locations where the total volatile organics reported from the first round were less than 40 micrograms per liter (ug/l), equivalent to parts per billion. Well MW-3I was the only well that fell into this category. A summary of the analytical results are presented on Tables 4-14 & 4-15.

Several chlorinated hydrocarbon compounds were detected in the 10 to 500 ug/l range in all of the monitoring wells. These included trichloroethene, tetrachloroethene and 1,1,1-trichloroethane.

As these compounds were detected in both upgradient wells but not in the soil samples from the borings for the leaching pools, their origin is attributed to sources outside of the Tronic Plating Company's operation. The fact that the concentration of organic compounds is higher in the deep upgradient well than the shallow upgradient well indicates that these compounds have traveled from some distance to the north.

Acetone, a solvent used to clean the sampling equipment, was detected in some of the groundwater samples as well as the field blank. The semivolatiles scan detected phthalate, a common plasticizer, at 11 ug/l in well MW-1D during the first round of sampling. The origin of the phthalate is believed to be an artifact of the labware used in the analysis.

Phase 2 Results

The distribution of volatile organics detected during the second phase of field work displayed a similar trend to the first round of sampling. These results are presented on Tables 4-16. As requested by EPA, Total Organic Carbon (TOC) results are presented on Table 4-17.

Trichloroethene, tetrachloroethene and 1,1,1,-trichloroethane were detected in many of the monitoring wells. The concentrations were generally at the same or higher levels in the two upgradient wells and generally higher in the deeper wells than the shallow wells. The fact that the concentrations detected from the deeper wells, were again higher than the shallow wells, supports the contention that these volatile organic compounds have traveled from a source some distance to the north. Maps illustrating the areal distribution of trichloroethene, tetrachloroethene and 1,1,1-trichloroethane collected during the third round of sampling are presented on Figure 4-8, A through J.

Trichloroethene was detected at 26 ug/L and 400 ug/L in wells MW-1S and MW-1D, respectively, the two upgradient wells. The trichloroethene concentrations decreased to the south in both the Tronic and Astro wells suggesting that a source area for this compound is located somewhere north of the site.

1,1,1-trichloroethane was detected in most of the Tronic site wells at levels of 1 to 10 ug/L and at 42 ug/L and 21 ug/L in wells MW-3I and UG1806, respectively. This pattern is most likely

representative of a one time release or "slug" of 1,1,1-trichloroethane that originated north of the site and is migrating south with the ambient flow of groundwater.

Tetrachloroethene was detected at levels of 1 to 5 ug/L in the shallow water table monitoring wells and at levels of 6 to 21 ug/L in the intermediate and deep monitoring wells. Once again, this pattern suggests that the source of the tetrachloroethene originated somewhere to the north and is migrating south with the ambient flow of groundwater.

Based on the patterns of volatile organic compounds detected during these sampling programs, there is no direct evidence that the onsite former leaching pools or storm drains are acting as a source of volatile organic groundwater contamination. That is, there is no pattern of higher volatile organic concentrations in the shallow wells around these structures.

4.3.2 Inorganics

Phase 1 Results

Groundwater withdrawn from each of the monitoring wells was analyzed for the full Target Compound List (TCL) of metals during both first and second rounds of Phase I sampling. As earlier discussed, in order to compensate for any possible interference attributable to the presence of suspended solids within the samples, both unfiltered (total metals) and filtered (dissolved metals) samples were collected at each well during each round of sampling. The filter mesh was 0.45 microns.

To supplement the TCL metals list, a group of additional parameters were also tested for during the first round of sampling. Those samples collected for the additional extended parameters were unfiltered.

Unfiltered Groundwater Samples

The metals sample analyses that were not filtered in the field had values that were of a generally similar magnitude for both the upgradient and downgradient well locations. Aluminum and iron were consistently higher in the shallow wells. However, ground water from these wells had a higher turbidity than the groundwater withdrawn from the intermediate and deep wells. The results are presented on Table 4-15.

Chromium was detected in the upgradient well MW-1S during the second sampling round at an estimated level of 16.5 ug/l. This metal was also detected in the downgradient wells at similar concentrations. During the second round of sampling, chromium was detected in well UG1806 at an estimated level of 36.5 ug/l, a considerable distance from the Site. However, this USGS monitoring well produced particularly turbid water and the integrity of the sample is somewhat less than the integrity of the controlled samples from the new wells at and near the Site.

Cadmium, which was not detected in any of the Phase I upgradient wells or the 'on-site' wells was also detected in well UG1806 at 151 and 23.9 (estimated) ug/l during the first and second rounds of sampling.

Cyanide was not detected in any of the upgradient or downgradient wells.

Lead was detected at the 30 to 75 ug/l range (estimated) in groundwater from both the shallow and deep upgradient wells during the first and second rounds of monitoring. With the exception of UG1806, groundwater from the on-site and downgradient wells produced a similar lead concentration as the groundwater from the upgradient wells. However, groundwater bailed from UG1806 contained lead at estimated levels of 2550 and 312 ug/l during the first and second rounds of sampling, respectively. These elevated

levels appear to be an artifact of the sediment in the wells and not representative of the actual groundwater chemistry.

Mercury was not detected. The metal vanadium was present in both upgradient wells (at the 10 to 40 ug/l range) and it was also detected at similar levels in the other wells but at a higher level in ground water from UG1806 to the south. Here, vanadium was reported at 150 ug/l during the first round of sampling.

Filtered Groundwater Samples

The concentrations of metals in the field-filtered groundwater samples was lower than the concentrations reported in the unfiltered samples. This is expected as the filtered samples contain water devoid of suspended matter (turbidity) which facilitates the adsorption of metallic ions onto the suspended soil particles in the sample. For the most part, the filtered samples represent a water that contains dissolved solids, and thus is more indicative of groundwater quality under actual aquifer conditions. The unfiltered sample analyses for metals represent total metals. That is, that portion of metals concentration comprising both the dissolved metals and those metals suspended in solution. As discussed earlier, it was very difficult during Phase I to obtain samples completely free of turbidity, especially in the shallow wells and particularly in the pre-existing USGS well UG1806.

Dissolved aluminum and iron were either detected at significantly lower concentrations than the aluminum and iron present in the unfiltered samples, or were not detected at all in the filtered samples. A summary of the analytical results is presented on Table 4-15.

The analysis of chromium in the filtered samples during the first round of sampling failed the QA/QC review. During the second round, the chromium results ranged from not detected at a detection level of 5.0 to an estimated level of 13.2 ug/l.

Cadmium, which was not detected in the upgradient wells or in the on-site wells was detected in well UG1806 at 14.1 and 8.4 (estimated) ug/l during the first and second rounds of sampling. Cyanide was not present in ground water from any of the downgradient wells.

Lead was detected in wells MW-1D, MW-2I, MW-3I and UG1806 in the estimated 5 to 10 ug/l range.

Mercury was not detected at a detection level of 0.2 ug/l. Vanadium was detected in two wells, MW-2S at 14.2 (estimated) ug/l and the duplicate of MW-3I at 14.2 ug/l. Zinc, a naturally occurring metal, was detected in all wells at the 20 to 150 ug/l range.

Phase 2 Results

Unfiltered Groundwater Samples

During the week of May 13, 1991, the combined network of wells installed during both Phase 1 and Phase 2 were sampled for the TCL list of metals and VOCs. As earlier discussed, the cooling water well at the office of the Pinelawn Cemetery which was screened from 60 to 65 feet below grade, was sampled in lieu of well UG1806 because of the turbid nature of the water previously collected from this well.

Analytical results are presented on Table 4-18 and maps illustrating the areal distribution of seven (7) different metals are included on Figure 4-8, D through J. These maps include the results of unfiltered metals samples collected during the May, 1991 round of sampling, the data collected at the neighboring Astro site in May, 1989, and the filtered results from a sample collected at well UG1806 in August, 1989.

Barium was detected in all unfiltered samples at levels at between 25 to 75 ug/L. The deeper wells displayed a moderately higher concentration. Downgradient concentrations were generally equal to or less than concentrations measured in the upgradient wells.

Cadmium was in well MW-5S at 93 ug/L during May, 1991 and 8.4 ug/L (estimated) in well UG1806 in August, 1989. All of the other wells did not detect cadmium using a detection limit of 5.0 ug/L. A potential source of the cadmium are the sediments at the bottom of storm drain SD-2, located just upgradient of well MW-5S.

Total chromium was detected in Tronic wells MW-2S at 12.9 ug/L and MW-5S at 15.5 ug/L. The remaining Tronic wells revealed no detections of chromium using a detection limit of 10 ug/L. Astro wells 2, 3, and 4 display chromium levels of 280 ug/L, 295 ug/L and 2,350 ug/L, respectively. The reported source of Astro's contamination is the migration of discharges from a series of onsite leaching pools. The cooling water well at Pinelawn Cemetery contained total chromium at 84.1 ug/L. The apparent source of this contamination are the leaching pools on the Astro property.

Copper was not detected in any of the Tronic monitoring wells sampled during this round. In May, 1989, the Astro wells contained levels between 27.4 and 32,400 ug/L of Copper.

Cyanide was not detected in any of the Tronic wells or the Astro wells using a detection limit of 10.0 ug/L.

During the data validation review, the analyses for lead and zinc were flagged with an "R" indicating that this constituent was also detected in the field blank and that the results are deemed unreliable. The data validation report goes on to say "for all intent and purposes, the reported positive results should now be considered the detection limits." The results from the Tronic wells ranged from a high of 15.4 ug/L in upgradient well MW-10 to 1.8 R ug/L in

well MW-5S. The Astro wells contained from 13 ug/L to 44 ug/L of lead.

Zinc concentrations ranged from 5.7 ug/L to 90.7 ug/L in the Tronic wells and from 43.5 ug/L to 204 ug/L in the Astro wells.

4.3.3 Development of Potential ARAR's, Evaluation and Summary of Detections in Groundwater

To assess the contaminant impacts upon groundwater underlying the Tronic site, a list of potential Applicable or Relevant and Appropriate Requirements or ARAR's were developed for organic and inorganic compounds detected during this remedial investigation. This list, presented on Table 4-19, contains the lowest enforceable, regulated groundwater concentrations developed by the NYSDEC, NYSDOH and USEPA. The USEPA's Maximum Contaminant Level Goals (MCLG's), a non-enforceable concentration of drinking water contamination, is provided for reference purposes only. The term potential is applied as these were purposely developed by CA RICH for the sole objective of comparison. Final ARAR's should be prepared by the EPA in the Risk Assessment phase of this project.

Inorganics

Tables 4-20 and 4-21 present a summary of detections of inorganic compounds for both filtered and unfiltered samples. These tables list the number of times each constituent was tested, the number of detections, high and low values, background concentrations and a comparison to both the potential ARAR's and background levels. Using these tables, parameters that exceed both the background levels and the potential ARAR's can be evaluated.

Several constituents exceeded both the background level and the ARAR one time during this program. Unfiltered samples from MW-2S analyzed for antimony and arsenic exceed the background and ARAR level, however, these results were not duplicated in the two follow-up sampling events.

Cadmium exceeded the potential ARAR of 5 ug/L in the unfiltered sample from well MW-5S and the filtered sample from UG1806. No detections of cadmium were measured in any of the other site wells. As mentioned earlier, due to high turbidity, poor storm water drainage, and lack of a locking cover, the results of samples from well UG1806 are at best questionable. Well PLCWW which was sampled during Phase 2 in place of UG1806 did not reveal detections of cadmium.

Total chromium and hexavalent chromium exceeded both the background level and the potential ARAR in well PLCWW. The apparent source of this contamination, however, are the leaching pools on the Astro site.

Iron exceeded the ARAR of 300 ug/L on two occasions. Numerous data validation qualifiers make it difficult to compare these values to background levels.

Filtered manganese samples exceeded filtered background and ARARs on four occasions. The unfiltered samples, however, did not exceed the background levels.

Silver exceeded the background level and the 50 ug/L ARAR on one occasion. This value was not duplicated, however, in the filtered samples or the follow-up sampling events.

Organics

The ARAR's for several volatile organics; trichloroethene, tetrachloroethene and 1,1,1-trichloroethane were exceeded on numerous events. These same compounds, however, were detected at similar or higher levels in the upgradient wells. 1,1 dichloroethene was detected slightly above the ARAR of 5.0 ug/L on one occasion. These detections, however, were not duplicated in follow-up sampling events.

Acetone and Freon 113 were each detected two times above the ARAR, but are believed to be artifacts of the analytical procedures.

SECTION 4.3

TABLES

TABLE 4-12

STABILIZED GROUNDWATER CONDITIONS*
FIRST AND SECOND SAMPLING ROUNDS

WELL NO.	PH (JUNE '89/AUG '89)	SPECIFIC CONDUCTIVITY (JUNE '89/AUG '89)	TEMPERATURE (CELSIUS) (JUNE '89/AUG '89)	TURBIDITY OF PURGE WATER (NTU's) (JUNE '89/AUG '89)	TURBIDITY OF SAMPLE WATER (NTU's) (JUNE '89/AUG '89)
MW-1S	5.14/4.79	105/110	MM/16	**/7.2	**/100+
MW-1D	5.83/5.43	110/130	MM/16	**/8.3	**/32
MW-2S	5.44/5.15	140/130	MM/16	**/23	**/100+
MW-2I	6.12/5.63	180/170	MM/16.5	**/14	**/100+
MW-2D	4.67/5.76	130/140	15/16	**/9.5	**/9.5
MW-3I	10.30/10.02	420/240	MM/14	**/39	**/35
UG 1806	6.0/5.83	89/90	MM/15	**/100+	**/100+
DW1/P5	**/5.23	**/135	**/16	**/14	**/100+

* STABILIZATION OF READINGS FOR TWO OR MORE CONSECUTIVE INTERVALS.
 ** NOT DETERMINED IN FIRST ROUND OF SAMPLING
 MM METER MALFUNCTION

**TABLE 4-13
TRONIC PLATING COMPANY SITE
STABILIZED GROUNDWATER CONDITIONS
THIRD SAMPLING ROUND**

Well No.	pH	Specific Conductance	Temperature °C	Turbidity of Purge Water (NTU'S)	Turbidity of Sample Water (NTU'S)
MW-1S	4.98	120	17	7	20 (1)
MW-1D	5.27	150	17	3	12 (2)
MW-2S	4.58	100	18	10	32 (1)
MW-2I	4.57	140	18	18	10 (2)
MW-2D	4.84	150	17	6	20 (2)
MW-3I	9.07	205	15	4	11 (2)
MW-4S	5.60	70	17.5	6	6 (3)
MW-4I	5.41	180	17	14	20 (2)
MW-5S	5.30	110	16	18	27 (1)
PLCWW	4.80	100	15	1.2	1.2 (3)

NOTES:

- 1) Metals, TOC and Cyanide collected from bailer after waiting 2 to 4 hours after purging.
- 2) Metals, TOC and Cyanide collected from bailer immediately after purging.
- 3) Metals, TOC and Cyanide collected from pump discharge.

TABLE 4-14

ORGANIC ANALYSIS FOR GROUNDWATER
Tronic Plating Company
Farmingdale, New York

WELL I.D. ROUND # DATE	MW-1S		MW-1D		MW-2S		MW-2X (MW-2S Dup)		MW-2I		MW-2D	
	ROUND #1 7-Jun-89	ROUND #2 17-Aug-89	ROUND #1 7-Jun-89	ROUND #2 17-Aug-89	ROUND #1 7-Jun-89	ROUND #2 17-Aug-89	ROUND #1 7-Jun-89	ROUND #2 15-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89
VOLATILE												
ACETONE	ND	ND	9700 B	79 B	12 U	ND	ND	N/A	360 U	ND	ND	15 B
TRICHLOROETHENE	84	65	110	490 J	40	35	46	N/A	48	63	13	18
TETRACHLOROETHENE	5	3 J	5	18	2 J	2 J	2 J	N/A	2 J	3 J	3 J	4 J
1,1,1-TRICHLOROETHANE	ND	ND	ND	4 J	10	8 J	9	N/A	18	7	32	25
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	7	N/A	ND	ND	ND	ND
1,2-DICHLOROETHENE	ND	8	ND	3 J	ND	ND	ND	N/A	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
TOLUENE	ND	ND	ND	ND	ND	ND	4 J	N/A	ND	ND	ND	ND
FREON	ND	ND	ND	10 J	ND	ND	ND	N/A	ND	ND	ND	ND
TOTAL UNKNOWNS	ND	ND	ND	ND	ND	ND	ND	N/A	21.3 JN	ND	ND	ND
SEMI-VOLATILE												
BIS(2-ETHYLHEXYL)PHTHALATE	ND	N/A	11 U	N/A	ND	N/A	ND	N/A	ND	N/A	ND	N/A
TOTAL UNKNOWNS	ND	N/A	ND	N/A	17 JN	N/A	ND	N/A	ND	N/A	ND	N/A
PESTICIDES/PCB	ND	N/A										

WELL I.D. ROUND # DATE	MW-3I		MW-3X (MW-3I Dup)		UG-1806		H-1(E.F.W.D. HYDRANT)		FIELD BLANK		TRIP BLANK	
	ROUND #1 8-Jun-89	ROUND #2 17-Aug-89	ROUND #1 8-Jun-89	ROUND #2 17-Aug-89	ROUND #1 8-Jun-89	ROUND #2 17-Aug-89	ROUND #1 8-Jun-89	ROUND #2 17-Aug-89	ROUND #1 7-Jun-89	ROUND #2 17-Aug-89	ROUND #1 6/7 & 8/89	ROUND #2 17-Aug-89
VOLATILE												
ACETONE	ND	METHOD CLP/624-M ND/ND	N/A	METHOD CLP/624-M ND/6	ND	ND	10 U	N/A	150	28	ND	ND
TRICHLOROETHENE	9	46/38	N/A	29/ND	61	14	ND	N/A	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	7	24J/20	N/A	14/ND	28	21 J	ND	N/A	ND	ND	ND	ND
TETRACHLOROETHENE	ND	39/41	N/A	24/ND	50	ND	ND	N/A	ND	ND	ND	ND
1,2-DICHLOROPROPANE	ND	2J/1	N/A	ND/ND	ND	ND	ND	N/A	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND/4	N/A	ND/ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND/2	N/A	ND/ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHENE	ND	ND/4	N/A	ND/ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND/ND	N/A	3 B/ND	ND	ND	ND	N/A	ND	ND	ND	ND
FREON	ND	74 J/ND	N/A	48 J/ND	120 JN	ND	ND	N/A	ND	ND	ND	ND
TOTAL UNKNOWNS	ND	ND/ND	N/A	ND/ND	ND	ND	ND	N/A	ND	ND	ND	ND
SEMI-VOLATILE												
BIS(2-ETHYLHEXYL)PHTHALATE	ND	N/A	N/A	N/A	ND	N/A	ND	N/A	ND	N/A	ND	N/A
TOTAL UNKNOWNS	ND	N/A	N/A	N/A	ND	N/A	ND	N/A	ND	N/A	ND	N/A
PESTICIDES/PCB	ND	N/A	N/A	N/A	ND	N/A	ND	N/A	ND	N/A	ND	N/A

All concentrations expressed in parts per billion (ppb).

J = Quantitation is approximate due to limitations identified in the quality control review.

B = The reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.

N = Identification to suspect due to limitations identified in the quality assurance review.

ND = Indicates No Detection.

N/A = Indicates Not Applicable.

MW-2X is a duplicate sample for MW-2S.

MW-3X is a duplicate sample for MW-3I.

624-M = EPA Method 624 Modified to achieve lower detection limits.

TABLE 4-15

INORGANIC ANALYSIS FOR UNFILTERED GROUNDWATER
(TOTAL METALS)
Tronic Plating Company
Farmingdale, New York

WELL I.D.	ROUND # DATE	MW-1S		MW-10		MW-2S		MW-2X (MW-2S Dup)		MW-2I		MW-2D	
		ROUND #1 7-Jun-89	ROUND #2 15-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89						
PARAMETER	(IDL)												
ALUMINUM	100.0	21400 J	6920 J	1840 J	298 J	9800 J	12200 J	23800 J	N/A	825 J	138 JB	307 J	ND
ANTIMONY	50.0	ND	ND	ND	ND	58.2 JB	ND	ND	N/A	ND	ND	ND	ND
ARSENIC	5.0	ND	ND	ND	ND	9 B	ND	31	N/A	12	ND	ND	ND
BARIUM	50.0	259	107 B	55.8 B	53.1 B	139 B	145 B	225	N/A	148 B	139 B	ND	ND
BERYLLIUM	5.0	5.7	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
CADMIUM	5.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
CALCIUM	10.0	12500	18200	19400	14400	21400	19100	23400	N/A	18600	14400	15700	16000
CHROMIUM	5.0	31 R	16.5 J	5.0 UR	ND	30.5 R	42.1 J	69.7 R	N/A	5.0 UR	10.1 J	8.1 R	ND
COBALT	10.0	48.5 B	ND	11.7 B	ND	19.9 B	18.8 B	40.7 B	N/A	ND	ND	ND	ND
COPPER	10.0	61.2 R	59.6	55.8 R	45.4	75.8 R	89.6	127 R	N/A	34.6 R	28.1	36.4 R	28.5
IRON	10.0	58800 R	15700 R	3870 R	889 R	17600 R	24400 R	43800 R	N/A	1480 R	264 R	733 R	122 R
LEAD	5.0	44.8 J	43.5 J	29.7 J	75.5 J	23.9 J	21.8 J	40.3 J	N/A	18.1 J	11.4 J	11.8 J	12.7 J
MAGNESIUM	20.0	6650	5450 J	4070 B	3500 J	5270	5330 J	8020	N/A	3270 B	2820 J	3170 B	4040 BJ
MANGANESE	10.0	3180 J	657	237 J	28	1030 J	886	1650 J	N/A	100 J	297	64.1 J	32.1
MERCURY	0.2	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
NICKEL	20.0	40.4	58.8	ND	36.8 B	25.3 B	31.2 B	70.1	N/A	ND	ND	ND	ND
POTASSIUM	400.0	4240 B	3860 B	4160 B	4810 B	6260 J	6480 B	8220 J	N/A	8110 J	9710	5310 B	5860 B
SELENIUM	5.0	ND	ND	ND	ND	ND	ND	ND	N/A	5	ND	ND	ND
SILVER	10.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
SODIUM	50.0	15200 J	12400 J	16400 J	15900 J	13800 J	13000 J	14300 J	N/A	12300 J	12100 J	12900 J	16000 J
THALLIUM	5.0	ND	5.8 B	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
VANADIUM	10.0	43.8 BJ	18.3 B	14.2 BJ	ND	17.7 BJ	35.8 B	51.4 J	N/A	ND	ND	ND	ND
ZINC	20.0	284 R	3680 R	169 R	899 R	97.9 R	1010 R	155 R	N/A	110 R	698 R	60.1 R	76.3 R
CYANIDE	10.0	10.0 UL	10.0 UL	10.0 UL	10.0 UL	10.0 UL	10.0 UL	10.0 UL	N/A	10.0 UL	10.0 UL	10.0 UL	10.0 UL
Results in mg/l													
ALKALINITY	<1	N/A	8 R	N/A	28	N/A	41	N/A	8 R	N/A	32	N/A	N/A
BICARBONATES	<1	N/A	8 R	N/A	28	N/A	41	N/A	8 R	N/A	32	N/A	N/A
B.O.D.	<3	N/A	<3	N/A	<3	N/A	<3	N/A	<3	N/A	<3	N/A	N/A
CHLORIDE	30	N/A	25	N/A	13	N/A	13	N/A	27	N/A	20	N/A	N/A
C.O.D.	49 R	N/A	15 R	N/A	23 R	N/A	32 R	N/A	19 R	N/A	28 R	N/A	N/A
HARDNESS	40	N/A	35	N/A	65	N/A	65	N/A	50	N/A	45	N/A	N/A
HEX. CHROM. (MDL=0.005)	0.067	0.01	0.037	0.008	0.061	0.014	<0.005	ND	0.058	0.007	0.051	ND	N/A
OIL & GREASE	<1	N/A	<1	N/A	<1	N/A	<1	N/A	<1	N/A	<1	N/A	N/A
SULFATE	14	N/A	20	N/A	42	N/A	38	N/A	51	N/A	22	N/A	N/A
NITRATES	N/A	3.37	N/A	7.1	N/A	3.16	N/A	N/A	N/A	5.15	N/A	4.47	N/A
CARBONATES	<1	N/A	<1	N/A	<1	N/A	<1	N/A	<1	N/A	<1	N/A	N/A

All concentrations expressed in parts per billion (ppb), unless stated otherwise.
 J - Quantitation is approximate due to limitations identified in the quality control review.
 B - The reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.
 R - Unreliable results - Analyte may or may not be present in this sample.
 ND - The analyte was Not Detected at the reported IDL.
 N/A - Indicates Not Applicable.
 MW-2X is a duplicate sample for MW-2S (First round only).
 IDL - Instrument Detection Level. MDL - Method Detection Level.

TABLE 4-15

INORGANIC ANALYSIS FOR UNFILTERED GROUNDWATER
(TOTAL METALS)
Tronic Plating Company
Farmingdale, New York

WELL I.D.	ROUND #1 ROUND #2 DATE	MW-31		MW-3X (MW-31 DUP)		UG-1806		E.F.W.D HYDRANT	P-5	FIELD BLANK		TRIP BLANK	
		ROUND #1 7-Jun-89	ROUND #2 15-Aug-89	ROUND #1 7-Jun-89	ROUND #2 15-Aug-89	ROUND #1 7-Jun-89	ROUND #2 15-Aug-89	ROUND #1 10-May-89	ROUND #2 15-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89
PARAMETER (Total)													
ALUMINUM (IDL)	100.0	783 J	482 J	N/A	538 J	80900 J	8800 J	ND	7130 J	ND	ND	N/A	N/A
ANTIMONY	50.0	ND	ND	N/A	ND	ND	ND	ND	ND	ND	ND	N/A	N/A
ARSENIC	5.0	8 B	ND	N/A	ND	9 B	ND	ND	ND	8 B	ND	N/A	N/A
BARIUM	50.0	ND	ND	N/A	ND	392	80.4 B	ND	178 B	ND	ND	N/A	N/A
BERYLLIUM	5.0	ND	ND	N/A	ND	7.2	ND	ND	ND	ND	ND	N/A	N/A
CADMIUM	5.0	ND	ND	N/A	ND	151	23.9 J	ND	ND	ND	ND	N/A	N/A
CALCIUM	10.0	29500	35200	N/A	35900	20300	15400	6320 J	17500	77.8 B	265 B	N/A	N/A
CHROMIUM	5.0	14.3 R	ND	N/A	8.2 JB	156 R	36.5 J	ND	33.4 J	5.0 UR	13.2 J	N/A	N/A
COBALT	10.0	ND	ND	N/A	ND	32.3	ND	ND	ND	ND	ND	N/A	N/A
COPPER	10.0	19.8 BR	24 B	N/A	22.4 B	546 R	65.1	ND	36	10.0 UR	ND	N/A	N/A
IRON	10.0	1760 R	497 R	N/A	1050 R	85200 R	11000 R	76 J	18100 R	10.2 R	25.5 R	N/A	N/A
LEAD	5.0	ND	34.9 R	N/A	5.2 J	2550 J	312 J*	ND	16.5 J	ND	ND	N/A	N/A
MAGNESIUM	20.0	5240	5830 J	N/A	5830 J	11000	4110 JB	1410 J	4630 BJ	58 B	66.3 BJ	N/A	N/A
MANGANESE	10.0	81.2 J	43.1	N/A	45.5	3230 J	248	ND	394	10.0 UJ	ND	N/A	N/A
MERCURY	0.2	ND	ND	N/A	ND	1.1	ND	ND	ND	ND	ND	N/A	N/A
NICKEL	20.0	ND	38.8 B	N/A	ND	7.4	22.1 B	ND	32.6 B	ND	ND	N/A	N/A
POTASSIUM	400.0	60500 J	26000	N/A	27000	6190 J	3560 B	847 R	4600 B	538 JB	1460 B	N/A	N/A
SELENIUM	5.0	ND	ND	N/A	ND	ND	ND	ND	ND	ND	ND	N/A	N/A
SILVER	10.0	ND	8.4	N/A	ND	ND	ND	ND	ND	ND	ND	N/A	N/A
SODIUM	50.0	30500 J	18300 J	N/A	18700 J	9120 J	9060 J	844 J	8710 J	297 BJ	219 BJ	N/A	N/A
THALLIUM	5.0	ND	ND	N/A	ND	ND	ND	ND	ND	ND	ND	N/A	N/A
VANADIUM	10.0	12.4 BJ	ND	N/A	10.1 B	150	16.8 B	ND	17.8 B	ND	ND	N/A	N/A
ZINC	20.0	43.4 R	58.4 R	N/A	67.2 R	1080 R	140 R	26.1 J	880 R	20.0 UR	20.0 UR	N/A	N/A
CYANIDE	10.0	10.0 UL	ND	N/A	ND	10.0 UL	ND	ND	ND	10.0 UL	ND	N/A	N/A
Results in mg/l													
ALKALINITY		97	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	N/A	N/A	N/A
BICARBONATES		5 R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	N/A	N/A	N/A
B.O.D		<3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<3	N/A	N/A	N/A
CHLORIDE		20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	N/A	N/A
C.O.D		32 R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	23	N/A	N/A	N/A
HARDNESS		25	N/A	N/A	N/A	30	N/A	N/A	N/A	<1	N/A	N/A	N/A
HEX. CHROM. MDL-0.005		0.03	0.087	N/A	0.07	0.038	0.08	N/A	0.028	<.005	ND	N/A	N/A
OL & GREASE		<.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<.1	N/A	N/A	N/A
SULFATE		52	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A
NITRATES		N/A	9.62	N/A	9.92	N/A	2.88	N/A	7.42	N/A	0.7	N/A	N/A
CARBONATES		10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1	N/A	N/A	N/A

All concentrations expressed in parts per billion (ppb), unless stated otherwise.
 J - Quantitation is approximate due to limitations identified in the quality control review.
 B - The reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.
 R - Unreliable results - Analyte may or may not be present in this sample.
 ND - The analyte was Not Detected at the reported IDL.
 N/A - Indicates Not Applicable.
 MW-3X is a duplicate sample for MW-31 (Second round only).
 IDL - Instrument Detection Level. MDL - Method Detection Level.

TABLE 4-15

INORGANIC ANALYSIS FOR FILTERED GROUNDWATER
(DISSOLVED METALS)
Tronic Plating Company
Farmingdale, New York

WELL I.D. ROUND # DATE	MW-1S		MW-1D		MW-2S		MW-2X (MW-2S Dup)		MW-2I		MW-2D	
	ROUND #1 7-Jun-89	ROUND #2 15-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89						
PARAMETER (Dissolved)												
ALUMINUM (IDL)												
100.0	ND	ND	ND	ND	ND	ND	107 B	N/A	ND	ND	ND	ND
ANTIMONY	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
50.0	ND	ND	ND	ND	ND	ND	5	N/A	5.0 BJ	ND	ND	ND
ARSENIC	ND	63.4 B	ND	ND	65.3B	ND	64 B	N/A	184 B	141 B	ND	ND
50.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
BARIUM	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
50.0	15000 B	13900	11700 B	9370	15800 B	14500	15700 B	N/A	14400 B	10300	13300 B	11000
BERYLLIUM	5.0 UR	ND	9.5 R	ND	11.4 R	ND	5.7 R	N/A	10.8 R	12.2 J	5.0 UR	5.1 JB
5.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
CADMIUM	ND	ND	ND	ND	ND	ND	ND	N/A	ND	18.2 B	16.5 B	ND
5.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	56.4 BR	78.9 BR	11.8 BR
CALCIUM	15000 B	13900	11700 B	9370	15800 B	14500	15700 B	N/A	14400 B	10300	13300 B	11000
10.0	5.0 UR	ND	9.5 R	ND	11.4 R	ND	5.7 R	N/A	10.8 R	12.2 J	5.0 UR	5.1 JB
CHROMIUM	5.0	ND	9.5 R	ND	11.4 R	ND	5.7 R	N/A	10.8 R	12.2 J	5.0 UR	5.1 JB
5.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
COBALT	10.0	ND	ND	ND	ND	ND	ND	N/A	ND	18.2 B	16.5 B	ND
10.0	16.8 B	10.0 B	ND	ND	ND	ND	ND	N/A	ND	56.4 BR	78.9 BR	11.8 BR
COBALT	10.0	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
10.0	16.8 B	10.0 B	ND	ND	ND	ND	ND	N/A	ND	18.2 B	16.5 B	ND
COPPER	10.0	52.8 BR	23.7 BR	10.0 UR	10.0 UR	48.0 BR	26.1 BR	75.7 BR	N/A	56.4 BR	78.9 BR	11.8 BR
10.0	ND	ND	ND	8.0 J	ND	ND	ND	ND	N/A	ND	8.6 J	26.4 R
IRON	52.8 BR	23.7 BR	10.0 UR	10.0 UR	48.0 BR	26.1 BR	75.7 BR	N/A	56.4 BR	78.9 BR	11.8 BR	90.2 BR
10.0	ND	ND	ND	8.0 J	ND	ND	ND	N/A	ND	ND	ND	26.4 R
LEAD	5.0	ND	ND	8.0 J	ND	ND	ND	N/A	ND	8.6 J	ND	26.4 R
5.0	4790 B	3600 BJ	2060 B	2430 J	2780 B	2310 J	2720 B	N/A	3090 B	2020 J	2240 B	2730 JB
MAGNESIUM	20.0	4790 B	3600 BJ	2060 B	2430 J	2780 B	2310 J	2720 B	N/A	3090 B	2020 J	2240 B
20.0	84.2 J	112	189 J	16.7	337 J	148	339 J	N/A	108 J	313	65.9 J	24.7
MANGANESE	10.0	84.2 J	112	189 J	16.7	337 J	148	339 J	N/A	108 J	313	65.9 J
10.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
MERCURY	0.2	ND	ND	ND	ND	ND	ND	N/A	ND	32.8 B	ND	ND
0.2	29.4 B	ND	ND	ND	ND	ND	ND	N/A	ND	32.8 B	ND	ND
NICKEL	20.0	29.4 B	ND	ND	ND	ND	ND	N/A	ND	32.8 B	ND	ND
20.0	3100 B	2850 B	2910 B	4930 B	7070 J	3240 B	6710 J	N/A	8910 J	10300	7920 J	5700 B
POTASSIUM	400.0	3100 B	2850 B	2910 B	4930 B	7070 J	3240 B	6710 J	N/A	8910 J	10300	7920 J
400.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
SELENIUM	5.0	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
5.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
SILVER	10.0	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
10.0	28300 J	12900 J	17800 J	16800 J	15700 J	12600 J	15600 J	N/A	16900 J	13100 J	18700 J	14200 J
SODIUM	50.0	28300 J	12900 J	17800 J	16800 J	15700 J	12600 J	15600 J	N/A	16900 J	13100 J	18700 J
50.0	ND	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
THALLIUM	5.0	ND	ND	ND	ND	ND	ND	N/A	ND	ND	ND	ND
5.0	ND	ND	ND	ND	14.2 BJ	ND	ND	N/A	ND	ND	ND	ND
VANADIUM	10.0	ND	ND	ND	14.2 BJ	ND	ND	N/A	ND	ND	ND	ND
10.0	152 J	56.4 R	153 J	55.4 R	43.3 J	39.3 R	37.7 J	N/A	95.4 J	78.1 R	90.8 J	70.8 R
ZINC	20.0	152 J	56.4 R	153 J	55.4 R	43.3 J	39.3 R	37.7 J	N/A	95.4 J	78.1 R	90.8 J
20.0	N/A	N/A										
CYANIDE	10.0	N/A	N/A	N/A								
10.0	N/A	5.0 U	N/A	5.0 U	N/A	5.0 U	N/A	N/A	N/A	5.0 U	N/A	5.0 U
HEX. CHROM. MDL=0.005	N/A	5.0 U	N/A	5.0 U	N/A	5.0 U	N/A	N/A	N/A	5.0 U	N/A	5.0 U

All concentrations expressed in parts per billion (ppb).

J - Quantitation is approximate due to limitations identified in the quality control review.

B - The reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.

R - Unreliable results - Analyte may or may not be present in this sample.

ND - Analyte was Not Detected at reported IDL.

N/A - Indicates Not Applicable.

MW-2X is a duplicate sample for MW-2S (First round only).

IDL - Instrument Detection Level.

MDL - Method Detection Level.

TABLE 4-15

INORGANIC ANALYSIS FOR FILTERED GROUNDWATER
(DISSOLVED METALS)
Tronic Plating Company
Farmingdale, New York

WELL I.D. ROUND # DATE	MW-31		MW-3X (MW-31 DUP)		UG-1806		P-5		FIELD BLANK		TRIP BLANK	
	ROUND #1 7-Jun-89	ROUND #2 15-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89	ROUND #1 8-Jun-89	ROUND #2 16-Aug-89						
PARAMETER (Dissolved) (IDL)												
ALUMINUM 100.0	268	276 J	N/A	289 J	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
ANTIMONY 50.0	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
ARSENIC 5.0	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
BARIUM 50.0	ND	ND	N/A	ND	ND	ND	N/A	69.3 B	N/A	N/A	N/A	N/A
BERYLLIUM 5.0	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
CADMIUM 5.0	ND	ND	N/A	ND	14.1 J	8.4 J	N/A	ND	N/A	N/A	N/A	N/A
CALCIUM 10.0	11000 B	25300	N/A	24900	9680 B	9530	N/A	13800	N/A	N/A	N/A	N/A
CHROMIUM 5.0	12.4 R	ND	N/A	7.3 JB	5.0 UR	ND	N/A	13.2 J	N/A	N/A	N/A	N/A
COBALT 10.0	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
COPPER 10.0	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
IRON 10.0	28.6 BR	10.0 UR	N/A	10.2 BR	604 R	56.3 BR	N/A	17.3 BR	N/A	N/A	N/A	N/A
LEAD 5.0	9.2 J	ND	N/A	ND	ND	5.0 J	N/A	ND	N/A	N/A	N/A	N/A
MAGNESIUM 20.0	2700 B	4480 J	N/A	4700 JB	2260 B	1950 J	N/A	2280 JB	N/A	N/A	N/A	N/A
MANGANESE 10.0	10.0 UJ	ND	N/A	ND	1280 J	107	N/A	17.4	N/A	N/A	N/A	N/A
MERCURY 0.2	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
NICKEL 20.0	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
POTASSIUM 400.0	68000 J	27900	N/A	30700	2780 B	3310 B	N/A	4300 B	N/A	N/A	N/A	N/A
SELENIUM 5.0	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
SILVER 10.0	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
SODIUM 50.0	32800 J	19600 J	N/A	20600 J	9560 J	9270 J	N/A	9350 J	N/A	N/A	N/A	N/A
THALLIUM 5.0	ND	ND	N/A	ND	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
VANADIUM 10.0	ND	ND	N/A	14.3 B	ND	ND	N/A	ND	N/A	N/A	N/A	N/A
ZINC 20.0	40J	23.5 R	N/A	28.9 R	35.5 J	42.8 R	N/A	37.2 R	N/A	N/A	N/A	N/A
CYANIDE 10.0	N/A	N/A										
HEX. CHROM. MDL=0.005	N/A	5.0 U	N/A	5.0 U	3B	5.0 U	N/A	5.0 U	N/A	N/A	N/A	N/A

All concentrations expressed in parts per billion (ppb).

J = Quantitation is approximate due to limitations identified in the quality control review.

B = The reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.

R = Unreliable results - Analyte may or may not be present in this sample.

ND = Analyte was Not Detected at the reported IDL.

N/A = Indicates Not Applicable.

MW-3X is a duplicate sample for MW-31 (Second round only).

IDL = Instrument Detection Level. MDL = Method Detection Level.

TABLE 4-16 (Cont'd)

VOLATILE ORGANIC ANALYSIS - ANALYTICAL RESULTS														- page 2
CA Rich Sample Number	MJ-5S (B)	MJ-1S (B)	MJ-1D (B)	FIELD BLANK FO 5/15	TRIP BLANK TO 5/15	PLCMA-1	MJ-31 (B)	FIELD BLANK FO 5/16	TRIP BLANK TO 5/16	MJ-2S (B)	MJ-2D (B)	FIELD BLANK FO 5/13	TRIP BLANK TO 5/13	MJ-21 (B)
Laboratory Sample Number	99201-001	99201-002	99201-003	99201-004	99201-005	99319-001	99319-002	99319-003	99319-004	99175-001	99175-002	99175-003	99175-004	99220-001
Remarks				Field Blank	Trip Blank			Field Blank	Trip Blank			Field Blank	Trip Blank	
Units	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
VOLATILE COMPOUNDS	Quantitation Limit													
cis-1,3-Dichloropropene	5													
Bromoform	5													
2-Heptanone	10													
4-Methyl-2-pentanone	10													
Tetrachloroethene	5	2 J	3 J	10 J			1 J	21		5 J	6			11
Toluene	5													
Chlorobenzene	5													
Ethylbenzene	5													
Styrene	5													
Total Xylenes	5													
Freon 113	5						22							1 J
Quantitation Limit Multiplier	1.00	1.00	5.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Date of Sample Collection	05/15/91	05/15/91	05/15/91	05/15/91	05/15/91	05/16/91	05/16/91	05/16/91	05/16/91	05/16/91	05/13/91	05/13/91	05/13/91	05/14/91
Date Sample Received by Laboratory	05/16/91	05/16/91	05/16/91	05/16/91	05/16/91	05/17/91	05/17/91	05/17/91	05/17/91	05/17/91	05/14/91	05/14/91	05/14/91	05/15/91
Date of Sample Analysis	05/21/91	05/21/91	05/21/91	05/21/91	05/21/91	05/21/91	05/21/91	05/21/91	05/21/91	05/22/91	05/19/91	05/19/91	05/19/91	05/21/91
Instrument Used for Analysis	MS-96 2	MS-96 2	MS-96 2	MS-96 2	MS-96 2	MS-96 1	MS-96 1	MS-96 1	MS-96 2	MS-96 2	MS-96 2	MS-96 2	MS-96 2	MS-96 2

NOTES:
 - Compound was not detected.
 U This compound should be considered "not-detected" since it was detected in a blank at a similar level.
 B Unreliable result - Compound may or may not be present in this sample.
 J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
 NJ This compound was not detected, but the quantitation limits is probably higher due to a low blank identified during the quality assurance review.

TABLE 4-16 (Cont'd)

CLP - TENTATIVELY IDENTIFIED COMPOUNDS	ESTIMATED CONCENTRATIONS														page 3
	MI-15 (D)	MI-15 (D)	MI-1D (D)	FIELD BLANK FD 5/15	TRIP BLANK TD 5/15	PLCMI-1	MI-31 (D)	FIELD BLANK FD 5/16	TRIP BLANK TD 5/16	MI-23 (D)	MI-20 (D)	FIELD BLANK FD 5/13	TRIP BLANK TD 5/13	MI-21 (D)	
Laboratory Sample Number	99201-001	99201-002	99201-003	99201-004	99201-005	99319-001	99319-002	99319-003	99319-004	99175-001	99175-002	99175-003	99175-004	99220-001	
Remarks				Field Blank	Trip Blank			Field Blank	Trip Blank			Field Blank	Trip Blank		
Units	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	
COMPOUNDS															
VOLATILE COMPONENTS															
2-Methylbutane					6 J										
Pentane									6 J				15 J		

- NOTES:
- Compound was not detected.
 - U This compound should be considered "not-detected" since it was detected in a blank at a similar level.
 - R Unreliable result - Compound may or may not be present in this sample.
 - J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
 - UJ This compound was not detected, but the quantitation limits is probably higher due to a low bias identified during the quality assurance review.

TABLE 4-16 (Cont'd)

VOLATILE ORGANIC ANALYSIS - ANALYTICAL RESULTS						- page 4
Lab Sample Number	MS-45 (P)	MS-45 (P)	MS-41 (B)	FIELD BLANK FB 5/14	TRIP BLANK TB 5/14	
Laboratory Sample Number	99220-002	99220-003	99220-004	99220-005	99220-006	
Remarks		Duplicate of MS-45 (P)		Field Blank	Trip Blank	
Units	ug/l	ug/l	ug/l	ug/l	ug/l	
VOLATILE COMPOUNDS	Quantitation Limit					
Chloromethane	10					
Bromomethane	10					
Vinyl Chloride	10					
Chloroethane	10					
Methylene Chloride	5					
Acetone	10					
Carbon Disulfide	5					
1,1-Dichloroethane	5					
1,1-Dichloroethane	5					
Total 1,2-Dichloroethane	5		1 J			
Chloroform	5					
1,2-Dichloroethane	5					
2-Butanone	10					
1,1,1-Trichloroethane	5		7			
Carbon Tetrachloride	5					
Vinyl Acetate	10					
Bromodichloromethane	5					
1,1,2,2-Tetrachloroethane	5					
1,2-Dichloropropane	5					
trans-1,3-Dichloropropene	5	R	R	R	R	R
Trichloroethene	5		2 J	57		
Dibromochloromethane	5					
1,1,2-Trichloroethane	5					
Benzene	5					

NOTES:

- Compound was not detected.
- U This compound should be considered "not-detected" since it was detected in a blank at a similar level.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

VOLATILE ORGANIC ANALYSIS - ANALYTICAL RESULTS						- page 5
CO Rich Sample Number	MW-45 (P)	MW-45 (P)	MW-41 (B)	FIELD BLANK FD 5/14	TRIP BLANK TD 5/14	
Laboratory Sample Number	99220-002	99220-003	99220-004	99220-005	99220-006	
Remarks		Duplicate of MW-45 (P)		Field Blank	Trip Blank	
Units	ug/L	ug/L	ug/L	ug/L	ug/L	
VOLATILE COMPOUNDS	Quantitation Limit					
cis-1,3-Dichloropropene	5					
Bromoform	5					
2-Hexanone	10					
4-Methyl-2-pentanone	10					
Tetrachloroethene	5			3 J		
Toluene	5					
Chlorobenzene	5					
Ethylbenzene	5					
Styrene	5					
Total xylenes	5					
Freon 113	5					
Quantitation Limit Multiplier	1.00	1.00	1.00	1.00	1.00	
Date of Sample Collection	05/14/91	05/14/91	05/14/91	05/14/91	05/14/91	
Date Sample Received by Laboratory	05/15/91	05/15/91	05/15/91	05/15/91	05/15/91	
Date of Sample Analysis	05/21/91	05/20/91	05/20/91	05/20/91	05/20/91	
Instrument Used for Analysis	MS-96 2	MS-96 2	MS-96 2	MS-96 2	MS-96 2	

NOTES:

- Compound was not detected.
- U This compound should be considered "not-detected" since it was detected in a blank at a similar level.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- WJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

TABLE 4-16 (Cont'd)

CLP - TENTATIVELY IDENTIFIED COMPOUNDS	ESTIMATED CONCENTRATIONS					- page 6
CA Rich Sample Number	MU-4S (P)	MUD-4S (P)	MU-4I (B)	FIELD BLANK	TRIP BLANK	
Laboratory Sample Number	99220-002	99220-003	99220-004	FD 5/14	TD 5/14	
Remarks		Duplicate of MU-4S (P)		Field Blank	Trip Blank	
Units	ug/L	ug/L	ug/L	ug/L	ug/L	
COMPOUNDS						
VOLATILE COMPONENTS						

NOTES:

- Compound was not detected.
- U This compound should be considered "not-detected" since it was detected in a blank at a similar level.
- Q Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

TABLE 4-17

**Summary of Total Organic Carbon (TOC) in Monitoring Wells- May 1991
Phase II Sampling**

Well Number	TOC in ug/L
MW-1S	13500
MW-1D	1530
MW-2S	11600
MW-2I	1610
MW-2D	11400
MW-3I	1440
MW-4S	970
MW-4I	13400
MW-5S	2600
PLCWW-1	2370

TABLE 4-18

Inorganic Detections in Phase 2 Groundwater Samples

INORGANIC ANALYSIS - ANALYTICAL RESULTS												Page 1
CA Rich Sample Number		MW-35 (B)	MW-15 (B)	MW-1D (B)	FIELD BLANK FB 5/15	PLCIV-1	MW-31 (B)	FIELD BLANK FB 5/16	MW-25 (B)	MW-2D (B)	FIELD BLANK FB 5/13	MW-21 (B)
Laboratory Sample Number		99281-1	99281-2	99281-3	99281-4	99319-1	99319-2	99319-3	99175-1	99175-2	99175-3	99228-1
Remarks					Field Blank			Field Blank			Field Blank	
Units		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
INORGANIC ELEMENTS	Detection Limit											
Aluminum	PH	36	186	123	83.3		262		1770 J	40.7 J	UJ	
Antimony	PH	35										
Arsenic	PH	1.4			UJ			UJ		1.4 U	UJ	
Barium	PH	3.0	27.1	44.3	71.7	47.0	37.3		44.7	44.2		48.6
Beryllium	PH	2.0										
Cadmium	PH	5.0	93.3									
Calcium	PH	30	13,400	11,000	13,100	855	9190	20,600	88.5	11,800	13,100	978
Chromium	PH	10	15.5				84.1		11.3	12.9		
Cobalt	PH	10										
Copper	PH	6.0	37.5 U		32.9 U		10.4 U	7.9 U				
Iron	PH	9.0	931	185	88.7	12.0	22.0	26.2		518	82.9	12.3
Lead	PH	1.0	1.8 B	2.0 B	15.4	1.4	6.9 B	3.6 B	1.5 J	5.2 B	9.5 B	1.9 J
Magnesium	PH	33	2450	2420	3020	184	2120	2850	51.5	2540	3400	230
Manganese	PH	2.0	168	26.5	9.8		23.4	27.5		118	35.5	21.4
Mercury	CV	0.20										
Nickel	PH	13	114									
Potassium	PH	90	2340	2290	7440		2480	15,000		1920	4800	175
Selenium	PH	1.0	UJ	UJ	UJ	UJ		1.4 J	UJ			
Silver	PH	5.0			5.0 U				UJ	UJ	UJ	UJ
Sodium	PH	2.7	9450 J	12,000 J	14,480 J	730 J	9730 J	16,480 J	106 J	12,400	17,580	880
Thallium	PH	1.1										
Vanadium	PH	6.0	9.5 U		12.6 U		9.6 U					
Zinc	PH	3.0	29.9 B	5.7 B	31.4 B	7.8	6.4 B	23.1 B	6.9	31.6 B	90.7	16.3
Cyanide	C	18										
Hexavalent chromium	C	18				83.8						

NOTES:

- Element was not detected.
- U - This analyte should be considered "not-detected" since it was detected in a blank at a similar level.
- B - Unreliable result - Analyte may or may not be present in this sample.
- J - Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ - This analyte was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

ANALYTICAL METHOD:

- PH - Inductively Coupled Plasma Analysis, microwave digestion
- PH - Graphite Furnace Atomic Absorption, microwave digestion
- CV - Cold Vapor Atomic Absorption
- C - Manual Spectrophotometric

TABLE 4-18 (Cont'd)

INORGANIC ANALYSIS - ANALYTICAL RESULTS		- Page 2	
CA Batch Sample Number	MD-45 (P)	MD-61 (B)	FIELD BLANK
FR 5/14	99220-2	99220-3	99220-4
Laboratory Sample Number	99220-2	99220-3	99220-4
Remarks	Duplicate	of MD-45 (P)	Blank
Units	ug/L	ug/L	ug/L
INORGANIC ELEMENTS			
Detection Limit			
Aluminum	PM	36	61.7
Antimony	PM	35	
Aspheric	FM	1.4	
Barium	PM	3.0	26.2
Beryllium	PM	2.0	25.3
Bismuth	PM	5.8	54.4
Calcium	PM	30	519.0
Chromium	PM	18	519.0
Cobalt	PM	18	14,300
Copper	PM	6.0	1250
Iron	PM	9.8	69.1
Lead	FM	1.0	6.4
Magnesium	PM	33	3.7
Manganese	PM	2.8	6.0
Mercury	CV	0.20	
Nickel	PM	13	
Potassium	PM	90	853
Selenium	FM	1.8	7580
Silver	PM	5.0	
Sodium	PM	2.7	11,100
Strontium	PM	11,100	11,000
Tantalum	FM	1.1	15,200
Tin	PM	3.0	41.8
Vanadium	PM	8.0	8.7
Zinc	PM	3.0	45.1
Cyanide	C	18	
Thoron/Protactinium C		18	

ANALYTICAL METHOD:

- PM - Inductively Coupled Plasma Analysis
- FM - Graphite Furnace Atomic Absorption, microwave digestion
- CV - Cold Vapor Atomic Absorption, microwave digestion
- C - Manual Spectrophotometric

- Element was not detected.
- U - This analyte should be considered "not detected" since it was detected in a blank at a similar level.
- B - Unreliable result - Analyte may or may not be present in this sample.
- J - Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ - This analyte was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

TABLE 4-19

Potential Applicable or Relevant and Appropriate Requirements (ARAR's)
GROUNDWATER STANDARDS (ug/l)

	NYSDEC* (Groundwater)	NYSDOH** Part 5	USEPA*** MCL	Potential ARAR	USEPA*** MCLG
INORGANICS					
Aluminum	-	-	-	-	-
Antimony	3	-	5 (P)	3	3
Arsenic	25	50	50	25	-
Barium	1000	1000	200	200	200
Beryllium	3	-	1	1	0
Cadmium	10	10	5	5	5
Calcium	-	-	-	-	-
Chromium	-	50	100	50	100
Hexavalent Chromium	50	-	-	50	-
Cobalt	-	-	-	-	-
Copper	1000	1000	1300	1000	1300
Iron	300	300	-	300	-
Lead	25	50	5 (P)	5 (P)	0
Magnesium	-	-	-	-	-
Manganese	300	300	-	300	-
Mercury	2	2	2	2	2
Nickel	-	-	100 (P)	100 (P)	100 (P)
Potassium	-	-	-	-	-
Selenium	20	10	50	10	50
Silver	50	50	-	50	-
Sodium	-	-	-	-	-
Thallium	-	-	1 (P)	1 (P)	0.5
Vanadium	-	-	-	-	-
Zinc	5000	5000	-	5000	-
Cyanide	200	-	200 (P)	200	200 (P)
ORGANICS					
Acetone	-	50	-	50	-
Trichloroethene	50	5	5	5	0
Tetrachloroethene	0.7	5	5	0.7	0
1,1,1-Trichloroethane	50	5	200	5	200
1,1-Dichloroethene	-	5	7	5	7
1,2-Dichloroethene	-	5	70	5	70
Toluene	50	5	100	5	100
Freon 113	-	50	-	50	-
1,1-Dichloroethane	-	5	-	5	-
Methylene Chloride	50	5	-	5	-
Chloroform	100	5	100	5	-

*NYSDEC, 4/1/87, Div. of Water-Technical & Operational Guidance Series, 6NYCRR Parts 701-703

**NYSDOH, 11/28/88, Chapter 1 State Sanitary Code Part 5 Drinking Water Supplies;
Subpart 5-1 Public Water Supplies

***USEPA Drinking Water Regulations and Health Advisories, April 1991

(P) = Proposed

MCL = Maximum Contaminant Level

MCLG = Maximum Contaminant Level Goal (non-enforceable)

TABLE 4-20

Tronics Plating Co. Site
Summary of Detections of Inorganic Compounds
in Unfiltered Groundwater Samples (ug/L)

