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SITE ASSESSMENT

FOR

STUART-OLVER-HOLTZ, INC.
HENRIETTA, NEW YORK

FEBRUARY, 1987

Prepared by:

Lozier Architects/Engineers
600 Perinton Hills
Fairport, New York

LOZIER
ARCHITECTS/ENGINEERS

[redacted]

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1.0 INTRODUCTION

This report presents the results of environmental studies conducted at the Stuart-Olver-Holtz, Inc. site in Henrietta, New York. The work was performed at the request of Harter, Secrest, & Emery representing the present owner/operator of this metal-plating firm.

Project goals were discussed with the firm's operator and his counsel on December 11, 1986 and authorization to proceed was received on December 16, 1987. Field work began on January 13, 1987 and was completed on January 22, 1987.

The project was initiated by Tom Lawson of Lozier Architects/Engineers, Fairport, New York. Mr. Lawson and Robert Teifke collected background information and inspected the site. Mr. Teifke planned the drilling and sampling approach and managed the project in the field. Drilling services were provided by Rochester Drilling Company, Inc. of Rochester, New York. Soil samples were collected by Mr. Teifke and groundwater samples were taken by Rick Rinehart of Lozier Laboratories, Fairport, New York. All environmental samples were analyzed by Lozier Laboratories.

2.0 PROJECT GOALS

The principal goal of this project was to determine the impact, if any, of the company's operations on the surrounding environment. Specifically, the possibility of organic and inorganic contamination of shallow soils and shallow groundwater was examined.

3.0 PROJECT SCOPE

Discrete project tasks included (1) meetings and informal discussions with plant personnel and acquisition of pertinent documents, (2) an initial site inspection and follow-up visits to determine site-specific constraints on the proposed work, (3) selection of a drilling contractor, (4) field supervision of drilling, sampling, well installation, and well development, (5) monitoring of field operations to ensure the health and safety of drilling personnel, (6) groundwater sampling, (7) analysis of environmental samples for selected organic and inorganic parameters, (8) water level measurements, (9) data analysis and interpretation, and (10) report preparation.

4.0 SITE LOCATION AND DESCRIPTION

The site is related to its surroundings in Figure 1 and presented in detail in Figure 2. Figure 1 is an excerpt from the U.S.G.S. 7.5-minute West Henrietta, NY Quadrangle and Figure 2 represents a survey recently commissioned by the property owner. The U.S.G.S. benchmark nearest the site, on West Henrietta Road approximately 400 feet east of the property, has a value of 533 feet MSL. The site datum with an assigned value of 100.00 on the northeastern corner of the survey, translates to an elevation of 530 feet MSL. Site topography and all elevations entered in this report are referred to the 530-foot site datum.

Site topography is unremarkable with relief of about five feet. Review of the older topographic sheets for this area indicate that extensive cultural modification of this area has not involved substantial alteration of the topographic aspect or drainage pattern of the area.