Compound	# of Times Tested*	# of Times Detected	% Detected	Range		Background Concentrations						Potential APAR Concentrations	# of Detections Above	
				High	Low	Jun-89		Aug-89		May-91			Background	APAR
						MW-1S	MW-1D	MW-1S	MW-1 D	MW-1S	MW-1D			
Aluminum	26	24	92	23800J	38.8	21400 J	1840 J	6920 J	298 J	123	83.3	-	1	-
Antimony	26	1	4	58.2	58.2	50 U	50U	50U	50 U	35 U	35 U	3	1	1
Arsenic	26	4	15	31	8 B	5 U	5 U	5 U	5 U	1.4 U	1.4 U	25	1	1
Barium	26	21	81	225	25.3	259	55.8 B	107 B	53.1 J	44.3	71.7	200	0	1
Beryllium	26	1	4	5.7	5.7	5.7	5 U	5 U	5 U	2 U	2 U	1	0	1
Cadmium	26	1	4	93.3	93.3	5 U	5 U	5 U	5 U	5 U	5 U	5	1	1
Calcium	24	24	100	35900	6320	12500	19400	18200	14400	11000	13100	-	2	-
Chromium	19	8	42	84	8.2 JB	31 R	5 U	16.5 J	5 U	10 U	10 U	50	1	1
Cobalt	26	5	19	48.5	11.7	48.5 B	11.7 B	10 U	10 U	10 U	10 U	-	0	-
Copper	19	8	42	89.6	22.4	61.2 R	55.8 R	59.6	45.4	6 U	32.9 U	1000	1	0
Iron	7	7	100	931	22	58800 R	3870 R	15700 R	899 R	185	88.7	300	2	2
Lead	19	19	100	75.5 J	3.7 J	44.6 J	29.7 J	43.5 J	75.5 J	2.0 R	15.4	5	0	16
Magnesium	24	24	100	6650	2120	6650	4070	5450 J	3500J	2420	3020	-	0	-
Manganese	26	26	100	3180 J	7	3180 J	237J	657	28	26.5	9.8	300	0	3
Mercury	26	0	0	-	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2	0	0
Nickel	26	10	38	114	25.3 B	40.4	20 U	58.8	36.8B	13 U	13 U	100	2	0
Potassium	26	26	100	60500 J	853	4240 B	4160 B	3860 B	4810	2290	7440	-	5	-
Selenium	26	2	8	5	1.4 J	5 U	5 U	5 U	5 U	1 UJ	1 UJ	10	0	0
Silver	26	1	4	64	64	10 U	10U	10 U	10 U	5 U	5 U	50	1	1
Sodium	26	26	100	30500 J	844 J	15200 J	16400	12400 J	15900	12800	14400 J	-	-	-
Thallium	26	1	4	5.6 B	5.6 B	5 U	5 U	5.6 B	5 U	1.1 U	1.1 U	1	0	1
Vanadium	26	9	35	51.4 J	10.1	43.8 BJ	14.2 BJ	16.3 B	10U	8 U	12.6 U	-	1	-
Zinc	4	4	100	90.7	21.6 J	284 R	169 R	3680 R	899 R	5.7 R	31.4 U	5000	-	0
Cyanide	26	0	0	-	-	10 UL	10 UL	10 UL	10 UL	10 U	10 U	200	0	0
Hex Chromium	11	1	9	67	8	67	37	10	8	10 U	10 U	50	0	1

* This Number is a sum of all samples that were collected, analyzed and not rejected during data validation

TABLE 4-20

Tronics Plating Co. Site
 Summary of Detections of Inorganic Compounds
 in Unfiltered Groundwater Samples (ug/L)

Compound	Locations of Detections of Inorganics in Unfiltered Groundwater Samples	Locations of Detections of Inorganics in Unfiltered Groundwater Samples Above Background Levels and ARAR's
Aluminum	MW-1 S, 1D, 2S, 2I, 2D, 3I, 4S, 5S	
Antimony	MW-2S	MW-2S
Arsenic	MW-2S, 2I, 3I	MW-2S
Barium	MW-1S, 1D, 2S, 2I, 4S, 4I, 5S; P-5; PLCWW-1	
Beryllium	MW-1S	
Cadmium	MW-5S	MW-5S
Calcium	MW-1S, 1D, 2S, 2I, 2D, 3I, 4S, 4I, 5S; P-5; PLCWW-1	
Chromium	MW-1S, 2S, 2I, 3I, 5S; P-5; PLCWW-1	PLCWW-1
Cobalt	MW-1S, 1D, 2S	
Copper	MW-1S, 1D, 2S, 2I, 2D, 3I; P-5	
Iron	MW-1S, 1D, 2S, 2D, 3I; PLCWW-1	MW-1S, 5S
Lead	MW-1S, 1D, 2S, 2I, 2D, 3I, 4S, 4I; P-5	
Magnesium	MW-1S, 1D, 2S, 2I, 2D, 3I, 4D, 5S; P-5; PLCWW-1	
Manganese	MW-1S, 1D, 2S, 2I, 2D, 3I, 4S, 4I, 5S; P-5; PLCWW-1	
Mercury		
Nickel	MW-1S, 1D, 2S, 2I, 3I, 5S; P-5	MW-5S
Potassium	MW-1S, 1D, 2S, 2I, 2D, 3I, 4S, 4I, 5S; P-5; PLCWW-1	MW-2S, 2I, 2D, 3I, 4I
Selenium	MW-2I, 3I	
Silver	MW-2D	MW-2D
Sodium	MW-1S, 1D, 2S, 2I, 2D, 3I, 4S, 4I, 5S; P-5; PLCWW-1	MW-2I, 2D, 3I
Thallium		
Vanadium	MW-1S, 1D, 2S, 3I; P-5	MW-2S
Zinc	MW-2D, 4S, 4I	
Cyanide		
Hex Chromium		

Tronics Plating Co. Site
Summary of Detections of Inorganic Compounds
in Filtered Groundwater Samples (ug/L)

Compound	# of Times Tested*	# of Times Detected	% Detected	Range		Background Concentrations				Potential ARAR Concentrations	# of Detections Above	
				High	Low	Jun-89		Aug-89			Background	ARAR
						MW-1S	MW-1 D	MW-1S	MW-1 D			
Aluminum	17	4	24	289 J	107 B	100 U	100 U	100 U	100 U	-	4	-
Antimony	17	0	0	-	-	50 U	50 U	50 U	50 U	3	0	0
Arsenic	17	2	12	5	5	5 U	5 U	5 U	5 U	25	2	0
Barium	17	6	35	184 B	63.4 B	50 U	50 U	63.4 B	50 U	200	5	0
Beryllium	17	0	0	-	-	5 U	5 U	5 U	5 U	1	0	0
Cadmium	17	2	12	14.1 J	8.4 J	5 U	5 U	5 U	5 U	5	2	2
Calcium	17	17	100	25300	9370	15000 B	11700 B	13900	9370	-	4	-
Chromium	9	4	44	13.2 J	5.1 JB	5 U	-	5 U	5 U	50	4	0
Cobalt	17	0	0	-	-	10 U	10 U	10 U	10 U	-	0	-
Copper	17	4	24	18.8 B	10 B	18.8 B	10 U	10 B	10 U	1000	0	0
Iron**	-	-	-	-	-	-	-	-	-	300	-	-
Lead	16	4	25	9.2	5 J	5 U	5 U	5 U	8 J	5	2	2
Magnesium	17	17	100	4790 B	1950 J	4790 B	2060 B	3600 BJ	2430 J	-	0	-
Manganese	17	14	82	1280 J	16.7	84.2 J	189 J	112	16.7	300	4	4
Mercury	17	0	0	-	-	0.2 U	0.2 U	0.2 U	0.2 U	2	0	0
Nickel	17	2	12	32.6	29.4 B	29.4 B	20 U	20 U	20 U	100	1	-
Potassium	17	17	100	66000 J	2650 B	3100 B	2910 B	2650 B	4930 B	-	9	-
Selenium	17	0	0	-	-	5 U	5 U	5 U	5 U	10	0	0
Silver	17	0	0	-	-	10 U	10 U	10 U	10 U	50	0	0
Sodium	17	17	100	32800 J	9270 J	26300 J	17800	12900 J	16800	-	1	-
Thallium	17	0	0	-	-	5 U	5 U	5 U	5 U	1	0	-
Vanadium	17	2	12	14.3 B	14.2 BJ	10 U	10 U	10 U	10 U	-	2	-
Zinc	8	8	100	153 J	35.5 J	152 J	153 J	-	43.3 J	5000	0	0
Hex Chromium	10	1	10	38	38	N/A	N/A	5 U	N/A	50	1	0

* This number is a sum of all samples that were collected, analyzed and not rejected during data validation
 **All analysis for this compound were deemed unreliable (R) during data validation

TABLE 4-21

Tronics Plating Co. Site
 Summary of Detections of Inorganic Compounds
 in Filtered Groundwater Samples (ug/L)

Compound	Locations of Detections of Inorganics for Filtered Groundwater	Locations of Detections of Inorganics for Filtered Groundwater
	Aluminum	MW-2S, 3I
Antimony		
Arsenic	MW-2S, 2I	MW-2S, 2I
Barium	MW-1S, 2S, 2I; P-5	
Beryllium		
Cadmium	UG-1806	UG-1806
Calcium	MW-1S, 1D, 2S, 2I, 2D, 3I; UG-1806; P-5	MW-2S, 2I, 3I
Chromium	MW-2I, 2D, 3I; P-5	
Cobalt		
Copper	MW-1S, 2I, 2D	
Iron		
Lead	MW-1D, 2I, 3I; UG-1806	
Magnesium	MW-1S, 1D, 2S, 2I, 2D, 3I; UG-1806; P-5	
Manganese	MW-1S, 1D, 2S, 2I, 2D; UG-1806; P-5	MW-2S; UG-1806
Mercury		
Nickel	MW-1S, 2I	MW-2I
Potassium	MW-1S, 1D, 2S, 2I, 2D, 3I; UG-1806; P-5	MW-2S, 2I, 3I
Selenium		
Silver		
Sodium	MW-1S, 1D, 2S, 2I, 2D, 3I; UG-1806; P-5	MW-3I
Thallium		
Vanadium	MW-2S, 3I	MW-2S, 3I
Zinc	MW-1S, 1D, 2S, 2I, 2D, 3I; UG-1806	
Hex Chromium	UG-1806	

Tronics Plating Co. Site
 Summary of Detections of Organic Compounds
 in Groundwater Samples (ug/L)

Compound	# of Times Detected*	# of Times Detected	% Detected	Range		Background Concentrations						Potential ARAR Concentrations	# of Detections Above	
				High	Low	Jun-89		Aug-89		May-91			Background	ARAR
						MW-1S	MW-1D	MW-1S	MW-1 D	MW-1S	MW-1D			
Acetone	28	3	11	9700 B	15 B	ND	9700 B	ND	79 B	ND	ND	50	0	2
Trichloroethene	28	26	93	490	2 J	84	110	65	490 J	26	400	5	0	25
Tetrachloroethene	28	23	82	50	1 J	5	5	3 J	18	3 J	18 J	0.7	3	23
1,1,1-Trichloroethane	28	22	79	42	2 J	ND	ND	ND	4 J	2 J	5 J	5	14	15
1,1-Dichloroethene	27	3	11	7	2 J	ND	ND	ND	ND	ND	ND	5	3	1
1,2-Dichloroethene	28	2	7	6	3 J	ND	ND	6	3 J	ND	ND	5	0	0
Toluene	28	1	4	4 J	4 J	ND	ND	ND	ND	ND	ND	5	1	0
Freon 113	28	5	18	120 JN	10 J	ND	ND	ND	10 J	ND	ND	50	4	2
1,1-Dichloroethane	28	1	4	2 J	2 J	ND	ND	ND	ND	ND	ND	5	1	0
Methylene Chloride	28	1	4	3 B	3 B	ND	ND	ND	ND	ND	ND	5	1	0
Chloroform	28	1	4	3 J	3 J	ND	ND	ND	ND	ND	ND	5	1	0

* This number is a sum of all samples that were collected, analyzed and not rejected during data validation

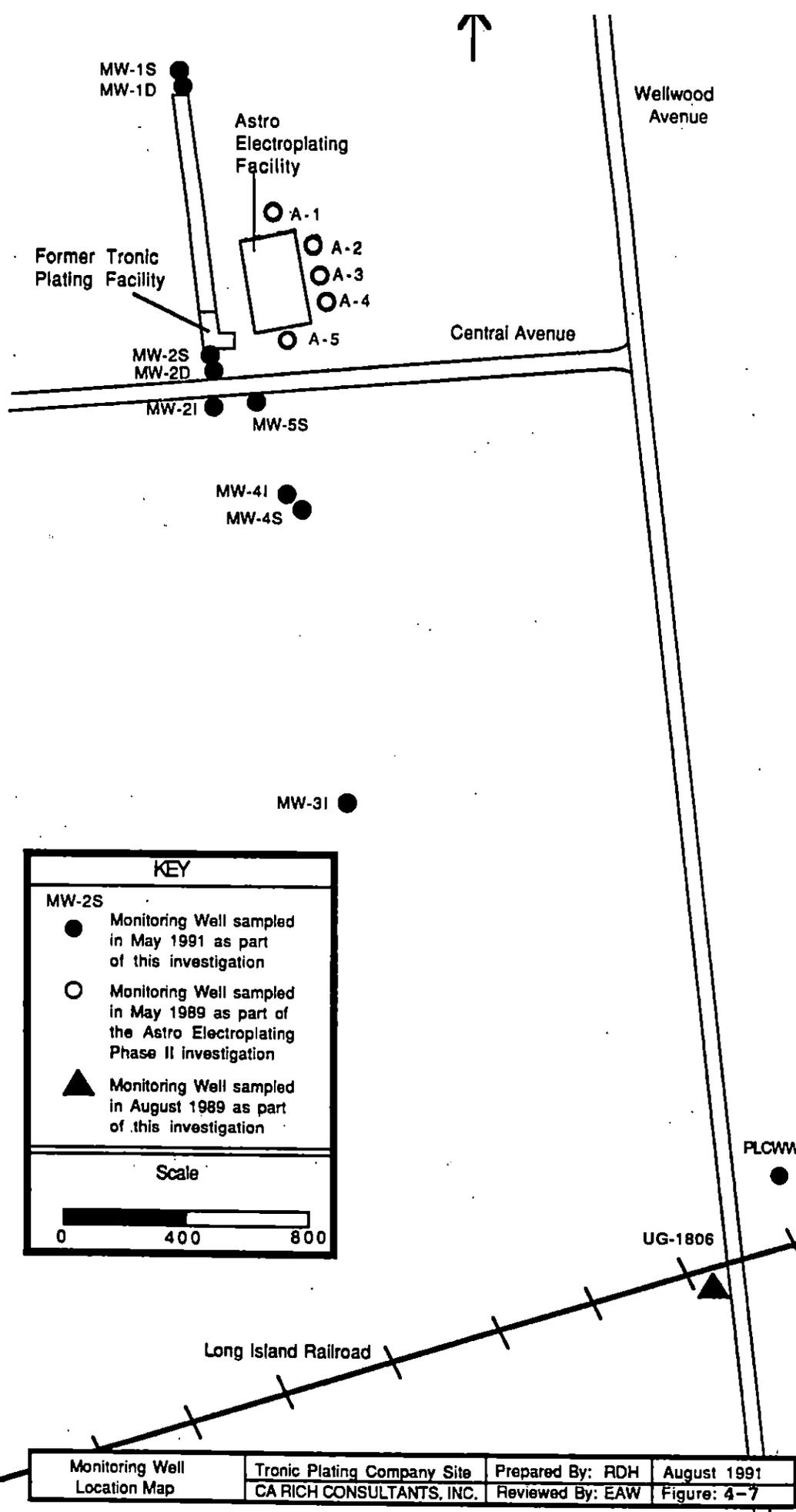
TABLE 4-22

Tronics Plating Co. Site
 Summary of Detections of Organic Compounds
 in Groundwater Samples (ug/L)

Compound	Location of Detections for Volatile Organics in Groundwater Samples	Location of Detections of Volatiles in Groundwater Samples Above Background and ARAR's
Acetone	MW-1D, 2D	
Trichloroethene	MW-1S, 1D, 2S, 2D, 2I, 3I, 5S; MWD-4S; UG-1806; P-5; PLCWW-1	
Tetrachloroethene	MW-1S, 1D, 2S, 2D, 2I, 3I, 5S; UG-1806; P-5; PLCWW-1	MW-2I, 3I; UG-1806
1,1,1-Trichloroethane	MW-1D, 2S, 2D, 2X, 2I, 3I, 5S; UG-1806; P-5	MW-2S, 2I, 2D, 3I, 4I; P-5; UG-1806
1,1-Dichloroethene	MW-2S, 2I, 3I	MW-2S, 2I, 3I
1,2-Dichloroethene	MW-1S, 1D	
Toluene	MW-2S	
Freon 113	MW-1D, 3I; UG-1806	MW-3I; UG-1806
1,1-Dichloroethane	MW-3I	
Methylene Chloride	MW-3I	
Chloroform	PLCWW-1	

SECTION 4.3

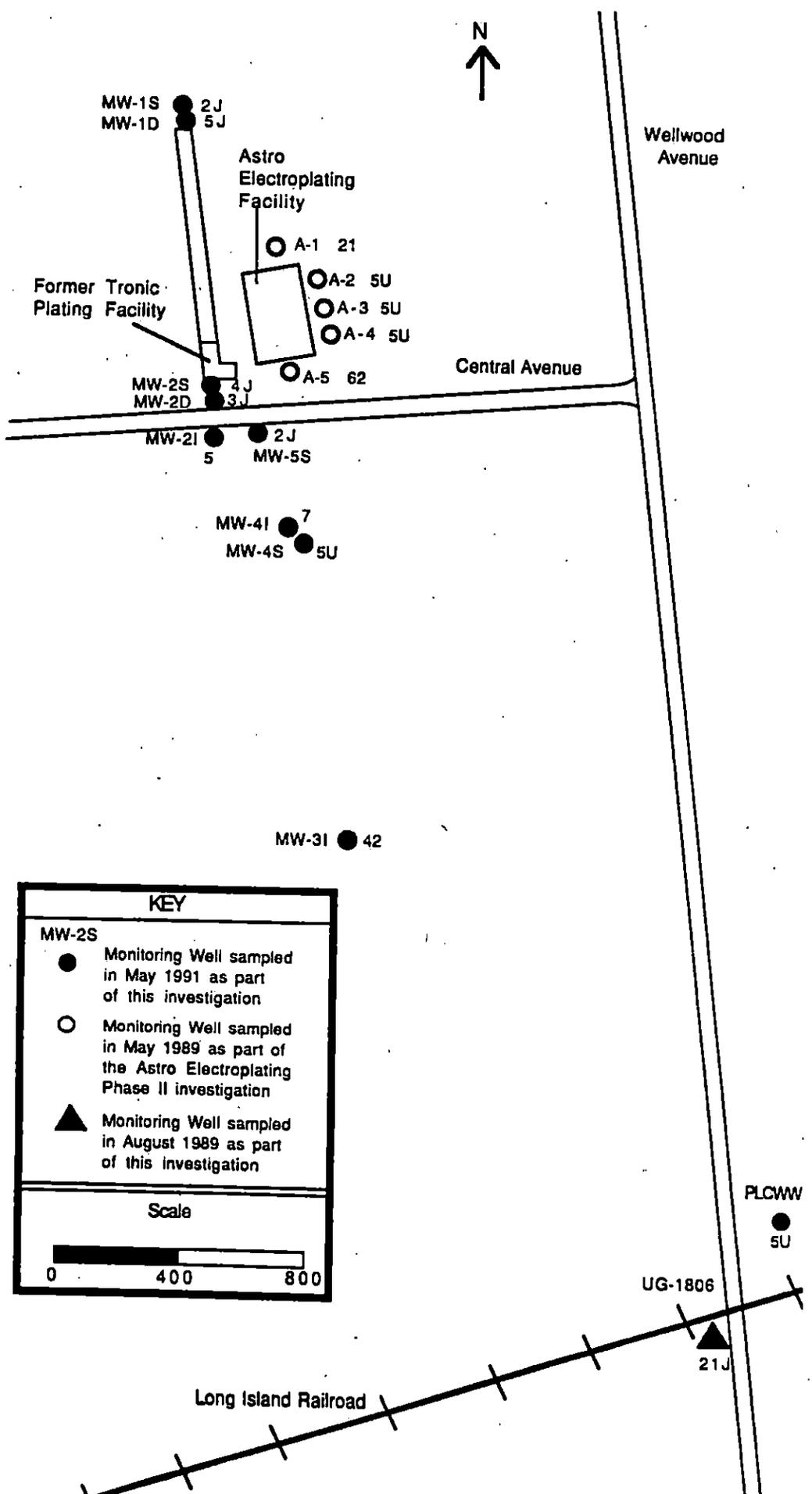
FIGURES

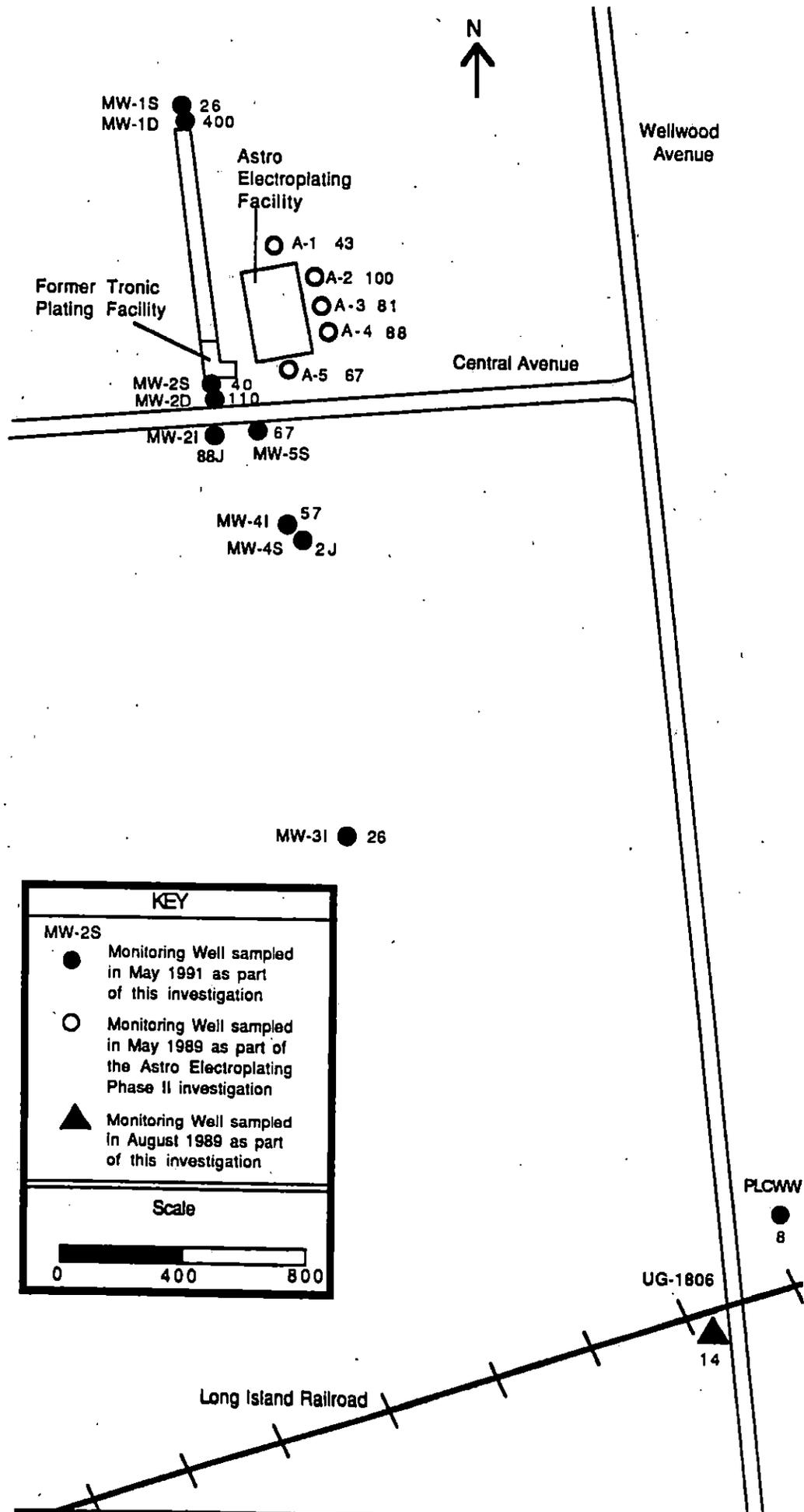


Monitoring Well Location Map	Tronic Plating Company Site	Prepared By: RDH	August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-7

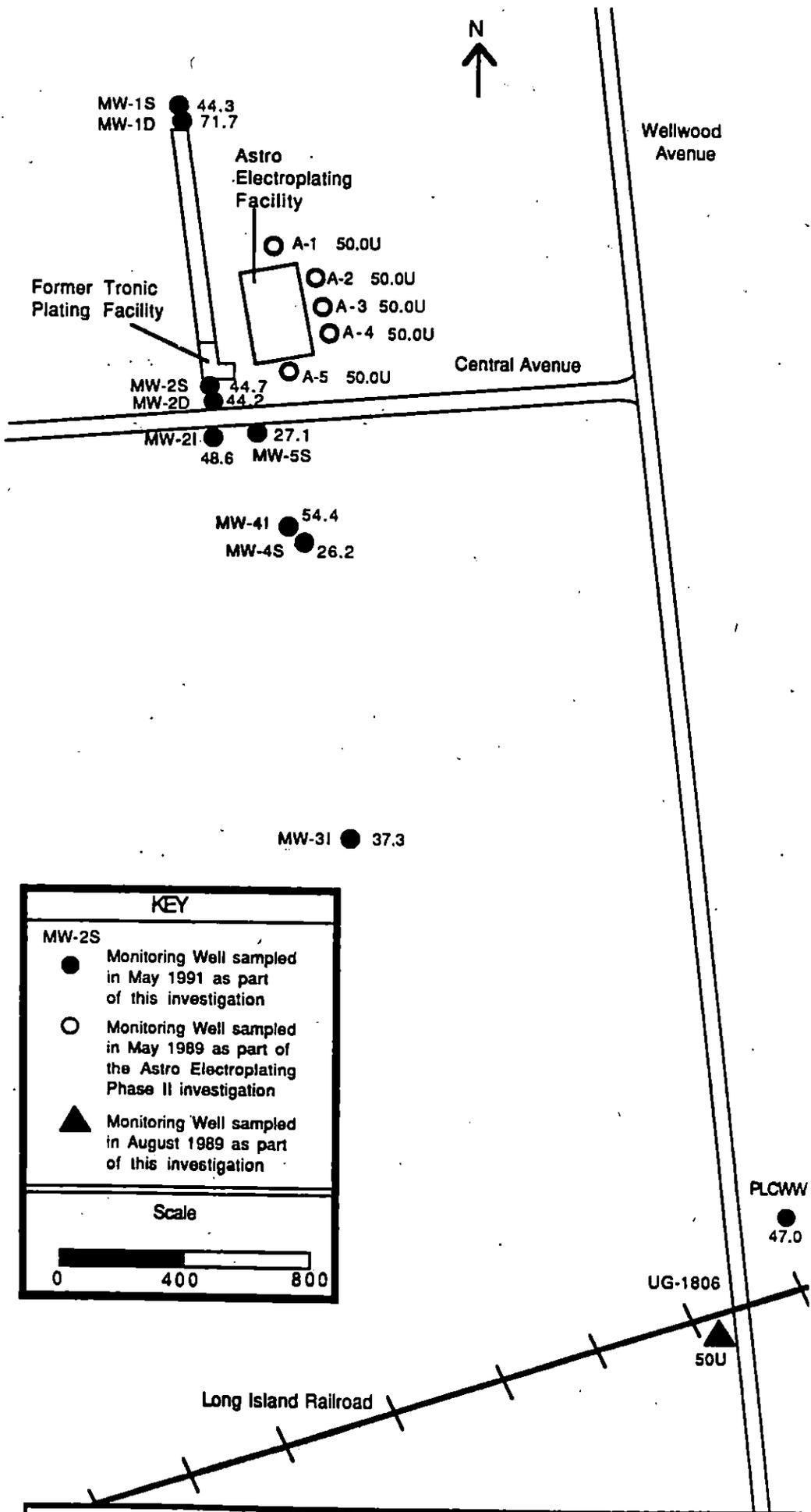
Notes for Figure 4-8

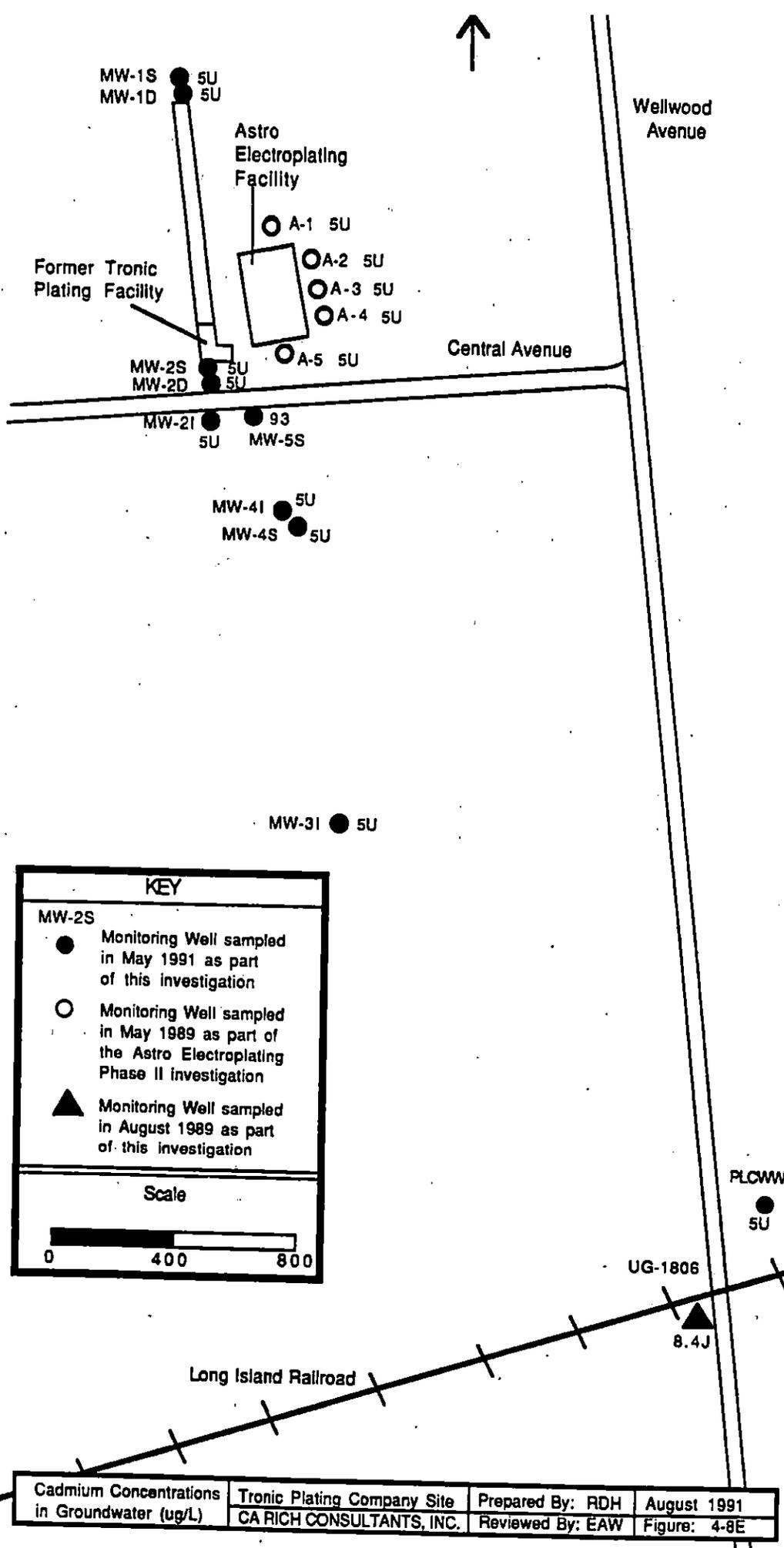
- U - Undetected at the reported concentration
- B - Less than the CRDL but greater than the IDL
- J - Quantitation is approximate due to limitations identified during the quality assurance review
- R - Unreliable, analyte may or may not be present

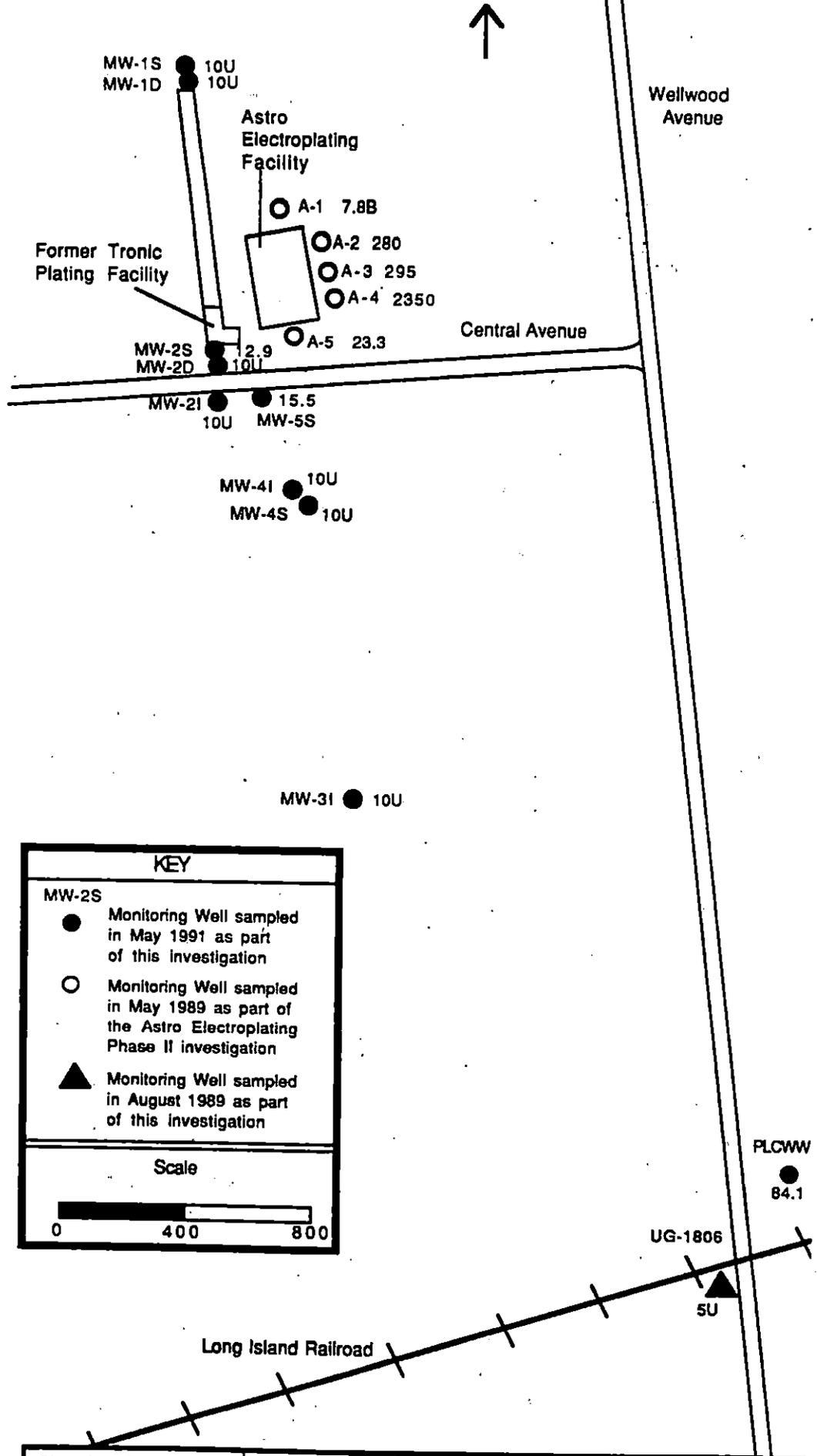




KEY	
MW-2S	
●	Monitoring Well sampled in May 1991 as part of this investigation
○	Monitoring Well sampled in May 1989 as part of the Astro Electroplating Phase II investigation
▲	Monitoring Well sampled in August 1989 as part of this investigation
Scale	







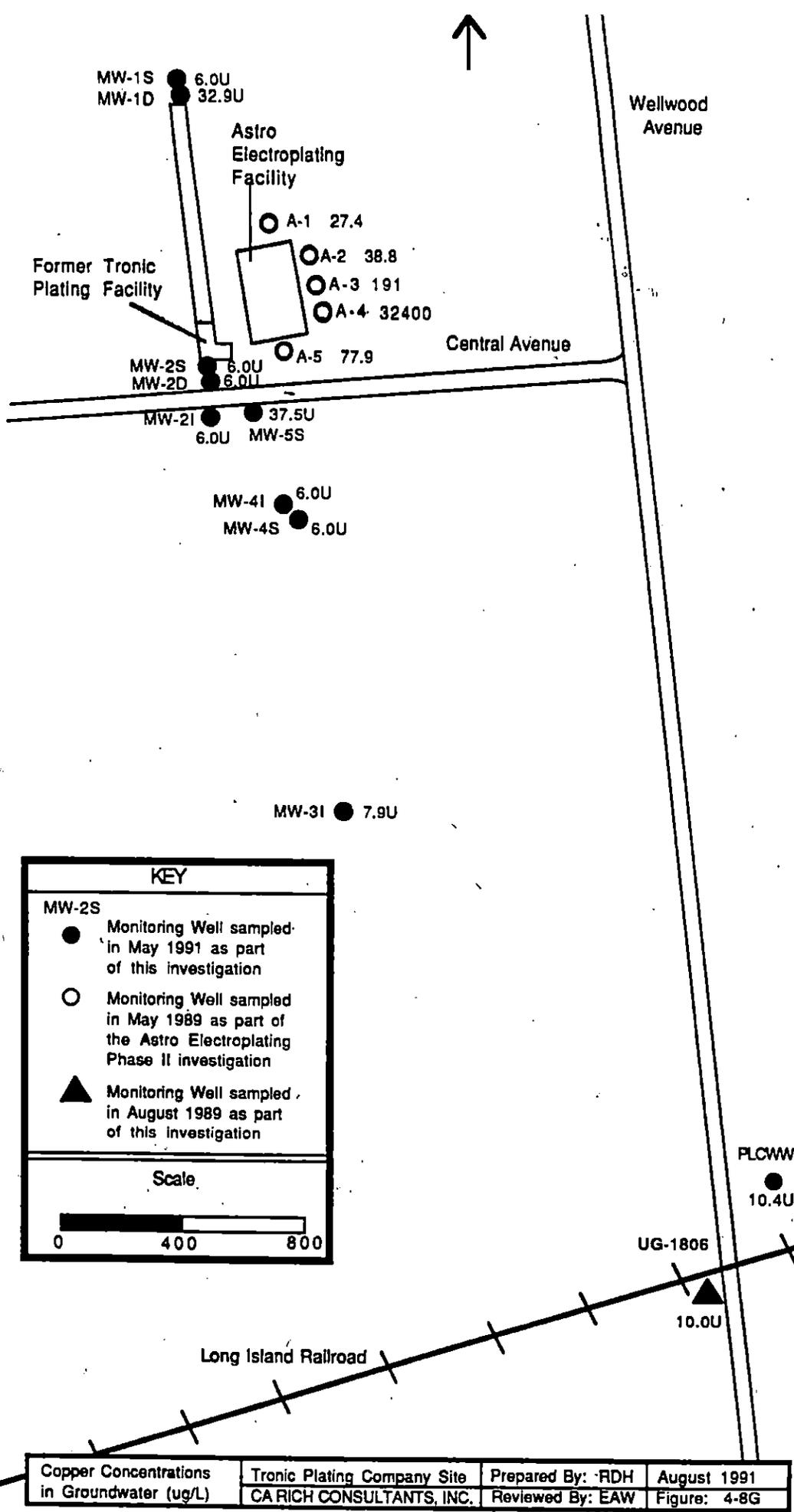
KEY

- Monitoring Well sampled in May 1991 as part of this investigation
- Monitoring Well sampled in May 1989 as part of the Astro Electroplating Phase II investigation
- ▲ Monitoring Well sampled in August 1989 as part of this investigation

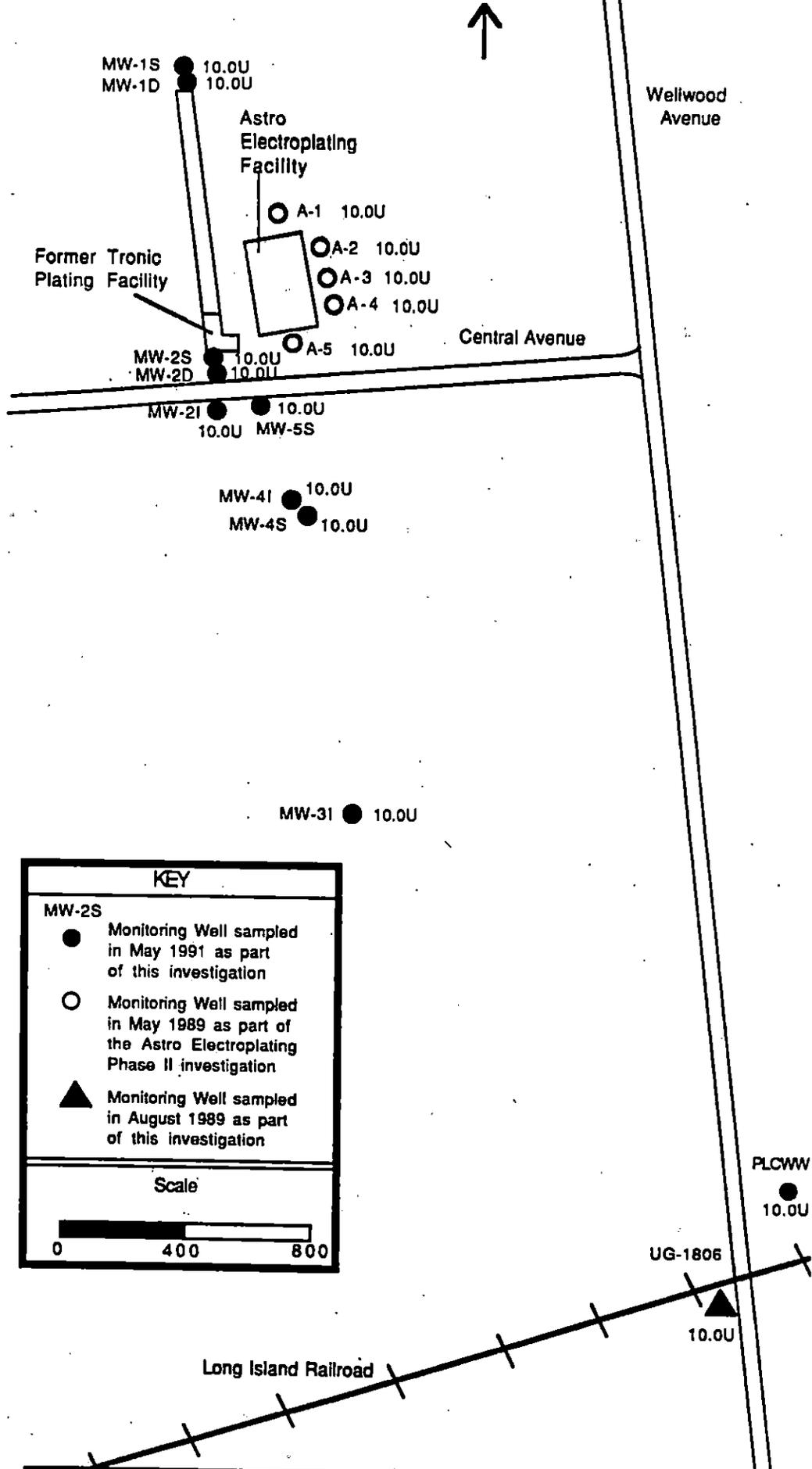
Scale

0 400 800

Chromium Concentrations in Groundwater (ug/L)	Tronic Plating Company Site CA RICH CONSULTANTS, INC.	Prepared By: RDH Reviewed By: EAW	August 1991 Figure: 4-8F
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Copper Concentrations in Groundwater (ug/L)	Tronic Plating Company Site	Prepared By: RDH	August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-8G



KEY

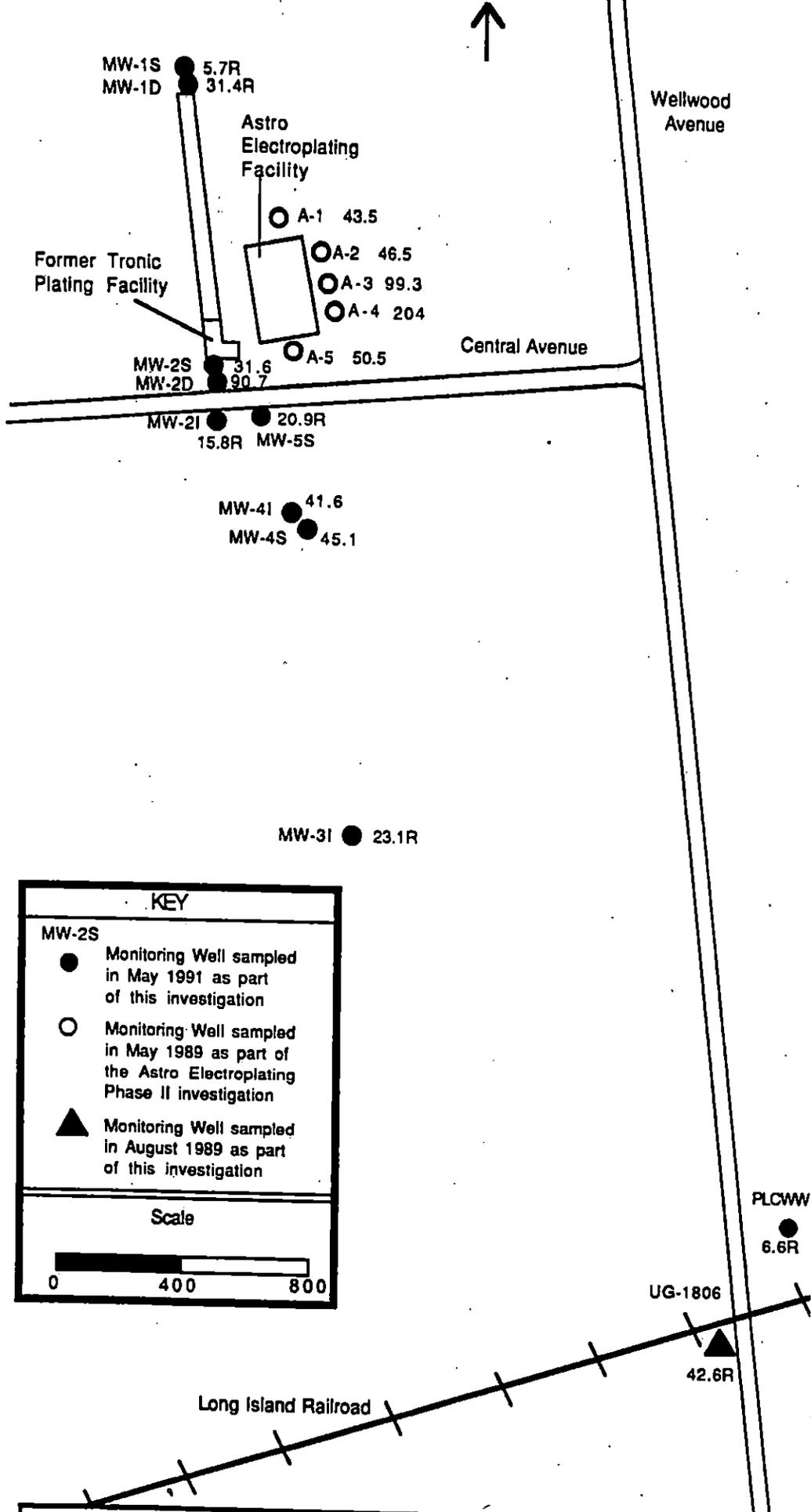
MW-2S

- Monitoring Well sampled in May 1991 as part of this investigation
- Monitoring Well sampled in May 1989 as part of the Astro Electroplating Phase II investigation
- ▲ Monitoring Well sampled in August 1989 as part of this investigation

Scale

0 400 800

Cyanide Concentrations in Groundwater (ug/L)	Tronic Plating Company Site	Prepared By: RDH	August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-8H



Zinc Concentrations in Groundwater (ug/L)	Tronic Plating Company Site	Prepared By: RDH	August 1991
	CA RICH CONSULTANTS, INC.	Reviewed By: EAW	Figure: 4-8J

4.4 In-situ "Slug" Type Permeability Analysis

Each of the 4-inch diameter monitoring wells at the Tronic Plating Site was slug tested to determine the permeability or hydraulic conductivity of the Upper Glacial aquifer directly beneath the Tronic Site. The slug tests were performed after the wells were developed and before they were purged for sampling. Derivations of this data are presented in Appendix D. Analyses utilized the Hvorslev Slug Test Analytical Method (1951).

The hydraulic conductivity beneath the Tronic Plating Site decreases slightly with depth. The formation materials adjacent to the screen zone of the shallow wells (MW-1S and MW-2S) have a higher hydraulic conductivity than the formation materials screened by the deeper wells. The intermediate well MW-2I is screened in aquifer materials that have a hydraulic conductivity that is between that calculated for the shallow and deep wells. The calculated hydraulic conductivity for the screened aquifer interval at each of the six monitoring wells installed on the Tronic Plating Company Site is provided in the following table.

HYDRAULIC CONDUCTIVITIES SLUG TEST RESULTS

<u>Well ID No.</u>	<u>Centimeters Per Second</u>	<u>Feet Per Day</u>
MW-1S	9.74 x 10 ⁻²	276.09
MW-1D	1.80 x 10 ⁻²	51.02
MW-2S	1.54 x 10 ⁻¹	436.54
MW-2I	9.82 x 10 ⁻²	278.36
MW-2D	2.47 x 10 ⁻²	70.02
MW-3I	2.80 x 10 ⁻³	7.94

Slug test results agree with the hydraulic conductivity for the formation materials underlying the Tronic Plating Company Site. The average hydraulic conductivity or permeability value is approximately 2000 gallon per day per square foot (2,000 gal/day/ft²) or 267.38 feet per day (McClymonds and Franke, 1972). The distribution of grain size analyses presented on Figure 4-6 also support the relatively high permeabilities developed from reduction of the measurements collected in the slug tests.

Monitoring Wells MW-1D, MW-2D, and MW-3I have screened intervals which purposely lie within the Upper-Glacial/Magothy Aquifer interface zone where the in-situ aquifer materials become finer-grained. The 'contact' or interface zone between the Upper Glacial and Magothy Aquifers at Tronics is identified on Figure 4-9.

4.5 Topographic Survey and Water Level Contour Map

After the installation of both the 2-inch and 4-inch diameter Phase 1 wells, a topographic survey was completed by Jerome D'Amaro, a New York State - licensed professional land surveyor, to determine the exact elevation of the top measuring point for each well casing, in hundredths of a foot above mean sea level (MSL) datum. Additional elevations were performed by Albert Tay, Licensed Surveyor, as part of the Phase 2 program. The measuring point elevations at the top of each well-head are given on Plate 3.

The survey measurements for each well (except wells MW-1D and MW-2D) were used in conjunction with depth-to-water measurements to determine the exact water table elevations beneath the Tronic Plating Site.

Using the water levels measured in May, 1991 from the two and four-inch wells, a groundwater contour map of equal water level elevation was constructed to determine the direction and rate of flow of the shallow groundwater quality within the Upper Glacial Aquifer. A partial section of this contour map is illustrated on

Plate 3 (in pocket). The direction of horizontal ground water flow is perpendicular to the drawn contour lines, or south-southeast.

The generalized rate of groundwater flow can be calculated from the given hydraulic conductivities and the mapped hydraulic gradient between two pre-selected data points. The average linear velocity of shallow groundwater flow directly beneath the Tronics Site downgradient toward UG1806, a distance of 3400 feet, is approximately 2 feet per day. Thus, based upon actual field head measurements, a particle of groundwater moving horizontally southward at water table depth would require about 5 years to migrate at the same rate as natural groundwater flow toward the UG1806 area to the south.

The water level head measurements in the deeper wells (MW-1D and MW-2D) were slightly different which indicated a subtle, but positive, natural vertically downward component of flow. A hydrogeologic cross-section illustrating the water level elevations for the shallow, intermediate and deep wells is presented on Figure 4-9.

Ground water levels in the Tronics wells screening the water table rose slightly, less than 0.01 feet, after a period of rainfall. This information is directly evident by the measured fluctuations in water levels displayed before and after a monitored storm event (see Table 4-23). A round of water levels were collected during July 10, 1989. That evening, a storm passing over Long Island produced approximately 3/4 inches of precipitation at the Mineola rain gauging station. A second post-storm follow-up round of water levels were collected during the morning of July 11, 1989. The difference in levels is apparent on Table 4-23.

During the second phase of field work, an additional set of water levels were measured (Table 4-24). Due to an overall increase in precipitation, water levels in all of the Phase I wells rose approximately 1 foot between 1989 and 1991.