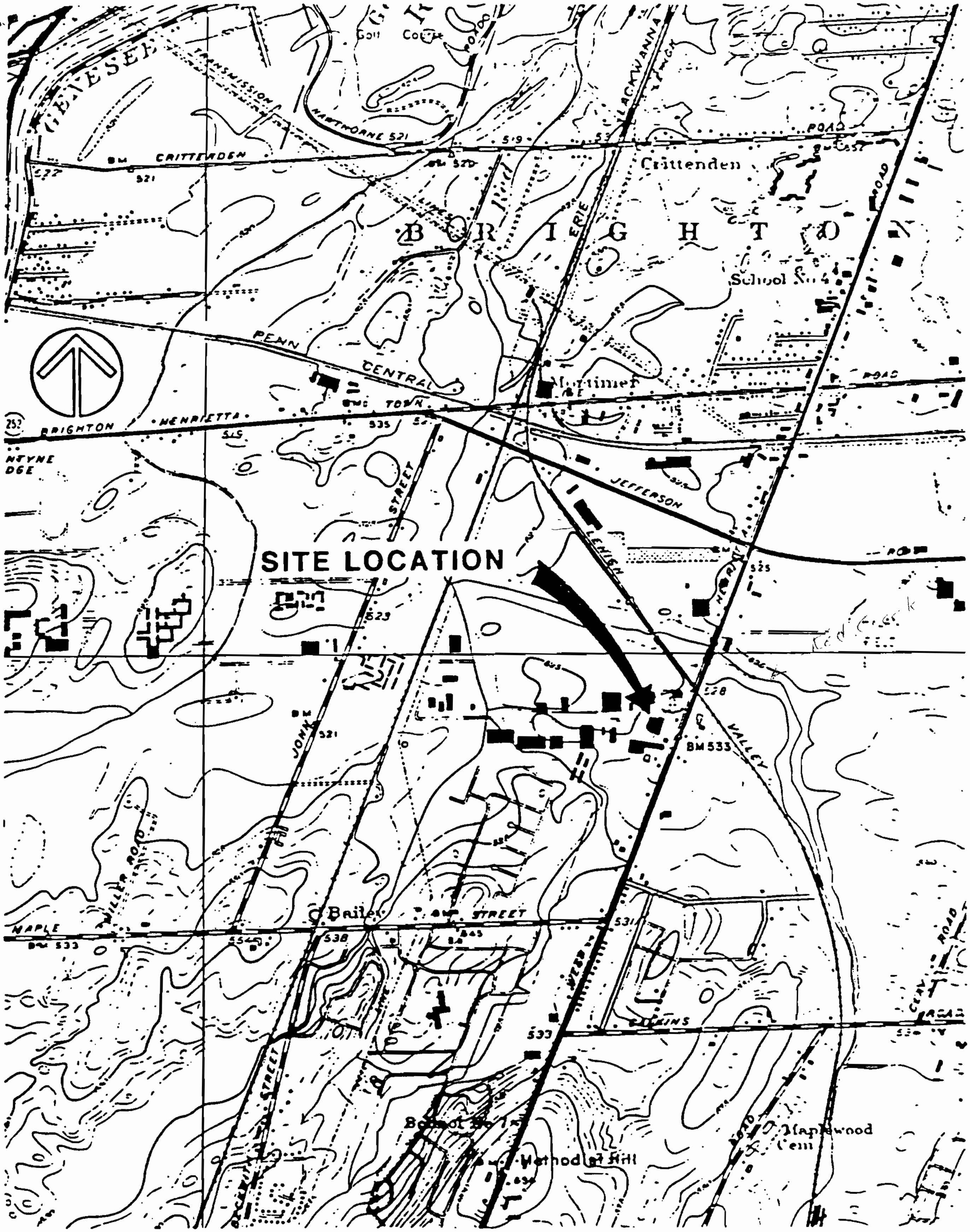


FIGURE 1

SITE LOCATION MAP

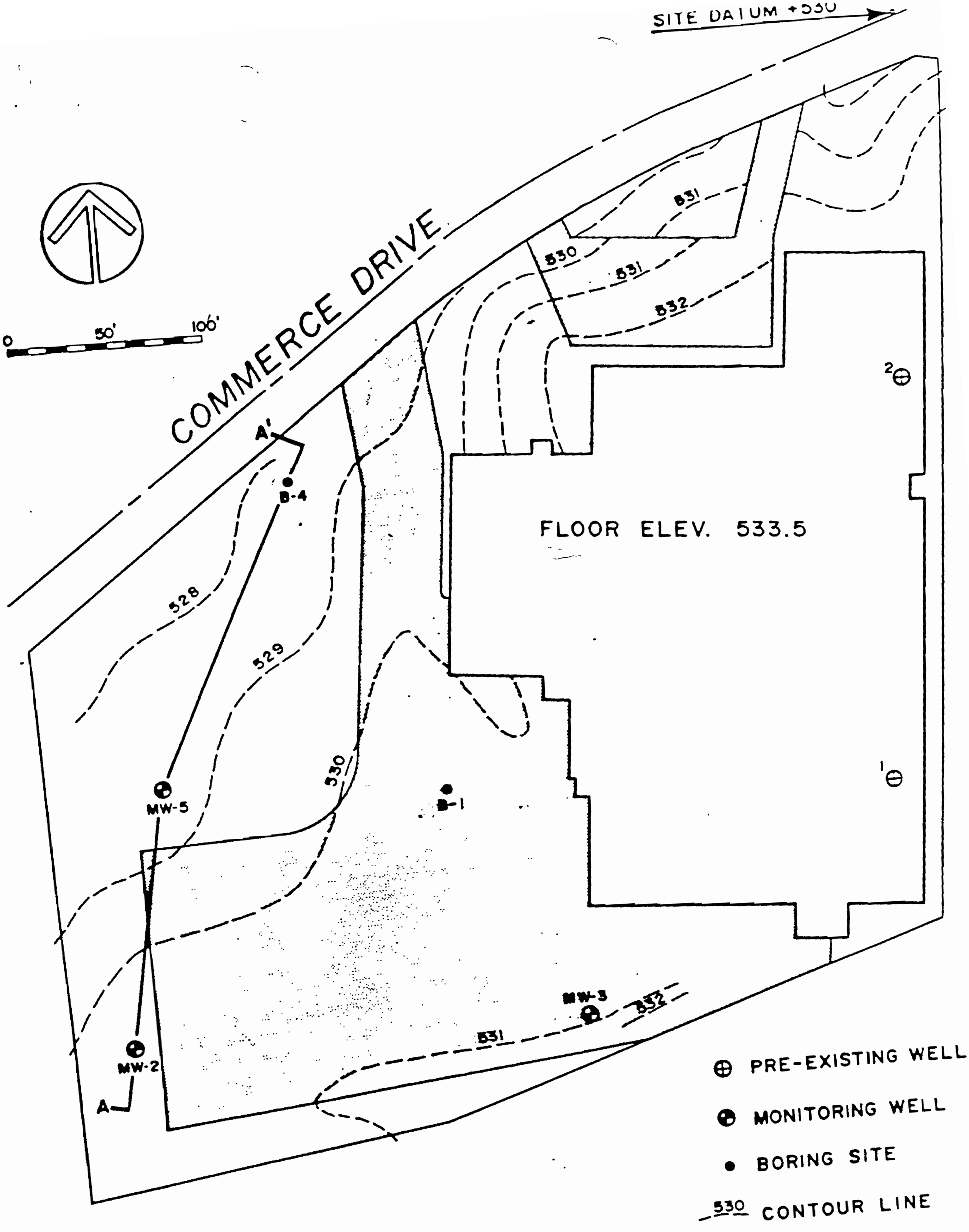


FIGURE 2

SITE PLAN, TOPOGRAPHY, AND SAMPLING LOCATIONS

However, the layout of the site, and the presence of underground and overhead utilities, easements, and stockpiled equipment placed some constraints on the positioning of the upgradient monitoring well.

This site lies between two branches of Red Creek and is on the 100-year floodplain; the 100-year flood would crest at an elevation of 531.5 feet MSL.

5.0 SITE GEOLOGY

The site is underlain at a depth of about 50 feet by shale bedrock (Fig. 3). Bedrock is overlain to the present surface by glacial deposits including stratified drift (outwash) and unstratified and unsorted drift (till). Boreholes advanced during the present study penetrated the upper 30 feet of the glacial deposits but the lower part of the glacial sequence remains unexplored. Three of the boreholes penetrated at least a part of the outwash sequence whereas the southwesternmost and northwesternmost boreholes (MW-2 and B-4 in Fig. 2) intersected 30 feet of section composed predominantly of dense till.

The Commerce Drive area is on the southern edge of a glacial outwash plain and lies only a short distance north of a drumlin field (Fig. 3). Data generated during this study indicate that a lobe of the outwash plain underlies the site. In this context, the outwash deposits would tend to thicken, coarsen, and become more widespread northward away from the site. Conversely, the outwash would tend to pinch out south of the site and to onlap the till sheet. Continuous outwash deposits probably are not present in the southern part of the Henrietta West Quadrangle.