SECTION 4.5

TABLES

TABLE 4-23

WATER LEVEL READINGS
TRONIC PLATING COMPANY
(IN FEET)

WELL NO.	TOP OF CASING ELEVATION	LEVEL MEASURING DATES		
		DTW/ELEVATION JULY 10, 1989 (DRY PERIOD)	DTW/ELEVATION JULY 11, 1989 (WET PERIOD)	DTW/ELEVATION AUGUST 22, 1989 (DRY PERIOD)
P-1	97.77	33.96/63.81	33.96/63.81	33.90/63.87
P-2	99.83	35.07/64.76	35.03/64.80	34.89/64.94
P-3	100.69	35.52/65.17	35.46/65.23	35.30/65.39
P-4	100.01	34.92/65.09	34.88/65.13	34.73/65.28
DW1/P5	97.80	33.75/64.05	33.72/64.08	33.66/64.14
P-6	96.90	33.32/63.58	33.31/63.59	33.30/63.60
MW-1S	100.29	35.11/65.18	35.04/65.25	34.84/65.45
MW-1D	100.13	35.07/65.06	35.06/65.07	34.78/65.35
MW-2S	97.82	33.97/63.85	33.94/63.88	33.90/63.92
MW-2I	97.58	33.85/63.73	33.76/63.82	33.80/63.78
MW-2D	97.90	34.08/63.82	34.09/63.81	34.03/63.87
MW-3I	91.27	29.78/61.49	29.78/61.49	29.95/61.32
UG 1806	85.86	27.77/58.09	27.81/58.05	28.18/57.68

NOTE: DTW = DEPTH TO WATER
ELEVATION DATUM IS MEAN SEA LEVEL (MSL)

TABLE 4-24
WATER LEVEL ELEVATIONS (FEET)
MEASURED ON MAY 13, 1991

Well Number	TOC Elevation	Depth to Water Below TOC	Water Elevation
MW-1S	100.29	33.77	66.52
MW-1D	100.13	33.69	66.44
MW-2S	97.82	32.85	64.97
MW-2D	97.90	32.98	64.92
MW-2I	97.58	32.78	64.80
MW-3I	91.27	28.91	62.36
MW-4S	95.40	31.58	63.82
MW-4I	95.37	31.54	63.83
MW-5S	97.54	32.85	64.69
P-1	97.77	32.89	64.88
P-2	99.83	33.82	66.01
P-3	100.69	34.21	66.48
P-4	100.01	33.64	66.37
P-5	97.80	32.63	65.17
P-6	96.90	32.28	64.62
1806 UG*	85.86	27.40	58.46

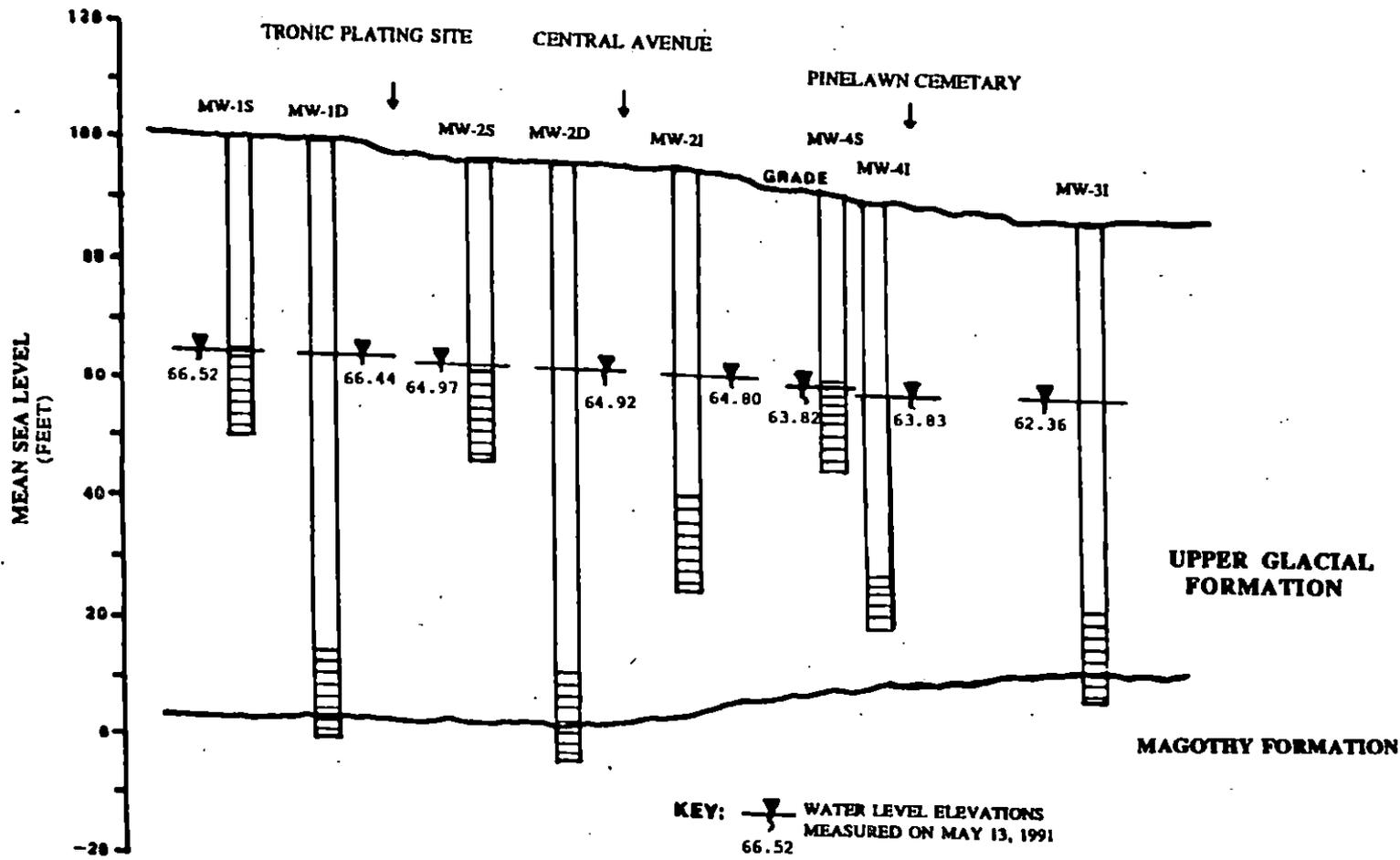
*Well 1806 UG measured on May 17, 1991

SECTIONS 4.4 AND 4.5

FIGURES

SECTIONS 4.4 AND 4.5

FIGURES



GEOLOGIC CROSS-SECTION OF STUDY AREA

CA RICH CONSULTANTS, INC
 Certified Ground-Water and Environmental Specialists

Tronic Plating Company Site
 Farmingdale, New York

Prepared By: RH

Date: August 1991

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Reviewed By: EAW

Figure: 4-9

SECTION 5

5.0 GROUNDWATER MODELING

5.1 Introduction

Groundwater beneath the Tronic Plating Company Site was modeled using two groundwater simulation codes. These codes are:

1) the modeling of groundwater flow in the study area was performed using MODFLOW which is a three-dimensional finite-difference code designed by McDonald and Harbaugh of the USGS (1984); and

2) the modeling of groundwater contaminant transport in the study area was performed using MT3D which is a three-dimensional method of characteristics transport model written by Dr. Chunmiao Zheng (1990) of S.S. Papadopoulos & Associates.

Section 5.0 contains individual subsections addressing:

- groundwater flow modeling using MODFLOW
- groundwater transport modeling using MT3D, and
- conceptual modeling of mass transport from on-site storm drains

In the MODFLOW application, a four mile by four mile area that includes both the Upper Glacial and Magothy Aquifers was simulated. A map displaying the locations of the MODFLOW and MT3D model boundaries is presented on Figure 5-1. The three-dimensional contaminant transport model incorporates the method of characteristics (MOC) procedure to solve the transport equation. Once calibrated, the output from the MODFLOW model was used as input to MT3D defining the flow field for the transport simulations.

Both versions of the codes used in this Tronic Remedial Investigation were purchased from S.S. Papadopoulos & Associates. These codes are available in the public domain and were not modified by CA RICH. All of the simulations were performed on CA RICH's Epson 386 computer, equipped with an 80387 math co-processor and 4 meg. of RAM.

Contours of the groundwater elevations and geochemistry from the various MODFLOW and MT3D simulations were created using Surfer (TM) version 3.0 released by Golden Software. Tables and Figures regarding the flow and transport models are included at the end of Sections 5.2 and 5.3, respectively. Copies of the input and output files for each of the simulations are available upon request.

5.2 USGS 3-D Flow Model - MODFLOW

5.2.1 Introduction

The use of two and three-dimensional flow models has been well documented by the USGS since the creation of model theory and application in the early 1970's. The MODFLOW code was developed to produce a computer program that allowed for easy modifications to input files of the model by separating the program into modules.

The model artificially simulates groundwater flow in the aquifer at any location and time using the following continuous partial-differential equation:

$$\text{Equation} = \frac{\partial}{\partial x} \left(K_{xx} \frac{\partial h}{\partial x} \right) + \frac{\partial}{\partial y} \left(K_{yy} \frac{\partial h}{\partial y} \right) + \frac{\partial}{\partial z} \left(K_{zz} \frac{\partial h}{\partial z} \right) - W = S_s \frac{\partial h}{\partial t}$$

where:

K_{xx} , K_{yy} and K_{zz} are values of hydraulic conductivity along the x, y, and z coordinate axes, assumed to be parallel to the major axes of hydraulic conductivity (Lt^{-1});

h is the potentiometric head (L);

W is a volumetric flux per unit volume and represents sources and/or sinks of water (t^{-1});

S_s is specific storage of the porous material (L^{-1});

and

t is time (t).

For detailed review of the MODFLOW code structure and theory, the reader is referred to McDonald & Harbaugh (1984).

The modules used to perform this simulation consisted of the Basic package, Block Centered Flow package, Recharge package, Well package, General-Head Boundary package and Strongly Implicit Procedure package.

5.2.2 Model Construction and Boundary Conditions

A three layer model was constructed to represent the 'layer cake' hydrogeologic stratigraphy beneath the study area, as presented on Figure 5-2. Layer 1 consists of the saturated portion of the Upper Glacial Aquifer which is approximately 60 feet in thickness. The underlying Magothy Aquifer was divided into two layers. Layer 2 represents the less permeable upper part of the Magothy Aquifer, and is referred to as the Upper Magothy, 200 feet in thickness. Layer 3 represents the more permeable Lower Magothy which is 500 feet in

thickness. A no flow boundary was placed at the bottom of Layer 3 to simulate the underlying confining Raritan Clay.

A grid consisting of 35 columns and 36 rows was developed to best represent this particular study area. Grid spacings in the center of the model where the Tronic Plating Company is situated are 400 feet by 400 feet in area. The individual grid spacings outside of this central target area are 800 feet by 800 feet.

Three (3) types of hydrogeologic boundary conditions were used in the development of this model. The boundary conditions used, which are displayed on Figures 5-3 through 5-5, are listed below:

- 1 Constant Head;
- 2 General Head; and,
- 3 No Flow.

The north and south boundaries of all three layers in the model were simulated using constant head (water level) conditions. The contours measured by the USGS during 1983 (Doriski, 1986) were used to derive the constant head boundary values for the Upper Glacial and Magothy Aquifers. The western boundary of Layer 1 and the eastern and western boundaries of Layers 2 and 3 are fairly perpendicular to the directional trend of the groundwater elevation contours justifying the use of no flow conditions for these boundaries. However, the eastern border of Layer 1 displays groundwater elevation contours that curve to the northeast due to the discharge of shallow groundwater into the southward flowing Carll's River. To accurately simulate this hydraulic setting, a general head boundary condition was artificially imposed linking the hydrologic head in the cells along this boundary to the water level elevation in the Carll's River.

The 1983 groundwater elevation contour maps prepared by the USGS were used as calibration targets in the development of the model. The 1983 levels were chosen for several reasons, as outlined below:

1. From 1980 to 1982, Long Island experienced relatively similar rates of annual rainfall of approximately 40 inches (see Figure 2-3). The water level measurements collected in the winter of 1983, therefore represented a fairly constant rate of recharge to the aquifers over an extended period;

2. This area of Farmingdale was tied into municipal sewers beginning in 1983, thus reducing the recharge rate to the aquifers in the this region. As such, the water levels measured during 1983 are considered to be representative of the area's hydrologic setting during the tenancy by the Tronic Plating Company; and,

3. Fairchild Republic, a fairly large defense contractor, has been in the process of closing down its plant south of the Site. The 1983 data includes the pumpage of Fairchild's wells that have since been taken out of service.

Taking these factors into account, the 1983 water level data is viewed as most representative of this area's hydrogeologic setting during the period of interest for this remedial investigation.

Recharge is applied to the model in the form of precipitation. The average annual precipitation during the past 30 years is 44 inches (see Figure 2-3). A recharge rate of 50 percent of the average annual precipitation, or 22 inches of infiltration to the aquifers (to account for surface runoff and evapotranspiration, etc.), was used for this simulation. A recharge rate of 33 inches or 75 percent was used for the cell that represents the Tronic facility to simulate the infiltration from on-site storm drains.

The aquifers on Long Island are one of the most thoroughly tested and researched hydrologic systems in the world. This is due primarily to their history serving as a sole source of potable water supply for over three million Long Island residents. As such, the generally accepted values for the transmissivity and the storage coefficient for both the Upper Glacial and Magothy Aquifers were obtained from USGS reports (McClymonds and Franke, 1972; et al).

A summary of the aquifer characteristic values used in the model are presented on Figure 5-2. In addition, the 'on-site' permeability of the Upper Glacial Aquifer was measured by performing "slug-type" permeability tests on the six monitoring wells installed for Phase 1 of this investigation (see Section 4.4). If documented values were unavailable for a given parameter, then the values were derived based upon the nature of the local geologic strata.

Withdrawal of groundwater by wells represents the only form of discharge in the model, besides the constant head and general head boundary conditions along the model perimeter.

In order to accurately inventory the ground water pumpage in the model area, an extensive survey of well users was performed. This included interviews with representatives of the East Farmingdale Water District (EFWD), Pinelawn Cementary, St. Charles Cemetery, and NYSDEC's regional water supply Offices in Stony Brook. A summary of the active pumping wells included in the model is presented on Table 5-1. It is important to note that all of these wells are screened either in the upper or lower Magothy Aquifer - Layers 2 and 3 of the model.

In addition to these pumping wells, one injection well is contained in the model at node 12, 9, 1 -- the node that represents the Tronic site -- to simulate infiltration of the on-site industrial leaching pools. The injection well discharges at a rate equivalent to 4,800 gallons per day, the effluent discharge rate that the Tronic's facility engineer estimated the pools received (Benson and Burns, 1974).

The Modflow model was run for two stress periods under steady state flow conditions. The first stress period includes discharge from the leaching pools simulating the tenancy of Tronics Plating Company. The second stress period simulates the flow pattern from 1983 to the present. No discharge from the leaching pools is simulated in stress period two as the building was serviced by sewers during this period.

5.2.3 MODFLOW Model Results

The aquifer characteristics used to define the flow model were confirmed by comparing the hydrologic heads simulated by the model to those actually mapped in the field by the USGS in 1983. The configuration of the contoured water level elevations simulated by MODFLOW for layers 1 and 3 are illustrated as solid lines in Figures 5-6 & 5-7. The Figures also show the contours overprinted upon the USGS' dashed contour lines that were interpreted from the actual 1983 water levels measured in the field.

A water level elevation map of level 2, the Upper Magothy Aquifer, was not prepared as water levels for this unit of strata are generally not contoured by the USGS.

The simulated and measured hydraulic heads in the Upper Glacial Aquifer are contoured on Figure 5-6. As shown, the configuration of each 'set' of contours are relatively similar indicating that there is good agreement between the results from the aquifer characteristics selected for input into the model and the conditions that were actually measured in the field.

A comparison of the simulated and measured heads for the Magothy Aquifer is presented on Figure 5-7. The comparison indicates that there is generally good agreement along the 30, 40 and 50-foot contour lines. However, the placement of the USGS 60-foot contour line (location interpreted from measured field data) was mapped

slightly south of the simulated 60-foot contour generated by the model. This difference is probably due to the interpretation of the measured well water levels used to construct the USGS 1983 contour map. In any event, both the simulated 60-foot contour and the mapped contour depict the same general trend of groundwater flow in this area of the Magothy and satisfy the goals of this model.

The following tabulation compares the 1983 measured head versus the calculated head for three Upper Glacial wells in the model study area. All three wells were simulated to within a difference of approximately ± 2 feet or less.

Calculated Head vs. Water Level Measured in 1983
Modflow Layer 1 - Upper Glacial Aquifer

USGS Well No.	Model Coordinates (i, j, k)	Measured Water Level (feet)	Calculated Head (feet)	Difference in Head (feet)
S-43811	12, 5, 1	60.6	62.7	+2.1
S-1806	15, 18, 1	53.2	53.6	+0.4
S-12068	32, 22, 1	45.8	44.9	-0.9

A volumetric hydrologic water budget derived for the entire model at the end of stress period 2 is given on Table 5-2. The budget indicates that the net volume of water entering the model equals the net volume of water leaving the model resulting in no significant unaccounted for losses and 0.11 percent discrepancy.

The primary objective of the three-dimensional MODFLOW model was to quantify the hydrologic properties of the aquifers underlying the Tronic Plating Company Site and to establish the flow field for the

MT3D transport simulations. The parameters developed and discussed thus far, can now be used to describe the contaminant transport modeling process.

SECTION 5.2

TABLES

Tronic Plating Co. Site
Summary of pumping wells in model area

DEC Number	Owner number	Owner	Use	Aquifer	Screen depth (ft)	Screen elevation (ft to SL)	Pump rate (GPM)	1983 pumpage (000 gals)	Avg. 1986-88 pumpage (000 gals)	Comments
N/A	5-1	E.F.W.D.	municipal	Magothy-L	623-683	?	?	--	--	unpermitted as of 1989 closed due to TCA
S20041	2-1	E.F.W.D.	municipal	Magothy-U	190-264	110-184	1400	0	ND	
S20042	2-2	E.F.W.D.	municipal	Magothy-L	524-585	439-500	1400	113960	88233	
S39709	3-1	E.F.W.D.	municipal	Magothy-L	650-705	565-620	1400	419710	340322	
S66556	4-1	E.F.W.D.	municipal	Magothy-L	647-707	597-657	1380	353509	411921	
S79105	4-2	E.F.W.D.	municipal	Magothy-L	690-750	ND	1400	ND	65783	1988 data only
S72214	--	Beth Moses	sanitary	Magothy-U	143-150	--	45	177	ND	
S8960	--	Beth Moses	general	Glacial	54- 66	--	200	--	308	
S19468	--	Pinelawn	irrigation	Glacial	? - 50	--	300	--	ND	
S28864	--	Pinelawn	irrigation	Magothy-U	241-290	--	800	2641	3279	
S49385	tank	Pinelawn	irrigation	Magothy-U	191-255	--	1500	116169	74079	
S236 (?)	1RC	St. Charles	irrigation	Magothy-U	?	--	--	--	--	
S4188	1	St. Charles	potable	Magothy-U	?- 47	--	60	564	812	office
S1062	2	St. Charles	irrigation	Magothy-U	55- 75	--	350	5104	2392	
S4574	4	St. Charles	irrigation	Magothy-U	53- 74	--	300	ND	ND	shut down 5/87 service bldg
S23532	5	St. Charles	wash water	Magothy-U	75- 82	--	45	517	520	
S6129	6	St. Charles	irrigation	Magothy-U	54- 75	--	300	2602	2133	
S7536	7	St. Charles	irrigation	Magothy-U	54- 75	--	300	4442	3658	
?	--	Fairchild	domestic	Glacial	80- 96	--	500	231	--	
?	--	Fairchild	domestic	Glacial	61- 82	--	500	ND	--	
?	--	Fairchild	?	?	?	--	--	--	--	discontinued and removed
S9724	--	Fairchild	domestic	Glacial	41- 47	--	40	ND	--	
S9723	9	Fairchild	domestic	Glacial	60- 65	--	40	ND	--	
S9312	8	Fairchild	domestic	Glacial	-100	--	?	?	--	
S9311	7	Fairchild	air cond.	Glacial	75- 86	--	300	ND	ND	
S727	6	Fairchild	?	?	?	--	?	?	--	discontinued
S4230	5	Fairchild	indus.	Glacial	62- 74	--	150	ND	ND	
S3892	4	Fairchild	process	Glacial	61- 70	--	150	ND	--	
S3504	3	Fairchild	air cond.	Glacial	74- 89	--	350	ND	--	
S3441	20	Fairchild	cooling	Glacial	72- 88	--	275	ND	--	
S3244	2	Fairchild	process	Magothy-U	83-131	--	1200	6311	--	
S3015	18	Fairchild	process	Magothy-U	168-221	--	1200	ND	--	
S28211	17	Fairchild	general	Magothy-U	173-213	--	400	--	30797	1988 data only
S2736	16	Fairchild	gen.	Glacial	55- 76	--	400	--	--	
S2735	15	Fairchild	supply	Glacial	72- 85	--	400	ND	--	
S2684	14	Fairchild	gen.	Glacial	66- 86	--	500	ND	--	
S1994	13	Fairchild	indus.	Glacial	74- 90	--	500	ND	--	
S1824	12	Fairchild	cooling	Magothy-U	190-211	115-136	200	ND	--	abandoned 1986 NO 1988 DATA
S1792	11	Fairchild	unspecified	Magothy-L	526-576	451-501	1400	--	266780	
S17325	10	Republic AP	fire prot.	Glacial	29- 45	--	--	--	--	
S16936	1	Republic	unspecified	Glacial	57- 75	+23-+5	600	--	ND	
S22278	--	Dog Shelt.	all	Magothy-U	166-180	106-120	10	--	--	
S3	--	NY Inst.	unspecified	Magothy-U	110-288	13-191	200	--	--	
S80573	--	Efcor	cooling	Magothy-U	164-199	68-103	300	--	(50000)	1985 pumpage. Replaced S19538
S10940	--	Poly Tech	air cond	Glacial	35- 51	--	300	--	ND	
S23823	--	Poly Tech	cooling	Magothy-L	386-407	316-337	190	--	ND	
S23059	--	ILN Rlty	proc & cool	Magothy-L	168-193	66- 88	200	--	--	Off computer records

=====
 South-east area
 =====

DEC Number	Owner number	Owner	Use	Aquifer	Screen depth (ft)	Screen elevation (ft to SL)	Pump rate (GPM)	1983 pumpage (000 gals)	Avg. 1986-88 pumpage (000 gals)	Comments
S51298	#1	SCWA	municipal	Magothy-L	581-652	527-598	1400	72828	375144	
S65505	#2	SCWA	municipal	Magothy-L	575-645	521-591	1400	14260	358849	
S51457	#4	SCWA	municipal	Magothy-L	527-617	--	1400	134904	6532	
S40330	#3	SCWA	municipal	Magothy-L	262-328	219-285	1200	56808	90979	
S21487	#2	SCWA	municipal	Magothy-L	262-340	219-297	1200	122976	77100	
S19585	#1	SCWA	municipal	Glacial	63-90	--	1000	0	ND	

 =====
 North-east area
 =====

S20300	#2	SCWA	municipal	Magothy-U	201-232	126-157	700	101472	95549	
S20057	#1	SCWA	municipal	Magothy-U	170-200	91-121	700	91140	108035	
S48193	#4	SCWA	municipal	Magothy-L	470-530	390-450	1000	115680	134656	
S30506	#3	SCWA	municipal	Magothy-L	546-618	471-543	1000	114600	128311	

TABLE 5-2

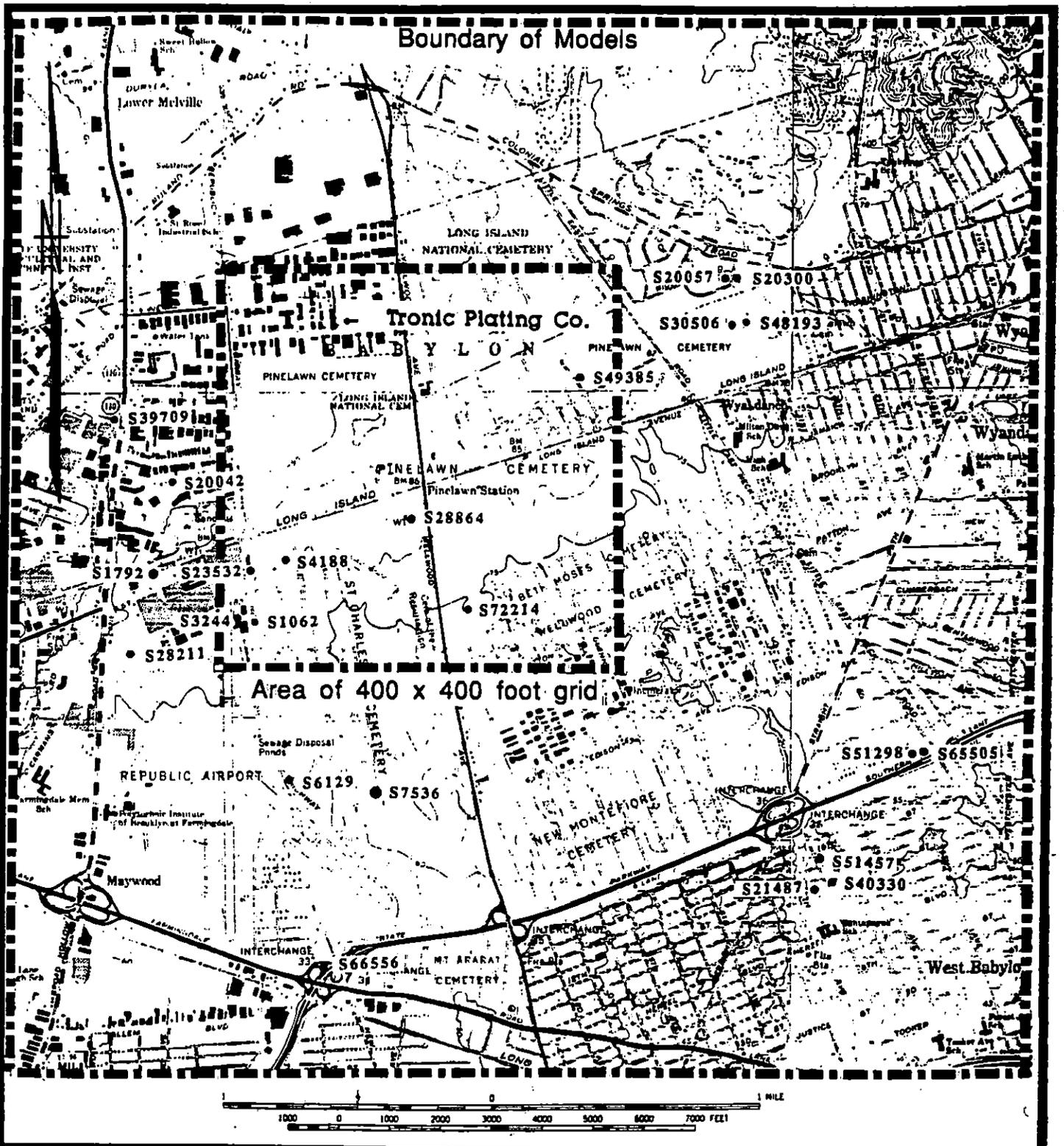
MODFLOW Volumetric Water Budget

VOLUMETRIC BUDGET FOR ENTIRE MODEL AT END OF TIME STEP 1 IN STRESS PERIOD 2

CUMULATIVE VOLUMES		L**3	RATES FOR THIS TIME STEP		L**3/T
IN:			IN:		
STORAGE	=	0.00000	STORAGE	=	0.00000
CONSTANT HEAD	=	0.30606E+07	CONSTANT HEAD	=	0.15303E+07
WELLS	=	641.00	WELLS	=	0.00000
RECHARGE	=	0.36868E+07	RECHARGE	=	0.18434E+07
HEAD DEP BOUNDS	=	0.00000	HEAD DEP BOUNDS	=	0.00000
TOTAL IN	=	0.67480E+07	TOTAL IN	=	0.33737E+07
OUT:			OUT:		
STORAGE	=	0.00000	STORAGE	=	0.00000
CONSTANT HEAD	=	0.42431E+07	CONSTANT HEAD	=	0.21214E+07
WELLS	=	0.12901E+07	WELLS	=	0.64503E+06
RECHARGE	=	0.00000	RECHARGE	=	0.00000
HEAD DEP BOUNDS	=	0.12221E+07	HEAD DEP BOUNDS	=	0.61102E+06
TOTAL OUT	=	0.67552E+07	TOTAL OUT	=	0.33774E+07
IN - OUT	=	-7140.0	IN - OUT	=	-3669.3
PERCENT DISCREPANCY	=	-0.11	PERCENT DISCREPANCY	=	-0.11

SECTION 5.2

FIGURES



Boundary Location Map of Groundwater Models

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Tronics Plating Company
 Farmingdale, N.Y.

Prepared By: STS

Date: November 1989

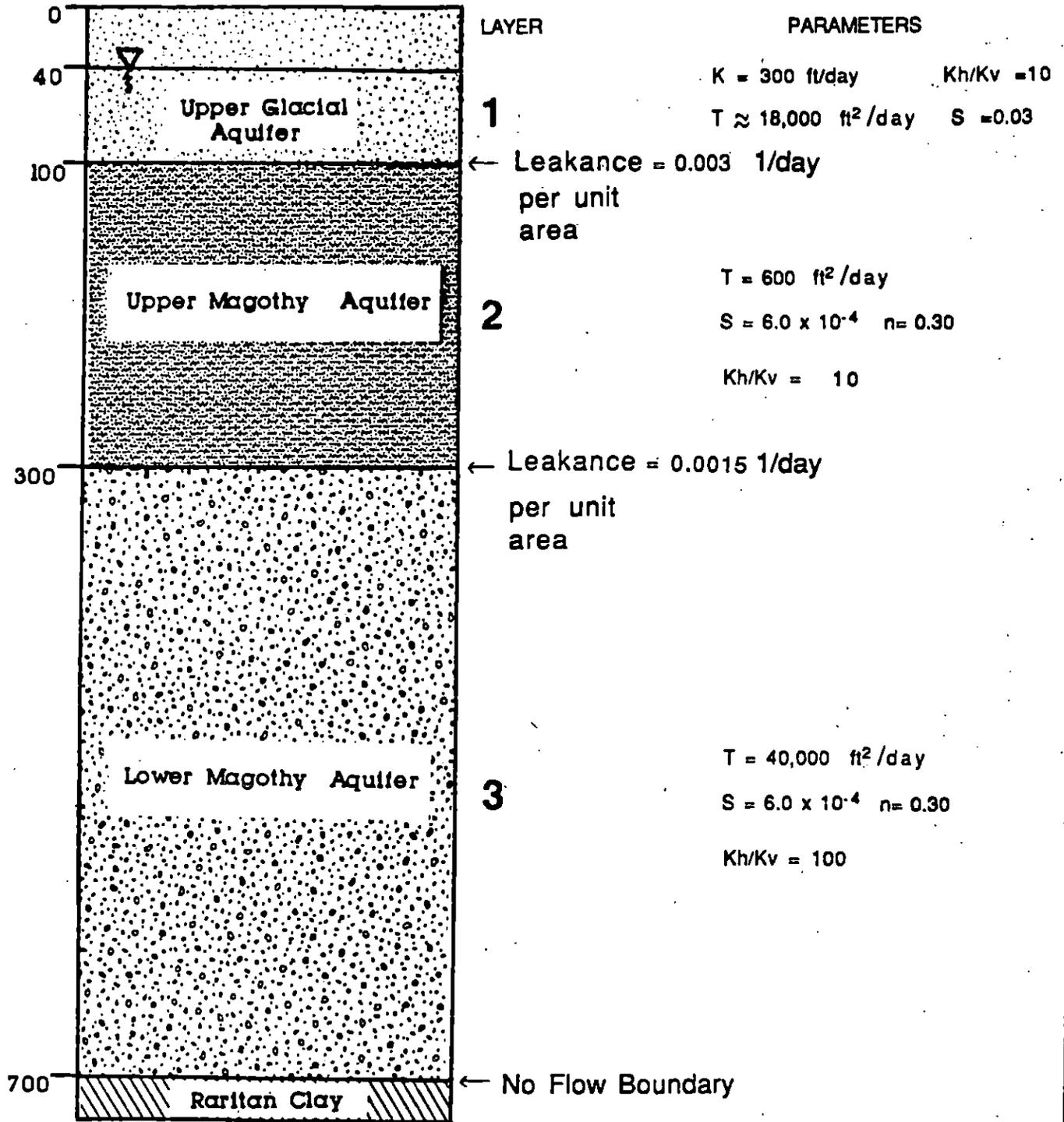
404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Reviewed By: EAW

Figure: 5-1

Depth
in Feet

Recharge = 22 inches/year (0.005 ft/day)



Stratigraphic Profile and Hydraulic Parameters
Used in the MODFLOW Model

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Tronic Plating Company
Farmingdale, N.Y.

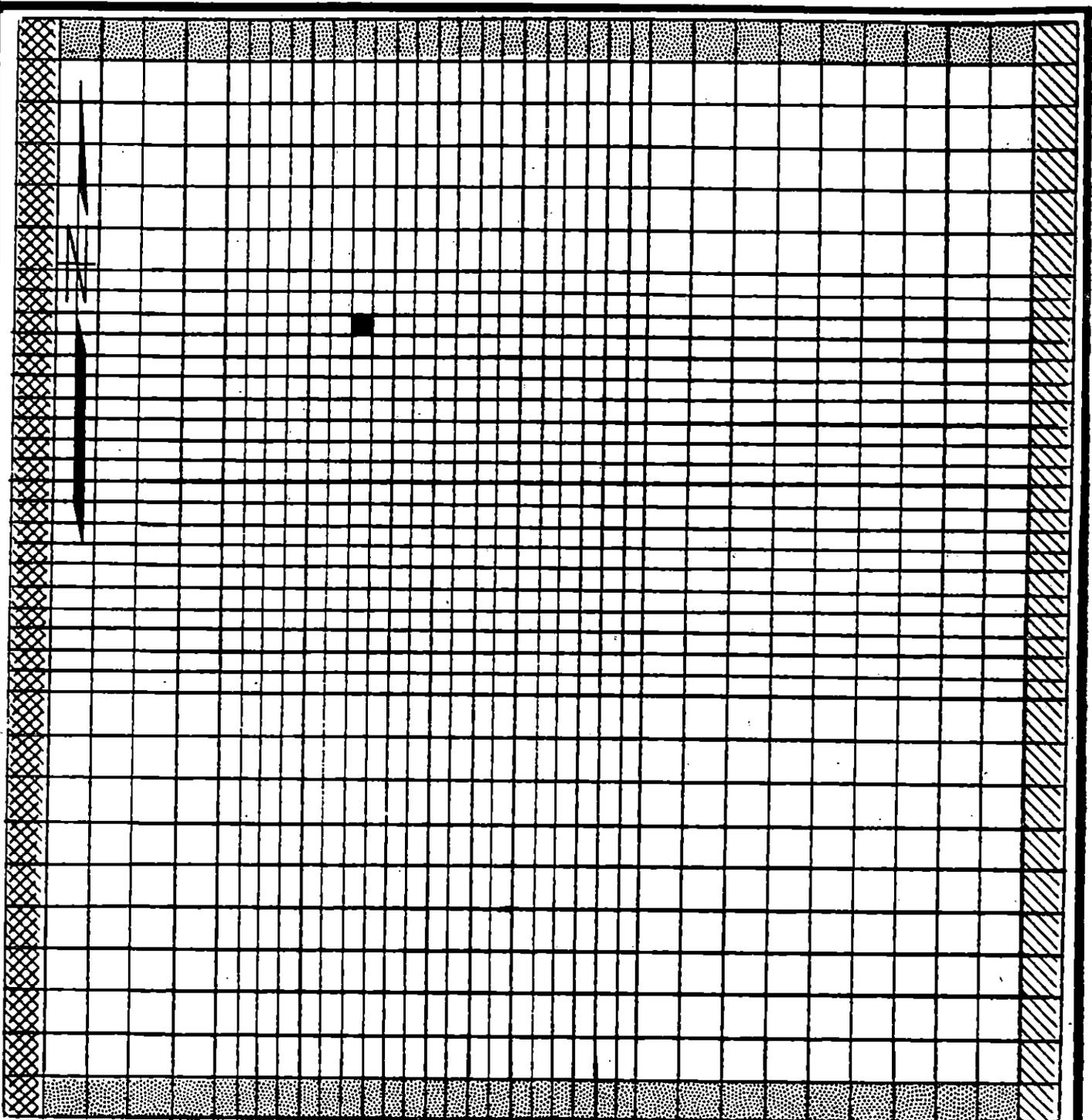
Prepared By: STS

Date: December 1989

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Reviewed By: EAW

Figure: 5-2



No Flow



Constant Head



General Head
Boundary



Site

Finite Difference Grid and Boundary Conditions for
Layer 1 of Modflow Model

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Tronics Plating Company
Farmingdale, N.Y.

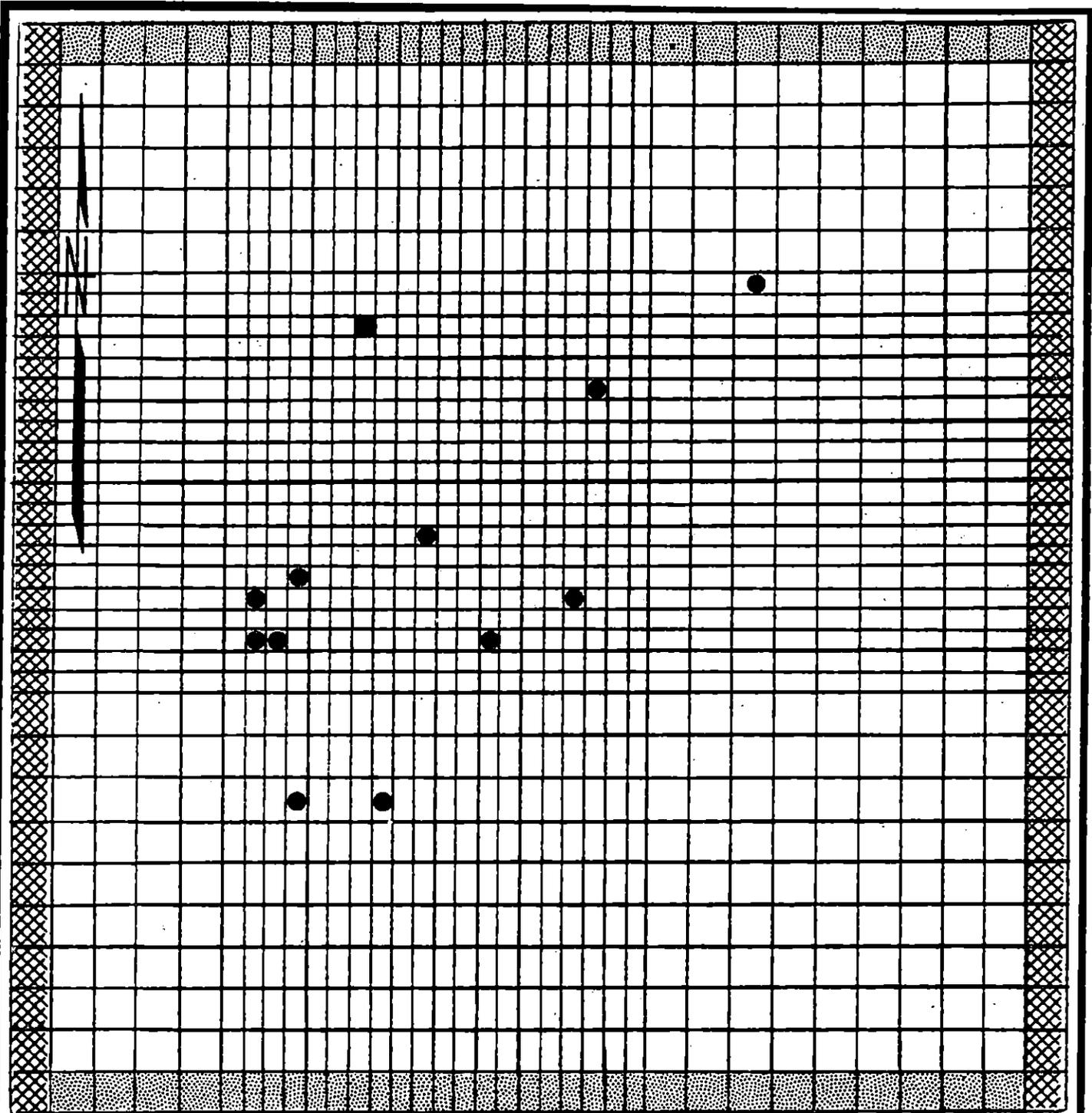
Prepared By: STS

Date: November 1989

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Reviewed By: EAW

Figure: 5-3



No Flow



Constant Head



Cell with Pumping Well(s)



Site

Finite Difference Grid and Boundary Conditions for Layer 2 of Modflow Model

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Tronics Plating Company
 Farmingdale, N.Y.

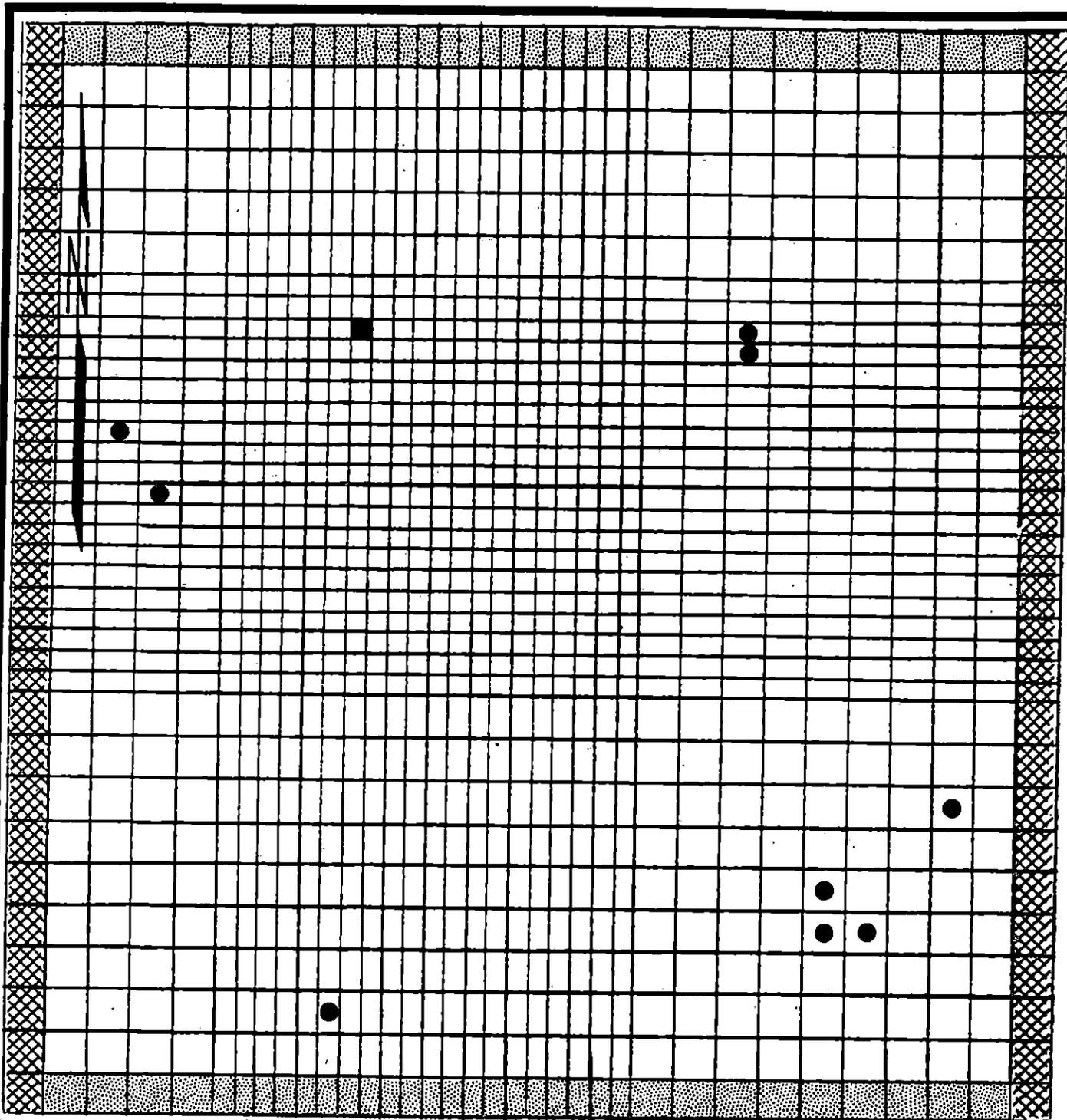
Prepared By: STS

Date: November 1989

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Reviewed By: EAW

Figure: 5-4



No Flow



Constant Head



Cell with Pumping Well(s)



Site

Finite Difference Grid and Boundary Conditions for
Layer 3 of Modflow Model

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Tronics Plating Company
Farmingdale, N.Y.

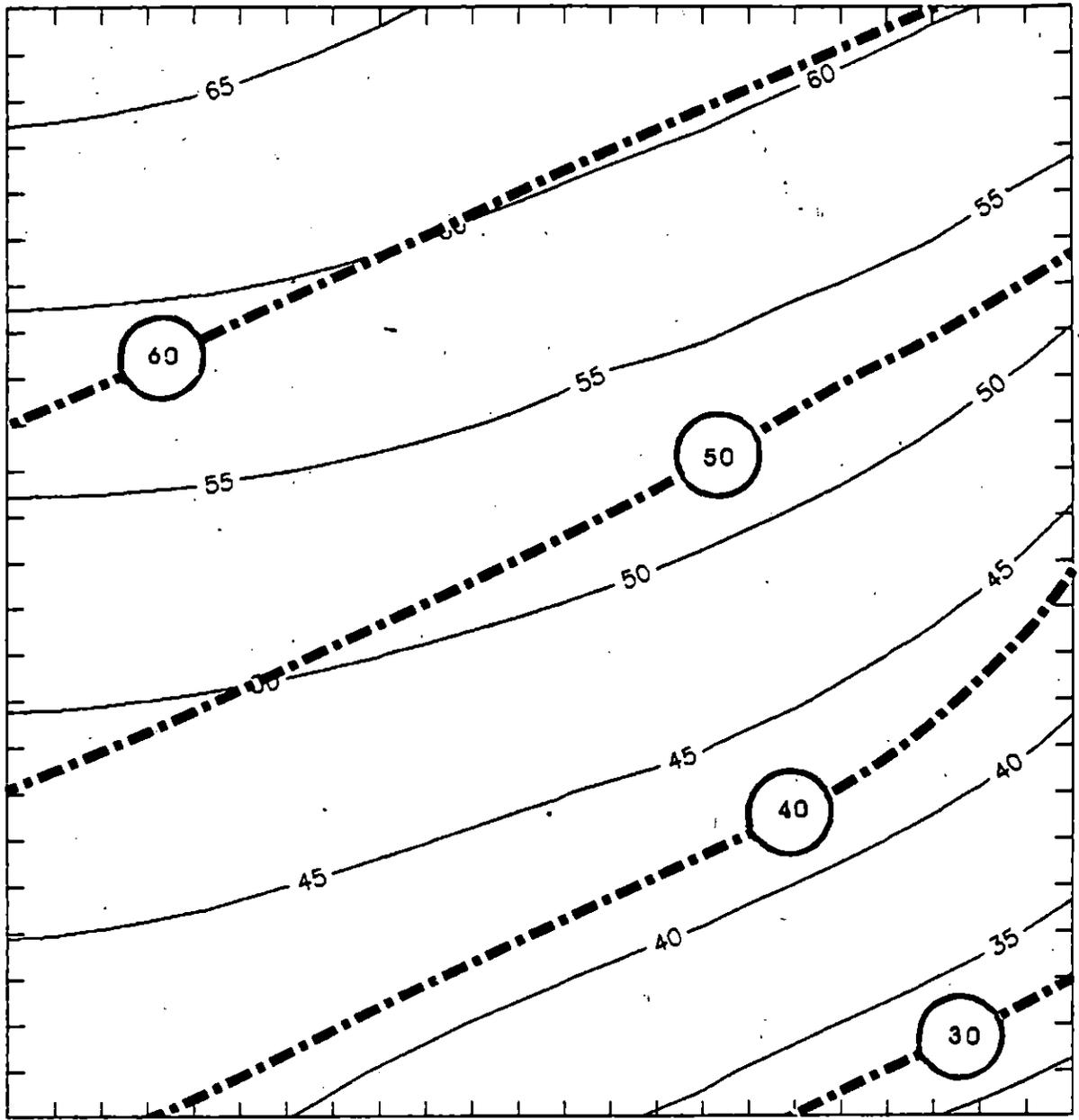
Prepared By: STS

Date: November 1989

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Reviewed By: EAW

Figure: 5-5



1983 groundwater elevation contours from USGS (Doriski, 1983)

1983 groundwater elevation contours simulated by model

Computed versus Measured Groundwater Elevation in the Upper Glacial Aquifer - Model Layer 1

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Tronics Plating Company
 Farmingdale, NY

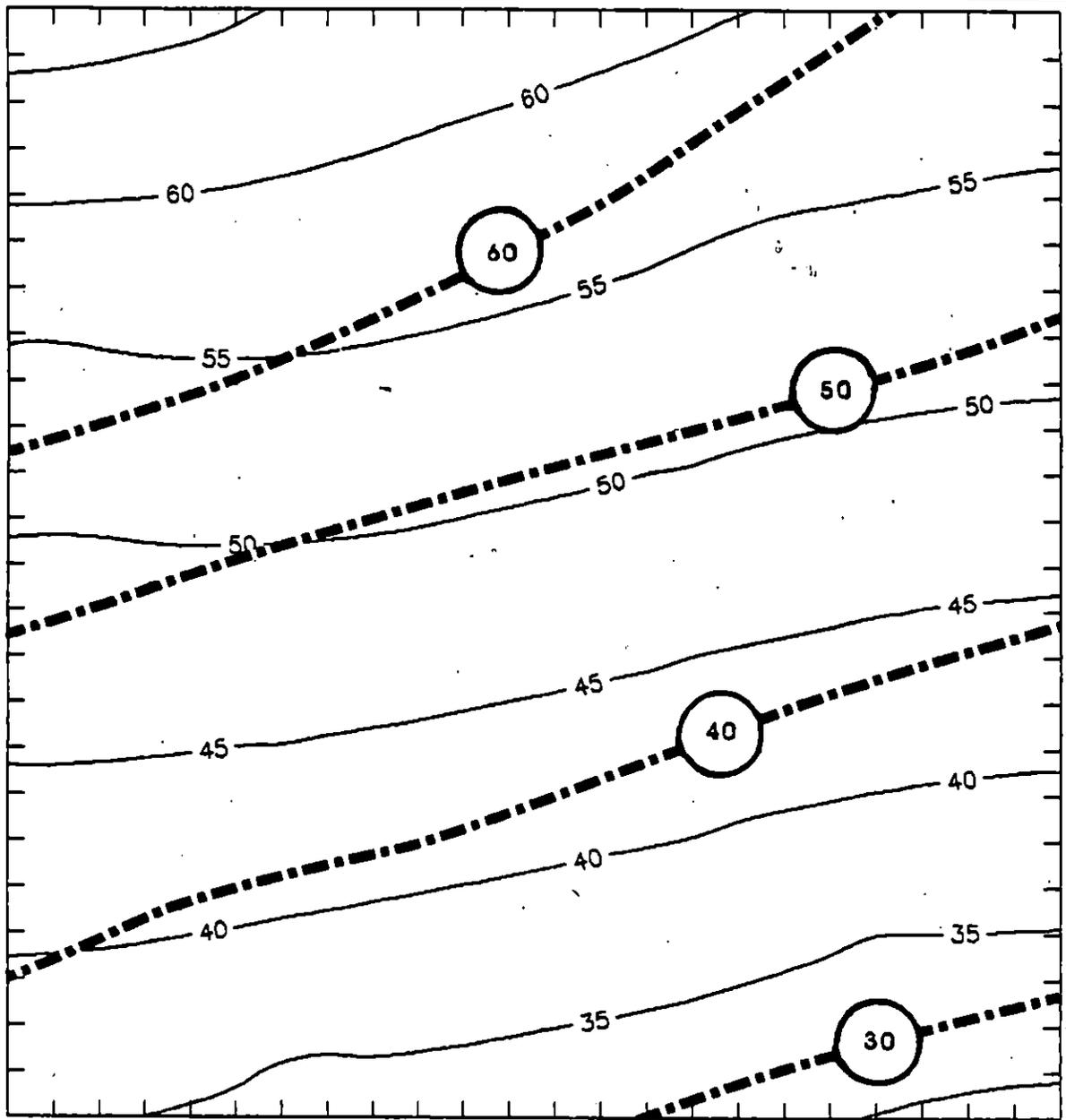
Prepared By: RH

Date: September 1991

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Reviewed By: EAW

Figure: 5-6



1983 groundwater elevation contours from USGS (Doriski, 1983)

1983 groundwater elevation contours simulated by model

Computed versus Measured Groundwater Elevations
in the Magothy Aquifer - Model Layer 3

CA RICH CONSULTANTS, INC.
Certified Ground-Water and Environmental Specialists

Tronics Plating Company
Farmingdale, NY

Prepared By: RH

Date: September 1991

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Reviewed By: EAW

Figure: 5-7

5.3 MT3D Transport Model

5.3.1 Introduction

The transport modeling performed in this report is not intended to present a precise representation of contaminant migration in this geographic area. Moreover, the intent of this modeling effort is to simulate -- using known geologic, hydrologic and waste disposal parameters -- the likely trend that dissolved metals would follow given this hydrogeologic setting. Results of this modeling effort shall serve as an additional tool for determining what, if any, environmental impacts are presented by the former metal plating facility and whether such impacts warrant consideration of corrective measures.

Previous versions of this report included mass transport simulations using the USGS's two dimensional Method of Characteristics (MOC) model written by Konikow and Bredehoeft (1978). These simulations, however, were not able to adequately simulate transport in both the horizontal and vertical mode. MT3D was selected as a suitable alternative application for the final version of the R.I. as it allows for the simulation of horizontal migration within any given model layer as well as vertical migration between model layers.

MT3D uses a modular structure similar to MODFLOW and includes options to simulate advection, dispersion, sink/source mixing and chemical reactions. This transport model is used in conjunction with block centered finite difference flow models, including MODFLOW. MT3D retrieves the hydraulic heads and the various flow and source/sink terms saved by the flow model, automatically incorporating them as specified hydrologic boundary conditions.

The partial differential equation describing three dimensional transport of contaminants in groundwater used in this model is as follows:

$$\frac{\partial C}{\partial t} = \frac{\partial}{\partial x_i} \left(D_{ij} \frac{\partial C}{\partial x_j} \right) - \frac{\partial}{\partial x_i} (v_i C) + \frac{q_i}{\theta} C_s + \sum_{k=1}^N R_k$$

where

- C is the concentration of contaminants dissolved in groundwater, ML^{-3} ;
- t is time, T ;
- x_i is the distance along the respective Cartesian coordinate axis, L ;
- D_{ij} is the hydrodynamic dispersion coefficient, L^2T^{-1} ;
- v_i is the seepage or linear pore water velocity, LT^{-1} ;
- q_i is the volumetric flux of water per unit volume of aquifer representing sources (positive) and sinks (negative), T^{-1} ;
- C_s is the concentration of the sources or sinks, ML^{-3} ;
- θ is the porosity of the porous medium, dimensionless;
- $\sum_{k=1}^N R_k$ is a chemical reaction term, $ML^{-3}T^{-1}$.

5.3.2 Computer Modeling Of Mass Transport From On-Site Leaching Pools

MT3D incorporates the same 35 column, 36 row and 3 layer grid initially developed for the MODFLOW model. The flow field modeled during the MODFLOW simulation is saved as an unformatted head & flow file which is read as an input file by the transport model. The individual data files were also created for input to MT3D's Basic Transport Package, Advection Package, Dispersion Package, Source & Sink Mixing Package and Chemical Reaction Package.

To simulate the infiltration of wastewater from the former leaching pools, an artificial injection well was placed in the model at node 12, 9, 1 -- the node representing the Tronic Site. Water was injected into the model at a rate of 4,800 gallons per day. Calculations prepared by Tronic's Engineers, Benson & Burns (1974), indicate that this was the estimated wastewater discharge rate of the former Facility.

Two stress periods were incorporated into the model. Stress period one of the model simulated the tenancy of the Tronic Plating Co. by injecting wastewater into the aquifer for a period of 15 years, or from 1968 to 1983. A second stress period was then run with the injection well off to simulate the migration of metals after Tronic left the property and the leaching pool were taken out of service. Print-outs of the calculated metals migration after an additional 8, 18, 28 and 38 years were recorded to simulate the hypothetical migration of metals in the years 1991 (round three of the sampling program), 2001, 2011 and 2021.

An injection concentration of 1,000 ug/l (or 1 mg/l) continuously throughout the period of simulation was applied in the model. Based on the data reported to the SCDHS (Table 2-1), this was a reasonable estimation of what the average concentration of an individual "generic" metal would be in wastewater effluent after it percolated vertically downward through 20 feet of unsaturated and partially saturated soil.