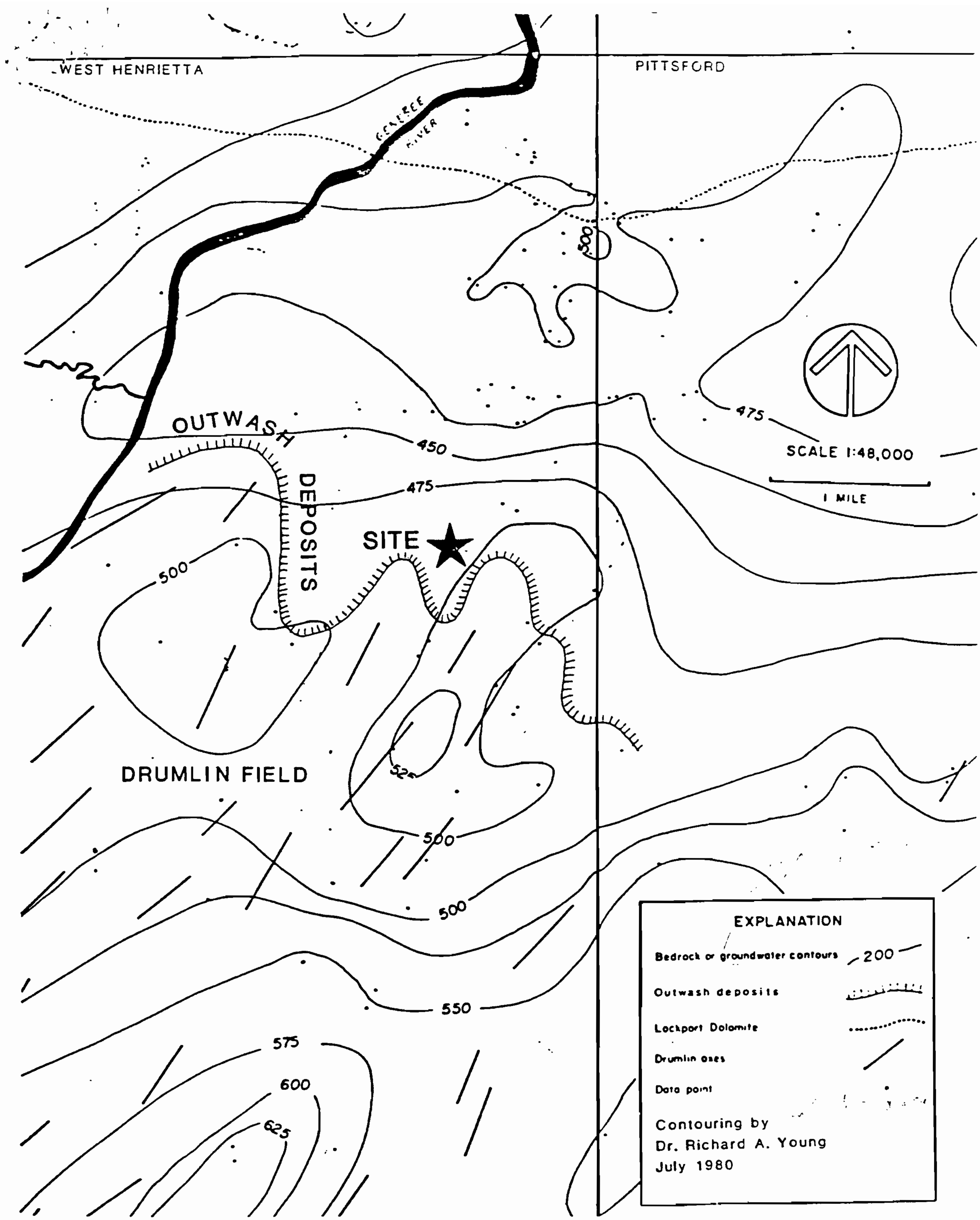


FIGURE 3. BEDROCK SURFACE

The unexplored lower 20 feet of drift probably consists mainly of dense impermeable till but the till-bedrock interface, as is commonly the case, is likely a permeable zone characterized by coarse debris and fractured bedrock.