Several retardation factors were applied to the model to simulate the absorption of metals onto the aquifer matrix. This phenomena is addressed in the model assuming that the absorption is linear, or that the sorbed concentration of metals, C' , are directly proportional to the dissolved metals concentration, C , and is simulated using the following equation:

$$C' = K_d C$$

where K_d is the distribution coefficient and defined as:

$$R = 1 + \frac{P_b}{n} K_d$$

and, where:

- R = the Retardation Factor
- P_b = the Bulk Density of the Aquifer
- n = the Porosity of the Aquifer.

Values for the bulk density and porosity terms are readily available in the literature. Terzaghi and Peck (1967) estimate that the bulk density for a poorly sorted sand, such as is characteristic in the Upper Glacial Formation, to be 186 grams per cubic centimeter and the USGS typically estimates the porosity of the Formations in this model to be 0.30, or 30 percent.

Estimates for the values of Kd, however, are not as easily obtained. As there were several different metals contained in Tronic's wastewater, no one Kd value would properly simulate the absorption of each metal. During the initial draft of this R.I., a literature search of Kd values was performed and values of 1, 5 and 10 millimeters per gram (ml/g) were applied to the MOC model. These earlier simulations, however, did not achieve a good "fit" with the data obtained during the three rounds of monitoring well sampling.

To assist in determining an adequate Kd value, reports prepared for the nearby Liberty Industrial Finishing Site which contains a chromium and cadmium groundwater plume were reviewed. Studies completed at the Liberty site by Pinder (1973) and Perlmutter & Lieber (1970) indicate that retardation of these dissolved metals in the Upper Glacial Formation would tend to be very minor. Simulations performed for this Report using MT3D were therefore run using Kd values of 0 (no retardation), .1 and .5 ml/g.

All simulations were run with a longitudinal dispersivity of 100 in layers 1, 2 and 3. The lateral/longitudinal and vertical/longitudinal dispersivity ratios were 0.25 in layers 1, 2 and 3. Mass balance budgets for the simulations performed with Kd equal to 0, 0.1 and 0.5 ml/g are included on Table 5.3. The percent discrepancy ranged from 9 to 15 percent.

RESULTS OF STRESS PERIOD ONE - 1983

Layer 1 / Upper Glacial Formation

Simulations of the projected distribution of metals in the Upper Glacial Aquifer after 15 years of Tronic's tenancy at the property, or approximately 1983, are presented on Figures 5-8, A, B, and C. These simulations were performed using Kd values of 0 (no retardation), .1 and .5 ml/g. Mass balance budgets for the

simulations are presented on Table 5-3. As the dissolved metals infiltrate to the water table, they flow in a southeastern direction with the ambient groundwater. Simulations performed with Kd equal to 0 and .1 both indicate a plume of approximately 4,000 feet ranging in concentration from 10 to 40 ug/l. The simulation performed with Kd equal to .5 produced a plume of a similar concentration magnitude but measuring approximately 1,500 feet in length.

Layer 2 / Upper Magothy Formation

Simulations performed using Kd equal to .5 and .1 ml/g indicate that at this time there would have been no migration of metals from the Tronic Site to model layer 2, the Upper Magothy Formation. The simulation performed using Kd equal to 0 ml/g indicates that several of the nodes in model layer 2 would have concentrations of metals at levels of less than 1 ug/l.

Layer 3 / Lower Magothy Formation

The simulations performed with Kd equal to 0, .1 and .5 ml/g all revealed no migration of metals to model layer 3, the Lower Magothy Formation, at this point in time.

RESULTS OF STRESS PERIOD TWO - 1991 thru 2021

Layer 1 / Upper Glacial Formation

After discharges to the on-site leaching pools were terminated and the dissolved metals are allowed to mix and flow with ambient groundwater, simulations for the year 1991, or round three of the sampling program, were performed and plotted on Figure 5-9, A, B, and C. Using Kd values of 0 and .1 ml/g, the area surrounding the former Tronic facility for more than two thousand feet displays no detectable levels of dissolved metals. These simulations agree with the results of groundwater samples collected from the monitoring wells installed around the facility -- wells MW-5S, 4S, 4I and 3I -- and are plotted on Figures 4-8 D through J. The simulation run with Kd equal to 0 indicates that small plume on the order of 5 ug/l or less might exist approximately 5,000 to 7,000 feet from the

leaching pools. Similarly, the simulation run with Kd equal to .1 ml/g displayed a plume on the order of 5 ug/l or less approximately 3,000 to 4,000 feet from the leaching pools.

The simulation run with a Kd value of .5 ml/g displayed a plume approximately 1,000 to 3,000 feet from the leaching pools and ranging in concentration from 10 to 30 ug/l. As these concentrations were not detected in the corresponding project well sampled in 1991 (MW-3I), .5 ml/g did not appear to be representative of this geologic formation and was not considered in the simulation of future time periods.

The results of simulations performed for the year 2001, illustrated on Figure 5-10, display a small plume of dissolved metals decreasing in both size and concentration. By the year 2021, or 30 years from now, the distribution of dissolved metals simulated in the Upper Glacial Formation are on the order of 1 ug/l or less using Kd values of either .1 or 0 ml/g.

Layer 2 / Upper Magothy Formation

The simulations performed using Kd values of 0 and .1 ml/g indicate that in 1991, the concentration of dissolved metals from the leaching pools that migrated to model layer 2 would be between 3 and less than 1 ug/l -- below the existing analytical quantitation limit for the metals of concern. By the year 2021, the level of dissolved metals in this layer increase slightly, but do not exceed 5.0 ug/l as the dissolved metals continue to mix and are diluted by ambient groundwater. These simulations are illustrated on Figures 5-11 and 5-12.

Layer 3 / Lower Magothy Formation

The simulations performed with Kd equal to 0 and .1 ml/g all revealed only very minor migration of metals to model layer 3, the Lower Magothy Formation, and all at levels significantly less than 1 ug/l. For all intents and purposes, the supply wells in the lower Magothy Aquifer are virtually unaffected by the metals discharged to the Upper Glacial Aquifer.

SECTION 5.3

TABLES

TABLE 5-3

MT3D Cumulative Mass Balance Budgets for
 Entire Model, End of Stress Period 2
 Kd Equal to 0, 0.1 and 0.5

CUMMULATIVE MASS BUDGETS AT END OF TRANSPORT STEP 80, TIME STEP 1, STRESS PERIOD 2

Kd=0

	IN	OUT
CONSTANT CONCENTRATION:	0.0000000	0.0000000
CONSTANT HEAD:	0.0000000	-0.7901530E+09
WELLS:	0.3509477E+10	-320540.8
HEAD-DEPENDENT BOUNDARY:	0.0000000	-2641.568
RECHARGE:	0.0000000	0.0000000
DECAY OR BIODEGRADATION:	0.0000000	0.0000000
MASS STORAGE (SOLUTE):	0.9222914E+10	-0.1008446E+11
MASS STORAGE (ADSORBED):	0.0000000	0.0000000
[TOTAL]:	0.1273239E+11	-0.1087493E+11
NET (IN - OUT):	0.1857457E+10	
DISCREPANCY (PERCENT):	15.73628	

CUMMULATIVE MASS BUDGETS AT END OF TRANSPORT STEP 50, TIME STEP 1, STRESS PERIOD 2

Kd=0.1

	IN	OUT
CONSTANT CONCENTRATION:	0.0000000	0.0000000
CONSTANT HEAD:	0.0000000	-0.4971400E+09
WELLS:	0.3509477E+10	-497964.4
HEAD-DEPENDENT BOUNDARY:	0.0000000	-2264.464
RECHARGE:	0.0000000	0.0000000
DECAY OR BIODEGRADATION:	0.0000000	0.0000000
MASS STORAGE (SOLUTE):	0.7094901E+10	-0.7904232E+10
MASS STORAGE (ADSORBED):	0.4398839E+10	-0.4900625E+10
[TOTAL]:	0.1500322E+11	-0.1330250E+11
NET (IN - OUT):	0.1700719E+10	
DISCREPANCY (PERCENT):	12.01679	

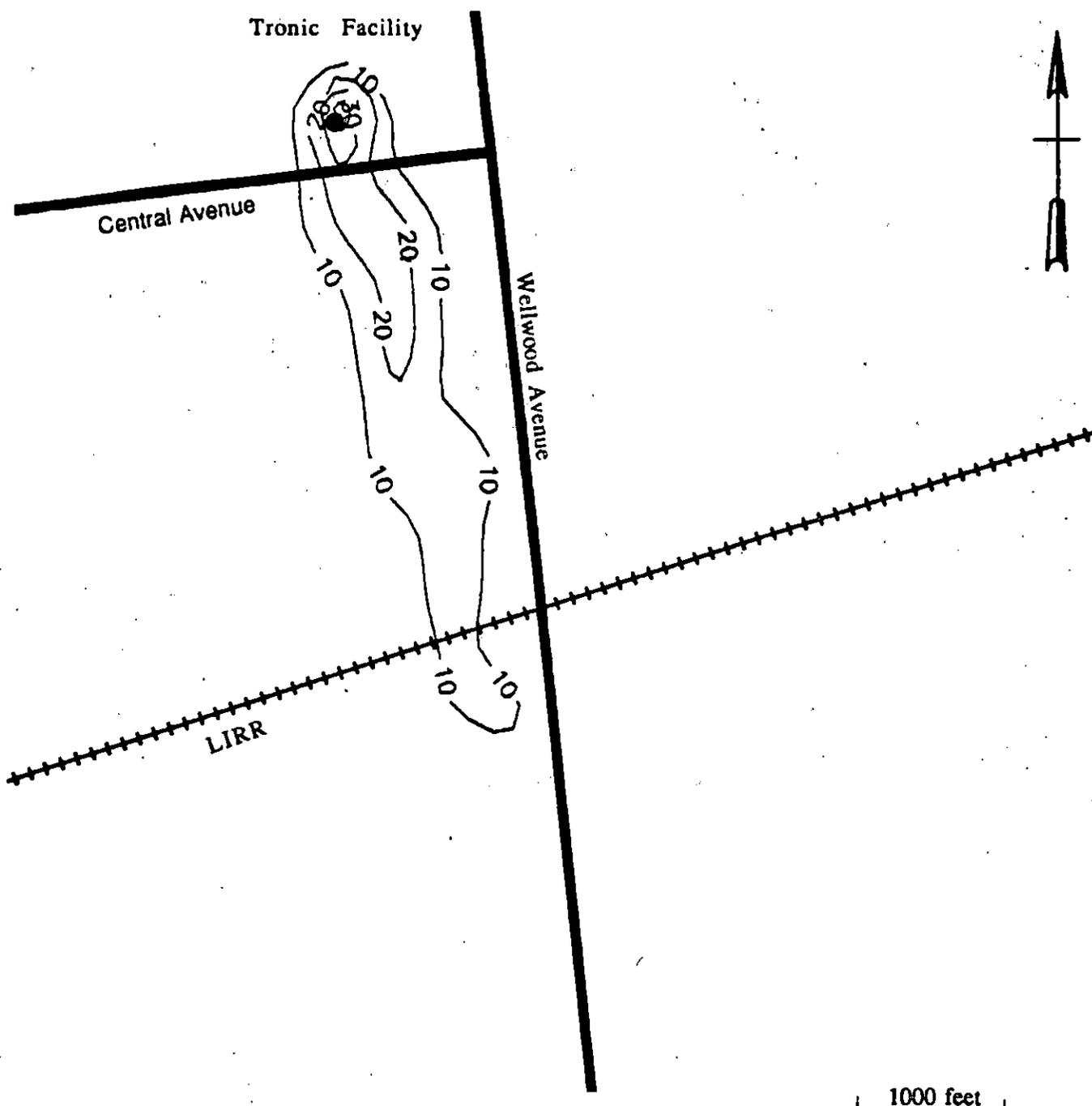
CUMMULATIVE MASS BUDGETS AT END OF TRANSPORT STEP 23, TIME STEP 1, STRESS PERIOD 2

Kd=0.5

	IN	OUT
CONSTANT CONCENTRATION:	0.0000000	0.0000000
CONSTANT HEAD:	0.0000000	0.0000000
WELLS:	0.3509475E+10	0.0000000
HEAD-DEPENDENT BOUNDARY:	0.0000000	-0.1311122E-14
RECHARGE:	0.0000000	0.0000000
DECAY OR BIODEGRADATION:	0.0000000	0.0000000
MASS STORAGE (SOLUTE):	0.2872823E+10	-0.3403314E+10
MASS STORAGE (ADSORBED):	0.8905751E+10	-0.1055028E+11
[TOTAL]:	0.1528805E+11	-0.1395359E+11
NET (IN - OUT):	0.1334459E+10	
DISCREPANCY (PERCENT):	9.127118	

SECTION 5.3

FIGURES



Simulated Metals Concentrations in ug/L with $K_d = 0$ ml/g
 Model Layer One - Upper Glacial Formation - 1983

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 Certified Ground-Water and Environmental Specialists

Tronic Plating Company
 Farmingdale, NY

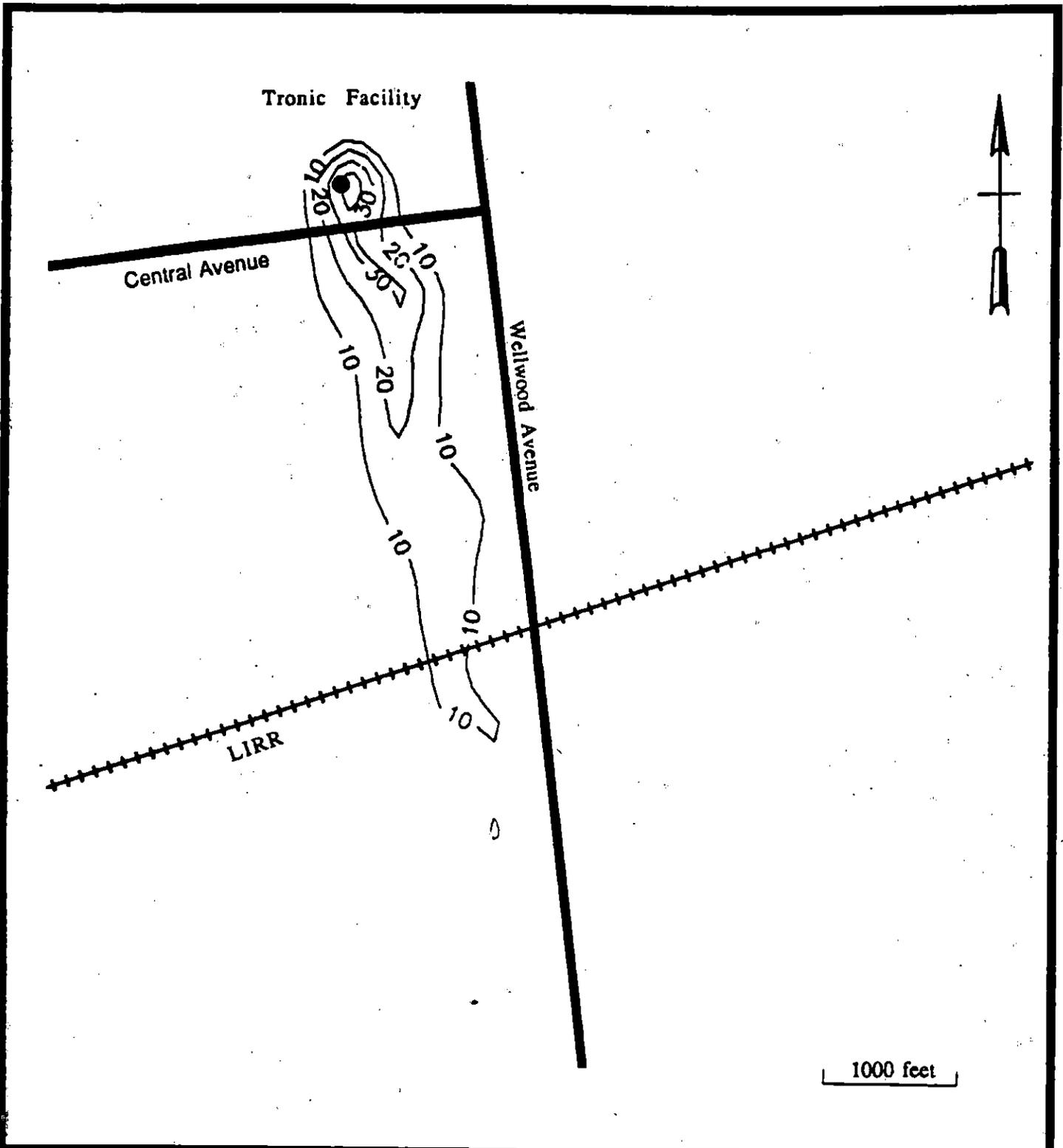
Prepared By: RH

Date: September 1991

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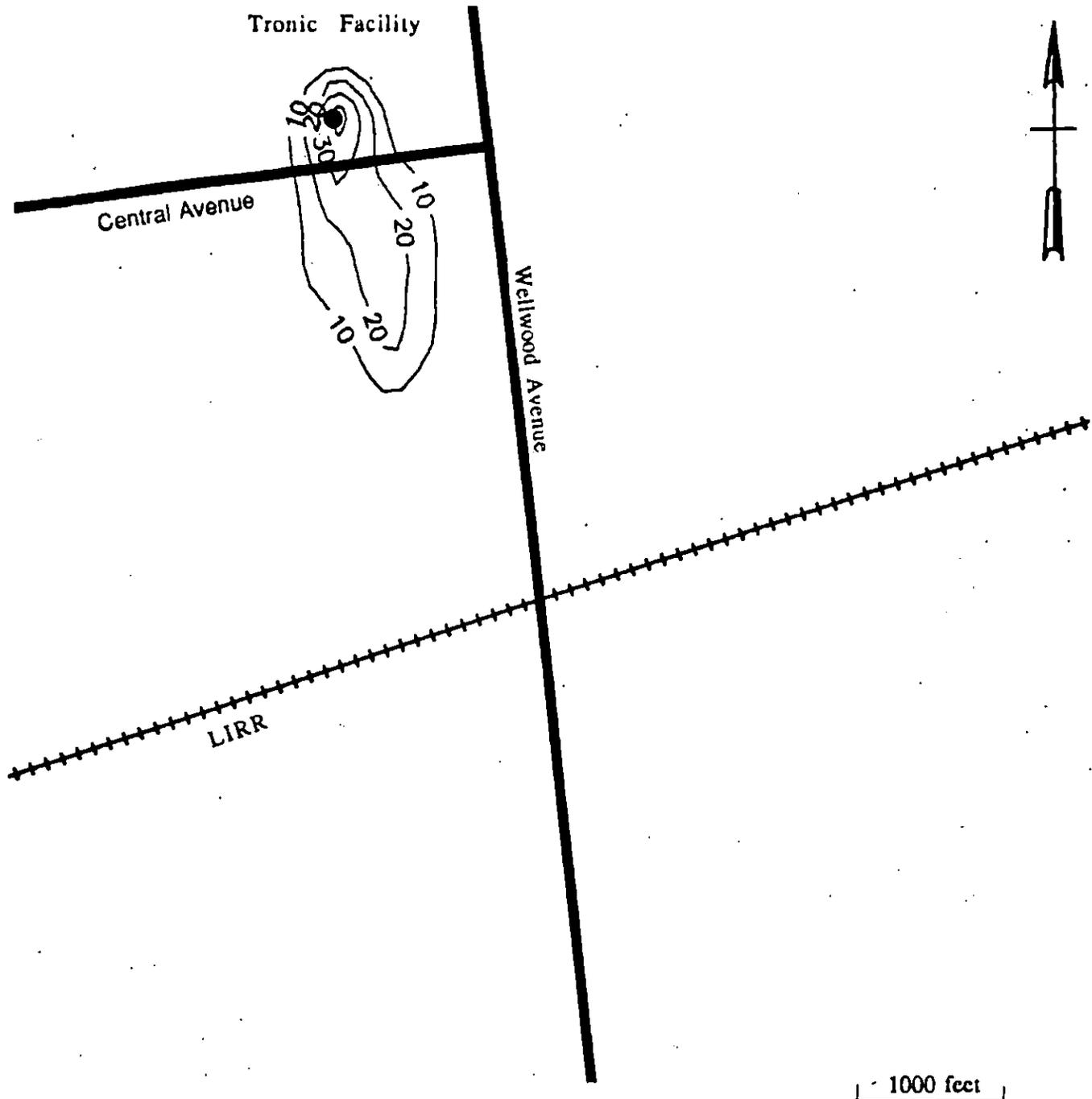
Reviewed By: EAW

Figure: 5-8 A



Simulated Metals Concentrations in ug/L with $K_d = 0.1$ ml/g
 Model Layer One - Upper Glacial Formation - 1983

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404 Glen Cove Avenue, Sea Cliff, N.Y. 11579	Prepared By: RH	Date: September 1991
	Reviewed By: EAW	Figure: 5-8 B



Simulated Metals Concentrations in ug/L with $K_d = 0.5$ ml/g
 Model Layer One - Upper Glacial Formation - 1983

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 Farmingdale, NY

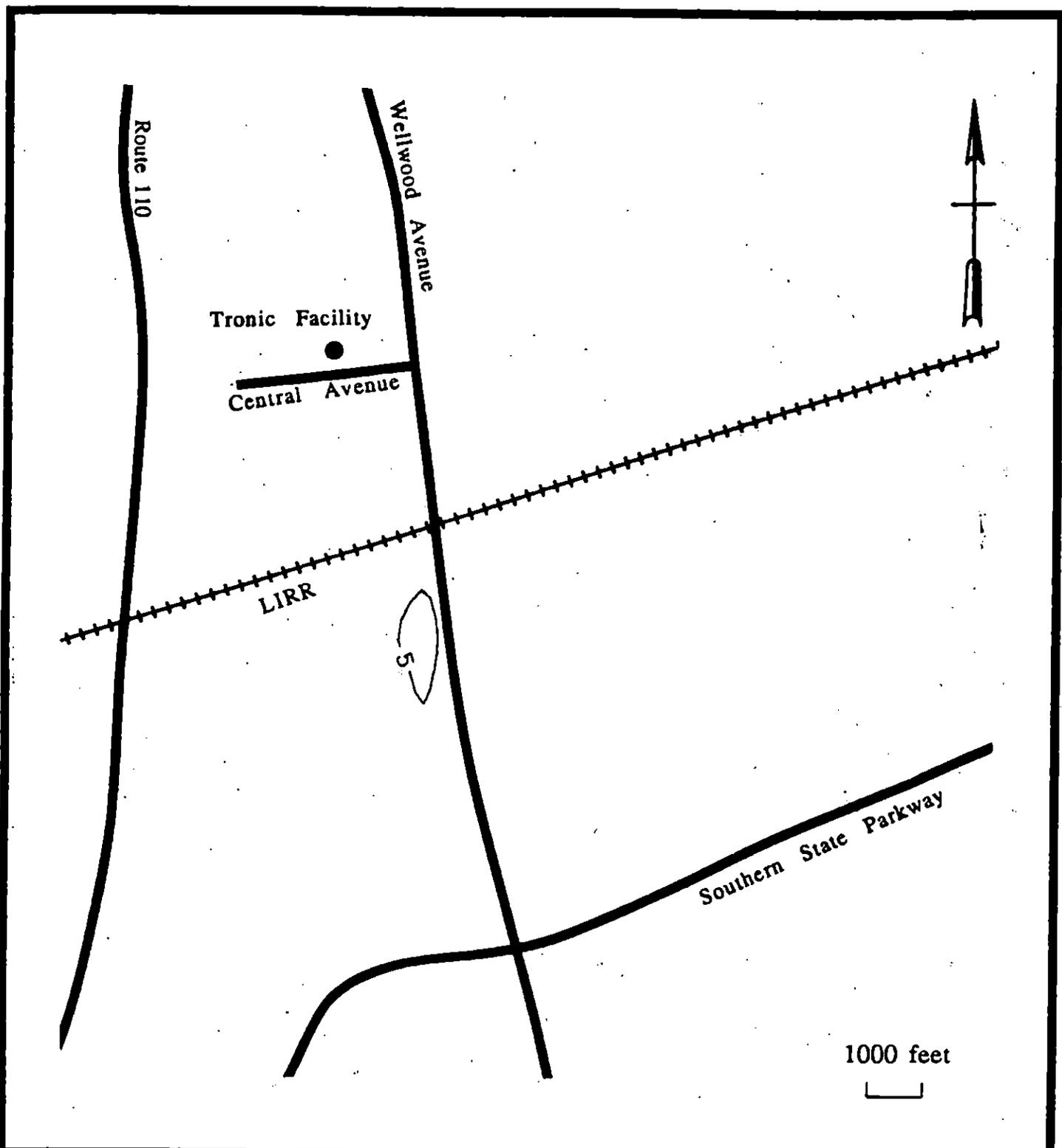
Prepared By: RH

Date: September 1991

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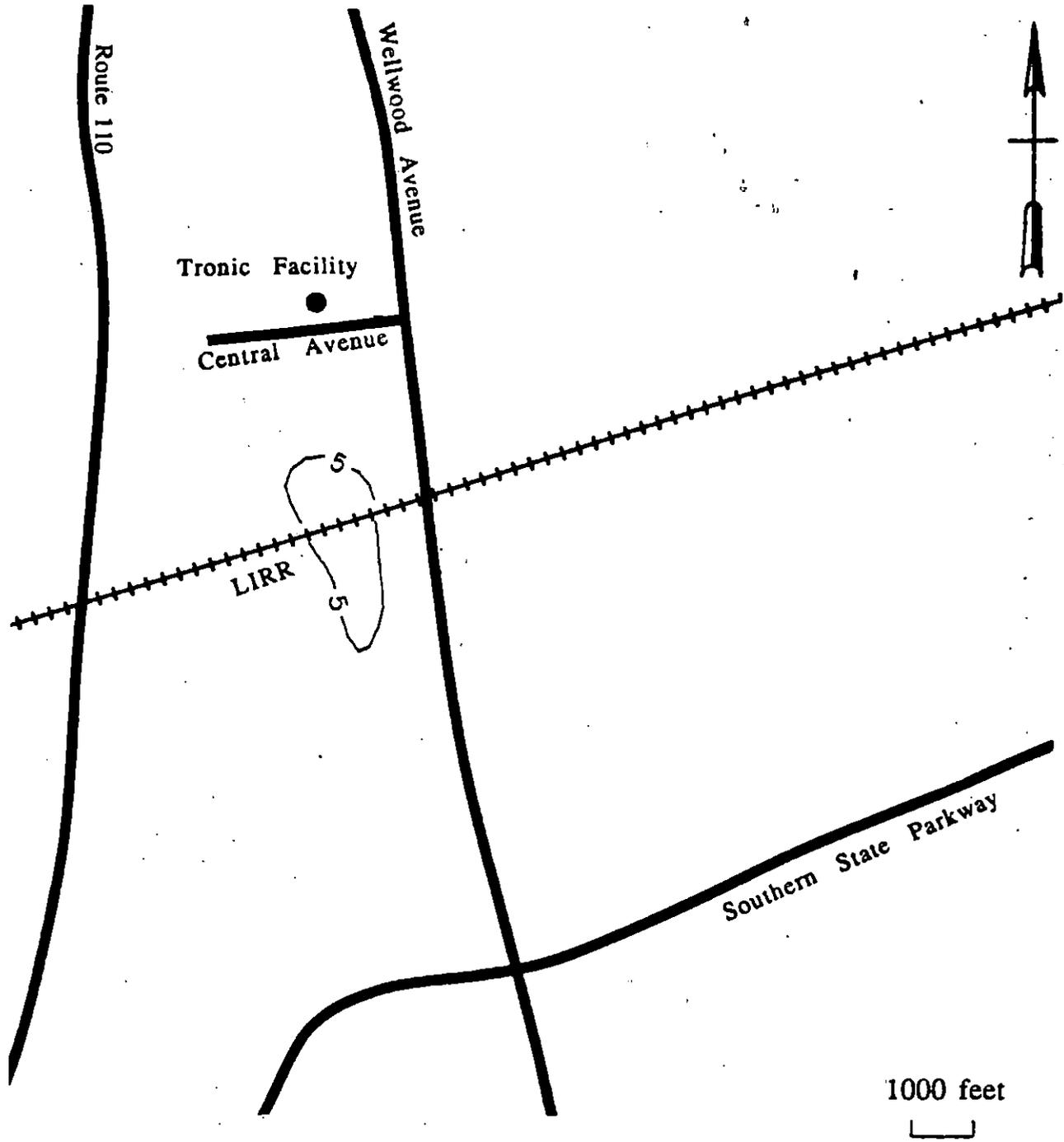
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Figure: 5-8 C



Simulated Metals Concentrations in ug/L with $K_d = 0$ ml/g
 Model Layer One - Upper Glacial Formation - 1991

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Simulated Metals Concentration in ug/L with $K_d = 0.1 \text{ ml/g}$
 Model Layer One - Upper Glacial Formation - 1991

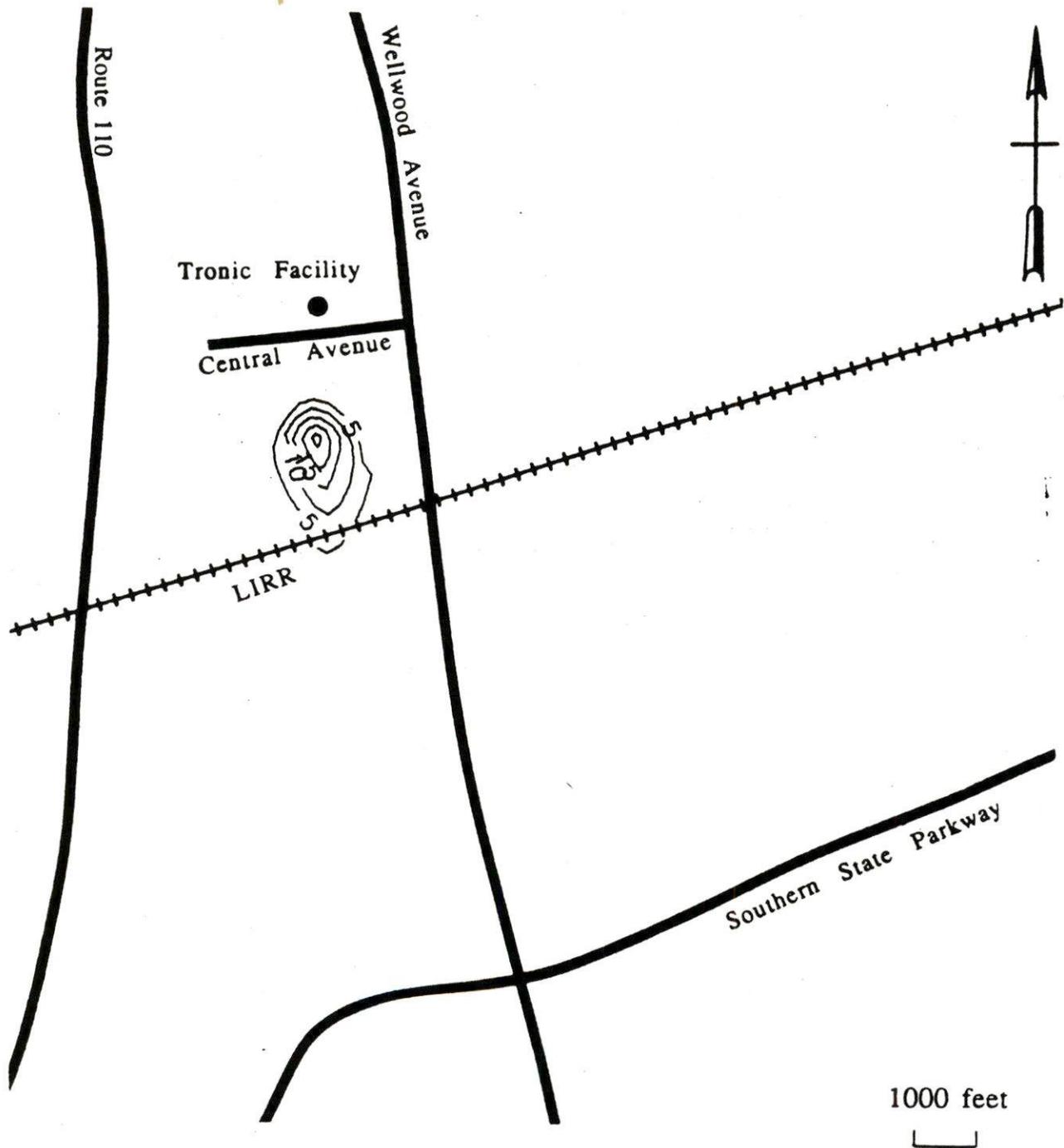
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Tronic Plating Company
 Farmingdale, NY

Prepared By: **RH** Date: **September 1991**

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Reviewed By: **EAW** Figure: **5-9 B**



Simulated Metals Concentrations in ug/L with $K_d = 0.5 \text{ ml/g}$
 Model Layer One - Upper Glacial Formation - 1991

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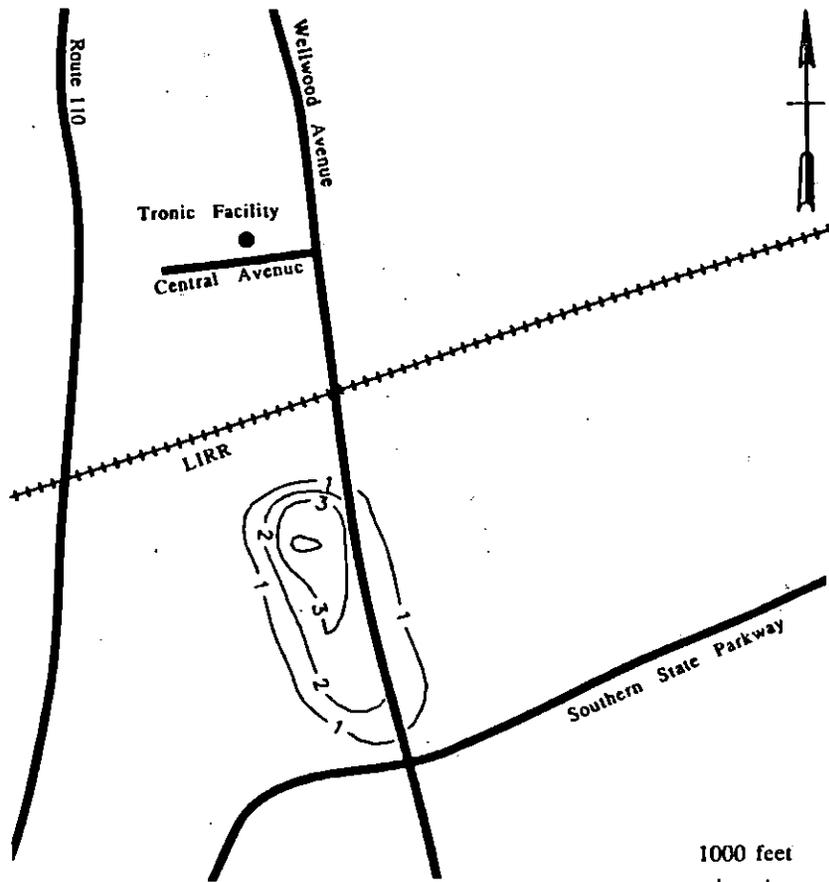
Prepared By: RH

Date: September 1991

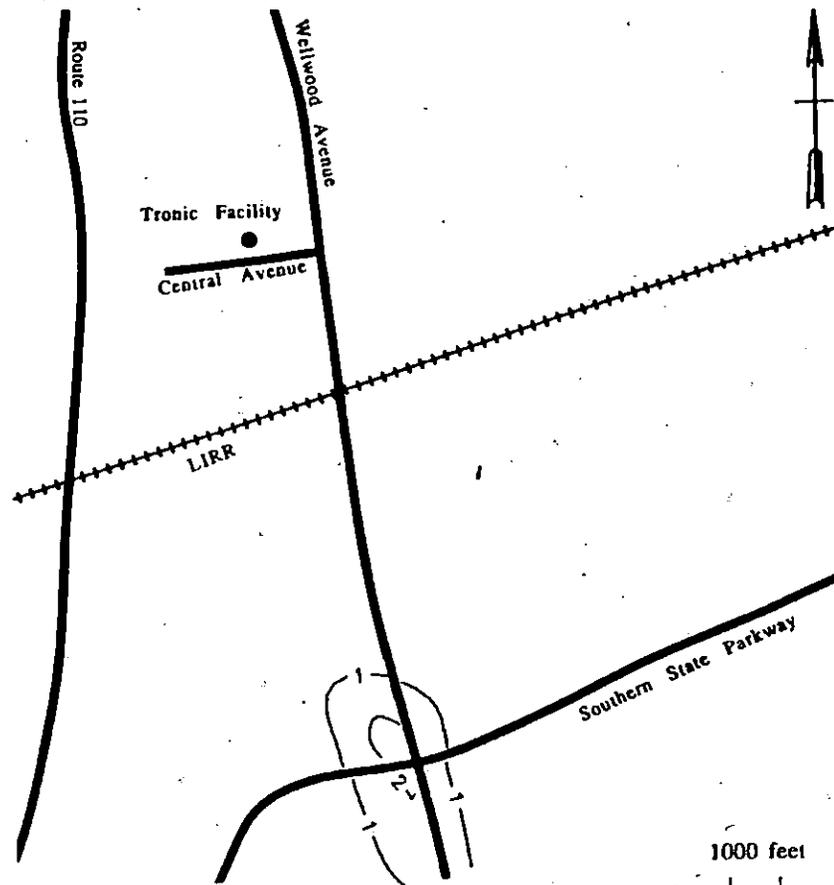
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Figure: 5-9 C



$K_d = 0.1 \text{ ml/g}$



$K_d = 0 \text{ ml/g}$

Simulated Metals Concentrations in ug/L
 Model Layer One - Upper Glacial Formation - 2021

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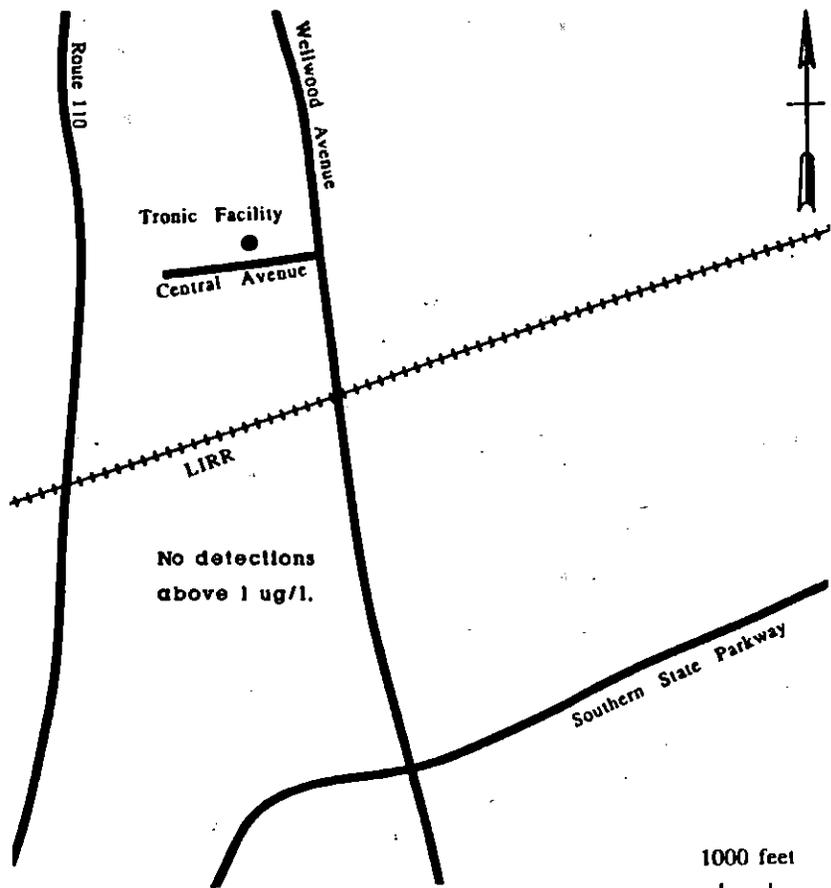
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 Farmingdale, NY

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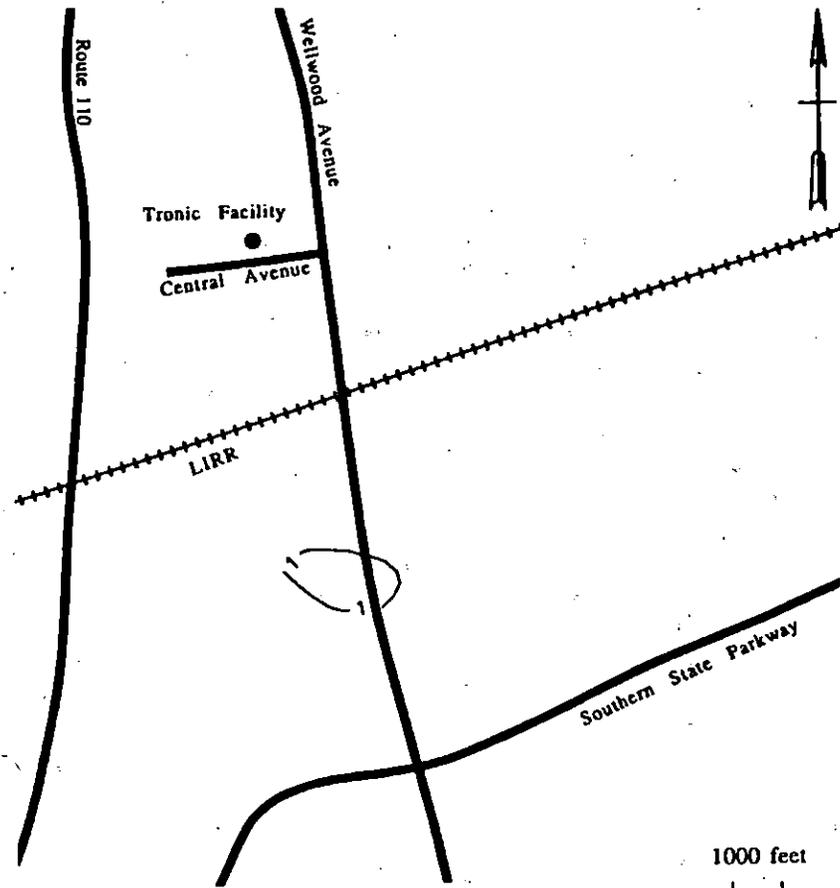
Date: September 1991

Reviewed By: EAW

Figure: 5-10



$K_d = 0.1 \text{ ml/g}$



$K_d = 0 \text{ ml/g}$

Simulated Metals Concentrations in ug/L
 Model Layer Two - Upper Magothy Aquifer - 1991

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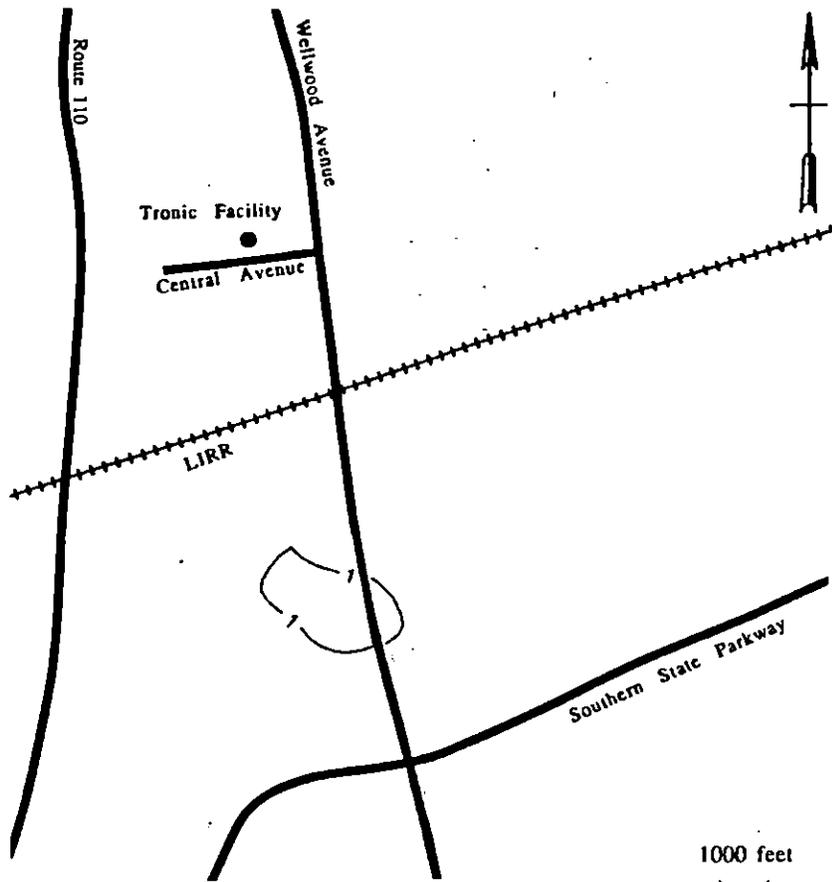
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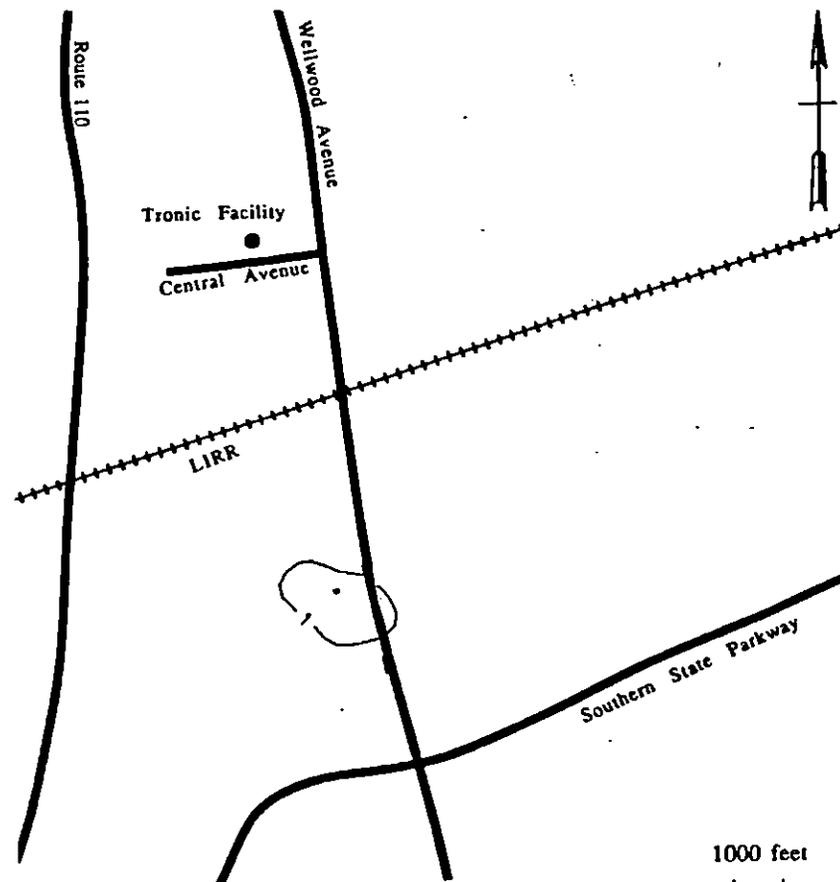
Date: September 1991

Reviewed By: EAW

Figure: 5-11



$Kd = 0.1 \text{ ml/g}$



$Kd = 0 \text{ ml/g}$

Simulated Metals Concentrations in ug/L
 Model Layer Two - Upper Glacial Aquifer - 2021

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404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Tronic Plating Company
 Farmingdale, NY

Prepared By: RH

Date: September 1991

Reviewed By: EAW

Figure: 5-12

5.4 Conceptual Modeling Of Mass Transport From On-Site Storm Drains

In 1979, the SCDHS reported a "...blue/green stain leading to the drain" referring to Storm Drain SD-2, and "...emulsion rinses used by the drain." Sampling of the sediments in this drain by SCDHS and later by CA RICH as part of this investigation, revealed elevated levels of several metals including cadmium and chromium. TCLP testing of these sediments also revealed elevated levels of cadmium in the extracted water leached from these sediments.

Sampling of monitoring well MW-5S, a water table well located 250 feet downgradient of SD-2, revealed 93 ug/l of cadmium. Wells MW-4S and 4I, a cluster of shallow and intermediate depth monitoring wells located 700 feet downgradient of SD-2 revealed no detections of cadmium using a detection limit of 5.0 ug/l during this same sampling event.

The mechanism by which cadmium has migrated from SD-2 to the water table is dependent on time, precipitation, the concentration of cadmium in the sediments and the amount of cadmium that leaches out of these sediments with each rainfall event. For the purposes of this report, we believe that the mechanics of this migration process are not well suited to a numerical model and best presented as a conceptual model.

When rainwater falls in the parking lot, it collects in the storm drain and slowly infiltrates through the bottom sediments into the underlying soils and eventually down onto the water table. As evidenced by the concentrations of cadmium detected in the boring drilled into SD-2, a portion of the cadmium absorbs onto the vadose zone soil grains as the water percolates downward. The remaining dissolved cadmium migrates to the southeast with the ambient flow of groundwater. An illustration of this model is presented on Figure 5-13.

On May 14 and 15, 1991, cadmium-tainted groundwater appears to have migrated as far as MW-5S at a level 93 ug/l. As the groundwater flows past this point, however, it continues to mix and dissolve with ambient groundwater and infiltrating rainwater. By the time it reached the location of monitoring wells MW-4S and 4I, the concentration of cadmium decreased to below the method detection limit of 5.0 ug/l. We believe that this is a dynamic, ongoing dispersion process that occurs in response to natural flow and rainfall events.

As a first course of action, CA RICH suggests that the cadmium-tainted sediments in the bottom of SD-2 be removed and replaced with clean fill and that monitoring continue at wells MW-4S, 4I and 5S. By removing this source, we believe that, over time, the level of cadmium in monitoring well MW-5S will gradually diminish to below 5.0 ug/l.

SECTION 5.4

FIGURES

SECTION 6

6.0 NATURE AND EXTENT OF CONTAMINATION

This section of the Report discusses the nature and extent of contamination regarding the following three areas:

- the former industrial and sanitary leaching pools
- on-site storm drains
- groundwater

6.1 Former Industrial and Sanitary Leaching Pools

6.1.1 Introduction

The sampling performed around and below the former leaching pools indicates that these soils are essentially free of volatile organic compounds. However, they do contain slightly elevated levels of the metals cadmium, chromium, copper and cyanide -- as compared to background levels.

6.1.2 Organics

The soils collected around and below the former leaching pools do not indicate the presence volatile organic contamination. The only exception to this is the unexpected presence of Freon 113 in soil collected at the DW-1 location. The source of the Freon is not known at this time, but may have been inadvertently introduced by the laboratory as this material is used in the extraction procedure for oil and grease analysis.

There was one isolated occurrence of the pesticides 4,4'-DDE and 4,4-DDT in leaching pool LP-2 at a depth of 14 to 16 feet below grade. These compounds, however, were not detected in any other of the soil samples or the groundwater samples analyzed for this investigation.

Several phthalate compounds, a common plasticizer, were detected in soil samples from all of the leaching pools. These are believed to have been introduced either from the plastic sampling gloves used during the sampling program or as an artifact of plastic labware used in the analytical procedures.

6.1.3 Inorganics

Comparisons of the established background levels measured in boring MW-1D and the soil samples collected below and around the former industrial leaching pools revealed nominal increases in the concentrations of cadmium, chromium, copper and cyanide.

Below the four former industrial wastewater leaching pools, LP-1 through LP-4, increased levels of cadmium, chromium, copper, and cyanide were found between the bottom of the leaching pools and 20 feet below grade, as illustrated on Figures 4-3, A through G and 4-4, A through G.

The established background level for chromium in soil (dry weight) is approximately 5 mg/kg. Below the leaching pools, chromium was found at estimated concentrations between 3 and 15 mg/kg. Copper, with a background concentration of 5.9 mg/kg, was detected between 5 and 40 mg/kg.

Cadmium, which was absent from the background samples, was present in the soils beneath the pools between 2 mg/kg and 8 mg/kg (estimated). Similarly, cyanide was absent from the background samples, but was present beneath the pools from 1 mg/kg up to 47 (estimated) mg/kg.

Moving progressively deeper beneath the leaching pools, the soil chemistry at the 38-40 foot depth below land surface (ie; at the water table interface) indicates conditions generally similar to background. These findings indicate that the bulk of the residual contaminant load remains 'bound' to the soil materials at fairly shallow depths directly beneath the former leaching pool areas.

Chemical analyses of in-place soils obtained from beneath the former sanitary leaching pool (SP-1) revealed the presence of both chromium and cadmium at (estimated) levels above background.

These samples were collected from both the 19 to 21 foot and the 37 to 39 foot depth. For example, chromium was detected in the 50 to 60 (estimated) mg/kg range and cadmium was detected in the 3 to 4 (estimated) mg/kg range.

Analyses of subsurface soils at, and in the vicinity of the dry well, DW-1, do not indicate any metal levels of concern and are generally of the same magnitude as the levels reported for the background samples.

6.1.4 Summary

Based on the levels of metals measured in samples collected around and below the leaching pools, these soils do not appear to be a significant on-going source of contamination to the underlying groundwater. Also, as no accumulations of volatile organics were detected in these soil samples, the leaching pools are not viewed as a source of VOC contamination in the groundwater.

6.2 On-Site Storm Drains

6.2.1 Introduction

A total of eight (8) on-site storm drain sediment samples were collected. Storm Drains SD-1, 2 and 3 -- the three storm drains located closest to the former metal plating facility -- revealed elevated levels of metals and are viewed as potential contaminant sources. Borings drilled into and beside these three storm drains indicate that the underlying and adjacent soils are essentially free of metals, with the exception of minor detections of cadmium below SD-2.

6.2.2 Organics

Several chlorinated and aromatic volatile organic compounds were detected in bottom sediments from storm drains SD-2 and SD-5 at levels of between 13 and 180 ug/kg. The remaining storm drain samples were generally free of volatile organic compounds. There is no obvious source for these VOC detections.

Compounds included in the polynuclear aromatic hydrocarbons (PAH) fraction of the semivolatile scan were detected in sediments from storm drains SD-2, 3, 5, 6 and 7. These compounds include typical petroleum hydrocarbon constituents such as pyrene, fluoranthene, fluorene and naphthalene. The origin of these are most likely drippings from automobile engines or by-products from the presence of asphalt pavements and are typical of this type of site drainage.

Several phthalate compounds, a common plasticizer, were also detected and are believed to be an artifact of plastic labware used in the analytical procedures.

TCLP analysis of sediments from SD-1, 2 and 3 revealed no detections of semivolatiles, pesticides or herbicides. Two volatiles -- tetrachloroethene and 2-butanone -- were detected at levels several orders of magnitude below the regulatory levels.

6.2.3 Inorganics

Several inorganic parameters were detected in the bottom sediments of all eight of the storm drains sampled. The three drains around the former plating facility -- SD-1, 2 and 3 -- contained significantly higher levels, however, of cadmium, chromium and lead.

For example, in storm drains SD-1, 2 and 3, cadmium ranged from 73 to 1130 mg/kg, chromium ranged from 126 to 1580 (estimated) mg/kg and lead ranged from 1190 to 2290 (estimated) mg/kg. Storm drains SD-4 through 8 on the other hand contained concentrations of cadmium in the range of 2 to 13 mg/kg and chromium in the range of 16 to 35 (estimated) mg/kg. Values for lead in SD-3 through 8 were given a qualifier of "R" in the data validation review indicating that this analyte may or may not be present. The measured lead levels ranged from 114-R to 874-R mg/kg.

The remediation borings performed in the storm drain areas indicate that levels of metals in the soil around and below drains SD-1, 2, and 3 are generally in the range of background levels, as illustrated on Figures 4-4, A through G and 4-5, A through G. Cadmium, detected at concentrations between 2.6 and 6.4 mg/kg was slightly above background in the samples collected below SD-2.

TCLP analysis performed on extracts prepared from the bottom sediments collected from SD-1, 2 and 3 revealed levels of cadmium and lead at concentrations exceeding the regulatory levels for these metals.

6.2.4 Summary

Sediments from storm drains SD-1, 2 and 3 contain elevated levels of cadmium, chromium and lead. Drain SD-2 was cited by SCDHS in a notice of violation to Tronics in 1979 that described a "...blue/green stain leading to the drain" and "...emulsion rinses used by the drain." Accumulations of these metals appear to persist in the bottom sediments of these drains and, as such, are viewed as potential sources of contamination to the underlying groundwater. The levels of metals in the remaining five drains contained significantly lower levels.

Storm drains SD-2 and 5 contained low, but detectable levels of several chlorinated and aromatic volatile organic compounds. Although relatively minor in magnitude, there is a potential for these drains to act as a continuing source of VOC contamination to the underlying groundwater.

Polynuclear aromatic hydrocarbons (PAH) compounds were detected in 5 of the 8 storm drains that were tested during this R.I. The concentrations of these compounds, however, are most likely attributable to automobile petroleum drippings or asphalt pavement by-products and are typical of this type of site drainage.

6.3 Groundwater

6.3.1 Introduction

The Tronic Plating Co. Site is situated over a regional VOC plume, as evidenced by the concentrations measured in the upgradient and downgradient site wells. Inorganics measured in water samples from the on-site and downgradient monitoring wells were generally of a similar magnitude as in the water quality from the upgradient background wells. Cadmium, detected at 93 ug/l in well MW-5S and chromium, detected at 84.1 ug/l in the Pinelawn Cemetery cooling water well, were the only major exceptions to this trend.

The cadmium detected in well MW-5S is most probably attributable, in part, to rain water infiltrating through the bottom sediments of storm drain SD-2. Based on the elevated level of chromium (2,350 ug/l), in well number 4 on the adjacent property, Astro Electroplating is viewed as the predominant source of the chromium detected in the Cemetery cooling water well. Site-wide water quality plots are included on Figures 4-8, A through J.

6.3.2 Organics

Several chlorinated hydrocarbon compounds were detected at levels in the 10 to 500 ug/l range in all of the monitoring wells. These included the presence of trichloroethene (TCE), tetrachloroethene (PCE) and 1,1,1-trichloroethane (TCA). Because these compounds are present in the groundwater flowing into and through the Site (ie; due to their confirmed detections in both upgradient wells) and because they are consistently absent in the on-site soil samples, their origins are attributed to an upgradient source(s) to the north, and outside, of the Tronic Plating Company Site. As the deeper well has a higher concentration of volatile organics than the shallow well, it appears that this contamination has traveled for some distance from the north.

A survey of potential upgradient sources of volatile organic contamination was performed to assist in determining the origin of these compounds (see Table 6-1). Figure 6-1 presents the area of potential contribution of contamination north of the Tronic Site. It is important to note that in lower Melville, the area north of the upgradient wells, there is no municipal sewer service and virtually all industries discharge their wastewater to septic systems.

6.3.3 Inorganics

The distribution of inorganics throughout the monitoring network is, generally, fairly even. That is, the levels in the groundwater directly downgradient of the site are similar to levels reported upgradient of the site, as well as at the site itself.

Exceptions to this trend are the isolated detections of cadmium and chromium. Cadmium was detected in monitoring well MW-5S at a concentration of 93 ug/l. As described in Section 5.4 of this Report, it is believed that the detection of cadmium in MW-5S is, in part, a result of the migration of rain water percolating through the bottom sediments for storm drain SD-2. As the groundwater continues to flow to the southeast, it mixes and dissolves with ambient groundwater as demonstrated by the absence of cadmium in wells MW-4S and 4I, both located directly downgradient of MW-5S. A cross-sectional representation of this process is presented on Figure 5-13.

Chromium was detected in the cooling water well of the Pinelawn Cemetery at a level of 84.1 ug/l. However, based on the 2350 ug/l of chromium recorded in well number 4 of the adjacent property, Astro Electroplating is viewed as the predominant source of the chromium detected in the Cemetery cooling water well.

6.3.4 Summary

The Tronic study area is superposed over a regional plume of dissolved volatile organic compounds, as evidenced by the concentrations measured in the upgradient and downgradient site wells. Suspected sources of these VOC's are the numerous wastewater leaching pools located in the unsewered lower Melville area and a number of NYSDEC listed inactive hazardous waste sites.

An isolated occurrence of cadmium in well MW-5S most likely can be attributed, in part, to the infiltration of rainwater through storm drain SD-2. This is believed to be a dynamic process that occurs in response to rainfall events, and as the groundwater continues to flow to the southeast, the concentration of cadmium decreases to below the analytical detection limit. Detections of chromium measured in the cooling water well of the Pinelawn cemetery are believed to be predominantly attributable to the historic waste disposal practices of the adjacent Astro Electroplating facility.

Computer modeling of the aquifers underlying the site between 1983, the year the Tronic Plating Co. left the property, and 1991, the date of the most recent round of groundwater sampling, was performed. These simulations indicate that by the year 1991 the dissolved metals discharged in the Facility's wastewater mixed with and were diluted by ambient groundwater to levels at or near the analytical quantitation limits for the constituents of concern. Simulations of groundwater flow and mass transport over an additional 30-year period indicate that supply wells located in the lower Magothy Aquifer would not be threatened by the past discharges of the Tronic facility.

SECTION 6

TABLES

TABLE 6-1

Land Use Survey of Areas
North of the Tronic Plating Co. Site

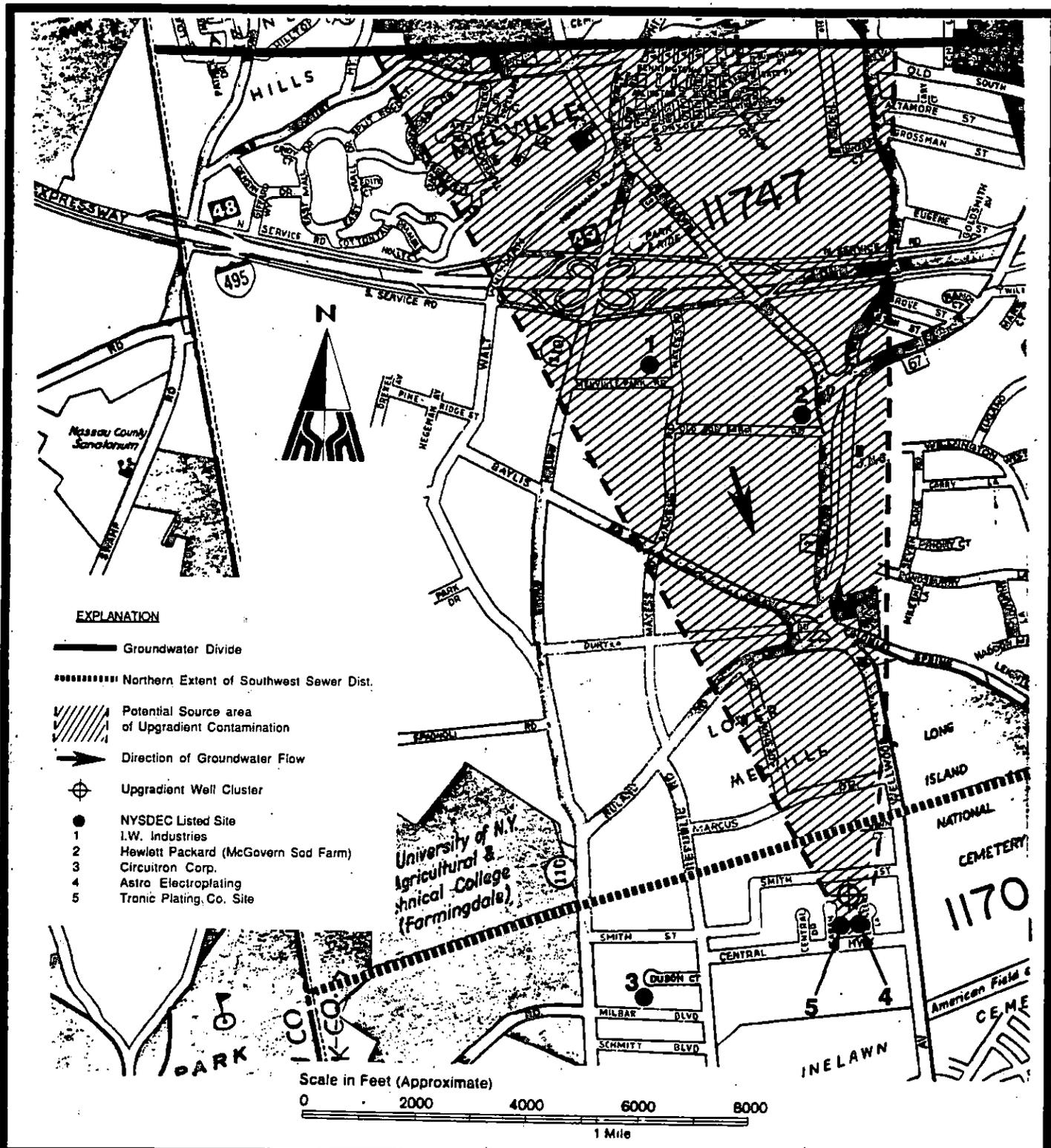
Name of Industry	Address
Kensol-Olenmark, Inc.	40 Melville Park Road
Foilmark, Inc.	40 Melville Park Road
Henlopen Mfg. Co., Inc.	20 Melville Park Road
I.W. Industries (NYSDEC Inactive Hazardous Waste Site)	35 Melville Park Road
Panafax	10 Melville Park Road
EAB	15 Melville Park Road
Office Space	25 Melville Park Road
Lambda	Balis Avenue/Rt. 110
Huntington Quadrangle	Balis Avenue/Rt.110
Atlana, Inc.	60 Balis Avenue
E. Fougera & Co.	60 Balis Avenue
Savage Laboratories	60 Balis Avenue
Pharmaderm	60 Balis Avenue
Milupa Company	60 Balis Avenue
Byk-Chemie Co.	60 Balis Avenue
Byk-Gulden, Inc.	60 Balis Avenue
Allstate Insurance	80 Balis Avenue
NaBanco	80 Balis Avenue
Town and Country Pools	5 Rutland Road
Sunoco Gas Station	5 Rutland Road/Rt. 110
Kenilworth Systems Corp.	80 Rutland Road
LILCO Substation	Rutland Road/north side

TABLE 6-1 (Cont'd)

<u>Name of Industry</u>	<u>Address</u>
Citicorp	135 Duryea Road
NY Blood Center	155 Duryea Road
LI Blood Center	155 Duryea Road
NYBCEN Plasma Labs.	155 Duryea Road
Melville Biologies	155 Duryea Road
USPS Complex	Duryea Road/south side
International C	107 Maxess Road
United Techn. Norden Systems	75 Maxess Road
Estee Lauder	125 Pinelawn Road
Hell Graphic Systems	145 Pinelawn Road
Chase Manhattan	145 Pinelawn Road
Office Space for Lease	175 Pinelawn Road
Imperial News Co., Inc.	175 Pinelawn Road
Gov't Defense Plant (no name on building)	Old Sod Farm Rd./south side
NEC	8 Old Sod Farm Road
Hewlett Packard/McGovern Sod Farm (NYSDEC Inactive Haz. Waste Site)	7 Old Sod Farm Road
Newsday Complex	Deshon Drive

SECTION 6

FIGURES



**Potential Source Area for Volatile Organic Contamination
 Detected in Upgradient Wells MW-1S and MW-1D**

CA RICH CONSULTANTS, INC.
 Certified Ground-Water and Environmental Specialists

**Tronic Plating Co. Site
 Farmingdale, New York**

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

Prepared By: STS	Date: May 1990
Reviewed By: EAW	Figure: 6-1

SECTION 7

7.0 CONCLUSIONS

1. The four former industrial wastewater leaching pools at the Tronic Plating Company NPL Site are not a significant source of groundwater contamination. Soil samples collected at depths of 15 to 20 feet below these four former leaching pools contained concentrations of cadmium, chromium, copper and cyanide at levels slightly above established background levels. These are the same metals detected by SCDHS in the Tronic Plating Company's industrial wastewater effluent. Soil samples collected at the water table contained metals levels generally representative of background concentrations.

2. In addition, the former sanitary leaching pool is not a significant source of groundwater contamination. Minor levels of chromium and cadmium were detected below the former sanitary leaching pool. However, as this area is covered by asphalt, rain water is prevented from percolating through these soils. Historical building information indicates that the Tronic Plating Company was the only tenant connected to this sanitary leaching pool during their tenancy at this property.

3. The former on-site dry well is not a significant source of groundwater contamination. Soil samples collected below this dry well contained metals concentrations representative of background conditions.

4. The bottom sediments collected from the three storm drains located around the former Tronic facility, SD-1, 2 and 3, contained elevated levels of cadmium, chromium & lead and are potential sources of groundwater contamination. Storm drain SD-2 was cited by SCDHS in a 1979 notice of violation to the Tronic Plating Company that described a "...blue/green stain leading to the drain" and "...emulsion rinses used by the drain."

5. Although very minor in magnitude, there is a potential for storm drains SD-2 and 5 to act as a source of VOC contamination to the underlying groundwater. Bottom sediments collected from these drains contained several VOC's ranging in concentration from 13 to 180 ug/kg.

6. Storm drains SD-4, 6, 7 and 8 are not a significant source of groundwater contamination. Sediments from these drains contained metals and polynuclear aromatic hydrocarbon (PAH) compounds at concentrations typical for this type of site drainage system.

7. The Tronic Plating Company site is superimposed over a regional area of dissolved volatile organic compounds, as evidenced by the VOC concentrations measured in the site's upgradient and downgradient groundwater monitoring wells. Suspected sources of these VOC's are numerous wastewater leaching pools located in the unsewered lower Melville area and a number of NYSDEC-listed inactive hazardous waste sites.

8. Cadmium was detected in monitoring well MW-5, located 250 feet from storm drain SD-2, at 93 ug/l. Well MW-4S and 4I, both located 700 feet from storm drain SD-2, did not reveal detections of cadmium.

9. The cooling water well sampled at the Pinelawn Cemetery contained 84.1 ug/l of chromium. The elevated levels of chromium measured in well number 4 on the adjacent property indicate that the adjacent Astro Electroplating property is the most likely source of this dissolved chromium.

10. The remaining site wells indicate that the on-site and downgradient groundwater generally contains inorganics of a similar concentration to the upgradient, background wells. This is supported by the uniform conductance readings measured during the geophysical survey.

11. Groundwater computer modeling performed for this investigation indicates that dissolved metals discharged to former wastewater leaching pools between 1968 and 1983 mixed with and were diluted by ambient groundwater. By the year 1991, these metals decreased to levels similar in magnitude to either background levels or the analytical detection limits for the contaminants of concern. The computer simulations agree well with results of the actual monitoring well sampling program in the field.

12. Regional groundwater flow and mass transport modeling indicate that supply wells located in the lower Magothy Aquifer, are not, and would not, be threatened by the historical wastewater discharges from the former Tronic facility.

SECTION 8

8.0 RECOMMENDATIONS

1. The goal of this Remedial Investigation Report is to serve as a basis for future regulatory decision-making at the Tronic Plating Company Site. Upon approval of this report by EPA, we recommend that a Public Health Evaluation be performed to assess the risks, if any, that this site presents to public health and the environment.

2. Once an EPA-approved Public Health Evaluation is completed, a focused Feasibility Study should be conducted. The Feasibility Study should include the clean-out and removal of contaminated sediments in storm drains SD-1, 2, 3 and 5 and continued annual monitoring of wells MW-5S, 4S, 4I, 3I, 2S and 1S for cadmium, chromium and lead. The monitoring should continue for a period of up to 5 years or until concentrations of cadmium in well MW-5S decrease below 5.0 ug/l, whichever occurs first.

3. We believe that once the identified storm drains are remediated, future levels of cadmium in well MW-5S will decrease to below 5 ug/l through natural flushing of the aquifer. As such, we prescribe source control and monitoring as opposed to a "pump and treat" approach for this site. A recovery well, installed in the area of MW-5S, is not recommended since it would most likely capture groundwater containing dissolved metals from the adjacent Astro Electroplating site rather than remediate the Tronic site.

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- A Violations Survey - Background Information
- B Geophysical Survey
- C Boring Logs and Well Construction Summaries
 - Phase I Field Program
 - Phase 2 Field Program
- D Slug Test Analysis
- E Ambient Air Monitoring
- F Additional Modeling Data

APPENDIX A
BACKGROUND INFORMATION

SECTION 9

9.0 REFERENCES

1. Bensen and Burns, (1974), Tronic Plating Co., Inc. Waste Treatment System, Engineering Report.
2. Bourg A.C.M. and Sauty, J.P., (1987), Can the Distribution Coefficient (Kd) Concept Account Successfully for the Adsorption of Pollutants in Hydrodynamic Mass Transfer Models?, Proceedings and Information Bulletin No. 38 of the International Conference, Vulnerability of Soil and Groundwater to Pollutants, Noordwijk aan Zee, the Netherlands, March 30 - April 3, 1987.
3. CA RICH, (1989), Final Project Operations Plan, RI/FS, for the Tronic Plating Company Site, CA RICH CONSULTANTS, INC., Sea Cliff, N.Y.
4. Doriski, T. P., (1986), Potentiometric-Surface Altitude of Major Aquifers on L.I., N.Y., in 1983, Water-Resources Investigations Report 85-4321.
5. EBASCO, (1988), Final Work Plan for RI/FS, Tronic Plating Co. Site, Farmingdale, N.Y.
6. Franke, O.L. and Cohen, P., (1972), Regional Rates of Ground-Water Movement on L.I., N.Y., USGS Professional Paper 800-C.
7. Freeze, R. A. and Cherry, J. A., (1978), Groundwater, Prentice-Hall, Inc., Englewood Cliffs, N.J.
8. Hvorslev M. J., (1951), Time Lag and Soil Permeability in Ground-Water Observations, Bull. No. 36, Waterways Experiment Station, Corps of Engineers, Vicksburg Miss.
9. Jenson, H. M. and Soren, J. (1974), Hydrogeology of Suffolk County, L.I., N.Y. USGS Hydrologic Investigation Atlas HA-501.
10. Konikow, L.F. and Bredehoft, J.D., (1978), Computer Model of Two-Dimensional Solute Transport and Dispersion in Ground Water, Techniques of Water-Resources Investigations of the USGS, Book 7 Chapter C2.
11. Linder, J.B. and Reilly, T.E., (1983), Analysis of Three Tests of the Unconfined Aquifer in Southern Nassau County, L.I., N.Y., Water-Resources Investigations Report 82-4021.

12. Looney, B.B., Grant, M.W. and King, C.M., (1987), Estimation of Geochemical Parameters for Assessing Subsurface Transport at the Savannah River Plant, U.S. Dept. of Energy, Contract No. DE-AC09-76SR00001, Document No. DPST--85-904, DE87 013051.
13. MacDonald, M.G. and Harbaugh, A.W., (1984), A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model, Techniques of Water-Resources Investigations of the USGS, Book 6 Chapter A1.
14. McClymonds, N.E. and Franke, O.L., (1972), Water-Transmitting Properties of Aquifers on L.I., N.Y., Geological Survey Professional Paper 627-E.
15. Mercer, J.W., Thomas, S.D. and Ross, B., (1982), Parameters and Variables Appearing in Repository Siting Models, U.S. Nuclear Regulatory Commission, Wash. D.C., NUREG/CR-3066.
16. Northeast Regional Climatic Center, (1989) Telephone Communication.
17. Perlmutter, N.M. and Lieber, M., 1970, Dispersal of Plating Wastes and Sewage Contaminants in Groundwater and Surface Water, South Farmingdale, Massapequa Area, Nassau County, New York, USGS Water Supply Paper 1979G.
18. Pinder, G. F., (1973), A Galerkin-Finite Element Simulation of Groundwater Contamination on L.I., N.Y., Water Resources Research, Dec. 1973, Vol. 9, No. 6.
19. Pluhowski, E. J., and Kantrowitz, I. H., (1964), Hydrology of the Babylon-Islip Area, Suffolk Co., L.I., N.Y., Geological Survey Water-Supply Paper 1768
20. Rai, D. and Zschaum, J.M., (1986), Geochemical Behavior of Chromium Species, Electric Power Research Institute, Research Project 2485-3, Document No. EA-4544.
21. Terzaghi, K. and Peck, R. B., (1967), Soil Mechanics in Engineering Practice, John Wiley & Sons, N.Y.
22. Zheng, C., (1990) MT3D, A Modular 3-D Transport Model for Simulation of Advection, Dispersion and Chemical Reactions of Contaminants in Groundwater Systems, S.S. Papadopoulos & Associates, Inc., Rockville, Maryland.

ASTRO ELECTROPLATING
170 CENTRAL AVENUE
FARMINGDALE, N.Y. 11735

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
3/26/85	SPDES Discharge pool, east side of Bldg. liquid 4-5' deep	pH Copper Iron Chromium Total Nickel Cadmium	approx. 3 170 mg/l 24 mg/l 64 mg/l 100 mg/l .04 mg/l
10/17/85	Facility Inspection	Chromium-Total Lead	6.96 mg/l 1.01 (gw) mg/l
7/23/85		Chromium-Total Hexavalent Chromium Copper Nickel pH	64 mg/l 34 mg/l 440 mg/l 100 mg/l 3
5/19/86	SPDES Discharge Pool	Copper Hexavalent Chromium	2.7 mg/l 8.8 mg/l
7/18/89	Leaching pool P186-W06-03	Hexavalent Chromium	199 mg/l
7/21/86	Waste Water Samples E186-027-01 E186-028-02 #001	Phenols Phenols Oil & Grease Copper Iron	0.015 mg/l 0.012 ug/l 30.3 mg/l 1693 ug/l 1335 ug/l
8/22/86	Liquid Run off, that was discharging from SPDES pool approx. 10 ft. south of pool. Water	Copper Iron Chromium-Total Nickel Lead pH	9.0 mg/l 10.0 mg/l 6.5 mg/l 8.0 mg/l 0.5 mg/l approx. 12-14

"ASTRO ELECTROPLATING"

"ASTRO ELECTROPLATING"
170 CENTRAL AVENUE
FARMINGDALE, N.Y. 11735

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
9/3/86	Unauthorized splitter box (tank) discharging into four leaching pools	pH Copper Iron Chromium-Total Nickel Zinc Lead Cadmium	2 2440.0 mg/l 280.0 mg/l 80.0 mg/l 800.0 mg/l 7.8 mg/l 3.2 mg/l 0.8 mg/l
9/9/86	Same as above	Chromium - Total Lead Cadmium pH	51.0 mg/l 1.8 mg/l 0.4 mg/l 2
1/13/87	East side of building pool #2; center bottom of pool (soil)	Copper Chromium-Total	10 ppm 103 ppm
1/21/87	Pool #1 East Side (soil)	Copper Chromium-Tot	12 ppm 60 ppm
1/22/87	Pool #2 (soil)	Copper Chromium-Total	19 ppm 28 ppm
	GUILTY PLEAD ON 6/6/87		

**SHOREWOOD PACKAGING CORP.
55 ENGINEERS LANE
FARMINGDALE, N.Y. 11735**

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
3/13/84	SPDES #001	Phenols Silver	0.04 mg/l 0.34 mg/l
5/4/84	SPDES Pool #001	Silver	0.58 mg/l

**KINEMOTIVE CORP.
222 CENTRAL AVENUE
FARMINGDALE, N.Y. 11735**

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
4/27/79	Industrial pool north side of bldg.	Iron	17 mg/l
8/29/80	Industrial Pool #001	pH	8.7

**ISLAND LITHOPLATE SERVICE INC.
176 CENTRAL AVENUE (Unit 15)
FARMINGDALE, N.Y. 11735**

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
9/17/80	Sanitary Pool in front	Cadium Silver	0.12 mg/l 0.48 mg/l

**BUCKNELL PRESS
240 SMITH STREET
FARMINGDALE, N.Y. 11735**

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
11/12/86	Sanitary Pool in Front lawn at 20 B Central Avenue	m-Dichlorobenzene o-Dichlorobenzene Phenol Iron Lead	24 ppb 90 ppb 0.247 mg/l 15.0 mg/l 0.4 mg/l

**CANTOR BROS.
ENGINEERS LANE
FARMINGDALE, N.Y. 11735**

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
4/21/83	Storm drain on south side of building	Benzene Toluene & unknown M-Xylene P-Xylene O-Xylene Ethylbenzene Cis-1,2-Dichloroethylene Trichloroethylene	330 ug/l 4,800 ug/l 114 ug/l 35 ug/l 90 ug/l 31 ug/l 550 ug/l 220 ug/l
9/14/84	MW-4	Chloroform 1,1,2 Trichloroethylene Tetrachloroethylene p-ethyltoluene Cis Dichloroethylene Toluene Ethylbenzene Xylene(s) 1,3,5, Trimethylbenzene p-Diethylbenzene 1,2,4,5 Tetramethylbenzene	12 ppb 230.0 ppb 7.0 ppb 98.0 ppb 1900.0 ppb 73.0 ppb 65.0 ppb 12.0 ppb 81.0 ppb 24.0 ppb 23.0 ppb
	MW-3	1,1,1, Trichloroethane 1,1,2, Trichloroethylene Tetrachloroethylene Cis Dichloroethylene Xylene(s)	3.0 ppb 470.0 ppb 2600.0 ppb 350.0 ppb 12.0 ppb
	MW-5	1,1,1, Trichloroethane 1,1,2, Trichloroethylene Tetrachloroethylene Cis Dichloroethylene	6.0 ppb 70.0 ppb 350.0 ppb 85.0 ppb
	12/3/85	Red liquid running into storm drain in parking lot.	Methylene Chloride 1,1,1, Trichloroethane 1,1,2, Trichloroethylene Benzene Toluene

OPTI-RAY
595 SMITH STREET
FARMINGDALE, N.Y. 11735

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
12/20/79	Industrial leaching pool "Scrubber"	pH Iron	3.5 1.2 mg/l
4/9/84	Pool on North Side	Chromium - Total Iron Lead Zinc Copper	.3 mg/l 1.7 mg/l 0.6 mg/l .8 mg/l .2 mg/l
5/3/84	Pool on North Side	Iron Lead	1.7 mg/l 0.6 mg/l
5/22/84	Incinerator cooling Water Discharge Pool	Lead	0.4 mg/l

P & V CIRCUIT
176 CENTRAL AVENUE
FARMINGDALE, N.Y. 11735

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
8/19/87	West Side of Building Storm drains N. Drain of three in line, old sanitary	Copper Zinc	9.0 mg/l .34 mg/l
8/31/87	Soil inside box around "old" sanitary vent	Toluene Xylene(s) p-ethyltoluene 1,3,5 Trimethylbenzene 1,2,4 Trimethylbenzene Copper Chromium Total Nickel Lead	190 ppb 250 ppb 13,000 ppb 12,000 ppb 19,000 ppb 1028 ppm 22 ppm 18 ppm 265 ppm

**LINCOLN GRAPHIC ARTS INC.
200 FINN COURT
FARMINGDALE, N.Y. 11735**

DATE	DISCHARGE AREA	PARAMETERS	VIOLATION RESULT
12/4/85	SPDES Pool (#001) Front Lawn East Side of Building	Chemical Oxygen Demand (COD) Total Nitrogen Iron Silver	405 mg/l 61.5 mg/l 1.8 mg/l 4.2 mg/l
2/4/87	SPDES discharge pool	Silver Phenols Total Nitrogen	0.7 mg/l 0.106 mg/l 11.6 mg/l
6/9/87	001 Outfall 003 Outfall 003 Outfall	Phenols Beryllium Silver Beryllium Lead	21.0 ug/l 14.0 ug/l (ud) 183.0 ug/l 10.0 ug/l (ud) >50 % of standard
4/7/88	Sanitary Pool 1st East from Bldg.	Copper Iron Zinc Silver	1.7 mg/l 7.0 mg/l 3.0 mg/l .03 mg/l
4/14/88	Sanitary Pool 1st East from Bldg.	Toluene 1,2,3,- Trimethylbenzene	64 ppb 50 ppb
4/14/88	Storm drain east end of loading dock on north side of bldg.	Xylene(s) p-Ethyltoluene 1,3,5 - Trimethylbenzene 1,2,4- Trimethylbenzene 1,2,4,5- Tetramethylbenzene	4600 ppb 78000 ppb 36000 ppb 99000 ppb 6100 ppb
4/14/88	Industrial Leaching Pool 1.5' Boring	p-Ethyltoluene 1,3,5- Trimethylbenzene 1,2,4- Trimethylbenzene	300,000 ppb 170,000 ppb 440,000 ppb

APPENDIX B

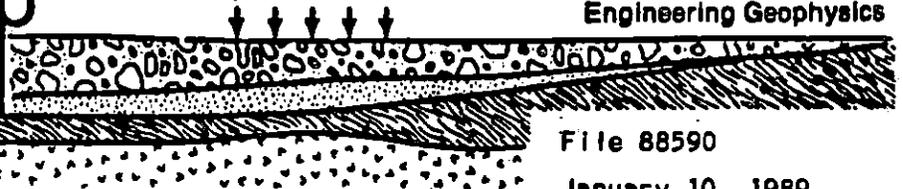
GEOPHYSICAL SURVEY

Note: Plate 1 in the S.A. Alsup text has been
renamed Plate 2 in this Report.

s.a. alsup

& associates, Inc.
617-281-4223

Consultants in
Engineering Geology
Engineering Geophysics



File 88590

January 10, 1989

ELECTROMAGNETIC INDUCTION INVESTIGATION
TRONICS PLATING PROJECT
FARMINGDALE, NEW YORK

INTRODUCTION

This report presents the results of an Electromagnetic Induction (EMI) investigation conducted by S.A. Alsup & Associates, Inc. for CA Rich Consultants, Inc. of Sea Cliff New York. Data collection in the field for the effort took place January 23, 24, and 25, 1988, with subsequent analysis and interpretation of data taken during that period forming the basis of this report. The location of the area surveyed is shown in Figure 1.

The purpose of the investigation was to examine an area downgradient from the Tronics Plating Company site to determine if any zones of anomalous terrain conductivity were present that might represent contamination of the subsurface soils and groundwater. Such zones might later be targeted for further examination by test boring or other methods. Toward that end, some 263 EMI stations were occupied using 10, 20, and 40 meter intercoil spacings at each station, with the total comprising about 7,800 linear feet of traverse. Alignments were traversed with stations at 10-meter intervals along the traverse with stations at 10 meter intervals at the locations shown on Plate 1. Please note that the alignments are located according to local geographic and cultural features, and an engineering survey was not available at the time of this report.

s.a. a/sup

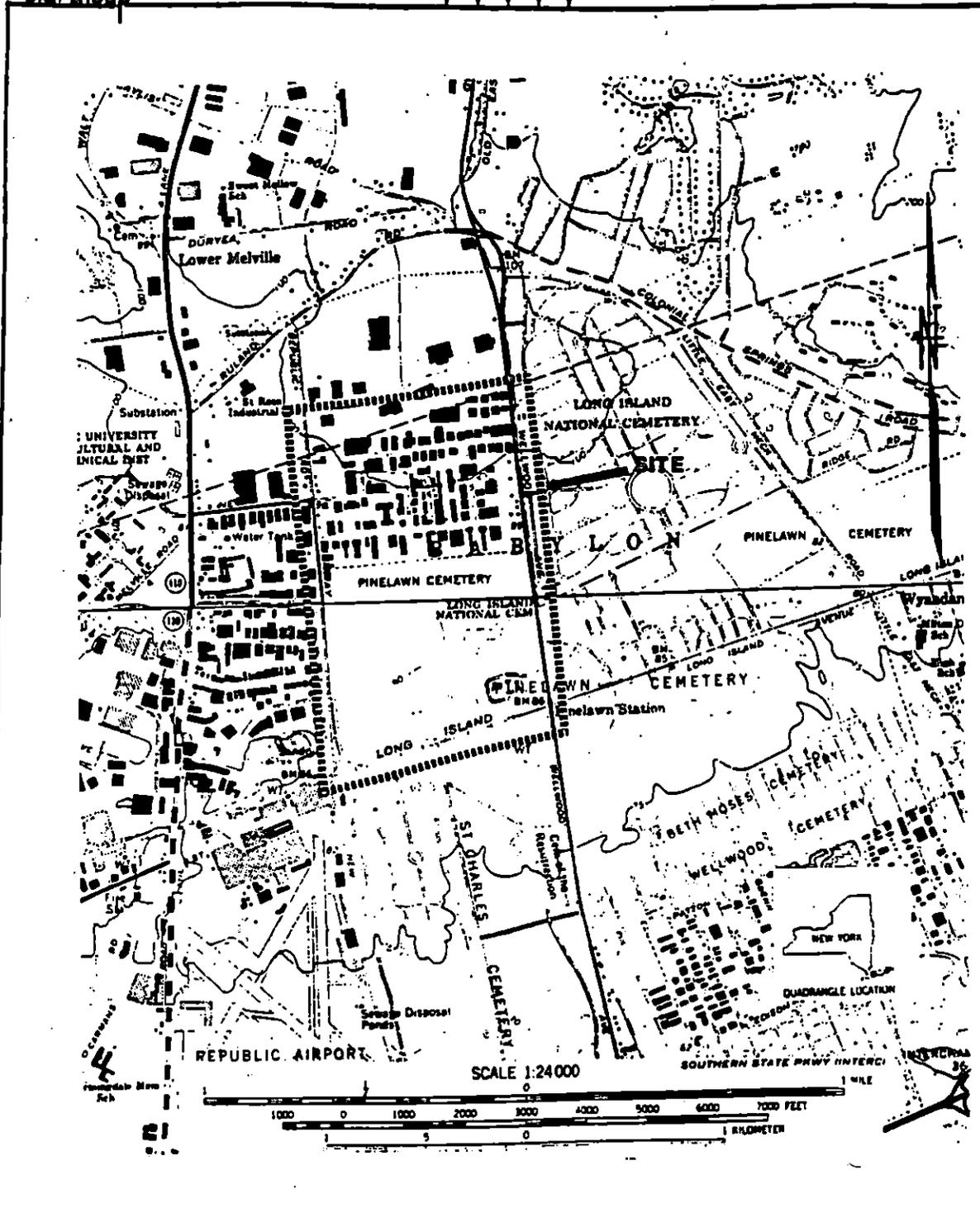


Figure 1. Locus Map. Tronics Plating Site Investigation Area.

January 10, 1989

s.a. alsup



Overall quality of the data collected was good to very good, with some interference encountered in the vicinity of power lines or buried utilities, and some unstable conductivity conditions were observed (most commonly at the wider intercoil spacings). The results are sufficient, however, to outline broad zones of conductivity representative of subsurface conditions beneath the area examined. Continuous coverage was obtained in the southerly part of the area, but very dense brush precluded continuous traversing in the northerly part.

EQUIPMENT AND PROCEDURES

The EMI data were collected using a Geonics Model EM34-3 Terrain Conductivity meter with 10, 20, and 40 meter intercoil spacings. The system consists of emitting and transmitting coils, transmitting and receiver units, and interconnecting cables of appropriate length for the three intercoil spacing intervals.

The EM34-3 provides a visual nulling meter that assures proper intercoil space for each reading, and a direct readout (dial) of conductivity derived from the strength of eddy currents generated by a main field induced from the transmitting coil. For this particular survey, all readings were made in the horizontal dipole mode of operation with coplanar coil positions. The alignments were traversed first with 10 meter intercoil spacing, with a small spraypaint marker at the forward coil for stationing. The same stations were occupied for the 20 and 40 meter measurements, placing the station at the center of the coil separation. Every tenth station of the 10 meter traverse was double marked for indexing and reference for the subsequent measurements along the alignment. Annotated entries were made in a field notebook denoting the measured conductivity values (in millimhos/meter) for each station, with multiple entries for each station for the three intercoil spacings. Photocopies of the field book entries are included in Appendix A.

s.a. aloup



The resulting data were analyzed in three different ways:

1. By simple comparison and intercomparison of the measured values, either at each station, or along the traverse. Such analysis seeks trends of lowering or elevating conductivity laterally along the alignment, or with depth (wider intercoil spacings are affected by deeper conductivity conditions).

2. By comparing the 10 and 20 meter readings and the 20 and 40 meter readings according to the formulas $2H_{20}-H_{10}$ and $2H_{40}-H_{20}$, where H_{10} , H_{20} , and H_{40} represent the measured conductivity values for the horizontal dipoles at 10, 20 and 40 meter spacings. This has the effect of focussing the conductivity response at a given station to a depth greater than about one-quarter of the wider intercoil separation and removes the strong near surface response inherent in the horizontal dipole mode. In general, most of the response for the horizontal dipoles lies between ground surface and about 0.5-0.75 of the intercoil spacing, with the strongest influence from materials within a few feet of ground surface.

3. Using the 10, 20, and 40 meter measured values in the relationship established in the equation $H_{40}-H_{20}/H_{20}-H_{10}$, and assuming that any change present is due to a two layer conductivity structure. A fixed relationship is present between the three readings that permits calculation of depth to the second layer. For horizontal dipole data, the value of the equation must lie between 0.5 and 2.0, and if it is less than 0.5 or greater than 2.0, a 1 meter depth is used to indicate an unuseable value for the calculation.

These different approaches above form the basis of the interpretation and discussions to follow. The raw data and calculated values are presented in Appendix B.

January 10, 1989

a.a. alsup



RESULTS OF INVESTIGATIONS

The data in Appendix B have been rearranged so that all entries are organized progressing west to east and south to north in the tabulations. All stationing originally denoted during field activities is maintained in the listings, however, and the data have simply been reorganized according to the conventions indicated above. One non-sequential stationing gap is present in the data (Station 23 of Traverse "A" was denoted as 24 while taking data in the field, and all subsequent stations of "A" are advanced by 1). In Plate 1, the traverses are identified with the field-assigned alphabetical identifier, and the beginning station of each is also indicated (i.e., the first station of Traverse "A" is (A:0 and the last as A:92) corresponding to the Appendix B entries. Every tenth station along each alignment is also indicated on Plate 1 (i.e., A:10, A:20, ..., A:90).

TRAVERSE "A"

With few exceptions, the EMI observed and calculated values of conductivity indicate a low level of conductivity that gradually increases with depth. The maximum levels of calculated conductivity with depth >10 meters are in the vicinity of A:85 to A:88 and beneath A:19. Levels of conductivity in the 5 - 6 millimho/meter range are not generally indicative of significant contamination in groundwater or soil. Several relatively high conductance readings are present at shallow depth in the easterly part of the traverse, and these most likely represent response to overhead telephone lines and suspected buried utilities (A:17, A:13, A:4). The generally elevated readings in the H10 data from STA A:0 to A:14 may also be related to the effects of road salt or other unusual shallow soil conductivities.

Very few of the stations produced results suitable for calculation of

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s.a. a/sup



depth assuming a two-layer conductivity model, but a narrow zone between Stations A:34 to A:37 is present. The conductivities projected from the other data in the range of depths calculated remains low, however, and the presence of contaminants is not suspected beneath this area on the basis of the measured and calculated conductivities.

TRAVERSE "B"

Measured and calculated conductivity values for this traverse also indicate a subsurface with conductivity gradually increasing with depth, with a few zones of mildly elevated conductivity. Those zones include stations B:1 to B:3, B:11 to B:17, and B:99 to B:100. Some individual stations also show unusually high conductivities (B:1, B:2, B:3, B:11, B:18, B:47) for the 40 meter readings that are most likely related to instabilities caused by very localized conductors or secondary eddy current effects.

In those readings where depth calculations were successful, calculated and measured values of conductivity do not indicate very high conductivities at or around the depth zone where a change in conductivity is calculated. No significant zones of contaminant are indicated by the conductivity data for this traverse.

TRAVERSE "C"

Collection of EMI data for this traverse was severely hampered by very dense brush and other vegetation, and attempts to make the "D" to "C" traverse continuous were unsuccessful. Only station C:3 showed any indication of elevated conductivity with depth, and considering that the 40 meter readings represent a 4-fold overlap of the 10 meter readings and a 2-fold overlap of the 20 meter readings, the isolated stations with slightly elevated predicted values are not indicative of any major zone of contamination.

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s.a. alsup



Two stations showing elevated conductivity at shallow depth (C:2, C:3) most likely represent a very localized near surface conductivity condition.

TRAVERSE "D"

Conditions beneath the westerly part of Traverse "D" appear similar to the general characteristic conductivity structure seen beneath the rest of the area, with a general tendency for mildly increasing conductivity with depth. From D:1 to D:22 (approximately), significant increase in conductivity is indicated in the data in both the measured and calculated values of conductivity with depth. Based upon trends in the data, the increase is related to conductive conditions between about 10 and 30 meters, and this depth would include the water table beneath the traverse. This zone is broad enough and of sufficient measured and calculated conductivity to be suspect of representing some undefined level of contamination to merit identification as a target for further explorations. It should also be noted that this changed conductivity could represent the presence of a stratigraphic change (clay or silt pocket).

TRAVERSE "E" (Not on Plate 1)

An abbreviated seven station traverse was conducted along a dirt trail just north of the easterly end of Traverse B to examine potential effects of power line and road salt interferences, if present. These data (see Appendix A) show considerable variation and instability at the 10 meter intercoil spacing, again providing corroborating indications that shallow conditions near the easterly end of the traverses are probably being affected by surficial conditions not related to groundwater or soil contamination from the Tronics Plating Site.

January 10, 1989

s.a. alup

SUMMARY AND RECOMMENDATIONS

Electromagnetic Induction investigations downgradient from the Tronic Plating plant shows a general subsurface conductivity structure of mildly increasing conductivity with depth for most of the area examined. One zone of elevated conductivity is indicated, however, and the conductivities are suggestive of significant subsurface change. The change may be stratigraphic, but it might also represent contamination present at and below the groundwater table.

The zone of elevated conductivity lies beneath stations D:1 to D:22. In examination of the Traverse "B" data, the zone of elevated conductivity beneath B:11 to B:17 could be related to the Traverse "D" zone, and these two areas should be considered as targets for further explorations.

Neither of the zones above show evidence of effects on the soils above the groundwater table (i.e., conductivities at shallow depth are low), and advance of any further explorations to the groundwater table depth, and greater is recommended.

s.a. a/sup



A P P E N D I X A

Fieldbook Entries

Tronics Plating Project

1-23-89

- Traces Plating, Farmingdale, NY
- Johnson, J Hamel, S. Adams onsite 1120
with Darrell
- Ebasco & CA Rich. oversite persons
on site also
- Weather, Hazy, Calm, ~ 40°F
- Took Corporate Building Photos, left for lunch,
back onsite 1255
- Begin on Line A, chest to Manholes
- Completed 10 + 20' spacing runs
of Line A today, 10m E→W,
20m W→E using same stationing
- Left site @ 1600

1/24/89

- Johnson, J Hamel onsite 0810
- Weather: Clear, calm, 32°F
- Complete Line A using 40m cell spacing, E→W
- Complete Line B
- LEFT SITE @ 1615

[Handwritten signature]

①

1-23-89, Tronics Platting Line A
 1-24-89
 Horizontal dipole mode. E→W

⑤

1-23-89
 1-24-89

STA	10 m	20 m	40 m	Pen				
0	1.6							
1	1.0							
2	0.5							
3	9.2							
4	5.0							
5					electric box	→ moved	to the south	of traverse
6					to the south	of traverse	~ 50 ft.	
<div style="border: 1px solid black; width: 100%; height: 100%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div>								
LINE A	1 st traverse	2 nd traverse	3 rd traverse	E→W	starting point moved	to north	along road	
10	4.8	2.1	non-accessible		NR: Road			
1	4.4	2.0	2.4					
2	1.2	1.9	2.9?					
3	7.0	1.8	2.3					
4	2.3	1.8	NR: Fluctuating		NR: No Reading (offscale)			
5	fluctuating or none	Fluctuating	NR: " "		evidence of buried powerline or pipeline			
6	5.2	1.5	NR: " "					
7	2.5	1.8	NR: " "					
8	3.2	1.7	NR: " "					
9	1.7	1.7	2.1?					
10	5.9	1.9	2.8?					
11	2.9	1.9	2.5					
12	4.3	1.8	2.7					
13	10?	0.5?	2.0?					
14	2.7	1.9	NR					
15	1.7	1.9	2.9					

⑥

LINE A (CON 14)

1-23-89 / 1-24-89

1-23-89

⑦

1-24-89

STA	H ₁₀	H ₂₀	H ₄₀	REM
16	1.4	1.8	2.9	
17	6.5	1.8	2.9	
18	1.3	1.8	3.3	TX in paved Road (10m)
19	1.1	1.8	4.2	" "
20	1.0	1.8	NR	" "
21	1.6	1.8	NR	
22	1.5	1.8	NR	
24	0.9	1.8	NR	NR. ^(underground) make pipe box on surface
25	1.4	1.8	NR	into wooded area
26	1.3	1.5	3.5	
27	1.4	1.6	3.4	NR. start of dirt road : ^{min 15'} 20' water pipe
28	1.4	1.6	2.6	
29	1.0	1.6	2.2	
30	0.8	1.7	2.5?	TX out of wooded area into clearing (10m)
31	0.6	1.5	1.8	
32	0.9	1.5	2.8	
33	0.8	1.6	3.2	
34	0.8	1.6	3.0	
35	0.7	1.5	2.0	
36	0.5	1.4	2.6	
37	0.7	1.4	2.2	
38	0.6	1.3	2.8	
39	0.5	1.2	3.1	NR. dirt road
40	0.7	1.2	3.1	
41	0.9	1.4	2.5	
42	1.0	1.4	2.5	

1/24 915-9000
of batteries

D. J. [Signature]

D. J. [Signature]

LINE A (cont'd)

1-23-89 / 1-24-89

1-23-89

①

1-24-89

STA	H ₁₀	H ₂₀	H ₄₀	STA	H ₁₀	H ₂₀	H ₄₀
43	1.1	1.3	2.8	69	1.3	1.4	2.6
44	1.0	1.4	3.2	70	1.3	1.5	2.0
45	1.2	1.4	2.6	71	1.3	1.3	2.2
46	1.0	1.4	2.2	72	1.3	1.5	2.3
47	1.1	1.3	2.5	73	1.3	1.5	2.6
48	1.1	1.4	2.7	74	1.3	1.5	2.9
49	1.1	1.3	2.6	75	1.4	1.4	2.7
50	1.2	1.3	1.8	76	1.4	1.5	3.2
51	1.2	1.2	2.1	77	1.4	1.4	1.4
52	1.2	1.3	2.7	78	1.3	1.5	2.6
53	1.2	1.4	2.6	79	1.3	1.5	2.9
54	1.2	1.3	2.7	80	1.3	1.5	2.4
55	1.3	1.2	2.5	81	1.2	0.7	2.1
56	1.1	1.3	2.6	82	0.5	1.4	2.6
57	1.2	1.3	2.7	83	0.5	0.8	2.4
58	1.2	1.3	2.7	84	1.2	1.3	2.2
59	1.2	1.2	2.6	85	1.2	1.2	3.7
60	1.3	1.4	3.1	86	1.3	1.5	3.8
61	1.2	1.4	1.8	87	1.3	1.5	4.1
62	1.3	1.3	1.8	88	1.2	1.6	3.9
63	1.2	1.2	2.3	89	1.2	1.5	3.0
64	1.3	1.2	3.0?	90	1.3	1.5	2.1
65	1.3	1.3	2.6	91	1.3	1.4	2.6
66	1.3	1.3	2.3	92	1.3	1.6	2.3
67	1.3	1.4	2.2	END OF LINE A			
68	1.3	1.4	2.2				

aces
to site south

17900

17900

⑩

1/24/89

LINE B W → E

STA	H ₁₀	H ₂₀	H ₃₀	REM
0	1.2 [?] RP	0.4 RP	-	~ 30 m to road
1	0.6 [?] RP	1.7 RP	8	
2	0.1	0.5 RP	6	
3	0.3 [?]	0.6 RP	6 [?]	
4	0.5 RP	0.4	NR	
5	0.5 RP	0.2 RP	5 [?]	
6	0.1 RP	0.3 RP	2 [?]	
7	0.4 RP	1.2	2 [?]	
8	0.5 [?]	1.2 RP	3	
9	0.2 RP	0.5 RP	5 [?]	
10	0.6	0.6	NR	
11	1.0	0.9 RP	6	
12	1.0	0.2 RP	5 [?]	
13	0.8	0.2 RP	5 [?]	
14	0.7	0.1 RP	5 [?]	
15	0.8	0.7	5	
16	1.1	0.4	5 [?]	
17	0.2	0.3	5 [?]	Edge of clearing
18	0.9	0.5	10 [?]	
19	1.4	0.7	3 [?]	
20	1.2	1.0	3 [?]	
21	1.3	0.6	NR	
22	1.2	1.2	NR	
23	1.2	0.9	NR	
24	1.2	0.4	NR	
25	1.0	0.4	NR	East edge of clearing

Jeffrey A. Howard

1-24-89 (cont.)