6.0 METHODS OF INVESTIGATION

Project goals were met by sampling on-site soils, defining subsurface conditions, constructing monitoring wells to provide groundwater sampling stations, and collecting groundwater samples from new and pre-existing wells to generate the data needed to characterize site groundwater and soils.

6.1 DRILLING AND SOIL SAMPLING

A B-55 drilling rig equipped with "three-inch" and "six-inch" hollow-stem augers was mobilized to the site on January 13, 1987. Drilling operations began on January 13 and were completed on January 19, the newly installed wells were developed on January 20, and groundwater sampling was conducted on January 22. Geological conditions at two of the five drilling locations and weather conditions were such that field operations took two days longer than had been anticipated.

Boreholes 1 and 2 were drilled with and sampled through "three-inch" augers, and boreholes 3, 4, and 5 were drilled with and sampled through "six-inch" augers. Sampling frequency is documented on the borehole logs (Attachment 1) and was conducted as directed by Mr. Teifke.

Lozier employed an hNu meter with 10.2 eV probe to monitor the drilling crew's air space and to screen the soil samples. The 10.2 eV lamp was selected with reference to prior knowledge of compounds likely to be encountered at the site; those data are included here as Attachment 6. During field operations, meter response in open air frequently exceeded 5 ppm but never persisted at these levels long enough to indicate the need for increased levels of respiratory protection.

Split-barrel sampling was conducted according to procedures outlined in ASTM-1586-84 (Attachment 7). Split-barrel samples and supplementary grab samples were screened with the hNu and placed in appropriately labelled eight-ounce jars. The jars were sealed with aluminum foil and capped. Each evening, the samples collected that day were warmed and screened once more by inserting the hNu probe through the foil septum and into the head-space. Meter responses were recorded on the drilling logs to provide a contaminant profile of each borehole (Attachment 1).

Placement of monitoring wells proceeded as planned with one exception. Location 4 initially had been designated as a well site. When 30 feet of drilling failed to reveal groundwater adequate to support a well, Location 2 was re-occupied, the borehole reamed out with "six-inch" augers, and a downgradient well installed in the previously determined aquifer. Borehole 2 (B-2) was redesignated MW-2.

6.2 WELL CONSTRUCTION AND DEVELOPMENT

Monitoring wells were installed using "six-inch" hollow-stem augers and casing pull-back methods. After the borehole had been cleaned out to prescribed depth, the bottom plug was retracted, the well assembly lowered into position, and the annulus filled according to specifications as the casing gradually was retracted from the borehole. A schematic diagram of each well is provided in Attachment 5. **The methods employed in drilling and constructing the wells virtually preclude the possibility that contaminants crossed the plastic clay barrier during operations.**

Monitoring wells were developed using surging and air-lift techniques. A surge block fabricated by the driller on location and operated manually was used to bring silt into the screen, and an air line connected to an Ingersoll-Rand compressor was employed to lift the silt-laden water from the well.

Consistent with observed geologic variation among well locations, MW-2 responded rapidly to the foregoing procedure, MW-5 responded considerably more slowly, and MW-3 was somewhat difficult to develop. However, when the three wells were sampled on January 22 each was functioning satisfactorily as a monitoring well.

7.0 SITE HYDROGEOLOGY

The fundamental hydrogeology of the site was determined on the basis of (1) data provided by wells installed during the present study and two pre-existing wells, (2) Young's (1980) bedrock map, and (3) Leggette's (1935) inventory of the groundwater resources of Monroe County.