⑪

LINE B

STA	H ₁₀	H ₂₀	H ₃₀	Rem
26	1.3	0.8	NR	P = average reading due to fluctuations of needle
27	1.5	0.3	1	
28	1.5	0.2	NR	NR = No reading
29	1.3	0.3	NR	
30	1.3	0.4	13 [?]	Wood dump
31	1.5	0.6	2 [?]	
32	1.4	0.8	2 [?]	
33	1.4	0.2	NR	
34	1.4	0.6	1 [?]	
35	1.4	0.5	2	
36	1.3	0.4	2	
37	1.4	0.1	3	
38	1.4	0.5	2	
39	1.4	0.1	1	
40	1.2	0.3	3	
41	1.3	0.5	1.5	
42	1.2	0.5	NR	Edge of fire break
43	1.3	0.1	2	
44	1.4	0.4	1.5	
45	1.2	0.6	1	east edge of fire break
46	1.3	1.2	2	
47	1.2	1.5	2	
48	1.2	1.4	2.5	
49	1.2	1.3	2	
50	1.3	1.1	2	
51	1.3	1.3	3	

Jeffrey A. Howard

12 1-24-89 (cont.)
Line B W → E

1-24-89 (cont.)
Line B W → E

13

STA	H ₁₀	H ₂₀	H ₄₀	Rem
52	1.3	1.3	2	
53	1.4	1.5	3	
54	1.3	1.4	1	
55	1.4	1.5	2.5	
56	1.4	1.8	2	
57	1.4	1.6	3	
58	1.4	1.6	2.5	
59	1.5	1.6	3	
60	1.4	1.8	2	
61	1.5	1.9	2	
62	1.5	1.8	2	
63	1.5	1.6	2.5	
64	1.5	1.6	2.5	
65	1.5	1.4	2	
66	1.4	1.6	2	
67	1.1	1.8	2	
68	0.9	1.7	1.5	
69	0.7	1.6	2.0	
70	1.5	1.8	2.0	
71	1.1	1.4	2.0	
72	0.5	1.5	4	Metal disk (for boring) to south ~ 10m
73	1.2	1.9	1.5	
74	1?	1.9	3.5	Edge of clearing or Mangrove
75	1.6	1.9	1.5	
76	0.5 RP	2.1	2.5	
77	1.1	2.0	2.0	
78	1.6	2.0	2.5	

STA	H ₁₀	H ₂₀	H ₄₀	Rem
79	0.1?	2.0	3.0	
80	0.1	2.0	3.2	
81	0.1	1.9	1.9	
82	1.3	1.8	3.0	
83	1.1	1.8	2.5	
84	3.0 RP	1.9	3.0	center of pipe drive behind
85	0.9 RP	1.9	2.5	
86	1.8 RP	2.1	3.0	
87	1.5 RP	2.1	4	
88	0.9 RP	2.4	3.0	
89	0.1 RP	2.3	3.5	
90	0.2?	2.9	3.1	sprinkler nearby
91	0.9	2.5	3	
92	3.6 RP	2.6	4.0	
93	4.2 RP	3.1	3.2	
94	6.0 RP	2.5	3.5	
95	6.7 RP	2.9	4.0	
96	6.8 RP	2.6	3.5	Edge Mangrove clearing
97	8.6 RP	2.7	4	
98	9.5 RP	2.7	4.0	
99	7.0 RP	1.2	4.5	debris piles
100	7.0 RP	4.4	3.6	" "
101	8.0 RP	2.9	3.5	
102	14 RP	2.8	3.6	
103	24 RP	2.9	—	
104	22 RP	NA	—	Under Power line

Arthur A. Howard

Arthur A. Howard

East End of Line B

(14)

1/25/89

J. Humel, D. Johnson, Mack V. (EPA)

arrive on site @ 8:15 Darcy Lonsik @ 8:30

WEATHER: Clear, Sunny, Temp 9.5°F

change batteries in Tr: R_x

LINE C E → W

STA	H ₁₀	H ₂₀	H ₃₀	REA
0	0.2 RP	1.9	3.8	in brush - east of
2	4.6 RP	2.0	4.1	fire break
2	8.9 RP	2.0	3.2	
3	8.9 RP	1.4	3.9	
4	6.5 RP	1.8	2.6?	
5	4.0 RP	1.7	2.2?	fire break
6	5.0 RP	1.8	2.2?	into brush (W)
7	5.6 RP	1.5	1.9?	
8	1.1	1.8	2.3?	
9	0.1	1.8	2.5?	
10	1.4	1.6	2.4?	
11	1.3	1.7	2.8?	bush too thick
END Line C				

1-25-89

(15)

LINE D E → W

STA	H ₁₀	H ₂₀	H ₃₀	REM
0	1.1	1.9	1.5?	
1	1.2	1.6	2.2	
2	1.3	1.8	2.5?	
3	1.3	1.7	2.7?	
4	1.3	1.4	2.4?	
5	1.2	1.2	2.4?	
6	1.3	1.3	2.6?	East edge of fire break.
7	1.3	1.5	2.7?	West edge of fire break
8	1.2	1.1	3.1?	
9	1.1	1.1	2.8?	
10	1.1	1.1	2.8?	
11	1.2	1.2	2.7?	
12	1.1	1.0	2.0?	
13	0.9	1.4	1.5?	
14	0.8	1.8	2.9?	
15	0.6	1.2	2.8?	
16	1.0	1.0	2.4?	
17	0.5	1.2	3.2?	
18	0.8	1.2	3.4?	
19	0.9	1.0	2.7?	
20	0.5	1.1	3.1?	
21	1.1	1.2	3.2?	
22	0.8	1.5	2.1?	
23	0.9	1.2	1.5? RP	
24	1.2	1.2	0.1? RP	
25	1.1	1.2	2.7? RP	east edge sand pit

(16)

Line D (cont) S→W

1-25-89

(17)

LINE E

STA	H ₁₀	H ₂₀	H ₄₀	Rem	STA	H ₁₀			Rem
26	1.2	1.3	1.7?		0	5			MR. Power 1 m.
27	1.4	1.5	1.8 RP		1	3.5?			
28	1.3	1.8	2.1?		2	2?			
29	1.3	1.2	2.5 RP		3	3			
30	1.3	1.2	7?		4	2			
31	1.3	1.6	6?		5	4.2? 10			
32	1.0	1.3	6.5		6	1.4			
33	1.2	1.1	5.1						END OF LINE E
34	1.4	1.2	7						
35	1.2	1.0	6	West edge Sand pit					PACKED UP GEAR
36	1.1	2.0	8						LEFT SITE @ 1315
37	1.2	1.9	6						
38	1.2	1.8	8						
39	1.2	1.8	7						
40	1.2	1.7	5						
41	1.2	1.8	7						
42	1.2	1.8	4?						
43	1.1	1.9	7						
44	0.9	1.5	5?						
45	0.7	1.9	4						
46	0.1	1.9	7?						
47	0.8	2.0	7?						
48	0.6	1.9	5						
49	1.3	2.0	5?						
50	0.5	2.0	4?	Edge of clearing					
51	1.8	2.5	NA	~ 30 m from road					

s.a. a/sup



A P P E N D I X B

Measured and Calculated
Conductivity Factors

Tronics Plating Project

MEASURED AND CALCULATED VALUES, HORIZONTAL DIPOLES, FILE TRONICAR

STA	H10 mmho/m	H20 mmho/m	H40 mmho/m	2H40-H20 (>10m)	2H20-H10 (>5m)	RH H4-H2/H2-H1	CALC D (m)	
+	92	1.3	1.6	2.3	3.0	1.9	0.00	1
+	91	1.3	1.4	2.6	3.8	1.5	0.00	1
+	90	1.3	1.5	2.1	2.7	1.7	0.00	1
+	89	1.2	1.5	3.0	4.5	1.8	0.00	1
+	88	1.2	1.6	3.9	6.2	2.0	0.00	1
+	87	1.5	1.5	4.1	6.7	1.5	0.00	1
+	86	1.3	1.5	3.9	6.3	1.7	0.00	1
+	85	1.2	1.2	3.7	6.2	1.2	0.00	1
+	84	0.5	0.8	2.4	4.0	1.1	0.00	1
+	83	0.5	0.8	2.4	4.0	1.1	0.00	1
+	82	0.5	1.4	2.6	3.8	2.3	1.33	14
+	81	1.2	0.7	2.1	3.5	0.2	0.00	1
+	80	1.3	1.5	2.4	3.3	1.7	0.00	1
+	79	1.3	1.5	1.9	2.3	1.7	2.00	100
+	78	1.3	1.5	2.6	3.7	1.7	0.00	1
+	77	1.4	1.4	1.4	1.4	1.4	0.00	1
+	76	1.4	1.5	3.2	4.9	1.6	0.00	1
+	75	1.4	1.4	2.7	4.0	1.4	0.00	1
+	74	1.3	1.5	2.9	4.3	1.7	0.00	1
+	73	1.3	1.5	2.6	3.7	1.7	0.00	1
+	72	1.3	1.5	2.3	3.1	1.7	0.00	1
+	71	1.3	1.3	2.2	3.1	1.3	0.00	1
+	70	1.3	1.5	2.0	2.5	1.7	0.00	1
+	69	1.3	1.4	2.6	3.8	1.5	0.00	1
+	68	1.3	1.4	2.2	3.0	1.5	0.00	1
+	67	1.3	1.4	2.2	3.0	1.5	0.00	1
+	66	1.3	1.3	2.3	3.3	1.3	0.00	1
+	65	1.3	1.3	2.6	3.9	1.3	0.00	1
+	64	1.3	1.3	3.0	4.7	1.3	0.00	1
+	63	1.2	1.2	2.3	3.4	1.2	0.00	1
+	62	1.3	1.3	1.8	2.3	1.3	0.00	1
+	61	1.2	1.4	1.8	2.2	1.6	0.00	1
+	60	1.3	1.4	3.1	4.8	1.5	0.00	1
+	59	1.2	1.2	2.6	4.0	1.2	0.00	1
+	58	1.2	1.2	2.6	4.0	1.2	0.00	1
+	57	1.2	1.2	2.7	4.1	1.4	0.00	1
+	56	1.1	1.3	2.6	3.9	1.5	0.00	1
+	55	1.2	1.2	2.5	3.8	1.1	0.00	1
+	54	1.2	1.2	2.7	4.1	1.4	0.00	1
+	53	1.2	1.4	2.6	3.8	1.6	0.00	1
+	52	1.2	1.3	2.7	4.1	1.4	0.00	1
+	51	1.2	1.2	2.1	3.0	1.2	0.00	1
+	50	1.2	1.3	1.8	2.3	1.4	0.00	1
+	49	1.1	1.3	2.6	3.9	1.5	0.00	1
+	48	1.1	1.4	2.7	4.0	1.7	0.00	1
+	47	1.1	1.3	2.5	3.7	1.5	0.00	1
+	46	1.0	1.4	2.2	3.0	1.8	0.00	1
+	45	1.2	1.4	2.6	3.8	1.6	0.00	1
+	44	1.0	1.4	3.2	5.0	1.8	0.00	1
+	43	1.1	1.3	2.8	4.2	1.5	0.00	1

MEASURED AND CALCULATED VALUES, HORIZONTAL DIPOLES, FILE TRONICAR

STA	H10 mmho/m	H20 mmho/m	H40 mmho/m	2H40-H20 (>10m)	2H20-H10 (>5m)	RH H4-H2/H2-H1	CALC D (m)	
+	43	1.1	1.3	2.8	4.3	1.5	0.00	1
+	42	1.0	1.4	2.5	3.6	1.8	0.00	1
+	41	0.9	1.4	2.5	3.6	1.9	0.00	1
+	40	0.7	1.2	3.1	5.0	1.7	0.00	1
+	39	0.5	1.2	3.1	5.0	1.9	0.00	1
+	38	0.6	1.3	2.8	4.3	2.0	0.00	1
+	37	0.7	1.4	2.2	3.0	2.1	1.14	10
+	36	0.5	1.4	2.6	3.8	2.3	1.33	14
+	35	0.7	1.5	2.0	2.5	2.3	0.63	3
+	34	0.8	1.6	3.0	4.4	2.4	1.75	29
+	33	0.8	1.6	3.2	4.8	2.4	0.00	1
+	32	0.9	1.5	2.8	4.1	2.1	0.00	1
+	31	0.6	1.5	1.8	2.1	2.4	0.33	1
+	30	0.8	1.7	2.5	3.3	2.6	0.89	7
+	29	1.0	1.6	2.2	2.8	2.2	1.00	8
+	28	1.4	1.6	2.6	3.6	1.8	0.00	1
+	27	1.4	1.6	3.4	5.2	1.8	0.00	1
+	26	1.3	1.5	3.5	5.5	1.7	0.00	1
+	25	1.4	1.8	0.0	1.8	2.2	0.00	1
+	24	0.9	1.8	0.0	1.8	2.7	0.00	1
+	22	1.5	1.8	0.0	1.8	2.1	0.00	1
+	21	1.6	1.8	0.0	1.8	2.0	0.00	1
+	20	1.0	1.8	0.0	1.8	2.6	0.00	1
+	19	1.1	1.8	4.2	6.6	2.5	0.00	1
+	18	1.3	1.8	3.3	4.8	2.3	0.00	1
+	17	6.5	1.8	2.9	4.0	2.9	0.23	1
+	16	1.4	1.8	2.9	4.0	2.2	0.00	1
+	15	1.7	1.9	2.9	3.9	2.1	0.00	1
+	14	2.7	1.9	0.0	1.9	1.1	0.00	1
+	13	10.0	0.5	3.0	5.5	9.0	0.25	1
+	12	4.3	1.8	2.7	3.0	0.7	0.35	1
+	11	2.9	1.9	2.5	3.1	0.9	0.60	3
+	10	5.9	1.9	2.8	3.7	2.1	0.23	1
+	9	1.7	1.7	2.1	2.5	1.7	0.00	1
+	8	3.2	1.7	0.0	1.7	0.2	1.13	10
+	7	2.5	1.8	0.0	1.8	1.1	0.00	1
+	6	5.2	1.5	0.0	1.5	2.2	0.41	1
+	5	0.0	0.0	0.0	0.0	0.0	0.00	1
+	4	23.0	1.8	0.0	1.8	19.4	0.08	1
+	3	7.0	1.8	2.3	2.8	3.4	0.10	1
+	2	1.2	1.9	2.9	3.9	2.6	1.43	16
+	1	4.4	2.0	2.4	2.8	0.4	0.17	1
+	0	4.8	2.1	0.0	2.1	0.6	0.78	5

MEASURED AND CALCULATED VALUES, HORIZONTAL DIPOLES, FILE TRONICB

STA	H10 mmho/m	H20 mmho/m	H40 mmho/m	2H40-H20 (>10m)	2H20-H10 (>5m)	RH H4-H2/H2-H1	CALC D (m)	
+	0	1.0	0.4	0.0	0.4	0.2	0.67	4
+	1	0.6	1.7	8.0	14.3	2.8	0.00	1
+	2	0.1	0.5	6.0	11.5	0.9	0.00	1
+	3	0.3	0.6	6.0	11.4	0.9	0.00	1
+	4	0.5	0.6	0.0	0.6	0.7	0.00	1
+	5	0.5	0.2	5.0	9.8	0.1	0.00	1
+	6	0.1	0.3	2.0	3.7	0.5	0.00	1
+	7	2.0	1.2	3.0	4.8	0.4	0.00	1
+	8	0.5	1.2	3.0	4.8	1.9	0.00	1
+	9	0.2	0.5	5.0	9.5	0.8	0.00	1
+	10	0.6	0.6	0.0	0.6	0.6	0.00	1
+	11	1.0	0.9	6.0	11.1	0.8	0.00	1
+	12	1.0	0.2	5.0	9.8	0.6	0.00	1
+	13	0.8	0.2	5.0	9.8	0.4	0.00	1
+	14	0.7	0.1	5.0	9.9	0.5	0.00	1
+	15	0.8	0.7	5.0	9.3	0.6	0.00	1
+	16	1.1	0.4	5.0	9.6	0.3	0.00	1
+	17	0.2	0.3	5.0	9.7	0.4	0.00	1
+	18	0.9	0.5	10.0	19.5	0.1	0.00	1
+	19	1.4	0.7	3.0	5.3	0.0	0.00	1
+	20	1.2	1.0	3.0	5.0	0.8	0.00	1
+	21	1.3	0.6	0.0	0.6	0.1	0.86	6
+	22	1.2	1.2	0.0	1.2	1.2	0.00	1
+	23	1.2	0.9	0.0	0.9	0.6	0.00	1
+	24	1.2	0.4	0.0	0.4	0.4	0.50	1
+	25	1.0	0.4	0.0	0.4	0.2	0.67	4
+	26	1.3	0.8	0.0	0.8	0.3	1.60	21
+	27	1.5	0.3	1.0	1.7	0.9	0.58	2
+	28	1.5	0.2	0.0	0.2	1.1	0.15	1
+	29	1.3	0.3	0.0	0.3	0.7	0.30	1
+	30	1.3	0.9	3.0	5.1	0.5	0.00	1
+	31	1.5	0.6	2.0	3.4	0.3	1.56	20
+	32	1.4	0.8	2.0	3.2	0.2	0.00	1
+	33	1.4	0.2	0.0	0.2	1.0	0.17	1
+	34	1.4	0.6	1.0	1.4	0.2	0.50	1
+	35	1.4	0.5	2.0	3.5	0.4	1.67	24
+	36	1.3	0.4	3.0	5.6	0.5	0.00	1
+	37	1.4	0.1	3.0	5.9	1.2	0.00	1
+	38	1.4	0.5	2.0	3.5	0.4	1.67	24
+	39	1.4	0.1	1.0	1.9	1.2	0.69	4
+	40	1.2	0.3	3.0	5.7	0.6	0.00	1
+	41	1.3	0.5	1.5	2.5	0.3	1.25	12
+	42	1.2	0.5	0.0	0.5	0.2	0.71	4
+	43	1.3	0.1	2.0	3.9	1.1	1.58	21
+	44	1.4	0.4	1.5	2.6	0.6	1.10	10
+	45	1.2	0.1	1.0	1.9	1.0	0.82	6
+	46	1.3	1.2	2.0	2.8	1.1	0.00	1
+	47	1.2	1.5	20.0	38.5	1.8	0.00	1
+	48	1.2	1.4	2.5	3.6	1.6	0.00	1
+	49	1.2	1.3	2.0	2.7	1.4	0.00	1

MEASURED AND CALCULATED VALUES, HORIZONTAL DIPOLES, FILE TRONICE

STA	H10 mmho/m	H20 mmho/m	H40 mmho/m	2H40-H20 (>10m)	2H20-H10 (>5m)	RH H4-H2/H2-H1	CALC D (m)
+ 49	1.2	1.3	2.0	2.7	1.4	0.00	1
+ 50	1.3	1.1	2.0	2.9	0.9	0.00	1
+ 51	1.3	1.3	3.0	4.7	1.3	0.00	1
+ 52	1.3	1.3	2.0	2.7	1.3	0.00	1
+ 54	1.3	1.4	1.0	0.6	1.5	0.00	1
+ 54	1.3	1.4	1.0	0.6	1.5	0.00	1
+ 55	1.5	1.5	2.5	3.5	1.5	0.00	1
+ 56	1.4	1.8	2.0	2.2	2.2	0.50	1
+ 57	1.4	1.6	3.0	4.4	1.8	0.00	1
+ 58	1.4	1.6	2.5	3.4	1.8	0.00	1
+ 59	1.5	1.6	3.0	4.4	1.7	0.00	1
+ 60	1.4	1.8	2.0	2.2	2.2	0.50	1
+ 61	1.5	1.9	2.0	2.1	2.3	0.25	1
+ 62	1.5	1.8	2.0	2.2	2.1	0.67	4
+ 63	1.5	1.6	2.5	3.4	1.7	0.00	1
+ 64	1.5	1.6	2.5	3.4	1.7	0.00	1
+ 65	1.5	1.4	2.0	2.6	1.3	0.00	1
+ 66	1.4	1.6	2.0	2.4	1.8	2.00	100
+ 67	1.1	1.8	2.0	2.2	2.5	0.29	1
+ 68	0.9	1.7	1.5	1.3	2.5	0.25	1
+ 69	0.7	1.6	2.0	2.4	2.5	0.44	1
+ 70	1.5	1.8	2.0	2.2	2.1	0.67	4
+ 71	1.1	1.4	2.0	2.6	1.7	0.00	1
+ 72	0.5	1.5	4.0	6.5	2.5	0.00	1
+ 73	1.2	1.9	1.5	1.1	2.6	0.57	2
+ 74	1.0	1.9	3.5	5.1	2.8	1.78	31
+ 75	1.6	1.9	1.5	1.1	2.2	1.33	14
+ 76	0.5	2.1	2.5	2.9	3.7	0.25	1
+ 77	1.1	2.0	2.0	2.0	2.9	0.00	1
+ 78	1.6	2.0	2.5	3.0	2.4	1.25	12
+ 79	0.1	2.0	3.0	4.0	3.9	0.53	1
+ 80	0.1	2.0	3.2	4.4	3.9	0.63	3
+ 81	0.1	1.9	1.9	1.9	3.7	0.00	1
+ 82	1.3	1.8	3.0	4.2	2.3	0.00	1
+ 83	1.1	1.8	2.5	3.2	2.5	1.00	8
+ 84	3.0	1.9	3.0	4.1	0.8	1.00	8
+ 85	0.9	1.9	2.5	3.1	2.9	0.60	3
+ 86	1.8	2.1	3.0	3.9	2.4	0.00	1
+ 87	1.5	2.1	4.0	5.9	2.7	0.00	1
+ 88	0.9	2.4	3.0	3.6	3.9	0.40	1
+ 89	0.1	2.3	3.5	4.7	4.5	0.55	2
+ 90	0.2	2.9	3.1	3.3	5.6	0.07	1
+ 91	0.9	2.5	3.0	3.5	4.1	0.31	1
+ 92	3.6	4.2	4.0	3.8	4.8	0.33	1
+ 93	4.2	3.1	3.2	3.3	2.0	0.09	1
+ 94	6.0	3.5	2.5	1.5	1.0	0.40	1
+ 95	6.0	2.9	4.0	5.1	0.2	0.35	1
+ 96	6.8	2.6	3.5	4.4	1.6	0.21	1
+ 97	6.6	2.7	4.0	5.3	3.2	0.22	1
+ 98	9.5	2.7	4.0	5.3	4.1	0.19	1
+ 99	7.0	1.2	4.5	7.8	4.6	0.57	2

MEASURED AND CALCULATED VALUES, HORIZONTAL DIPOLES, FILE TRONICB

STA	H10 mmho/m	H20 mmho/m	H40 mmho/m	2H40-H20 (>10m)	2H20-H10 (>5m)	RH H4-H2/H2-H1	CALC D (m)
+ 99	7.0	1.2	4.5	7.8	4.6	0.57	2
+ 100	7.0	1.4	3.6	5.8	4.2	0.39	1
+ 101	8.0	2.9	3.5	4.1	2.2	0.12	1
+ 102	1.4	2.8	3.6	4.4	4.2	0.57	2
+ 103	24.0	2.9	0.0	2.9	18.2	0.14	1
+ 104	22.0	0.0	0.0	0.0	22.0	0.00	1

MEASURED AND CALCULATED VALUES, HORIZONTAL DIPOLES, FILE TRONICCR

STA	H10 mmho/m	H20 mmho/m	H40 mmho/m	2H40-H20 (>10m)	2H20-H10 (>5m)	RH H4-H2/H2-H1	CALC D (m)
+ 11	1.3	1.7	2.8	3.9	2.1	0.00	1
+ 10	1.4	1.6	2.4	3.2	1.8	0.00	1
+ 9	0.1	1.6	2.5	3.2	3.5	0.41	1
+ 8	1.1	1.8	2.3	2.8	2.5	0.71	4
+ 7	5.6	1.5	1.9	2.3	2.6	0.10	1
+ 6	5.0	1.8	2.2	2.6	1.4	0.13	1
+ 5	4.0	1.7	2.2	2.7	0.6	0.22	1
+ 4	5.5	1.8	2.6	3.4	1.9	0.22	1
+ 3	8.9	1.4	3.9	6.4	6.1	0.33	1
+ 2	8.9	2.0	3.2	4.4	4.9	0.17	1
+ 1	4.6	2.0	4.1	6.2	0.6	0.81	6
+ 0	0.2	1.9	3.8	5.7	3.6	1.12	10

MEASURED AND CALCULATED VALUES, HORIZONTAL DIPOLES, FILE TRONICDF

STA	H10 mmho/m	H20 mmho/m	H40 mmho/m	2H40-H20 (>10m)	2H20-H10 (>5m)	RH H4-H2/H2-H1	CALC D (m)	
+	51	1.1	1.9	1.5	1.1	2.7	0.50	1
+	50	1.2	1.6	2.2	2.8	2.0	1.50	18
+	49	1.3	1.8	2.5	3.2	2.3	1.40	15
+	48	1.3	1.7	2.7	3.7	2.1	0.00	1
+	47	1.3	1.4	2.4	3.4	1.5	0.00	1
+	46	1.2	1.2	2.4	3.6	1.2	0.00	1
+	45	1.3	1.3	2.6	3.9	1.3	0.00	1
+	44	1.3	1.5	2.7	3.9	1.7	0.00	1
+	43	1.2	1.1	3.1	5.1	1.0	0.00	1
+	42	1.1	1.1	2.8	4.5	1.1	0.00	1
+	41	1.1	1.1	2.8	4.5	1.1	0.00	1
+	40	1.2	1.2	2.7	4.2	1.2	0.00	1
+	39	1.1	1.0	2.0	3.0	0.9	0.00	1
+	38	0.9	1.4	1.5	1.6	1.9	0.20	1
+	37	0.0	1.0	2.9	4.0	2.8	1.10	10
+	36	0.6	1.2	2.8	4.4	1.8	0.00	1
+	35	1.0	1.0	2.4	3.8	1.0	0.00	1
+	34	0.5	1.2	3.2	5.2	1.9	0.00	1
+	33	0.8	1.2	3.4	5.6	1.6	0.00	1
+	32	0.9	1.0	2.7	4.4	1.1	0.00	1
+	31	0.5	1.1	3.1	5.1	1.7	0.00	1
+	30	1.1	1.2	3.2	5.2	1.3	0.00	1
+	29	0.0	1.5	2.1	2.7	2.2	0.85	6
+	28	0.9	1.2	15.0	28.8	1.5	0.00	1
+	27	1.2	1.2	2.1	3.0	1.2	0.00	1
+	26	1.1	1.2	2.2	3.2	1.3	0.00	1
+	25	1.2	1.3	1.7	2.1	1.4	0.00	1
+	24	1.4	1.5	1.8	2.1	1.6	0.00	1
+	23	1.3	1.0	2.1	2.4	2.3	0.60	3
+	22	1.3	1.2	25.0	48.8	1.1	0.00	1
+	21	1.3	1.2	7.0	12.8	1.1	0.00	1
+	20	1.3	1.4	6.0	10.4	1.9	0.00	1
+	19	1.0	1.3	5.5	11.7	1.6	0.00	1
+	18	1.2	1.1	5.0	8.9	1.0	0.00	1
+	17	1.4	1.2	7.0	12.8	1.0	0.00	1
+	16	1.2	1.0	6.0	11.0	0.8	0.00	1
+	15	1.1	2.0	6.0	14.0	2.9	0.00	1
+	14	1.2	1.9	6.0	10.1	2.6	0.00	1
+	13	1.2	1.8	8.0	14.2	2.4	0.00	1
+	12	1.2	1.8	7.0	12.2	2.4	0.00	1
+	11	1.2	1.7	5.0	8.3	2.2	0.00	1
+	10	1.2	1.8	7.0	12.2	2.4	0.00	1
+	10	1.2	1.8	4.0	6.2	2.4	0.00	1
+	9	1.1	1.7	7.0	12.1	2.7	0.00	1
+	7	0.9	1.5	5.0	8.5	2.1	0.00	1
+	6	0.7	1.9	4.0	6.1	3.1	1.75	29
+	5	0.1	1.9	7.0	12.1	3.7	0.00	1
+	4	0.8	2.0	7.0	12.0	3.2	0.00	1
+	3	0.6	1.9	5.0	8.1	3.2	0.00	1
+	2	1.3	2.0	5.0	8.0	2.7	0.00	1

MEASURED AND CALCULATED VALUES, HORIZONTAL DIPOLES, FILE TRO1

STA	H10 mmho/m	H20 mmho/m	H40 mmho/m	2H40-H20 (>10m)	2H20-H10 (>5m)	RH H4-H2/H2-H1
+ 2	1.3	2.0	5.0	8.0	2.7	0.00
+ 1	0.5	2.0	4.0	6.0	3.5	1.33
+ 0	1.8	2.5	0.0	2.5	3.2	0.00

APPENDIX C

**BORING LOGS AND WELL
CONSTRUCTION SUMMARIES**

PHASE 1

FIELD PROGRAM

BORINGS

Log of Boring

Well/Boring#: LF-1 Geologist/Inspector on site: E.A. Weinstock Page 1 of 2
 Project: Ironics Plating Location: Farmingdale, N.Y. Date Drilled: 4/20/89 Total Depth: 40 feet
 Drilling Co: Environmental Drilling Inc. Drilling Method: Hollow-stem auger Org. Vapor Instrats: MMU

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Rec (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
0						Tan fine to medium sand.		Grass surface.
2								
4								Concrete cap at 2.5 feet below grade. Open area 1.5 feet below cap
6						Tan, fine to medium sand (fill).		
8	1	4,2,1,0	6-8	2/1	0.2			Fill material in leaching pool
10	1	1,1,1,0	8-10	2/1				
12	2	3,1,0,2	10-12	2/1	-			
14	3	7,3,3,2	12-14	2/1	-	Brown, fine to coarse-grained sand, native soil.		Native deposit (upper-glacial)
16	4	2,2,2,2	14-16	2/0	20			
18	4	6,9,12,14	16-18	2/1				
20	5	7,13,19,23	18-20	2/1	7			

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Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppa)	Sample Description	Strata Change	Remarks of Activities		
20	6	7,9,13,16	20-22	2/1.75	--	Brown, fine to coarse sand and gravel.				
22	7	4,7,15,14	22-24	2/1.75	--					
24	8	6,12,15,13	24-26	2/1.75	0					
26	9	14,15,25,27	26-28	2/1						
28	9	12,20,27,33	28-30	2/1	0.2					
30	10	6,11,15,19	30-32	2/1.5	0.2					
32	11	13,23,16,14	32-34	2/1.5	0.1				Brown, fine to coarse sand.	
34	12	28,37,25,33	34-36	2/1.5	0.2					
36	13	27,26,26,27	36-38	2/1.5	2.5					
38	14	6,9,8,8	38-40	2/1.75	11				Wet sand and gravel at 38 feet.	
40										

HMU reading in auger = 0ppa.
 Total depth = 40 ft below grade at 12:30 on 4-26-89.
 Boring back-filled with grout.

Log of Boring

Well/Boring#: LP-2 Geologist/Inspector on site: E.A. Weinstock Page 1 of 2
 Project: Ironics Plating Location: Farmingdale, N.Y. Date Drilled: 4/26/89 Total Depth: 40 feet
 Drilling Co: Environmental Drilling Inc. Drilling Method: Hollow-stem auger Org. Vapor Instrts: HNu

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Rec (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
0						Tan, fine to medium sand (fill).		Grass surface.
2								
2.5								Concrete cap for leaching pool at 2.5 feet below grade. Open area (1.5 ft) below cap.
4						Tan, fine to medium sand (fill).		
6								
8	1	1,0,1,0	6-8	2/0	--			Fill material in leaching pool.
10	2	2,1,1,0	8-10	2/1	0			
12	3	1,1,1,0	10-12	2/1	0			
14	4	1,5,3,2	12-14	2/0.5	-			
14						Brown, medium to coarse-grained sand, native deposits.		Native deposit (upper-glacial)
16	5	2,2,2,4	14-16	2/1	0			
18	6	7,14,15,17	16-18	2/1	0			
20	7	7,14,12,17	18-20	2/1	20			

Log of Boring

Project: Tronics Plating Location: Farmingdale, N.Y. Well/Boring Number: LP-2 Page 2 of 2

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppa)	Sample Description	Strata Change	Remarks of Activities	
20	8	2,4,7,7	20-22	2/1	--	Brown, fine to coarse sand and gravel.			
22	8	7,8,6,7	22-24	2/1	--				
24	9	7,9,10,10	24-26	2/1	0				
26	10	8,9,9,11	26-28	2/1	0.1				
28	11	11,15,21,21	28-30	2/1	0				
30	12	12,25,25,30	30-32	2/1	0.1				
32	13	34,20,25,25	32-34	2/1	0				Brown, coarse, gravelly, sand.
34	14	12,21,23,22	34-36	2/1	0				
36	15	24,20,13,19	36-38	2/1	0				
38	16	7,7,7,7	38-40	2/1.5	0.1				Wet sand and gravel at 38 feet.
40									

Project: Tronics Plating Location: Farmingdale, N.Y. Date Drilled: 4/27/89 Total Depth: 40 feet

Drilling Co: Environmental Drilling Inc. Drilling Method: Hollow-stem auger Org. Vapor Instrats: HNu

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Rec (ft)	Head Sp (ppa)	Sample Description	Strata Change	Remarks of Activities
0						Tan, fine to medium sand with clay fill.		Grass surface.
2								Concrete cap 6 inches below grade. Open area 1 foot below cap.
4								Fill material in leaching pool.
6	1	1,0,1,1	5-7	2/0.5	0			
8								
10								
12								
14	2	1,1,1,4	12-14	2/1	--			
16	3	3,2,2,5	14-16	2/1.5	2.5	Brown, fine to coarse-grained sand and gravel.		Native, upper-glacial deposits.
18	4	3,5,4,6	16-18	2/1.5	0.1			
20	5	14,22,26,31	18-20	2/1	3.0			

Log of Boring

Project: Ironics Plating Location: Farmindale, N.Y. Well/Boring Number: LP-3 Page 2 of 2

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./Rec.(ft)	Head Sp (ppa)	Sample Description	Strata Change	Remarks of Activities			
20	6	7,12,10,10	20-22	2/1.5	--	Brown, fine to coarse sand and gravel.					
22	6	6,6,7,9	22-24	2/1.5	--						
24	7	7,16,27,20	24-26	2/0.75							
26	7	13,7,13,14	26-28	2/0.75	0						
28	8	19,22,30,26	28-30	2/1.5	0.1						
30	9	19,21,21,19	30-32	2/0.5	0						
32	9	20,29,29,50/0	32-34	1.5/1	0				Brown, coarse, sand and gravel.		
34	10	20,26,31,27	34-36	2/1	0.2						
36	11	14,19,13,17	36-38	2/1	0.1				Wet sand and gravel at 38 feet.		
38	12	4,4,4,4	38-40	2/1.5	0						
40											

Total depth = 40 ft below grade at 10:20 am on 4/27/89.

Boring back-filled with grout.

Log of Boring

Well/Boring#: LP-4 Geologist/Inspector on site: E.A. Weinstock Page 1 of 2
 Project: Tronic Plating Location: Farmingdale, N.Y. Date Drilled: 4/27/89 Total Depth: 40 feet
 Drilling Co: Environmental Drilling Inc. Drilling Method: Hollow-stem auger Org. Vapor Instrmts: HNu

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Rec (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
0						Tan, fine to medium sand (fill).		Grass surface.
2								Concrete cap 6 inches below grade for leaching pool. Open area (1.5 feet) below the cap.
4								
6	1	1,0,1,0	5-7	2/0.5		Tan, fine to medium sand (fill).		
8	1	1,0,1,2	7-9	2/1.5	0.5			Fill material in leaching pool.
10								
12								
14	2	1,0,5,4	14-16	2/1.5	0	Brown, medium to coarse-grained sand and gravel (native soil).		Native deposit (upper-glacial)
16	3	4,5,5,6	16-18	2/1.5				
18	3	4,5,6,7	18-20	2/1	0			

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Log of Boring

Project: <u>Ironics Plating</u>		Location: <u>Farmingdale, N.Y.</u>		Well/Boring Number: <u>LP-4</u>		Page 2 of <u>2</u>		
Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec. (ft)	Head Sp (pps)	Sample Description	Strata Change	Remarks of Activities
20	4	4,10,19,24	20-22	2/1	--	Brown, fine to coarse sand and gravel.		
22	4	22,17,14,20	22-24	2/1	--			
24	5	13,16,19,17	24-26	2/0.75	0			
26	5	16,10,10,15	26-28	2/1.5	0			
28	6	9,13,15,19	28-30	2/1.5	0			
30	7	5,6,6,6	30-32	2/1.5	0			
32	8	15,15,20,40	32-34	2/1.5	0			
34	9	13,20,17,22	34-36	2/1.2	0.1			
36	10	21,23,25,20	36-38	2/1.2	0			
38	11	3,3,3,6	38-40	2/1.5	0			
40								

Total depth = 40 ft below grade at 1:00p on 4-27-89.

Boring back-filled with grout.

Log of Boring

Well/Boring#: SP-1 Geologist/Inspector on site: D.L. Shoemaker Page 1 of 2

Project: Ironics Plating Location: Farmingdale, N.Y. Date Drilled: 5/3/89 Total Depth: 39 feet

Drilling Co: Environmental Drilling Inc. Drilling Method: Hollow-stem auger Org. Vapor Instrats: HNu

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Rec (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
0						Auger cuttings reveal approx. 1.5 ft of fill consisting of dark brown to black sand and cobbles followed by native undisturbed glacial deposits (upper-glacial) of light-brown sand, silt and cobbles.	Asphalt grade	Asphalt grade
2								
4								
6								
8	1	5,5,6,12	7-9	2/1.5	0	Light-brown to tan coarse sand and gravel		Start split-spoons at 7 ft below grade, even with the bottom of the sanitary pit.
10	2	6,8,13,15	9-11	2/2	0			
12	3	12,18,22,34	11-13	2/1.5	0			
14	3	18,25,21,24	13-15	2/0.2	0			HNu reading in work-zone 0ppm at 5:45pm
16	4	5,7,12,16	15-17	2/1.75	200			
18	4	13,14,12,19	17-19	2/1.75				
20	5	3,3,7,9	19-21	2/1.7	250			

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Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities		
20						Brown-tan coarse-grained sand and gravel with some cobbles.		HMu reading of 0.5ppm in work zone at 6:10p.		
22	6	6,10,6,8	21-23	2/2	100					
24	7	10,11,22,32	23-25	2/1.2	200					
26	8	12,16,20,20	25-27	2/0.3	20					
28	8	13,14,22,23	27-29	2/1.3						
30	9	6,7,7,8	29-31	2/2	19					
32	10	6,5,6,4	31-33	2/2	2					
34	11	35,30,24,29	33-35	2/1.2	1					
36	12	8,8,6,6	35-37	2/2	5					
38	13	4,4,4,6	37-39	2/2	1					
40									Wet sand and gravel at 39 feet.	Total depth = 39 ft below grade at 7:00p on 5/3/89.
										Boring back-filled with grout.

Well/Boring#: DW1-PS Geologist/Inspector on site: D.L. Shoemaker Page 1 of 3
 Project: Ironics Plating Co. Location: Farmingdale, N.Y. Date Drilled: 5/2/89 Total Depth: 50 feet
 Drilling Co: Environmental Drilling Inc. Drilling Method: Hollow-stem auger Org. Vapor Instrats: HNu

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Rec (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
2								First boring was abandoned due to large obstruction.
4								No samples taken for the first 5 feet due to the dry-well depth.
6	1	13,13,20,22	5-7	2/1.7	0	Light brown fine to coarse-grained sand and gravel with some cobbles.		
8	2	25,26,60/5*	7-9	1.5/1				
10	2	9,20,28,33	9-11	2/1	0			
12	3	22,42,56,33	11-13	2/1.5	0	Light tan-brown coarse sand and gravel.		
14	4	6,9,14,20	13-15	2/1.5	0			
16	5	5,5,12,15	15-17	2/2	0			
18	6	12,11,14,29	17-19	2/2	0.1			
	7	15,19,27,28	19-21	2/1.5	0.1			6:58pm Hnu reading of Opps in work-zone.

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec. (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities	
20									
22	8	17,20,21,21	21-23	2/1.5	0	Light tan-brown coarse sand with gravel.			
24	9	16,26,20,22	23-25	2/1.5	0				
26	10	6,7,8,9	25-27	2/2	0			7:20pm, HNu reading of Oppa in work-zone.	
28	11	15,22,31,30	27-29	2/1	0				
30	12	11,12,18,13	29-31	2/2	0				
32	13	24,37,37,42	31-33	2/1.5	0			8:00pm, HNu reading of Oppa in work-	
34	13	12,24,33,37	33-35	2/1					
36	14	6,11,10,10	35-37	2/2	0				
38	15	5,6,6,7	37-39	2/2	0				
40							Met at 38.7 feet below grade.		

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
42								
44						Light tan-brown coarse sand with gravel.		
46								
48								
50								
52								
54								
56								
58								
60								
62								

End boring at 50 feet below grade at 8:45p on 5/2/89.

Log of Boring

Well/Boring#: MW-1D Geologist/Inspector on site: D.L. Shoemaker Page 1 of 5
 Project: Ironics Plating Co. Location: Farmingdale, N.Y. Date Drilled: 5/9/89 Total Depth: 100 ft
 Drilling Co: Delta Well Drilling Inc. Drilling Method: Hollow-stem auger Org. Vapor Instrats: HNu

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Ret (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
2	1	4,4,12,17	0.5-2.5	2/0.5	0.8	'Fill' consisting of brown clayey silt and sand.		Asphalt (2") 8:15am; HNu reading of Oppm in work-zone.
4	2	11,17,21,24,27	2.5-5	2.5/1.5	0			8:30am; HNu reading of Oppm in work-zone.
6	3	7,14,20,29,28	5-7.5	2.5/1.5	0	Coarse sand and gravel light-brown to orange in color.		
8	4	18,22,18,22,26	7.5-10	2.5/1.3	0.2			
12	5	19,18,27,26,37	10-12.5	2.5/2	2			
14	6	22,12,12,15,16	12.5-15	2.5/1.3	0.2			
16	7	11,10,10,11,12	15-17.5	2.5/1	1			
18	8	10,15,13,14,15	17.5-20	2.5/1.3	0			

LOG OF BORING

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppa)	Sample Description	Strata Change	Remarks of Activities
20	9	10,14,13,16,17	20-22.5	2.5/1.25	3	Light-brown to orange coarse sand and gravel with some cobbles.	22	
22								
24	10	8,8,8,9,12	22.5-25	2.5/1.25	0		24	10:03am; HMu reading of Oppa in work-zone.
26	11	5,7,10,14,14	25-27.5	2.5/1.5	0.1		26	
28	12	9,8,17,14,15	27.5-30	2.5/0	N/A		28	No recovery; Cobble stuck in drive-shoe.
30							30	
32	13	9,11,15,11,15	30-32.5	2.5/1.25	0		32	
34	14	13,13,13,21,40	32.5-35	2.5/1.5	0		34	
36	15	15,22,22,28,18	35-37.5	2.5/1.25	0		36	
38	16	36,16,15,18,16	37.5-40	2.5/0.5	0.1		38	11:20am; HMu reading of Oppa in work-zone.
40	No Sample					Wet material at 39.7 feet below grade.	40	11:30am; HMu reading of 2ppa in bore-hole.

Log of Boring

Project: Ironics Plating Location: Farmingdale, N.Y. Well/Boring Number: MW-1D Page 3 of 5

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./Rec. (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
42						Light-brown to orange coarse sand and gravel with little silt (wet).		
44								
46								
48								
50								
52	17	19,11,7,6,14	50-52.5	2.5/2	0.1			6 inches of heaving sand in lead auger.
54								Split-spoon not retaining sample, used a 2 inch bailer to grab sample.
56	18	6,15,6,5,5	55-57.5	2.5/0	N/A			
58								
60								
62	19	1,1,2,8,12	60-62.5	2.5/1.25	0.2			Potable water used to put head in lead auger to prevent the heaving of the sand.

Log of Boring

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppa)	Sample Description	Strata Change	Remarks of Activities
64							64	
66							66	
68							68	
70						Brown coarse sand and gravel (wet).	70	
	20	10,4,6,12,21	70-72.5	2.5/1.5	2			
72							72	
74							74	
76							76	
78							78	
80						Light-brown to red medium silty sand and gravel with some cobbles.	80	
	21	8,3,14,21,60	80-82.5	2.5/1	1			
82							82	
84							84	

LOG OF BORING

Project: Ironics Plating Location: Farmingdale, N.Y. Well/Boring Number: MW-16 Page 5 of 5

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec. (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
86								
88								
90	22	2,1,4,18,34	90-92.5	2.5/2	1.2	Light-brown fine to medium quartz 90 sand with banded gray clay and some mica.		Contact of the Upper-glacial and Magothy aquifers.
92								
94								
96								
98								
100	23	8,1,5,8,14	100-102.5	2.5/0.5	1	Inter-bedded layers of gray to red clay and medium-fine sand with mica (Magothy formation).		Well placed at 100 ft below grade at 3:00p on 5/11/89.
102								
104	24	1,1,4,5,9	102.5-105	2.5/1	N/A			Split-spoon to confirm the aquifer.
106								

Well/Boring#: MW-2D Geologist/Inspector on site: D.L. Shoemaker Page 1 of 5
 Project: Ironics Plating Co. Location: Farmingdale, N.Y. Date Drilled: 5/11/89 Total Depth: 100 ft
 Drilling Co: Delta Well Drilling Inc. Drilling Method: Hollow-stem auger Org. Vapor Instrmts: HNu

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Rec (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
0	1	2,3,8,10,10	0-2.5	2.5/1.5	0	'Fill' consisting of black-brown sandy, silty, clay to 1.5 feet below grade.		Grass at grade
2						Brown medium sand and gravel with some silt and clay.	2	
4	2	7,7,5,4,2	2.5-5	2.5/1	0			
6	3	3,2,3,4,4	5-7.5	2.5/0.3	0	Light-brown to tan coarse sand and gravel with some cobbles.	6	9:44am; HNu reading of Oppm in work-zone.
8								Cobble stuck in lead auger.
10	4	13,7,10,11,11	7.5-10	2.5/1.2	0			10:20am; HNu reading of Oppm in work-zone.
12	5	18,15,14,15 25	10-12.5	2.5/2	0			
14	6	6,6,8,8,11	12.5-15	2.5/1.3	0			
16	7	8,9,12,14,12	15-17.5	2.5/1.0	0			
18	8	14,13,13,16, 19	17.5-20	2.5/1.0	0			12:30pm; HNu reading of Oppm in work-zone.

Log of Boring

Project: Ironics Plating Location: Farmingdale, N.Y. Well/Boring Number: MW-2D Page 2 of 5

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppa)	Sample Description	Strata Change	Remarks of Activities
20	9	16,18,15,19, 21	20-22.5	2.5/2	0	Light-brown to tan coarse sand and gravel with some cobbles.		
22								
24	10	10,9,11,15,17	22.5-25	2.5/0	N/A			
26	11	11,10,11,12,9	25-27.5	2.5/1	0			
28								
30	12	10,7,14,16,17	27.5-30	2.5/1.25	0			
32	13	10,20,20,21, 25	30-32.5	2.5/1.25	0		1:00pm; HNu reading of Opps in work-zone.	
34	14	46,23,27,18, 15	32.5-35	2.5/0	N/A		Cobble in lead auger.	
36	15	22,23,19,16, 12	35-37.5	2.5/0.1	0			
38	16	20,11,10,10,9	37.5-40	2.5/1	0		Cobble stuck in split-spoon	
40						Tan fine to coarse sand and gravel.		Stop drilling at 40 feet on 5/12/89. Continue on 5/15/89.

Log of Boring

Project: Ironics Plating Location: Farmingdale, N.Y. Well/Boring Number: MW-20 Page 3 of 5

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
42								5/15/89 at 7:00am, start drilling.
44								
46								
48								
50								
52	17	5,9,6,6,6	50-52.5	2.5/1	0	Tan fine to coarse sand and gravel.		
54	18	8,8,9,9	52.5-55	2/1.5	0			
56	19	22,8,7,10	55-57.5	2/0	N/A			
58	20	11,7,6,6	57.5-60	2/1.25	0			
60								
62								

Log of Boring

Project: Ironics Plating Location: Farmingdale, N.Y. Well/Boring Number: MW-2D Page 4 of 5

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec. (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
64							64	
66							66	
68							68	
70						Coarse to fine tan sand and gravel.	70	
72	21	15,16,11,12	70-72	2/1.25	0		72	
74							74	
76							76	
78							78	
80							80	
82	22	37,75,100/.2	80-82.5	2.5/1.5	0		82	
84							84	

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec. (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
86								
88								
90								
92	23	15,8,6,15,25	90-92.5	2.5/1.5	0			
94								
96								
98								
100						Gray, red, and light tan layered sand, silt and clay (Magothy).		
102	24	17,21,76,35	100-102.5	2.5/1	0			2:00pm, End boring at 102.5 feet. Place well at 100 feet below grade.
104								
106								

Log of Boring

Well/Boring#: MM-21 Geologist/Inspector on site: D.L. Shoemaker Page 1 of 4

Project: Tronics Plating Co. Location: Farmingdale, N.Y. Date Drilled: 5/17/89 Total Depth: 70 feet

Drilling Co: Delta Well Drilling Inc. Drilling Method: Hollow-stem auger Drg. Vapor Instrmts: HNu

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Rec (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
0	1	1,2,3,3	.5-2.5	2/1	0.1	Organic fill consisting of clay, silt, and sandy gravel dark-brown to black in color.		Grass at grade
2	2	8,11,18,34,35	2.5-5	2.5/1.3	1	Tan to brown fine to medium sand and gravel with some silt and cobbles.		
4	3	8,22,25,32,33	5-7.5	2.5/1.5	0			12:20pm; HNu reading of Oppa in work-zone.
6						Light-brown to orange coarse sand and gravel.		
8	4	14,15,21,28,28	7.5-10	2.5/1.5	0			
10								
12	5	35,18,27,23,28	10-12.5	2.5/2	0			2 inch plug in lead auger.
14	6	6,12,13,15,14	12.5-15	2.5/1	0			1:00pm; HNu reading of Oppa in work-zone.
16	7	6,15,13,15,17	15-17.5	2.5/1.3	0.1			
18								
20	8	14,13,16,19,15	17.5-20	2.5/0.5	0.1			1:20pm; HNu reading of Oppa in work-zone.

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Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec. (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
20	9	15,8,12,14,16	20-22.5	2.5/1.5	1.5	Coarse to medium tan sand and gravel with little silt.		
22								
24	10	6,10,11,13,15	22.5-25	2.5/1	6			
26	11	12,8,8,14,15	25-27.5	2.5/1.25	2.5			
28	12	8,7,11,10,10	27.5-30	2.5/1.25	0			
30								
32	13	7,8,12,16,20	30-32.5	2.5/1.25	2.5			
34	14	17,17,18,12,9	32.5-35	2.5/1.25	0			
36	15	18,15,15,9,14	35-37.5	2.5/1	0			
38	16	8,9,13,11,9	37.5-40	2.5/1	0.1			
40								

2:10pm; HNu reading of Oppa in work-zone.

4 inch plug in lead auger.

3:00pm; HNu reading of Oppa in work-zone.

End drilling on 5/17/89.

Start drilling on 5/18/89.

Log of Boring

Project: Ironics Plating Location: Farmingdale, N.Y. Well/Boring Number: MN-21 Page 3 of 4

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec. (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
42								
44								
46								
48								
50								
50	17	24,10,7,8,8	50-52.5	2.5/2	0	Light-brown to tan coarse sand and gravel with few cobbles.		8 inch plug in lead auger. Use a 2 inch bailer to clear plug.
52								
54								
56								
58								
58								9:55pm; MNu reading of Oppm in work-zone.
60								
60	18	47,15,9,10,14	60-62.5	2.5/1.5	0	Brown to orange medium to coarse sand, silt and gravel.		Hard to drive the split-spoon for the first 6 inches (plug).
62								

Log of Boring

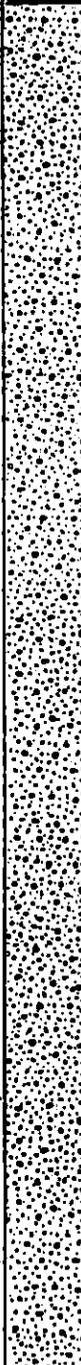
Project: <u>Ironics Plating</u>		Location: <u>Farmingdale, N.Y.</u>		Well/Boring Number: <u>MW-21</u>		Page 4 of <u>4</u>		
Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
64							64	
66							66	
68							68	
70						Orange to gray fine to medium sand at 70 feet below grade.	70	End boring at 70 feet below grade on 5/18/89.
	19	18,16,28,67/0	70-72.5	2.5/1	0		72	
72							72	
74							74	
76							76	
78							78	
80							80	
82							82	
84							84	

Log of Boring

Well/Boring#: MW-31 Geologist/Inspector on site: D.L. Shoemaker Page 1 of 4

Project: Ironics Plating Co. Location: Farmingdale, N.Y. Date Drilled: 5/22/89 Total Depth: 80 feet

Drilling Co: Delta Well Drilling Inc. Drilling Method: Hollow-stem auger Org. Vapor Instrats: HNu

Depth (ft)	Sample No.	Blow-count per 6 inch	Intrvl. (ft)	Adv/Rec (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
0								Grass at grade
1	1	1,1,2,3,5	0-2.5	2.5/1		'Fill' consisting of Dark-brown silty clay and gravel.		
2								
4								
6								
8								
10						Tan coarse sand and gravel.		
12	2	27,27,28,31; 40	10-12.5	2.5/1.5				
14								
16								
18								

Log of Boring

Project: Tronics Plating Location: Farmingdale, N.Y. Well/Boring Number: MW-31 Page 2 of 4

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppa)	Sample Description	Strata Change	Remarks of Activities
20						Tan coarse sand and gravel.		
22	3	17,16,15,17,17	20-22.5	2.5/1				
24								
26								
28								
30								
32	4	35,29,29,18,18	30-32.5	2.5/1.25				
34	5	16,14,19,23,25	32.5-35	2.5/1.5		Wet tan to light-brown coarse sand and gravel with some cobbles at 32.5 feet below grade.	1:30pa; HNu reading of Oppa in work-zone.	
36								
38								
40								
42.5	6	21,21,9,7,7	40-42.5	2.5/1.5				

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Log of Boring

Project: Ironics Plating Location: Farmingdale, N.Y. Well/Boring Number: MW-31 Page 3 of 4

Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./Rec. (ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
42								
44								
46								
48								
50						Tan medium to coarse sand and gravel.		2:30pm; HNu reading of Oppa in work-zone.
52	7	23,8,7,5,8	50-52.5	2.5/1.25				Used bailer to obtain samples for remedial parameters.
54								
56								
58								
60								No recovery from the split- spoon was obtained from 60-62.5 feet.
62	8	33,12,6,11,15	60-62.5	2.5/0				4:00pm; HNu reading of Oppa.

Project: Ironics Plating Location: Farmingdale, N.Y. Well/Boring Number: MW-31 Page 4 of 4								
Depth (ft)	Sample No.	Blow Counts per 6 inch	Intrvl. (ft)	Adv./ Rec.(ft)	Head Sp (ppm)	Sample Description	Strata Change	Remarks of Activities
64								
66								
68								
70								
72								
74								
76	9	2,4,11,37,61	75-77.5	2.5/1		<p>Contact of Upper Glacial and Magothy aquifers approximately 75 feet below grade.</p> <p>Tan fine to medium sand with bands of red to grey clay.</p>		Cobble in front of split-spoon.
78								
80								End boring at 80 feet below grade at 5:30pm on 5/22/89.
82								
84								

PHASE 2

FIELD PROGRAM

**WELL CONSTRUCTION
SUMMARIES**

WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: MW-15

DRILLING SUMMARY

Drilling Company: Environmental Drilling Inc. Driller: Bob Askins

Drill Rig Make/Model: Mobil Drill; Model B-61

Bit Diameter: 10 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 50 feet below grade Depth to Water: 39.40 ft. from TGC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: Tan to brown, fine to coarse-grained gravelly sand, with few cobbles.

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 2 inch Length: 35 feet

Screen Material: Schedule 40 PVC Diameter: 2 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 50 ft. to 35 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 50 ft. to 32 ft Below Grade

Seals Material: Bentonite Slurry Setting: 32 ft to 30 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 30 ft to 3 ft. Below Grade

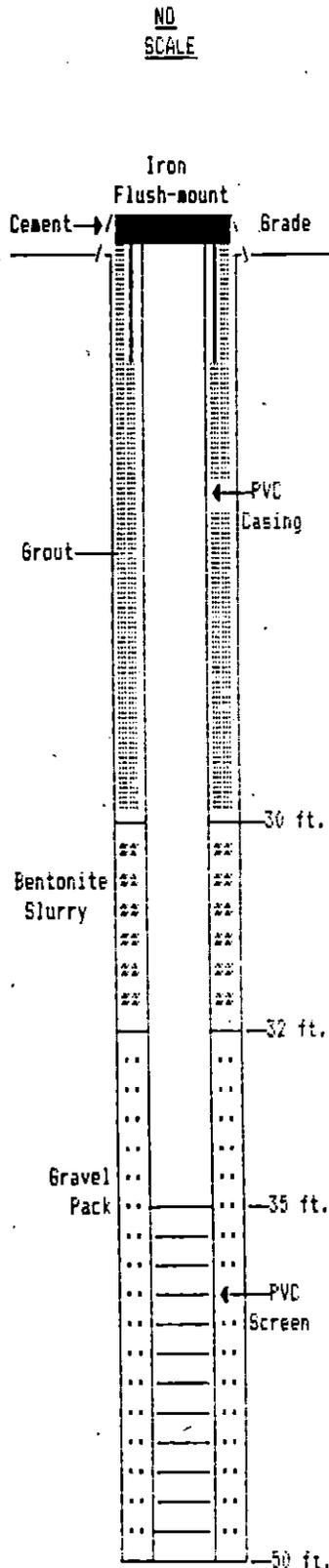
Surface Casing Material: Iron valve box Setting: Flush mounted

<u>TIME LOG</u>	<u>Started</u>	<u>Completed</u>
<u>Drilling:</u>	<u>5/3/89</u>	<u>5/3/89</u>
<u>Installation:</u>	<u>5/3/89</u>	<u>5/3/89</u>
<u>Development:</u>	<u>5/5/89</u>	<u>5/5/89</u>

WELL DEVELOPMENT

Method: Meyers Submersible pump Pumping Rate: 5 gallons per minute (gpm).

Volume Pumped: 300 gallons for 1 hour Specific Capacity: N/A



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WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: MW-1D

DRILLING SUMMARY

Drilling Company: Delta Drilling Inc. Driller: Al Tav

Drill Rig Make/Model: Failing F-10 WT

Bit Diameter: 10 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 100 feet below grade Depth to Water: 39.70 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: See boring log

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 4 inch Length: 85 feet

Screen Material: Schedule 40 PVC Diameter: 4 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 100 ft to 85 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 100 ft to 81 ft Below Grade

Seals Material: Bentonite Slurry Setting: 81 ft to 79 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 79 ft to 3 ft. Below Grade

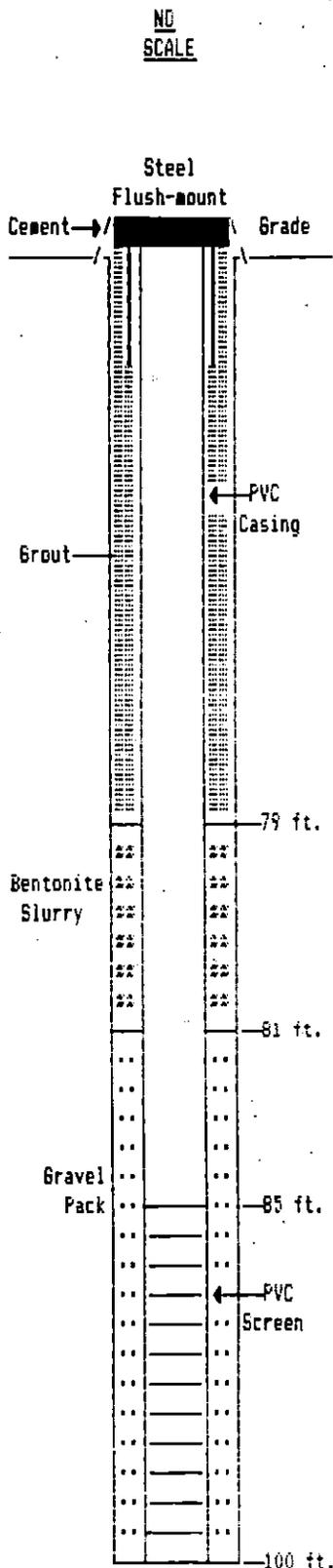
Surface Casing Material: Steel valve cover Setting: Flush mounted

TIME LOG	Started	Completed
Drilling:	<u>5/9/89</u>	<u>5/11/89</u>
Installation:	<u>5/11/89</u>	<u>5/11/89</u>
Development:	<u>5/12/89</u>	<u>5/12/89</u>

WELL DEVELOPMENT

Method: Submersible pump Pumping Rate: 14 gpm for 2 hours

Volume Pumped: 1680 gallons Specific Capacity: 14 gpm/ft



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Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: MW-25

DRILLING SUMMARY

Drilling Company: Environmental Drilling Inc. Driller: Bob Askins

Drill Rig Make/Model: Mobil Drill; Model B-61

Bit Diameter: 10 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 50 feet below grade Depth to Water: 38.30 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: Tan to brown, fine to coarse-grained gravelly sand, with few cobbles.

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 2 inch Length: 35 feet

Screen Material: Schedule 40 PVC Diameter: 2 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 50 ft. to 35 ft. Below Grade

Filter Material: Morie #0 Filter Sand Setting: 50 ft. to 32 ft. Below Grade

Seals Material: Bentonite Slurry Setting: 32 ft to 30 ft. Below Grade

Grout: 3% Bentonite/Cement Setting: 30 ft to 3 ft. Below Grade

Surface Casing Material: Iron valve box Setting: Flush mounted

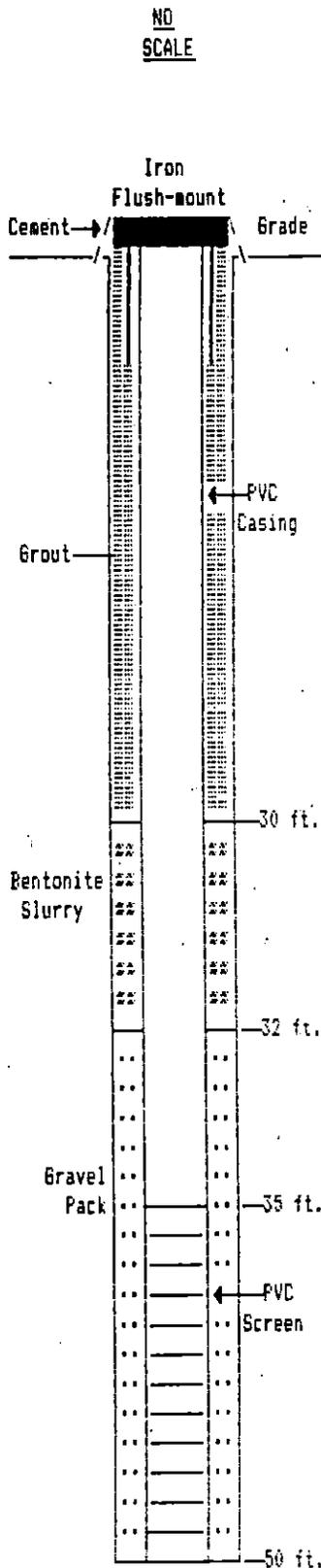
TIME LOG

	Started	Completed
Drilling:	<u>5/4/89</u>	<u>5/4/89</u>
Installation:	<u>5/4/89</u>	<u>5/4/89</u>
Development:	<u>5/5/89</u>	<u>5/5/89</u>

WELL DEVELOPMENT

Method: Meyers Submersible pump Pumping Rate: 8 gallons per minute (gpm).

Volume Pumped: 480 gallons for 1 hour Specific Capacity: 26.6 gpm/ft



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WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: MW-21

DRILLING SUMMARY

Drilling Company: Delta Drilling Inc. Driller: Al Tay
 Drill Rig Make/Model: Falling F-10 WT
 Bit Diameter: 10 inch Carbide Bit Drilling Method: Hollow-stem auger
 Drilling Fluid: None
 Total Depth: 70 feet below grade Depth to Water: 38.00 ft. from TOC
 Supervisory Geologists: Daryl L. Shoemaker (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: See boring log

WELL DESIGN

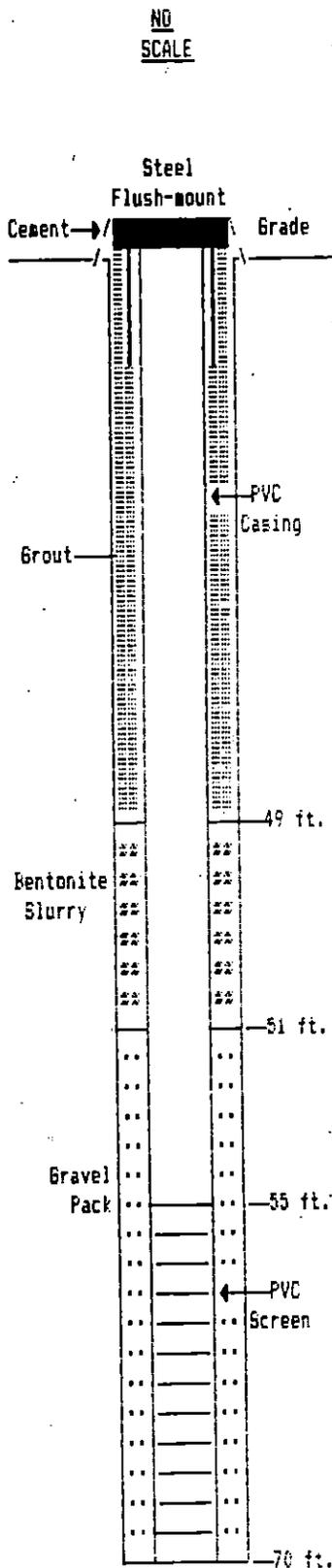
Casing Material: Schedule 40 PVC Diameter: 4 inch Length: 55 feet
 Screen Material: Schedule 40 PVC Diameter: 4 inch Length: 15 ft.
 Slot Size: 20 Slot; (0.020 mil slotted) Setting: 70 ft. to 55 ft Below Grade
 Filter Material: Morie #0 Filter Sand Setting: 70 ft. to 51 ft Below Grade
 Seals Material: Bentonite Slurry Setting: 51 ft to 49 ft Below Grade
 Grout: 3% Bentonite/Cement Setting: 49 ft to 3 ft. Below Grade
 Surface Casing Material: Steel valve cover Setting: Flush mounted

TIME LOG

	Started	Completed
Drilling:	<u>5/17/89</u>	<u>5/18/89</u>
Installation:	<u>5/19/89</u>	<u>5/19/89</u>
Development:	<u>5/24/89</u>	<u>5/24/89</u>

WELL DEVELOPMENT

Method: Submersible pump Pumping Rate: 13 gpm for 1.5 hours
 Volume Pumped: 1170 gallons Specific Capacity: N/A



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WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: MW-20

DRILLING SUMMARY

Drilling Company: Delta Drilling Inc. Driller: Al Tay

Drill Rig Make/Model: Failing F-10 WT

Bit Diameter: 10 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 100 feet below grade Depth to Water: 38.00 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: See boring log

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 4 inch Length: 85 feet

Screen Material: Schedule 40 PVC Diameter: 4 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 100 ft to 85 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 100 ft to 81 ft Below Grade

Seals Material: Bentonite Slurry Setting: 81 ft to 79 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 79 ft to 3 ft. Below Grade

Surface Casing Material: Steel valve cover Setting: Flush mounted

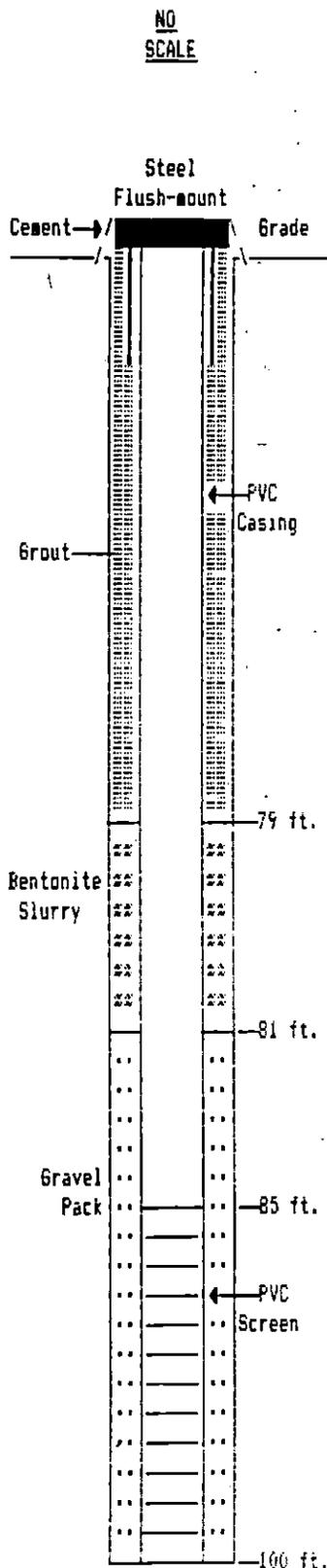
TIME LOG

	Started	Completed
Drilling:	<u>5/15/89</u>	<u>5/16/89</u>
Installation:	<u>5/16/89</u>	<u>5/16/89</u>
Development:	<u>5/17/89</u>	<u>5/17/89</u>

WELL DEVELOPMENT

Method: Submersible pump Pumping Rate: 13 gpm for 2 hours

Volume Pumped: 1560 gallons Specific Capacity: 6.5 gpm/ft



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WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: MW-31

DRILLING SUMMARY

Drilling Company: Delta Drilling Inc. Driller: Al Tav

Drill Rig Make/Model: Falling F-10 WT

Bit Diameter: 10 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 80 feet below grade Depth to Water: 31.55 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: See boring log

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 4 inch Length: 65 feet

Screen Material: Schedule 40 PVC Diameter: 4 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 80 ft. to 65 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 80 ft. to 61 ft Below Grade

Seals Material: Bentonite Slurry Setting: 61 ft to 59 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 49 ft to 3 ft. Below Grade

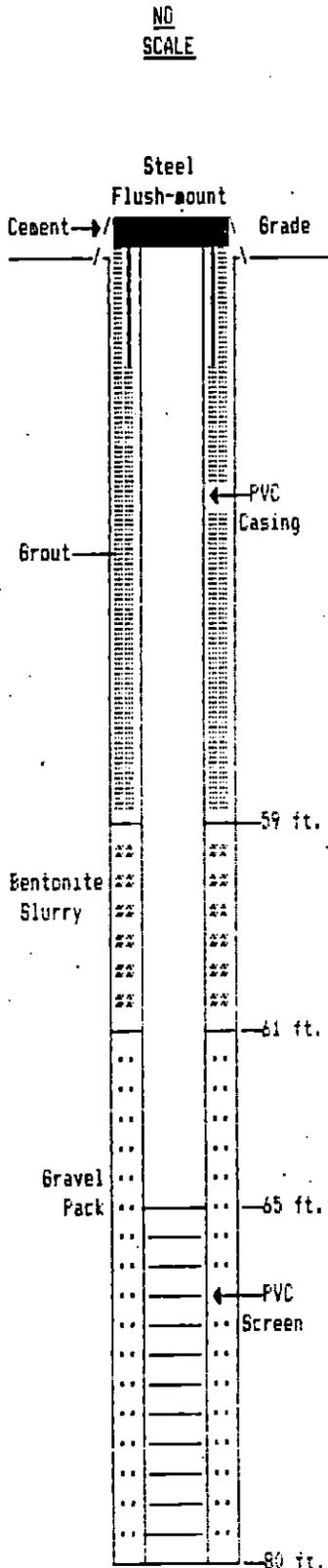
Surface Casing Material: Steel valve cover Setting: Flush mounted

TIME LOG	Started	Completed
Drilling:	<u>5/22/89</u>	<u>5/23/89</u>
Installation:	<u>5/23/89</u>	<u>5/23/89</u>
Development:	<u>5/24/89</u>	<u>5/24/89</u>

WELL DEVELOPMENT

Method: Submersible pump Pumping Rate: 13 gpm for 2.0 hours

Volume Pumped: 1560 gallons Specific Capacity: N/A



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PIEZOMETERS

WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: P-1

DRILLING SUMMARY

Drilling Company: Environmental Drilling Inc. Driller: Bob Askins

Drill Rig Make/Model: Mobil Drill; Model B-61

Bit Diameter: 6 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 50 feet below grade Depth to Water: 38.90 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: Tan-brown fine to coarse-grained sand and gravel.

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 2 inch Length: 35 feet

Screen Material: Schedule 40 PVC Diameter: 2 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 50 ft. to 35 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 50 ft. to 32 ft Below Grade

Seals Material: Bentonite Slurry Setting: 32 ft to 30 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 18 ft to 3 ft. Below Grade

Surface Casing Material: Iron valve box Setting: Flush mounted

TIME LOG

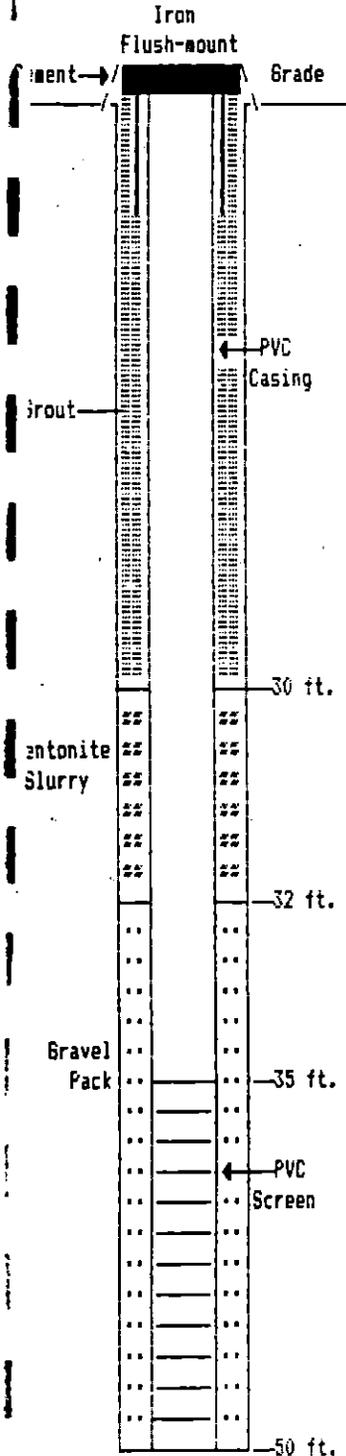
	Started	Completed
Drilling:	<u>5/2/89</u>	<u>5/2/89</u>
Installation:	<u>5/2/89</u>	<u>5/3/89</u>
Development:	<u>5/10/89</u>	<u>5/10/89</u>

WELL DEVELOPMENT

Method: Stainless-steel 2 inch bailer Pumping Rate: N/A

Volume Pumped: 5 gallons Specific Capacity: N/A

NO SCALE



WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: P-2

DRILLING SUMMARY

Drilling Company: Environmental Drilling Inc. Driller: Bob Askins

Drill Rig Make/Model: Mobil Drill; Model B-61

Bit Diameter: 6 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 50 feet below grade Depth to Water: 39.41 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: Brown to orange fine to coarse-grained sand and gravel.

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 2 inch Length: 35 feet

Screen Material: Schedule 40 PVC Diameter: 2 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 50 ft. to 35 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 50 ft. to 24 ft Below Grade

Seals Material: Bentonite Slurry Setting: 24 ft to 22 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 22 ft to 2 ft. Below Grade

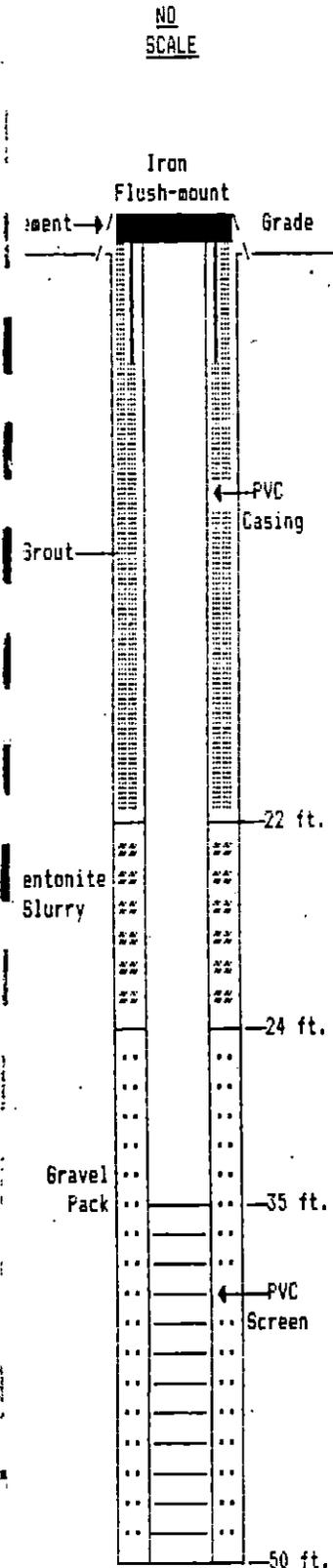
Surface Casing Material: Iron valve box Setting: Flush mounted

TIME LOG	Started	Completed
Drilling:	<u>5/1/89</u>	<u>5/1/89</u>
Installation:	<u>5/1/89</u>	<u>5/1/89</u>
Development:	<u>5/8/89</u>	<u>5/8/89</u>

WELL DEVELOPMENT

Method: Hand operated pump Pumping Rate: N/A

Volume Pumped: 10 gallons Specific Capacity: N/A



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WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: P-3

DRILLING SUMMARY

Drilling Company: Environmental Drilling Inc. Driller: Bob Askins

Drill Rig Make/Model: Mobil Drill; Model B-61

Bit Diameter: 6 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 50 feet below grade Depth to Water: 39.85 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Materials encountered: Tan to brown fine to coarse-grained gravelly sand.

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 2 inch Length: 35 feet

Screen Material: Schedule 40 PVC Diameter: 2 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 50 ft. to 35 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 50 ft. to 32 ft Below Grade

Seals Material: Bentonite Slurry Setting: 32 ft to 30 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 30 ft to 3 ft. Below Grade

Surface Casing Material: Iron valve box Setting: Flush mounted

TIME LOG

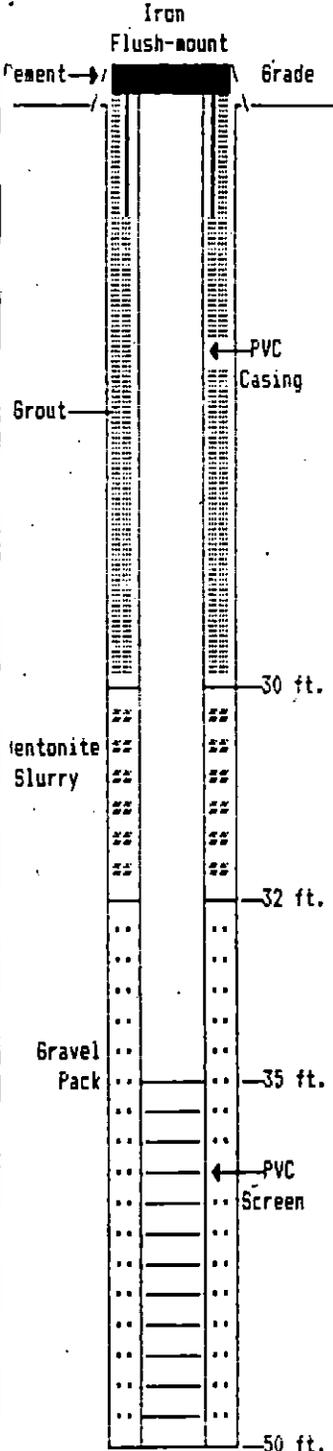
	Started	Completed
Drilling:	4/27/89	4/27/89
Installation:	4/27/89	4/28/89
Development:	5/8/89	5/8/89

WELL DEVELOPMENT

Method: Hand operated pump Pumping Rate: N/A

Volume Pumped: 10 gallons Specific Capacity: N/A

NO SCALE



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WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: P-4

DRILLING SUMMARY

Drilling Company: Environmental Drilling Inc. Driller: Bob Askins

Drill Rig Make/Model: Mobil Drill; Model B-61

Bit Diameter: 6 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 50 feet below grade Depth to Water: 38.99 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: Light brown to brown fine to coarse-grained gravelly sand with some cobbles.

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 2 inch Length: 35 feet

Screen Material: Schedule 40 PVC Diameter: 2 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 50 ft. to 35 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 50 ft. to 25 ft Below Grade

Seals Material: Bentonite Slurry Setting: 25 ft to 23 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 23 ft to 2 ft. Below Grade

Surface Casing Material: Iron valve box Setting: Flush mounted

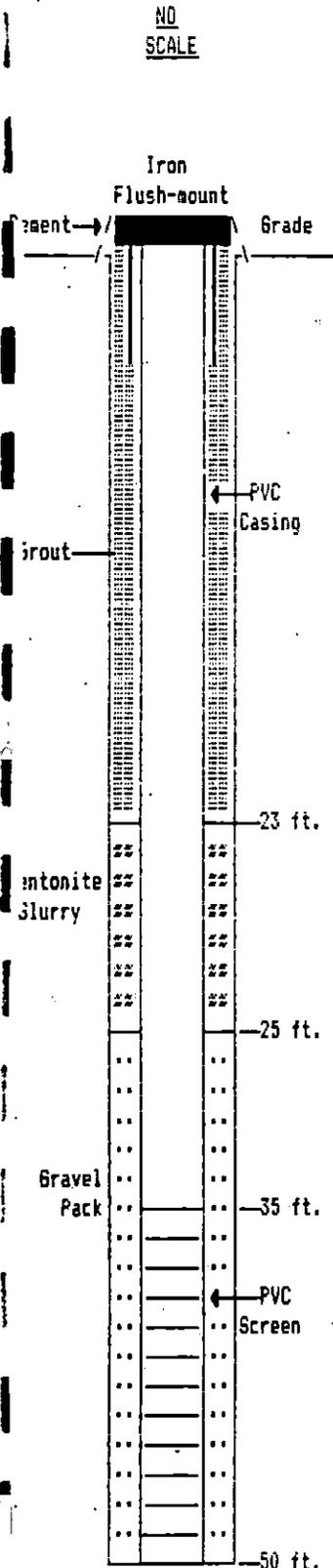
TIME LOG

	Started	Completed
Drilling:	<u>5/1/89</u>	<u>5/1/89</u>
Installation:	<u>5/1/89</u>	<u>5/1/89</u>
Development:	<u>5/10/89</u>	<u>5/10/89</u>

WELL DEVELOPMENT

Method: Stainless-steel 2 inch bailer Pumping Rate: N/A

Volume Pumped: 5 gallons Specific Capacity: N/A



CA Rich Consultants, Inc.
404 Glen Cove Ave., Sea Cliff, N.Y.

WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: DW1-P5

DRILLING SUMMARY

Drilling Company: Environmental Drilling Inc. Driller: Bob Askins

Drill Rig Make/Model: Mobil Drill; Model B-61

Bit Diameter: 6 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 50 feet below grade Depth to Water: 38.05 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: Tan to brown fine to coarse-grained gravelly sand.

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 2 inch Length: 35 feet

Screen Material: Schedule 40 PVC Diameter: 2 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 50 ft. to 35 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 50 ft. to 31 ft Below Grade

Seals Material: Bentonite Slurry Setting: 31 ft to 29 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 29 ft to 2 ft. Below Grade

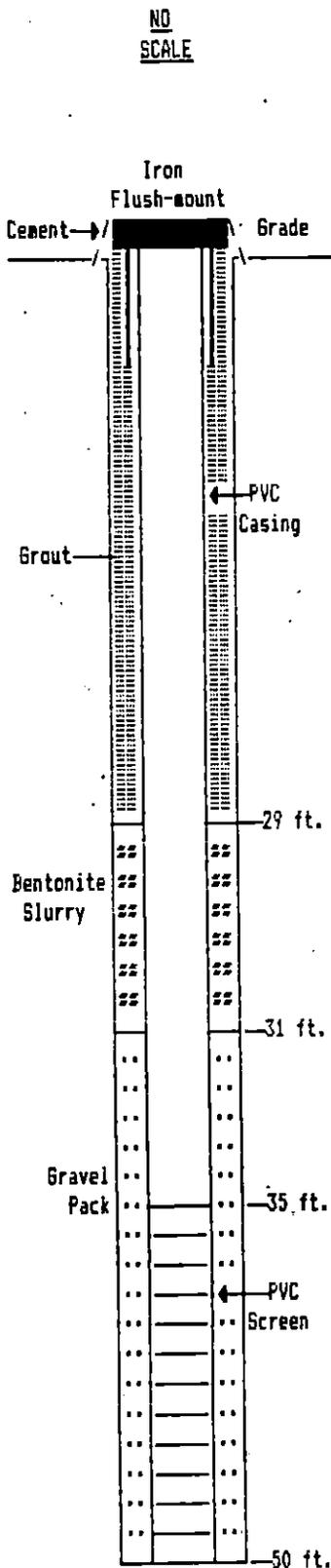
Surface Casing Material: Iron valve box Setting: Flush mounted

TIME LOG	Started	Completed
Drilling:	<u>5/2/89</u>	<u>5/2/89</u>
Installation:	<u>5/2/89</u>	<u>5/3/89</u>
Development:	<u>5/10/89</u>	<u>5/10/89</u>

WELL DEVELOPMENT

Method: Stainless-steel 2 inch bailer Pumping Rate: N/A

Volume Pumped: 5 gallons Specific Capacity: N/A



CA Rich Consultants, Inc.
404 Glen Cove Ave., Sea Cliff, N.Y.

WELL CONSTRUCTION SUMMARY

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No.: P-6

DRILLING SUMMARY

Drilling Company: Environmental Drilling Inc. Driller: Bob Askins

Drill Rig Make/Model: Mobil Drill; Model B-61

Bit Diameter: 6 inch Carbide Bit Drilling Method: Hollow-stem auger

Drilling Fluid: None

Total Depth: 50 feet below grade Depth to Water: 38.92 ft. from TOC

Supervisory Geologists: Daryl L. Shoemaker; (CA Rich Staff Geologist)

GEOLOGIC DESCRIPTION

Material encountered: Light brown to brown fine to coarse-grained sand and gravel.

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 2 inch Length: 35 feet

Screen Material: Schedule 40 PVC Diameter: 2 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 50 ft. to 35 ft Below Grade

Filter Material: Morie #0 Filter Sand Setting: 50 ft. to 31 ft Below Grade

Seals Material: Bentonite Slurry Setting: 31 ft to 29 ft Below Grade

Grout: 3% Bentonite/Cement Setting: 29 ft to 3 ft. Below Grade

Surface Casing Material: Iron valve box Setting: Flush mounted

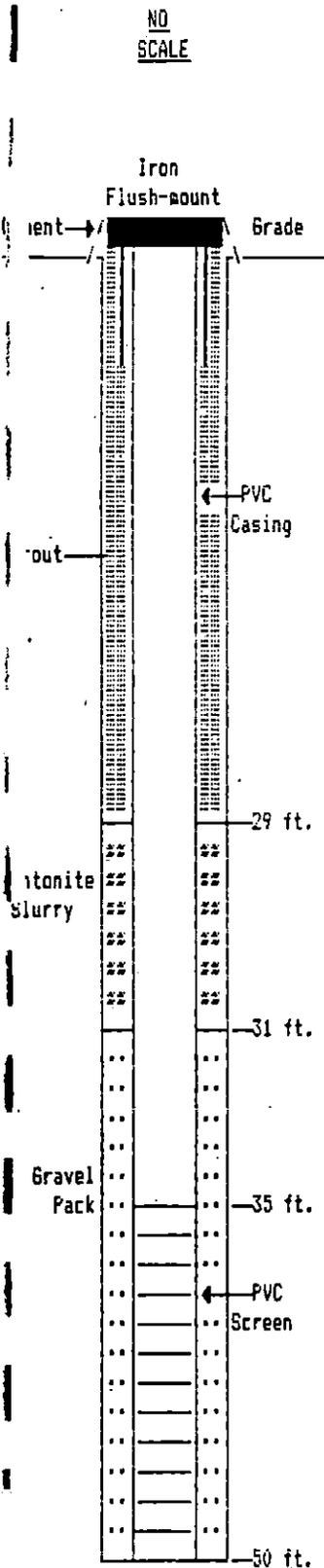
TIME LOG

	Started	Completed
Drilling:	<u>5/2/89</u>	<u>5/2/89</u>
Installation:	<u>5/2/89</u>	<u>5/2/89</u>
Development:	<u>5/10/89</u>	<u>5/10/89</u>

WELL DEVELOPMENT

Method: Stainless-steel 2 inch bailer Pumping Rate: N/A

Volume Pumped: 5 gallons Specific Capacity: N/A



CA Rich Consultants, Inc.
404 Glen Cove Ave., Sea Cliff, N.Y.

PHASE 2

FIELD PROGRAM

BORINGS

CA Rich Consultants, Inc.
Well/Boring Log

Well/Boring No. MM-41 Geologist/Inspector on site: Eric Weinstock (CA Rich Consultants) Page 1 of 2
 Project: Tronic Plating Co. Location Farmingdale N.Y. Date Drilled 4-18-91 Depth: 70 ft.
 Drilling Co. Delta Well & Pump Company Drilling Method: Hollow Stem Auger Org. Vapor Instrats. Hnu

Depth (ft)	Sample No.	Blows per 6"	Sapl. Intvl.	Adv/Rec (inch)	Org. Vap (ppm)	Sample Description	Strata Change	Remarks
5						Organic matter- tan fine to coarse sand with rounded gravel.		Start 8:45 am
10								
15								
20						Tan fine to coarse sand with rounded gravel		
25								
30								
35								
40								
45						Tan fine to coarse sand with rounded gravel		

CA Rich Consultants Inc.
Well/Boring Log

Well/Boring No. MW-41 Geologist/Inspector on site: Eric Weinstock (CA Rich Consultants) Page 2 of 2
 Project: Tronic Plating Co. Location Farmingdale N.Y. Date Drilled 4-18-91 Depth: 70 ft.
 Drilling Co. Delta Well & Pump Company Drilling Method: Hollow Stem Auger Org. Vapor Instrmts. Hnu

Depth (ft)	Sample No.	Blows per 6" 120 lbs.	Sepl. Intvl.	Adv/Rec (inch)	Org. Vap (ppm)	Sample Description	Strata Change	Remarks
60						Tan fine to coarse sand with rounded gravel.		
65	1	49 53 71 101	64 to 66	24"/14"	2	Tan fine to medium sand with some clay.		
70								End at 11:45 am

**WELL CONSTRUCTION
SUMMARIES**

WELL CONSTRUCTION SUMMARY

CA RICH CONSULTANTS, INC.

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No: MW-4S

DRILLING SUMMARY

Drilling Company: Delta Well & Pump Company Driller: Brian Devine

Drill Rig Make/Model: Falling F-7

Borehole Diameter: 10" to 47 feet

Drilling Fluid: None

Total Depth: 47 feet below grade Depth to Water: 32.5 feet

Supervisory Geologists: Eric Weinstock (CA Rich Consultants, Inc.)

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 4 inch Length: 30 ft.

Screen Material: Schedule 40 PVC Diameter: 4 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 45 ft. to 30 ft. below grade

Filter Material: Morie #1 Filter Sand Setting: 45 ft. to 26 ft. below grade

Seals Material: Bentonite Slurry Setting: 26 ft. to 24 ft. below grade

Grout: Bentonite/Cement Setting: 24 ft. to 1 ft. below grade

Surface Casing Material: Iron Setting: Flush

TIME LOG

	Started	Completed
Drilling:	<u>4-19-91</u>	<u>4-19-91</u>
Installation:	<u>4-19-91</u>	<u>4-19-91</u>
Development:	<u>4-23-91</u>	<u>4-23-91</u>

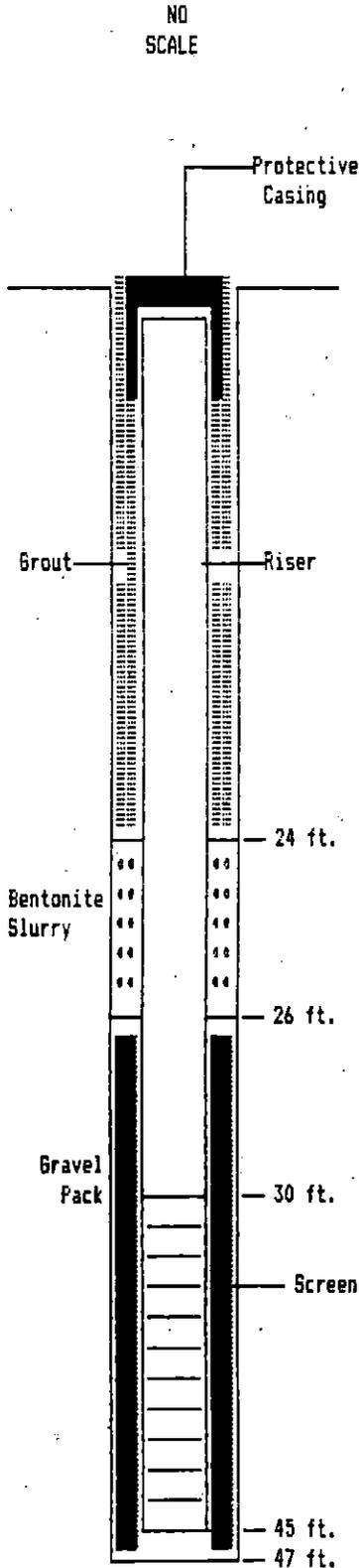
WELL DEVELOPMENT

Method: 4" Submersible Pump

Static Depth to Water: 31.45 Specific Capacity: 2.6 GPM/FT

Pumping Depth to Water: 31.70

Pumping Rate: Approx. 12 GPM Volume Pumped: 900 Gallons



WELL CONSTRUCTION SUMMARY

CA RICH CONSULTANTS, INC.

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No: MW-4I

DRILLING SUMMARY

Drilling Company: Delta Well & Pump Company Driller: Brian Devine

Drill Rig Make/Model: Failing F-7

Borehole Diameter: 10" to 72 feet

Drilling Fluid: None

Total Depth: 72 feet below grade Depth to Water: 32.5 feet

Supervisory Geologists: Eric Weinstock (CA Rich Consultants, Inc.)

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 4 inch Length: 60 ft.

Screen Material: Schedule 40 PVC Diameter: 4 inch Length: 10 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 70 ft. to 60 ft. below grade

Filter Material: Morie #1 Filter Sand Setting: 70 ft. to 56 ft. below grade

Seals Material: Bentonite Slurry Setting: 56 ft. to 53 ft. below grade

Grout: Bentonite/Cement Setting: 53 ft. to 1 ft. below grade

Surface Casing Material: Iron Setting: Flush

TIME LOG

	Started	Completed
Drilling:	<u>4-18-91</u>	<u>4-18-91</u>
Installation:	<u>4-18-91</u>	<u>4-18-91</u>
Development:	<u>4-23-91</u>	<u>4-23-91</u>

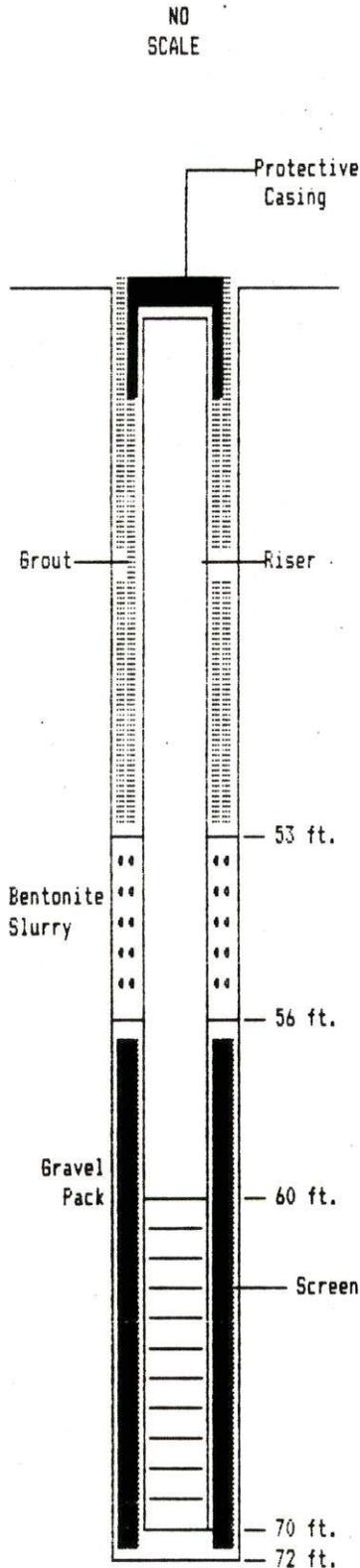
WELL DEVELOPMENT

Method: 4" Submersible Pump

Static Depth to Water: 31.45 Specific Capacity: 2.2 GPM/FT

Pumping Depth to Water: 36.75

Pumping Rate: Approx. 12 GPM Volume Pumped: 960 Gallons



WELL CONSTRUCTION SUMMARY

CA RICH CONSULTANTS, INC.

Project: Tronic Plating Co. Location: Farmingdale, N.Y. Well No: MW-56

DRILLING SUMMARY

Drilling Company: Delta Well & Pump Company Driller: Brian Devine

Drill Rig Make/Model: Failing F-7

Borehole Diameter: 10" to 47 feet

Drilling Fluid: None

Total Depth: 47 feet below grade Depth to Water: 33.2 feet

Supervisory Geologists: Eric Weinstock (CA Rich Consultants, Inc.)

WELL DESIGN

Casing Material: Schedule 40 PVC Diameter: 4 inch Length: 30 ft.

Screen Material: Schedule 40 PVC Diameter: 4 inch Length: 15 ft.

Slot Size: 20 Slot; (0.020 mil slotted) Setting: 45 ft. to 30 ft. below grade

Filter Material: Morie #1 Filter Sand Setting: 45 ft. to 26 ft. below grade

Seals Material: Bentonite Slurry Setting: 26 ft. to 24 ft. below grade

Grout: Bentonite/Cement Setting: 24 ft. to 1 ft. below grade

Surface Casing Material: Iron Setting: Flush

TIME LOG

	Started	Completed
Drilling:	<u>4-17-91</u>	<u>4-17-91</u>
Installation:	<u>4-17-91</u>	<u>4-17-91</u>
Development:	<u>4-23-91</u>	<u>4-23-91</u>

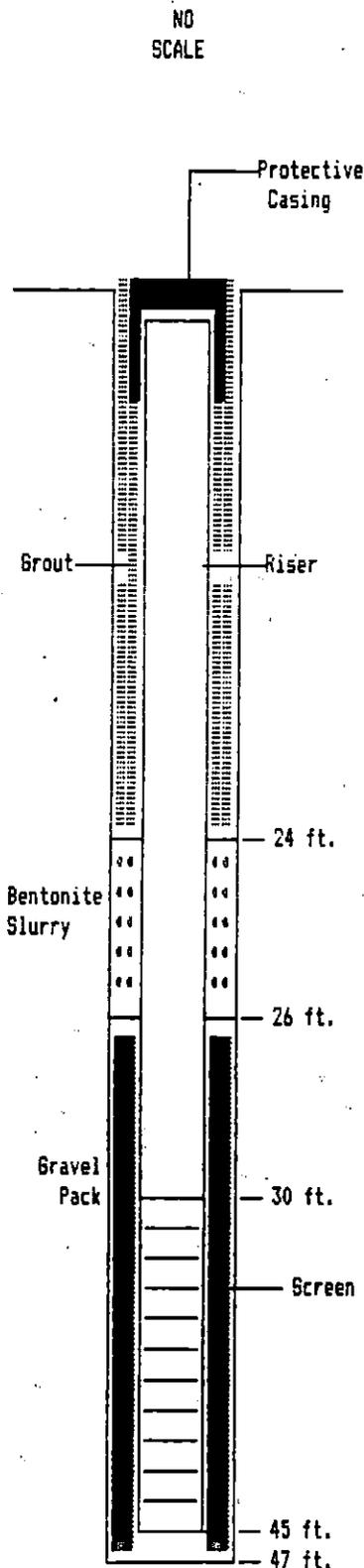
WELL DEVELOPMENT

Method: 4" Submersible Pump

Static Depth to Water: 32.60 Specific Capacity:

Pumping Depth to Water:

Pumping Rate: 8 GPM Volume Pumped: 720 Gallons



APPENDIX D

SLUG TEST ANALYSES

(SLUG-15)

HYDROSLUG TEST ANALYSIS
UNCONFINED AQUIFER

MONITORING WELL: MW-15

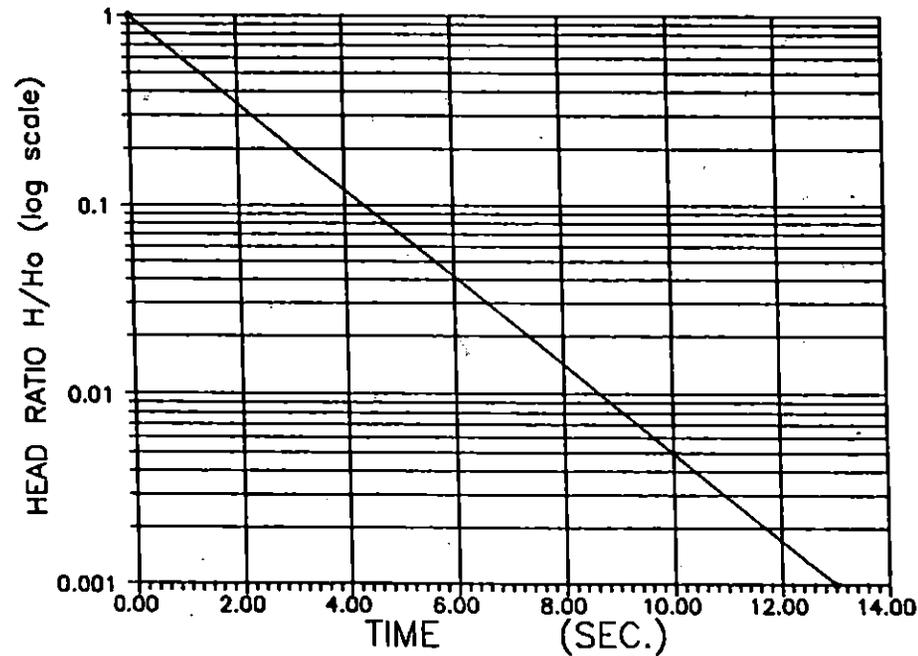
D(in)= 4 L(ft)= 13.99 M = 10 Hi(ft)= 0.5 HF(ft)= 0.001 Ti(min)= 0 Tf(min)= 0.216666
D(cm)= 10.16 L(cm)= 426.415 Hi(cm)= 15.2 HF(cm)= .0 Ti(sec)= 0 Tf(sec)= 13

TIME (SEC)	TIME (MIN)	DEPTH TO WATER (FT)	H (ft)	H/Ho (FT)
STATIC		36.01		
0	0	36.5	0.5	1.00
13	0.21666	36	0	0.00

FORMULA:

$$K_h = \frac{D \times D \times \ln(2ML/D)}{8 \times L \times (T_f - T_i)} \times \ln(H_i/H_f)$$
$$= \frac{695.0}{44347} \times 6.21 = 9.74E-02 \text{ cm/sec}$$

SLUG TEST - WELL MW-15



(SLUG-31)

Hvorslev Slug Test Analysis
Unconfined Aquifer

MONITORING WELL: MW-31

D(in)= 4 L(ft)= 15 M = 10 Hi(ft)= 2.01 HF(ft)= 0.28 Ti(min)= 0 Tf(min)= 2.25
 D(cm)= 10.16 L(cm)= 457.2 Hi(cm)= 61.3 HF(cm)= 8.5 Ti(sec)= 0 Tf(sec)= 135

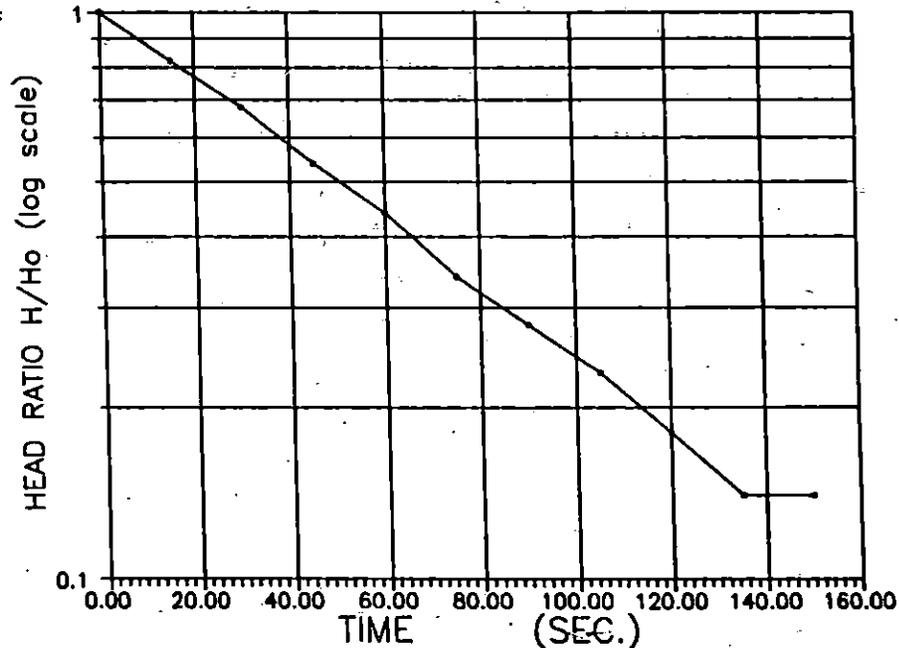
TIME (SEC)	TIME (MIN)	DEPTH TO WATER (FT)	H (ft)	LOG H/Ho (ft)
STATIC		30.94		
0	0	32.95	2.01	1.00
15	0.25	32.58	1.64	0.82
30	0.5	32.3	1.36	0.68
45	0.75	32.03	1.09	0.54
60	1	31.82	0.88	0.44
75	1.25	31.63	0.69	0.34
90	1.5	31.5	0.56	0.28
105	1.75	31.4	0.46	0.23
120	2	31.31	0.37	0.18
135	2.25	31.22	0.28	0.14
150	2.5	31.22	0.28	0.14

FORMULA:

$$Kh = \frac{D \times D \times \ln(2ML/D)}{8 \times L \times (Tf - Ti)} \times \ln(Hi/HF)$$

$$= \frac{702.2}{493776} \times 1.97 = \underline{\underline{2.80E-03 \text{ cm/sec}}}$$

SLUG TEST - WELL MW-31



(SLUG-20)

Hvorslev SLUG TEST ANALYSIS
UNCONFINED AQUIFER

MONITORING WELL: MW-20

D(in)= 4 L(ft)= 15 M = 10 Hi(ft)= 1 Hf(ft)= 0.04 Ti(min)= 0 Tf(min)= 0.416666
D(cm)= 10.16 L(cm)= 457.2 Hi(cm)= 30.5 Hf(cm)= 1.2 Ti(sec)= 0 Tf(sec)= 25

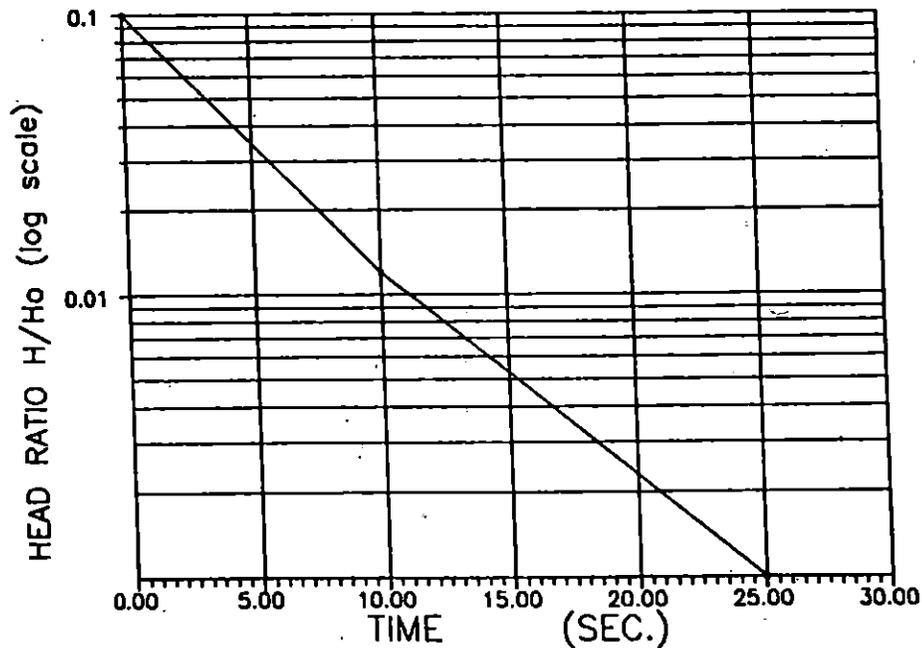
TIME (SEC)	TIME (MIN)	DEPTH TO WATER (FT)	H (ft)	LOG H/Ho (ft)
STATIC		35.06		
0	0	36.06	1	1.00
10	0.16666	35.18	0.12	0.12
25	0.41666	35.02	0.01	0.01

FORMULA:

$$K_h = \frac{D \times D \times \ln(2ML/D)}{8 \times L \times (T_f - T_i)} \times \ln(H_i/H_f)$$

= $\frac{702.2}{91440}$ 3.22 = $\underline{\underline{2.47E-02}}$ cm/sec

SLUG TEST - WELL MW-20



(SLUG-2I)

Hvorslev Slug Test Analysis
Unconfined Aquifer

MONITORING WELL: MW-2I

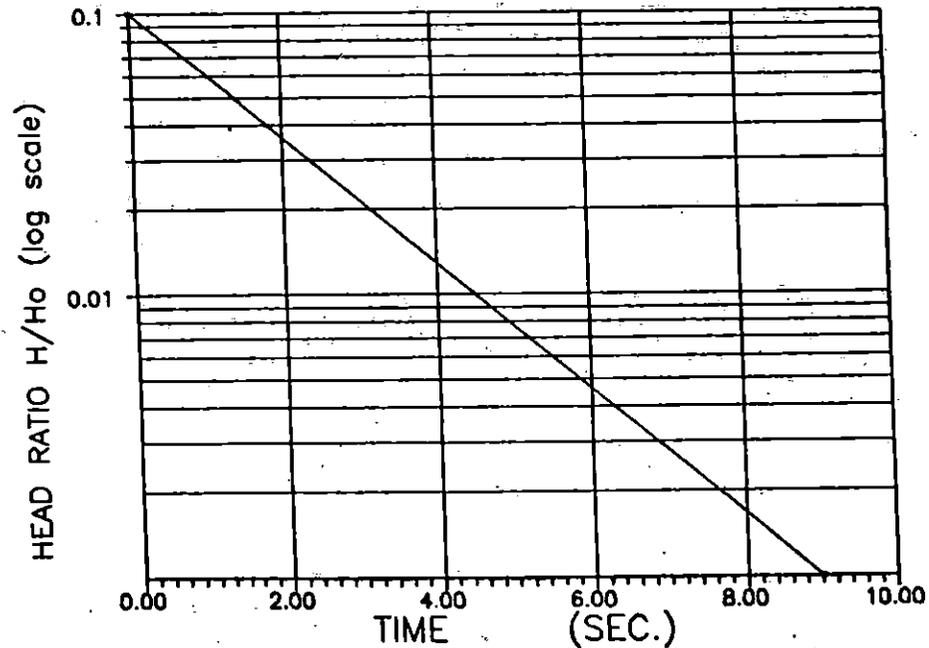
D(in)= 4 L(ft)= 15 M = 10 Hi(ft)= 1 Hf(ft)= 0.01 Ti(min)= 0 Tf(min)= 0.15
D(cm)= 10.16 L(cm)= 457.2 Hi(cm)= 30.5 Hf(cm)= 0.3 Ti(sec)= 0 Tf(sec)= 9

TIME (SEC)	TIME (MIN)	DEPTH TO WATER (FT)	H (ft)	LOG H/Ho (ft)
STATIC		34.83		
0	0	35.83	1	1.00
9	0.15	34.83	0.01	0.01

FORMULA:

$$K_h = \frac{D \times D \times \ln(2ML/D)}{8 \times L \times (T_f - T_i)} \times \ln(H_i/H_f)$$
$$= \frac{702.2}{32918} \times 4.61 = 9.82E-02 \text{ cm/sec}$$

SLUG TEST - WELL MW-2I



(SLUG-2S)

Hvorslev Slug Test Analysis
Unconfined Aquifer

Monitoring Well: MW-2S

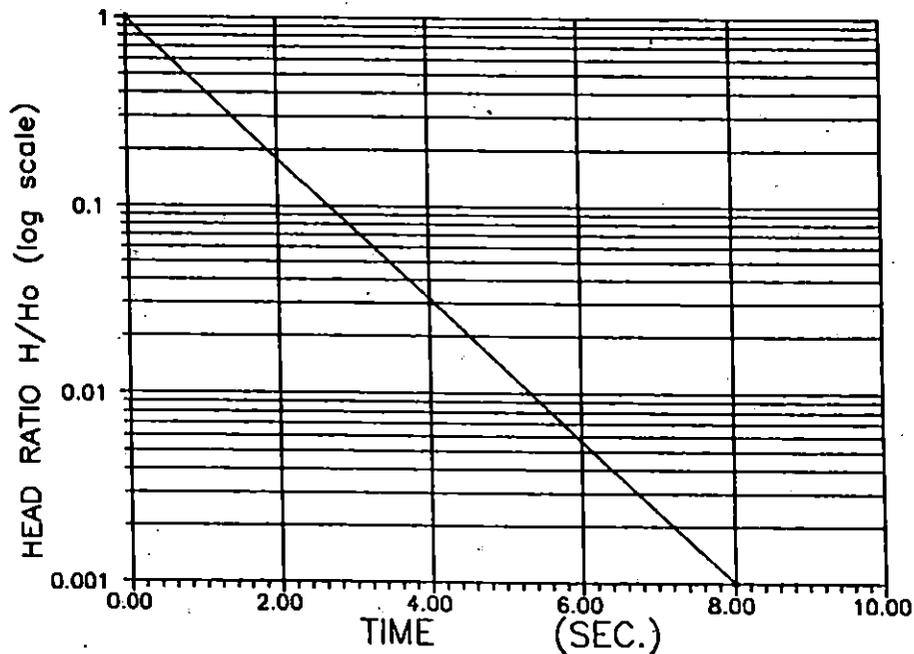
D(in)= 4 L(ft)= 14.4 M = 10 Hi(ft)= 0.5 HF(ft)= 0.001 Ti(min)= 0 Tf(min)= 0.133333
D(cm)= 10.16 L(cm)= 438.912 Hi(cm)= 15.2 HF(cm)= .0 Ti(sec)= 0 Tf(sec)= 8

TIME (SEC)	TIME (MIN)	DEPTH TO WATER (FT)	H (ft)	H/Ho (FT)
STATIC		34.95		
0	0	35.45	0.5	1.00
8	0.13333	34.95	0	0.00

FORMULA:

$$K_h = \frac{D \times D \times \ln(2ML/D)}{8 \times L \times (T_f - T_i)} \times \ln(H_i/H_f)$$
$$= \frac{698.0}{28090} \times 6.21 = 1.54E-01 \text{ cm/sec}$$

SLUG TEST - WELL MW-2S



<SLUG-10>

Hvorslev Slug Test Analysis
 UNCONFINED AQUIFER

MONITORING WELL: MW-10

D(in)= 4 L(ft)= 15 M = 10 Hi(ft)= 1 Hf(ft)= 0.06 Ti(min)= 0 Tf(min)= 0.5
 D(cm)= 10.16 L(cm)= 457.2 Hi(cm)= 30.5 Hf(cm)= 1.8 Ti(sec)= 0 Tf(sec)= 30

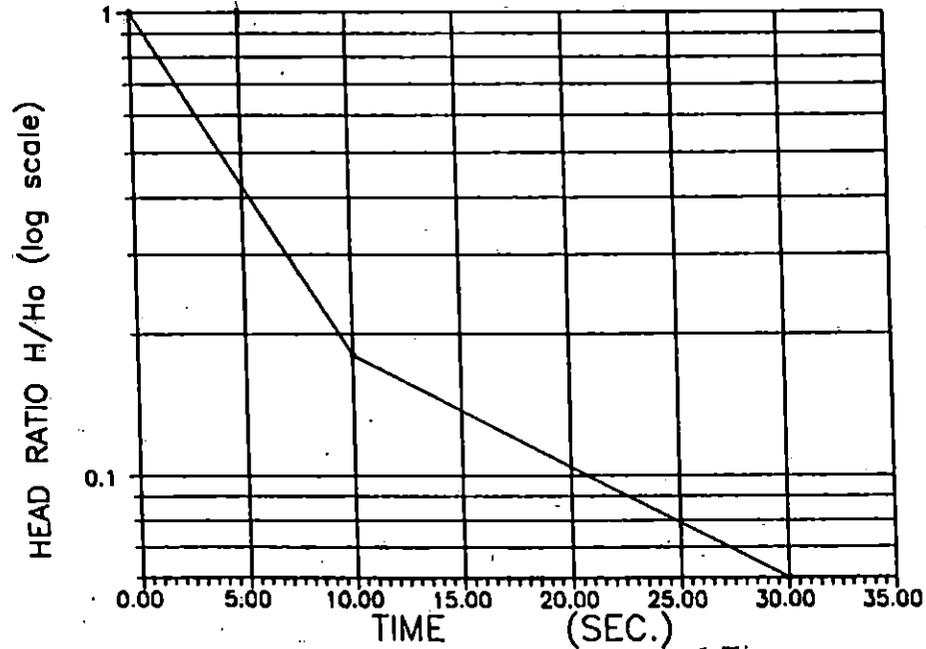
TIME (SEC)	TIME (MIN)	DEPTH TO WATER (FT)	H (ft)	LOG H/Ho (ft)
STATIC		35.93		
0	0	36.93	1	1.00
10	0.16666	36.11	0.18	0.18
30	0.5	35.99	0.06	0.06

FORMULA:

$$K_h = \frac{.0 \times D \times \ln(2ML/D)}{8 \times L \times (T_f - T_i)} \times \ln(H_i/H_f)$$

$$= \frac{702.2}{109728} \times 2.81 = \underline{\underline{1.80E-02 \text{ cm/sec}}}$$

SLUG TEST - WELL MW-10



APPENDIX E

**AMBIENT
AIR MONITORING**

APPENDIX E

Ambient Air Monitoring Readings Measured During the Remedial Investigation Drilling Program Tronic Plating Co. Site, Farmingdale, NY

<u>Date</u>	<u>Boring Number</u>	<u>Depth* (feet)</u>	<u>HNU Reading In Work Space</u>
4/26/89	LP-1	2.5	No detection
		38	No detection (5 ppm in augers)
4/27/89	LP-2	30	No detection
	LP-3	18	No detection
5/3/89	SP-1	8	No detection
		17	No detection
5/2/89	DW-1	21	0.5 ppm
		35	No detection
		39	No detection
		17	No detection
5/3/89	MW-15	27	No detection
		33	No detection
		15	No detection
5/4/89	MW-25	25	No detection
5/17/89	MW-21	3	No detection
		12.5	No detection
		20	No detection
		27.5	No detection
		40	No detection
		60	No detection

5/11/89	MW-2D	5	No detection
		10	No detection
		12.5	No detection
		20	No detection
		32.5	No detection
5/9/89	MW-1D	1	No detection
		5	No detection
		22.5	No detection
		40	No detection
			(2 ppm in auger)
5/22/89	MW-3I	30	No detection
		50	No detection
		60	No detection

*Borehole depth at time of reading measured in work space.