The regional geologic setting of the site is shown in Figure 4, and the shallow geology of the site is described in Figure 5. In order of increasing depth, the local sequence comprises (1) a thin soil profile developed on a very limited thickness of poorly stratified sands, silts, clays, and gravels of Pleistocene (glacial) or Recent age,

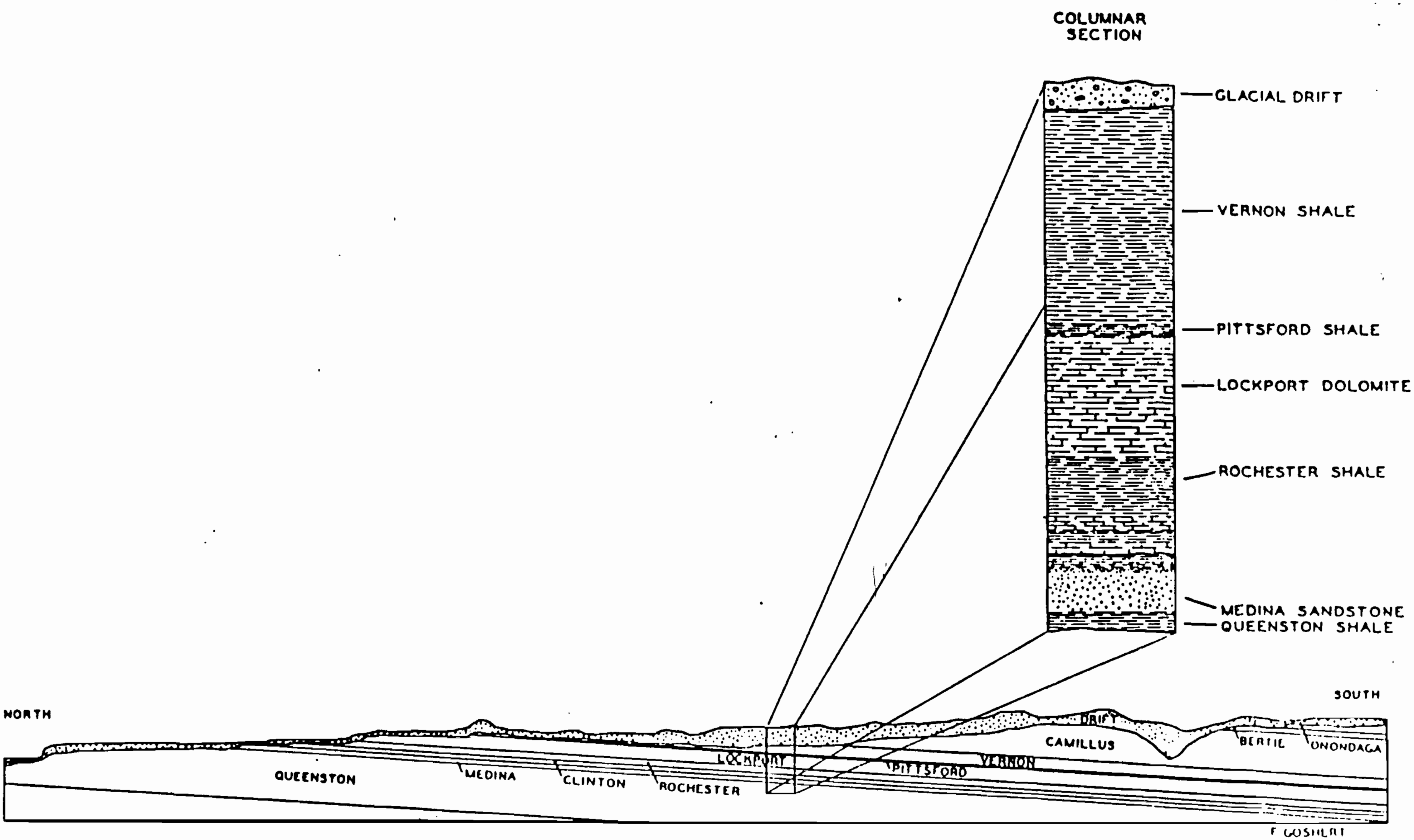


FIGURE 4

NORTH - SOUTH CROSS SECTION
OF MONROE COUNTY SHOWING POSITION
AND GEOLOGIC SETTING OF SITE.
(after Leggette, 1935, Fig. 12.)