APPENDIX F

**GROUNDWATER COMPUTER MODELING
INPUT PARAMETERS AND SOURCES
FOR MODFLOW AND MT3D MODELS**

**MODFLOW
INPUT PARAMETERS**

**Summary of Hydraulic Parameters
Used for the MODFLOW Model**

Formation	Parameter	Source	Values Reviewed	Value Selected for Model
Upper Glacial	30-Yr. Average Annual Precipitation	Nassau County Health Department	44 inches/year	Not required
	Recharge	50% of precipitation	22-inches/year (0.005 ft/day)	0.005 ft/day
	Permeability	Site specific slug tests	200 to 400 ft/day	300 ft/day
	Transmissivity	McClymonds & Franke - [1972]	200,000 gpd/ft (27,000 sq ft/day)	Not required for unconfined aquifers
	Aquifer Thickness	Site-specific boring logs	60 feet	60 feet
	Kh/Kv	Linder & Reilly [1983] Seaford Site, Stallman Type Curve Method	2 to 60	10
	Storativity	Linder & Reilly [1983] Pinder [1973]	0.25 to 0.35	0.3
Upper Magothy*	Permeability	Based on review of off-site boring logs, and Freeze & Cherry [1978]	1.0 x 10 ⁽⁻³⁾ cm/sec. (3 ft/day)	Not required for confined aquifers
	Transmissivity	Permeability & thickness	600 sq ft/day	600 sq/ft day
	Aquifer Thickness	Based on off-site boring logs on file at DEC	200 ± feet (ranges from 100 to 300 feet)	Not required for confined aquifers

Upper Magothy*	Kh/Kv	Based on interpretation of boring logs (clay content)	10	10
	Storativity	Personal communication with USGS	6.0×10^{-4}	6.0×10^{-4}
Lower Magothy*	Permeability	---	---	Not required for confined aquifers
	Transmissivity	McClymonds & Franke [1972]	300,000 gpd/ft (40,000 sq ft/day)	40,000 sq ft/day
	Aquifer Thickness	Jensen & Soren [1974]	700 ± ft for upper and lower Magothy combined	Not required for confined aquifers
	Kh/Kv	Based on interpretation of boring logs	100	100
	Storativity	Personal communication with USGS	6.0×10^{-4}	6.0×10^{-4}

*The Magothy Formation, as typically defined in USGS Reports, was separated into lower and upper units to reflect localized changes in stratigraphy with depth.

NASSAU COUNTY DEPARTMENT OF HEALTH

PRECIPITATION AT MINEOLA
US GEOLOGICAL SURVEY RECORDS

YEAR	RAINFALL (INCHES)	YEAR	RAINFALL (INCHES)	YEAR	RAINFALL (INCHES)
1937	44.77	1956	43.44	1975	63.04
1938	52.67	1957	35.33	1976	37.91
1939	38.39	1958	55.04	1977	55.01
1940	42.36	1959	39.01	1978	45.08
1941	39.12	1960	48.66	1979	52.86
1942	48.30	1961	46.71	1980	40.36
1943	38.85	1962	42.21	1981	38.53
1944	50.85	1963	34.19	1982	40.47
1945	44.62	1964	35.83	1983	64.64
1946	39.22	1965	22.04	1984	57.13
1947	42.16	1966	34.76	1985	38.31
1948	51.06	1967	41.69	1986	44.06
1949	40.40	1968	38.80	1987	43.31
1950	36.88	1969	43.88		
1951	47.47	1970	30.67		
1952	47.73	1971	40.80		
1953	48.68	1972	53.26		
1954	47.25	1973	51.70		
1955	46.39	1974	38.99		

51 YEAR AVERAGE (1937-1987) 44.02 INCHES

DHM ** 17-Jun-88 **

General Head Boundary Conditions

LAYER	ROW	COL	ELEVATION	CONDUCTANCE	BOUND NO.
1	1	35	58.00	7200.	1
1	2	35	56.00	7200.	2
1	3	35	56.00	7200.	3
1	4	35	54.00	7200.	4
1	5	35	52.00	7200.	5
1	6	35	50.00	7200.	6
1	7	35	49.00	3600.	7
1	8	35	48.00	3600.	8
1	9	35	47.00	3600.	9
1	10	35	45.00	3600.	10
1	11	35	45.00	3600.	11
1	12	35	43.00	3600.	12
1	13	35	41.00	3270.	13
1	14	35	40.00	3060.	14
1	15	35	39.00	2880.	15
1	16	35	38.00	2770.	16
1	17	35	37.00	2670.	17
1	18	35	36.00	2400.	18
1	19	35	35.00	2250.	19
1	20	35	34.00	2120.	20
1	21	35	34.00	2000.	21
1	22	35	33.00	1900.	22
1	35	35	17.00	2400.	23
1	23	35	33.00	1900.	24
1	24	35	32.00	1900.	25
1	25	35	31.00	1900.	26
1	26	35	31.00	1900.	27
1	27	35	30.00	3790.	28
1	28	35	30.00	3600.	29
1	29	35	27.00	3200.	30
1	30	35	25.00	2880.	31
1	31	35	24.00	2620.	32
1	32	35	23.00	2400.	33
1	33	35	21.00	2400.	34
1	34	35	19.00	2400.	35
1	36	35	15.00	2400.	36

Formula for Leakage Calculation
 Source: McDonald & Harbaugh, 1988

$$V_{cont\ i,j,k+1/2} = \frac{1}{\frac{(\Delta v_k)/2}{K_{z\ i,j,k}} + \frac{(\Delta v_{k+1})/2}{K_{z\ i,j,k+1}}} \quad (51)$$

where Δv_k is the thickness of model layer k

Δv_{k+1} is the thickness of model layer $k+1$

$K_{z\ i,j,k}$ is the vertical hydraulic conductivity of the upper layer in cell i,j,k

$K_{z\ i,j,k+1}$ is the vertical hydraulic conductivity of the lower layer in cell $i,j,k+1$

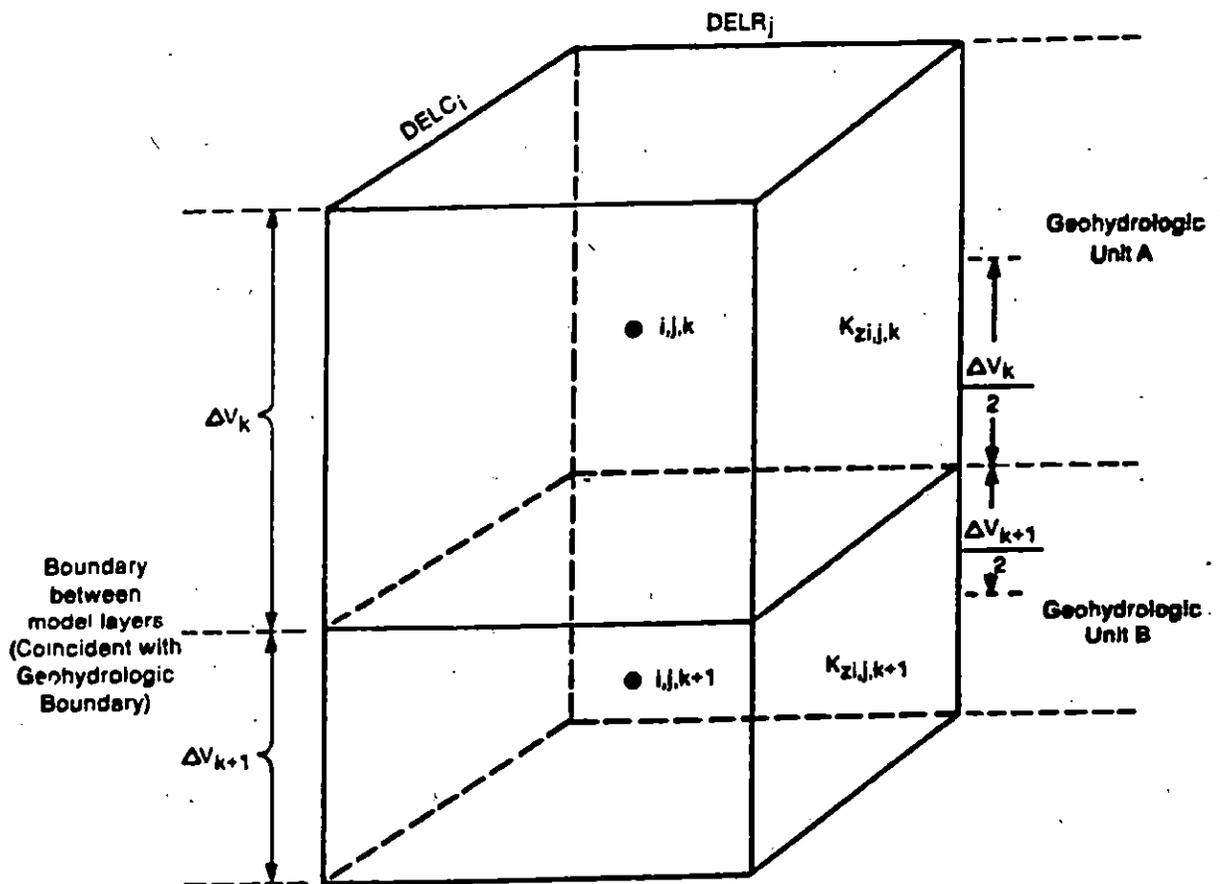


Figure 27.—Diagram for calculation of vertical leakage, V_{cont} , between two nodes located at the midpoints of vertically adjacent geohydrologic units.

V cont Calculations (leakance)

Layers 1 - 2

$$V \text{ cont} = \frac{1}{\frac{60/2}{30} + \frac{200/2}{.3}} = 0.003 \text{ 1/day}$$

Layer 1 $K_v = K_h \times 0.1$
 $= 300 \times 0.1 = 30$

60 feet

Layer 2 $K_v = K_h \times 0.1$
 $= 3 \times 0.1 = 0.3$

200 feet

V cont Calculations (leakance)

Layers 2 - 3

$$V \text{ cont} = \frac{1}{\frac{200/2}{.3} + \frac{500/2}{.8}} = 0.0015 \text{ 1/day}$$

Layer 2 $K_v = K_h \times 0.1$
 $= 3 \times 0.1 = 0.3$

200 feet

Layer 3 $K_v = K_h \times 0.1$
 $= 8 \times 0.1 = .8$

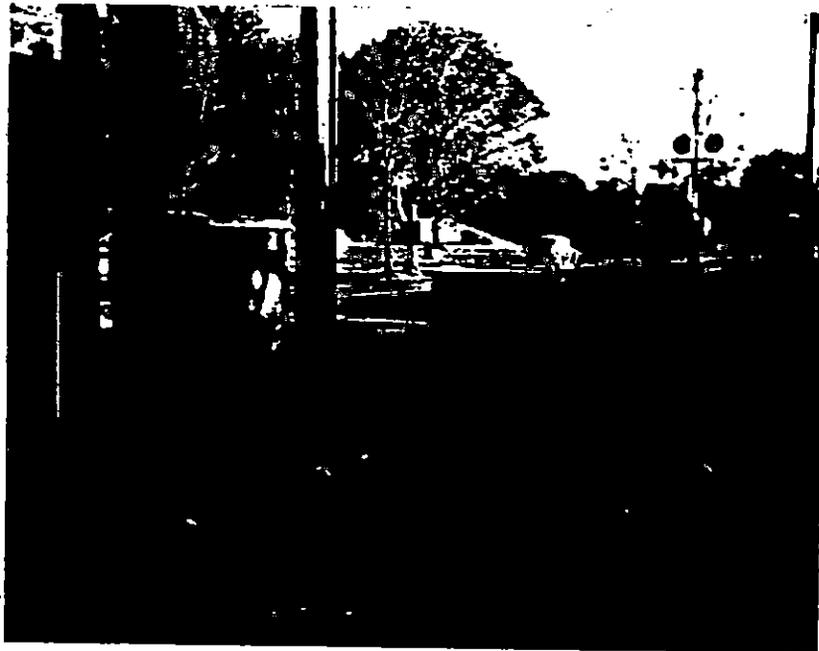
500 feet

REPRESENTATIVE LOCAL WELL LOGS

MODFLOW INPUT PARAMETERS

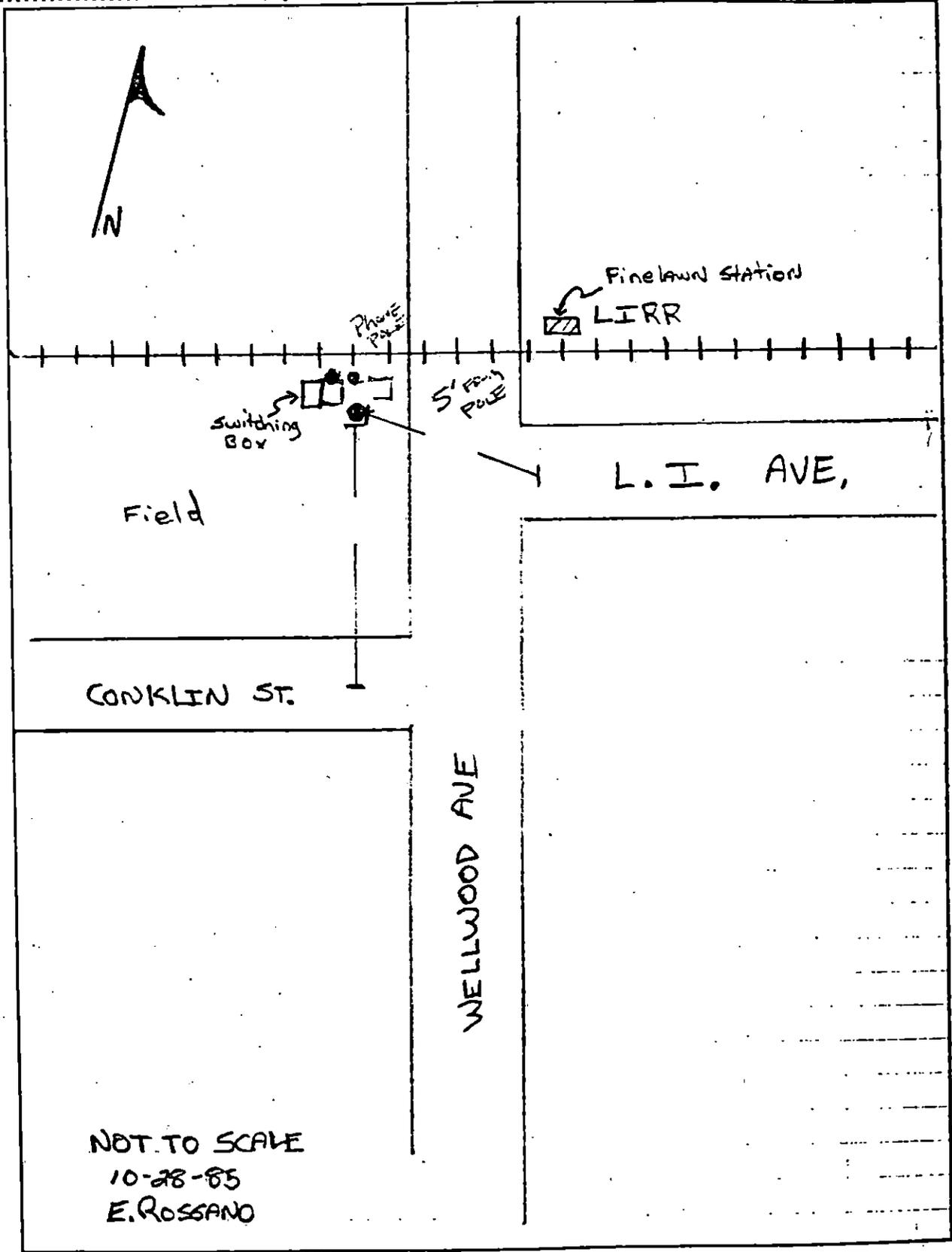
LOCATION SKETCH

- | | |
|------------------------------------------------------------|-------------------------------------------|
| 1) Location (community) <u>Pinehawn</u> | 2) N.Y.S. Well # <u>5-1806</u> |
| 3) Owner <u>USGS</u> | 5) Latitude <u>40 44 42</u> |
| 4) Address <u>---</u> | 6) Long. & Seg. <u>073 24 05.01</u> |
| 7) Completion Date of Well <u>8-15-77</u> | 8) Aquifer Screened <u>Upper Glacial</u> |
| 9) Desc. of Measuring Point (MP) <u>TOP OF 2" COUPLING</u> | |
| 10) Elev. of MP <u>85.51</u> | 11) Elev. of Land Surface <u>85.6</u> |
| 12) Diameter of Casing <u>2"</u> | 13) MP <u>09</u> Above/below Land Surface |
| 14) Total Well Depth Below MP <u>45'</u> | 15) Screened Interval <u>40'-45'</u> |
| 16) Type of Well <u>Observation</u> | 17) Approx. Depth to Water <u>30'</u> |



← UG 1806

MAP 4, L-3



NOT TO SCALE
10-28-85
E. ROSSANO

981-2369

Note: This form is to be filled out by the operator with depth below ground level in each section. It is not to be filled out by the engineer and Report Form 47.

Date: 11/11/61
Well No. 5-1950
Operator: Phillip Samuels, WPA & Equip. Co. Inc.

Work being done: Reinstalling
Type of well: Casing

Depth: 11 ft
Diameter: 6 in

Discharge head: 11 ft of total head
Capacity: 11 ft of discharge head

Model No. H.P. 5
H.P. 5

Duration of trial: 60 minutes
Flow rate: 11 ft below top of casing

Scale of flow: 11 ft below top of casing
Maximum flow rate: 60 gallons per minute

Duration of trial: 60 minutes
Flow rate: 11 ft below top of casing

Duration of trial: 60 minutes
Flow rate: 11 ft below top of casing

Duration of trial: 60 minutes
Flow rate: 11 ft below top of casing

Duration of trial: 60 minutes
Flow rate: 11 ft below top of casing

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Flow rate: 11 ft below top of casing

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Flow rate: 11 ft below top of casing

Duration of trial: 60 minutes
Flow rate: 11 ft below top of casing

Duration of trial: 60 minutes
Flow rate: 11 ft below top of casing

Duration of trial: 60 minutes
Flow rate: 11 ft below top of casing

Top of Well
Ground SUR. EL. 11 ft. ABOVE SEA
LOC
Well No. 5-1950
LOAN
BROWN MUD
SAND AND
GRITS
121
COARSE BROWN
SAND, GRITS
AND GRAVEL
701
BROWN SLAYE
FINE SAND
731

*Exc. This is a supply well @ cemetery
DEC couldst find anything else. Chris*

PL CW

County Suffolk

Well Number S-93979D

COMPLETION REPORT—LONG ISLAND WELL

OWNER Pinelawn Memorial Park		*LOG Ground Surface	
ADDRESS Box 420, Farmingdale, NY 11735		EL. _____ ft. above sea	
LOCATION OF WELL 250' E/O Pinelawn Rd., 40' N/O Park Entrance Road		Λ _____ ft. V _____ ft.	
DEPTH OF WELL BELOW SURFACE 50'		DEPTH TO GROUNDWATER FROM SURFACE Not recorded	
CASINGS			
DIAMETER 4 in.		in.	
LENGTH 30 ft.		ft.	
SEALING Grout		CASINGS REMOVED None	
SCREENS			
MAKE Johnson		OPENINGS 80 Slot	
DIAMETER 4 in.		in.	
LENGTH 20 ft.		ft.	
DEPTH TO TOP FROM TOP OF CASING 30'			
PUMPING TEST			
DATE N/A		TEST OR PERMANENT PUMP?	
DURATION OF TEST days hours		MAXIMUM DISCHARGE gallons per min.	
STATIC LEVEL PRIOR TO TEST ft. in. below top of casing		LEVEL DURING MAXIMUM PUMPING in. below top of casing	
MAXIMUM DRAWDOWN ft.		Approximate time of return to normal level after cessation of pumping hours min.	
PUMP INSTALLED			
TYPE N/A	MAKE	MODEL NUMBER	
MOTIVE POWER	MAKE	H.P.	
CAPACITY g.p.m. against		ft. of discharge head	
NUMBER OF BOWLS OR STAGES		ft. of total head	
DROP LINE		SUCTION LINE	
DIAMETER N/A in.		DIAMETER N/A in.	
LENGTH ft.		LENGTH ft.	
METHOD OF DRILLING <input type="checkbox"/> rotary <input type="checkbox"/> cable tool <input checked="" type="checkbox"/> other Auger		USE OF WATER Diffusion Well	
WORK STARTED 5/8/89		COMPLETED 5/9/89	
DATE 5/26/89	DRILLER Delta Well & Pump Co., Inc.	LICENSE NUMBER 1299	
<p>* NOTE: Show log of well materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job. See Instructions as to Well Driller's License and Reports. Page 5-7.</p>			

TOP OF WELL

0-3 Topsoil
3-27 Medium-coarse sand
27-50 Medium-coarse sand with some gravel

DUPLICATE—RETAIN

✓ Suffolk

State of New York
 Department of Conservation
 Division of Water Resources

Well No. S-49385
(on preliminary)

LOG

Ground Surf., El.ft.

^
ft.

v
 Top of Well

COMPLETION REPORT—LONG ISLAND WELL

Owner Rinelawn Memorial Cemetery

Address P. O. Box 420, Farmingdale, N.Y. 11735

Location of well 1600' W/O Little East Neck Rd., 1200' N/O Long Island Ave., Farmingdale, N.Y.

Depth of well below surface.....255.....feet

Depth to ground water from surface.....28.....feet

CASINGS:

Diameter.....20.....in.in.in.in.

Length.....191.....ft.ft.ft.ft.

ScalingNone.....

Casings removedNO.....

SCREENS: Make.....Johnson..... Openings.....60.....

Diameter.....8.....in.in.in.in.

Length.....64.....ft.ft.ft.ft.

Depth to top from top of casing.....191.....ft.

PUMPING TEST: Date.....10/25/73..... Test or permanent pump?.....Test.....

Duration of Test.....8.....days.....8.....hours

Maximum Discharge.....1500.....gallons per minute

Static level prior to test.....29.....ft.10 1/2.....in. below top of casing

Level during Max. Pumping.....100.....ft.1.....in. below top of casing

Maximum Drawdown70'-2 1/2".....ft.

Approx. time of return to normal level after cessation of pumping.....4.....hours.....minutes

PUMP INSTALLED:

Type.....VTP..... Make.....Byron-Jackson..... Model No.....12MQH-5

Motive power.....Electric..... Make.....Westinghouse..... H.P.....150

Capacity.....1500.....g.p.m. against } 231.....ft. of discharge head

No. bowls or stages..... } 341.....ft. of total head

DROP LINE:

Diameter10.....in.None.....in.

Length120.....ft.None.....ft.

SUCTION LINE:

Method of Drilling (Rotary, cable tool, etc.).....Reverse Rotary.....

Use of WaterIrrigation.....

Work started.....8/26/73..... Completed.....6/19/74.....

Date.....6/24/74..... Driller.....Delta Well Co., Inc.

License No.....1299.....

0	3	Loam
3'	96'	Very coarse sand & gravel & boulder
96'	100'	Lignite & fine sand
100'	104'	Solid gray clay
104'	134'	Lite Brn clay; some sand.
134'	146'	Coarse sand, clean
146'	149'	Solid clay, white
149'	168'	Gray clay some fine sand.
168'	226'	Fine to Med. sand some bits of clay.
226'	233'	Fine sand w/clay
233'	255'	Med. to fine sand some lite of clay
255'	257'	Yellow solid clay

NOTE: Show log of well—materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job.

See Instructions as to Well Drillers' Licenses and Reports—pp. 5-7.

Hydro Group, Inc. LAYNE WELL & PUMP DIVISION

SERVICE REPORT

~~CONKLN~~ PINELAWN MEMORIAL PARK & CEMETERY

Pump Make PEERLESS

Address P. O. Box 420, Farmingdale, NY 11735

Size/Type/Stgs DWT

Job Site Cor. Conklin St. & Wellwood Ave.

Serial No. #250494

System: Elev. Tank, Mod 10 MXB-8

Setting (Baseplate to Suction Flange) _____

Airline Length 96'

(DATE)

(DATE)

DATE	10-6-86	4-29-87	10-14-87	4-18-88	9-21-88	4-11-89
Static Water Level 28'	18'	18'	19'	21'	25'	24'
Drawdown SP. CAP. 40'	46'	42'	54'	32'	32'	44'
Pumping Water Level	64'	60'	73'	53'	57'	68'
Capacity	800 GPM	800 GPM	800 GPM	500 GPM	800 GPM	800 GPM
Pressure	44#	38#	40#	93#	35#	45#
Water Temp.	53°	53°	53°	53°	54°	53°
Water Lube Hand Lube Lineshaft Lubrication	W.L.	W.L.	W.L.	W.L.	W.L.	W.L.
Gear Head Motor Bearings 6 Qts.	OK	Changed	OK	Changed	OK	Changed
Grease Spicer Shaft	OK	Greased	OK	Oil	OK	Oil Greased
Oil	OK					
Amps: Line 1 80 H.P. Ford Diesel	Diesel	Diesel	Diesel	Diesel	Diesel	Diesel
Line 2 Diesel	Eng.	Eng.	Eng.	Eng.	Eng.	Eng.
Line 3						
Volts: Line 1						
Line 2						
Line 3						
Vibration	High	Same	Higher	OK	OK	Same
Stuffing Box	OK	OK	OK	OK	OK	OK
Tank	OK	OK	OK	OK	OK	OK
Compressor	-	-	-	-	-	-
Gear Drive 6 Qts.	OK	OK	OK	OK	OK	-
Flow Meter	OK	Greased	OK	Greased	OK	Greased
Gauges Pressure	OK	OK	OK	OK	OK	5# High
Water Level Gauge Drawdown	OK	OK	OK	NG	NG	NG
Other					Runs at	194732
WITNESS - INITIAL HERE					1500 RPM	

Remarks 10-14-87: Vibration getting higher. I think there is a lot of wear in spider rubbers. 9/21/88 - Pump breaks suction at 1650 RPM. We can not go over 1500 RPM

Bill Kelly 234-1000

Mechanic s/ Philip Conway

Suffolk
County

S-72214
Well No.

COMPLETION REPORT - LONG ISLAND WELL

OWNER Beth Moses Cemetery Corp.				* LOG	
ADDRESS P.O. Box 340, Farmingdale, N.Y. 11735				Ground Surface ft. _____ ft. above sea level	
LOCATION OF WELL W.S Wellwood Ave., 1/2 mile S/O L.I. Ave. Pinelawn				A _____ ft. V _____ ft.	
DEPTH OF WELL BELOW SURFACE 150 ft.		DEPTH TO GROUND WATER FROM SURFACE 23'-5" ft.		TOP OF WELL	
CASINGS					
DIAMETER 4 in.		_____ in.		_____ in.	
LENGTH 143 ft.		_____ ft.		_____ ft.	
SEALING Grout		CASINGS REMOVED None			
SCREENS					
MAKE Johnson		OPENINGS 35			
DIAMETER 4 in.		_____ in.		_____ in.	
LENGTH 7 ft.		_____ ft.		_____ ft.	
DEPTH TO TOP FROM TOP OF CASING 143'					
PUMPING TEST					
DATE 7/19/82		TEST OR PERMANENT PUMP? Permanent Pump			
DURATION OF TEST _____ days _____ hours		MAXIMUM DISCHARGE _____ gallons per min.			
STATIC LEVEL PRIOR TO TEST 23'-5" ft. in. below top of casing		LEVEL DURING MAXIMUM PUMPING 33 ft. in. below top of casing			
MAXIMUM DRAWDOWN 10 ft.		Approximate time of return to normal level after cessation of pumping _____ hrs. _____ min.			
PUMP INSTALLED					
TYPE Subm.		MAKE Standard Pump		MODEL NO. P8110834	
MOTIVE POWER Elec. 230V		MAKE Franklin		H.P. 3	
CAPACITY 45 g.p.m. against		_____ ft. of discharge head			
NUMBER BOWLS OR STAGES _____		_____ ft. of total head			
DROP LINE			SUCTION LINE		
DIAMETER _____ in.		DIAMETER None _____ in.			
LENGTH _____ ft.		LENGTH _____ ft.			
METHOD OF DRILLING <input checked="" type="checkbox"/> Rotary <input type="checkbox"/> cable tool <input type="checkbox"/> other _____		USE OF WATER Sanitary Supply			
WORK STARTED Jan. 13, 1982		COMPLETED July 30, 1982			
DATE 8/27/82		DRILLER Delta Well Co., Inc.		REGISTRATION NO. 1299	

0-3' Top soil
3-6' Loam & large gravel
6-74' Coarse brown sand, grit & gravel
74-92' Light gray fine sandy clay
92-104' Solid dark clay
104-108' Layers of solid clay & fine sand
108-130' Med. fine light brown sand
130-150' Multi

*NOTE: Show log of well - materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job. See Instructions as to Well Drillers' Certificates of Registration and Reports. Pages 5 - 7.

JUL 30 1988

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

County SUFFOLK

Well No. S-91611

PRELIMINARY REPORT ON PROPOSED WELL

OWNER EAST FARMINGDALE WATER DISTRICT			
MAILING ADDRESS 72 GAZA BLVD., FARMINGDALE, NY			
WELL LOCATION 160' S/O Smith St. 425' E/O Rte. 110, Farmingdale, N.Y.			
DEPTH 700	FL.	DIAMETER CASINGS 20	PUMP CAPACITY 1300 G.P.M.
PURPOSE Water Supply		DATE 7/25/88	TYPE Vertical Turbine
DRILLER'S SIGNATURE DELTA WELL & PUMP CO., INC.		LIST OF EXISTING WELLS	
WATER SUPPLY UNIT (Engineer in Charge) <i>[Signature]</i>		LICENSE NUMBER 1299	
		PERMIT TO SINK WELL	DATE JUL 25 1988

DUPLICATE REPORT

CASING
20" STEEL PIPE
3/4" WALL THICKNESS

24" DIA. BORE HOLE

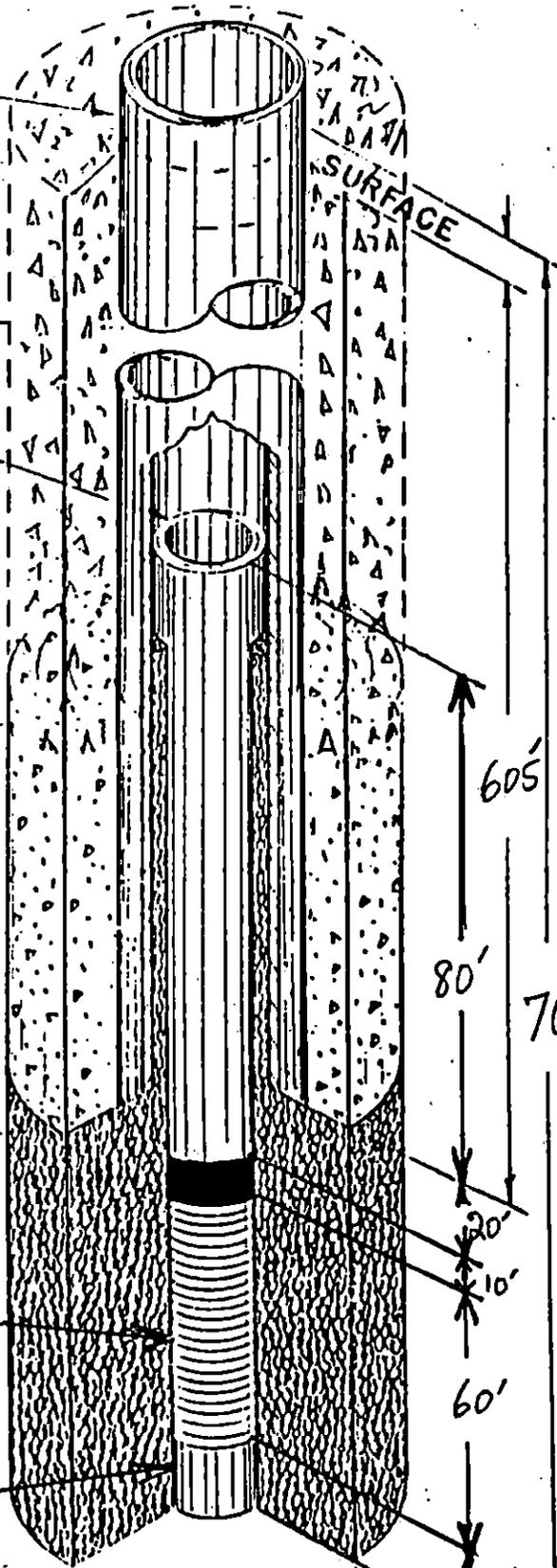
SCREEN RISER
12" P.S.
STEEL PIPE
3/8" WALL THICKNESS

NEAT CEMENT GROUT

2" DIA. GRAVEL ENVELOPE

WELL SCREEN
12" P.S. - 316L
EXTRA STRENGTH

SUMP
12" P.S. - 316L
T.U. EXTRA STRENGTH



DELTA WELL & PUMP Co.

87 UNION AVENUE • PO BOX 1303 • BAYBRIDGE, N.J.
(516) 981-2255

EAST FARMINGDALE WATER DISTRICT

CONTRACT NO. 88-EFWD.

PROPOSED SUPPLY WELL

JULY 28, 1988

PREPARED BY: BE

DELTA WELL & PUMP CO., INC.
 97 Union Avenue
 P.O. Box 1309
 Ronkonkoma, N.Y. 11779

EST WELL LOG

NAME East Farmingdale Water District Contract # 88-EFWD-67
 LOCATION Smith Street W.R.C. WELL NO. 5-1
 FINISH PT. _____ S. W. L. _____
 BEGAN July 19, 1988 COMPLETED _____ DRILLER Sucharski & Rybak

SAMPLE				Formation	FROM	TO	Thickne -DEPTH
No.	Actual Depth	Lgth	Blows				
				Top soil	0	1	1
				Loam & sandy clay	1	5	4
				Medium course brown sand and grave;	5	75	70
				Solid dark brown clay	75	89	14
				Medium course brown sand	89	100	11
				Medium course brown sand, grits and small gravel	100	130	30
				Medium course brown sand	130	138	8
				Solid brown sand, hard pan	138	150	12
				Course brown sand, brown clay	150	160	10
				Solid brown clay	160	170	10
				Course brown sand, gravel and hard pan	170	212	42
				Course brown sand, gravel, hard pan & solid brown clay	212	250	38
				Solid brown clay, hard pan & some gravel	250	275	25
				Solid grey clay	275	285	10
				Solid tan and brown clay	285	295	10
				Fine tan sand solid tan clay and hard pan	295	315	20
				Fine tan sand	315	335	20
				Fine tan sand solid tan clay, hard pan, some gravel	335	350	15
				Fine tan sand	350	353	3
				Light grey sandy clay, grits, mica and tan sand	353	364	11
				Solid dark grey clay	364	369	5
				Layers tan sand clay, white sand and some hard pan	369	372	3
				Solid grey clay, grey sandy clay - pyr	372	387	15
				Layers white sandy clay, streaks white sand, solid clay	387	393	6
				Fine to medium white sand, mica, hardpan, small grit	393	401	8
				Layers solid and sandy light grey clay and hard pan	401	405	4
				Fine to medium white sand, hardpan, streaks of clay & grits	405	418	13
				Solid tan and grey clay, layers tan sand	418	423	5

DELTA WELL & PUMP CO., INC.
 97 Union Avenue
 P.O. Box 1309
 Ronkonkoma, N.Y. 11779

EST WELL LOG

WELL NAME East Farmingdale Water District Contract # 88-EFWD-67
 LOCATION Smith Street W.R.C. WELL NO. 5-1
 REFERENCE PT. _____ S. W. L. _____
 DATE STARTED July 19, 1988 COMPLETED _____ DRILLER Sucharski & Rybak

SAMPLE				Formation	FROM	TO	Thickness DEPTH
No.	Actual Depth	Lgth	Blows				
				Fine to course grey sandy grits, layers clay, hard pan	423	435	12
				Layers solid dark grey clay & multi color sandy clay	435	460	25
				Fine course grey sand, some grits - white clay	460	470	10
				Fine medium tan sand, pieces of clay	470	471	1
				Fine white sand and sandy white clay	471	485	14
				Fine course grey sand, mica and some hard pan	485	503	18
				Fine tan sand (dirty)	503	518	15
				Fine to course tan sand, grits and layers of clay	518	525	7
				Fine to course brown sand, grits, hardpan, layers wht clay	525	541	16
				Layers multi color sandy clay & grits	541	542	1
				Fine to course brown sand, grits & layers of clay	542	548	6
				Very fine multi color clayie sand	548	583	35
				Fine to course tan sand, grits and small gravel	583	594	11
				Fine to course tan sand - sandy clay and hard pan	594	608	14
				Fine to course tan sand - grits & mica	608	613	5
				Fine to course tan sand, grits, mica & layers of clay	613	623	10
				Fine to medium tan sand, mica, traces of clay	623	633	10
				Fine to medium tan sand, streaks solid grey clay	633	643	10
				Fine to medium tan sand - streaks solid grey clay, mica	643	653	10
				Medium to course tan sand & grits, streaks grey clay	653	663	10
				Solid grey clay with grit and gravel (embedded)	663	673	10
				Medium to course tan sand and grit	673	683	10
				Course sand & grits in multi colored clay	683	693	10
				Solid tan clay with tan sandy clay, grit & gravel	693	698	5
				Solid tan clay with tan sandy clay, grit & black clay	698	700	2
				Medium course tan sand, grits - some multi colored clay	700	709	9
				Solid red with some white clay	709	?	

County Suffolk

ORIGINAL TO COMMISSION
W-2327

Well No. S-23059
(on preliminary report)

State of New York
Department of Conservation
Division of Water Resources

LOG *carried from top*
Ground Surf. El. 100 ft. above sea

S. 23225D

COMPLETION REPORT—LONG ISLAND WELL

Owner ILN Realty Corp.

Address 2 Park Avenue, New York, New York

Location of well Smith Str. & Wellwood Ave. E. Farmingdale
LI

Depth of well below surface 193 feet

Depth to ground water from surface 38 feet

CASINGS:

Diameter 8 in.

Length 171 ft.

Sealing

Casings removed

SCREENS: Make COOK Openings #14

Diameter 6 in.

Length 25 ft.

Depth to top from top of casing 168' to Packer
171' to top exposed slot

PUMPING TEST: Date NONE Test or permanent pump? Test

Duration of Test 5 1/2 days 5 1/2 hours

Maximum Discharge 500 gallons per minute

Static level prior to test 4 ft. below top of casing

Level during Max. Pumping 4 ft. below top of casing

Maximum Drawdown 4 ft.

Approx. time of return to normal level after cessation of pumping 4 minutes

PUMP INSTALLED:

Type DWT Make Peerless Model No. 6LB

Motive power Elect. Make US H.P. 15

Capacity 200 g.p.m. against 175' ft. of discharge head

No. bowls or stages 5 ft. of total head

DROP LINE:

SUCTION LINE:

Diameter 4" x 1" in.

Length 75' ft.

Use of water Plant Process Cooling

Work started 7/30/64 Completed 8/19/64

Date 21 August 1964 Driller MATHIES WELL & PUMP CO., INC.

License No. 153

NOTE: Show log of well—materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job.

See Instructions as to Well Drillers' Licenses and Reports—pp. 5-7.

Top of Well	73'	Sand & Gravel
	84'	Fine Sand
	173'	Clay w/ large amt of fine sand
	191'	Med. - Fine Sand
	204'	Solid Clay

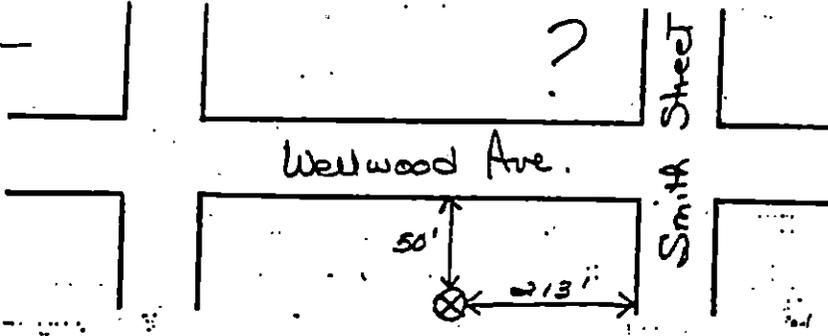
No report 8/24/64 (S-23059)

NEW YORK
RESOURCES
AUG 4 1964
COMMISSION
RECEIVED

SKETCH OF LOCATION

S23059

N ←



Locate well with respect to at least two streets or roads, showing distance from corner and front of lot.

Show North Point

County...Suffolk.....

ORIGINAL—TO COMMISSION

Well No. S-30008
(on preliminary report)

State of New York
Department of Conservation
Division of Water Resources

LOG
Ground Surf., El. 55 ft. above sea
^ft.
vft.
Top of Well

WSA-5290

at S-26,247

COMPLETION REPORT—LONG ISLAND WELL

Owner So. Huntington Water District
Address 5th Ave. So. Huntington
Location of well Whitson Rd.
Dept of well below surface 488' feet
Depth to ground water from surface 137' feet

CASINGS:
Diameter 20" in. in. in. in.
Length 418' ft. ft. ft. ft.
Sealing
Casings removed

SCREENS: Make Johnson Everdur Openings #55
Diameter 12" in. in. in. in.
Length 60' ft. ft. ft. ft.
Depth to top from top of casing 223' ft.

See Screen
Assembly on
back.

PUMPING TEST: Date 3/20/67 Test or permanent pump? Test
Duration of Test 1404 days hours
Maximum Discharge 1404 gallons per minute
Static level prior to test 137 ft. in. below top of casing
Level during Max. Pumping 159 ft. 8 in. below top of casing
Maximum Drawdown 27 ft. 8 in. below top of casing
Approx. time of return to normal level after cessation
of pumping hours minutes

From #20
155'-0

May Top +22±
mit top -420±

PUMP INSTALLED:
Type Sub. Make Johnson Model No. 12DC
Motive power Elec. Make GE H.P. 150
Capacity 1400 g.p.m. against 208 ft. of discharge head
No. bowls or stages 8 377 ft. of total head

STATE OF NEW YORK
WATER RESOURCES
AUG 14 1967
COMMISSION
RECEIVED

DROP LINE: Diameter 10" Suction LINE: Diameter 10" in. in.
Length 178' ft. ft.

Use of water PUBLIC SUPPLY

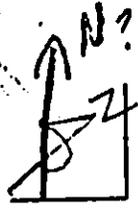
Work started 2/13/67 Completed 2/26/67
Date August 11, 1967 Driller THE LAUMAN CO., INC.

License No. 13

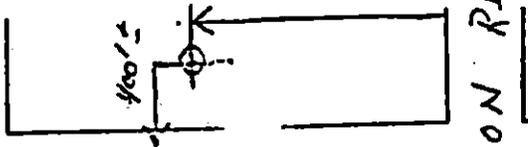
NOTE: Show log of well—materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job.

See Instructions as to Well Drillers' Licenses and Reports—pp. 5-7.

Del
also S 26247



SKETCH OF LOCATION



S30008

E. ROGUES PATH

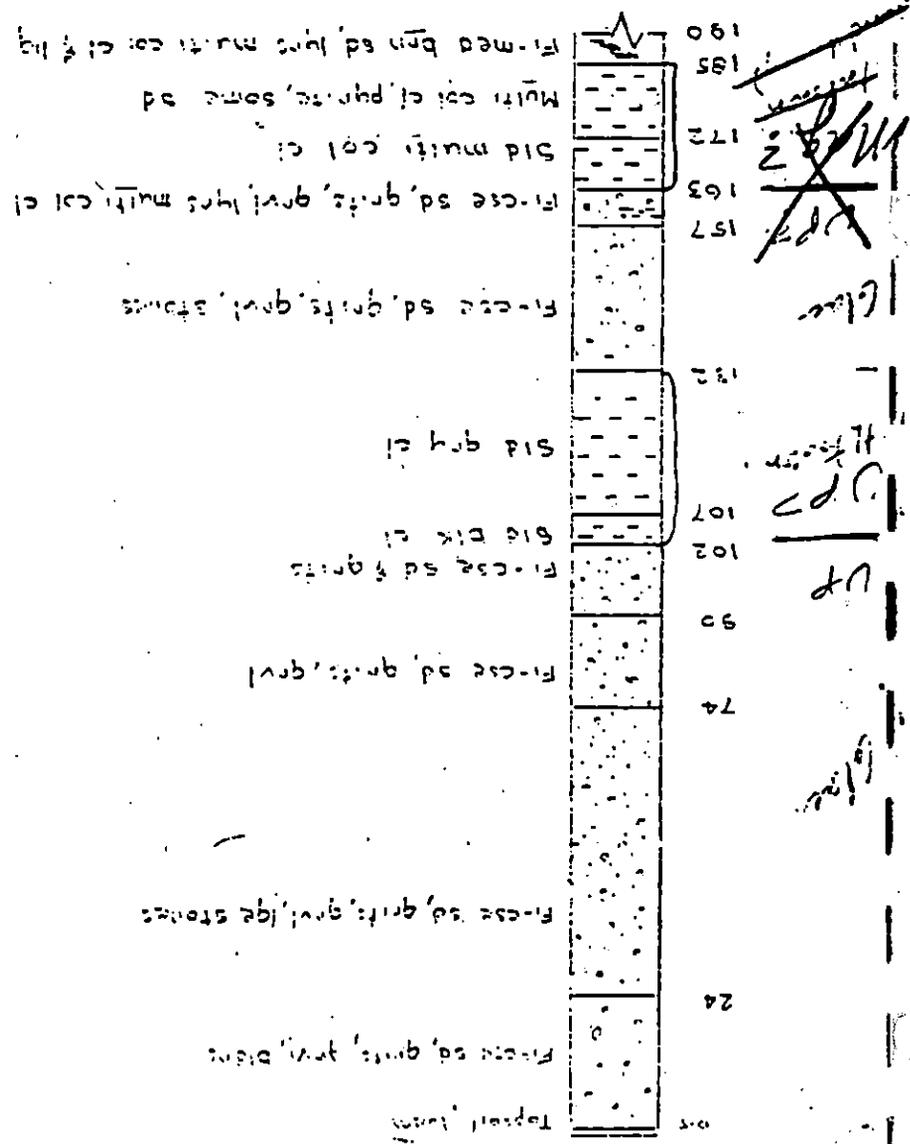
WHITSON RD.

Locate well with respect to at least two streets or roads, showing distance from corner and front of lot.

Show North Point

- 0 - 418' 20" casing
- 316' -6" - 403' 87' x 12" Steel Riser
- 403' - 423' 20' x 12" Tight Wound Everdur Riser
- 423' - 483' 60' x 12" #55 slot Everdur Well Screen
- 483' - 488' 5' x 12" Tight Wound Everdur Sump

South Huntington Water Dist.
 Whitson Road
 S-30008

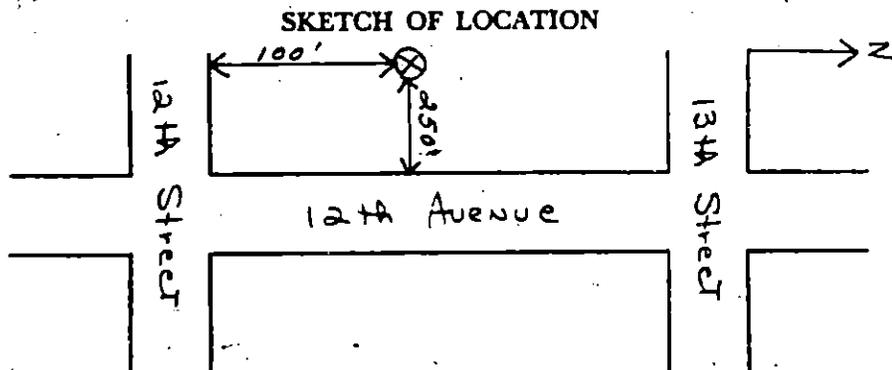


185
 133
 + 22
 185
 M/S

Leaf surface
 185' ±

S30008

S21487



Locate well with respect to at least two streets or roads, showing distance from corner and front of lot.

Show North Point

- 208' - Gray Clay
- 267' - Fine gray sand, lignite & mica
- 277' - Medium Gray sand, Lignite & mica
- 300' - Medium gray sand, streaks of clay, lignite & pyrite
- 312' - Fine gray sand, streaks of gray clay, lignite & pyrite
- 315' - Gray clay, lignite, pyrite, streaks of gray sand.
- 335' - Fine gray sand, streaks of gray clay, lignite & pyrite
- 337' - Dark gray clay, streaks of sand, pyrite & lignite
- 338' - Fine gray sand, streaks of lignite & pyrite
- 340' - Gray clay, pyrite, streaks of gray sand.

524

644f.

Victor Moore well, Deer Park. About 0.3 mile east of Deer Park Avenue and about 1 mile south of Motor Parkway, Dix Hills. (9 D, 3.25 N., 16 W.)

3.3 0.2 ✓

Drilled by C. W. Lauman & Company September-October, 1935.

Cable Tool method, no clay Driller's log.

Elevation: approximately 140 to 150 feet above sea level.

Attitude about horizontal.

	Thickness (feet)	Depth (feet)
Loam and clay	6	6
Brown sand, and gravel	13	19
White fine sand	17	36
Fine sand, and yellow clay (hole stayed open below pipe)	23	59
Brown coarse sand	28	87
Brown fine sand (hardpan 104 to 104.5 feet)	19	106
Fine yellow sand and clay (no life)	12	118
Fine red sand, with lumps of red and white clay (no life)	3	121
Very coarse clean reddish sand (plenty of life)	9	130
Fine muddy sand	2	132

4-inch casing. [Casing: 4-inch
 Screen: 4 feet of #25 slot Johnson Everdur set from 127.7 feet to 131.7 feet.
 Static level: 88 feet from ground level, below surface.
 Yield: 4.5 gallons per minute.

N

560573

75'

200'

0

Smith St.

Rte. #110

New Highway

Locate well with respect to at least two streets or roads,
showing distance from corner and front of lot.

Show North Point

Check the Town in which the project is located:

Nassau County:

Hempstead

North Hempstead

Oyster Bay

Suffolk County:

Babylon

Brookhaven

East Hampton

Huntington

Islip

Riverhead

Shelter Island

Smithtown

Southampton

Southold

DRILLER'S LCG:

0' - 6"	Asphalt
6" - 3'	Loam
3' - 55'	Coarse Brown Sand, Gravel, Stones
55' - 140'	Medium Coarse Brown Sand, Gravel
140' - 150'	Medium Coarse Brown Sand, Some Brown Clay
150' - 155'	Medium Coarse Brown Sand, Layers Gray Clay
155' - 202'	Fine to Medium Brown Sand, Some Brown Clay

STOP

MT3D

**EXPLANATION OF
PUMPING PERIODS**

1. 1970-1971
2. 1971-1972
3. 1972-1973
4. 1973-1974
5. 1974-1975
6. 1975-1976
7. 1976-1977
8. 1977-1978
9. 1978-1979
10. 1979-1980
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50. 2019-2020
51. 2020-2021
52. 2021-2022
53. 2022-2023
54. 2023-2024
55. 2024-2025