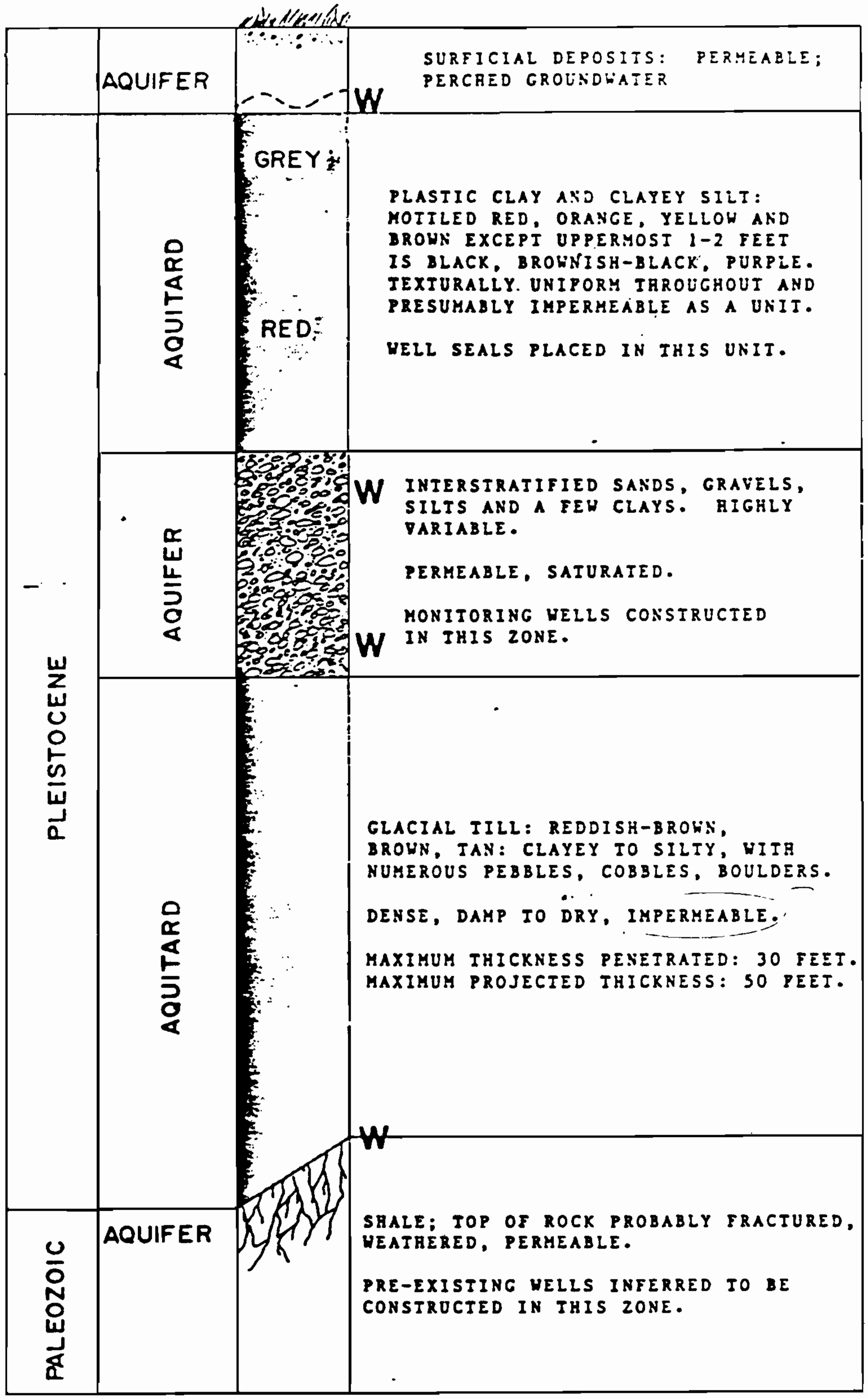


FIGURE 5

SITE STRATIGRAPHIC COLUMN SHOWING VERTICAL ARRANGEMENT OF AQUIFERS AND AQUITARDS.

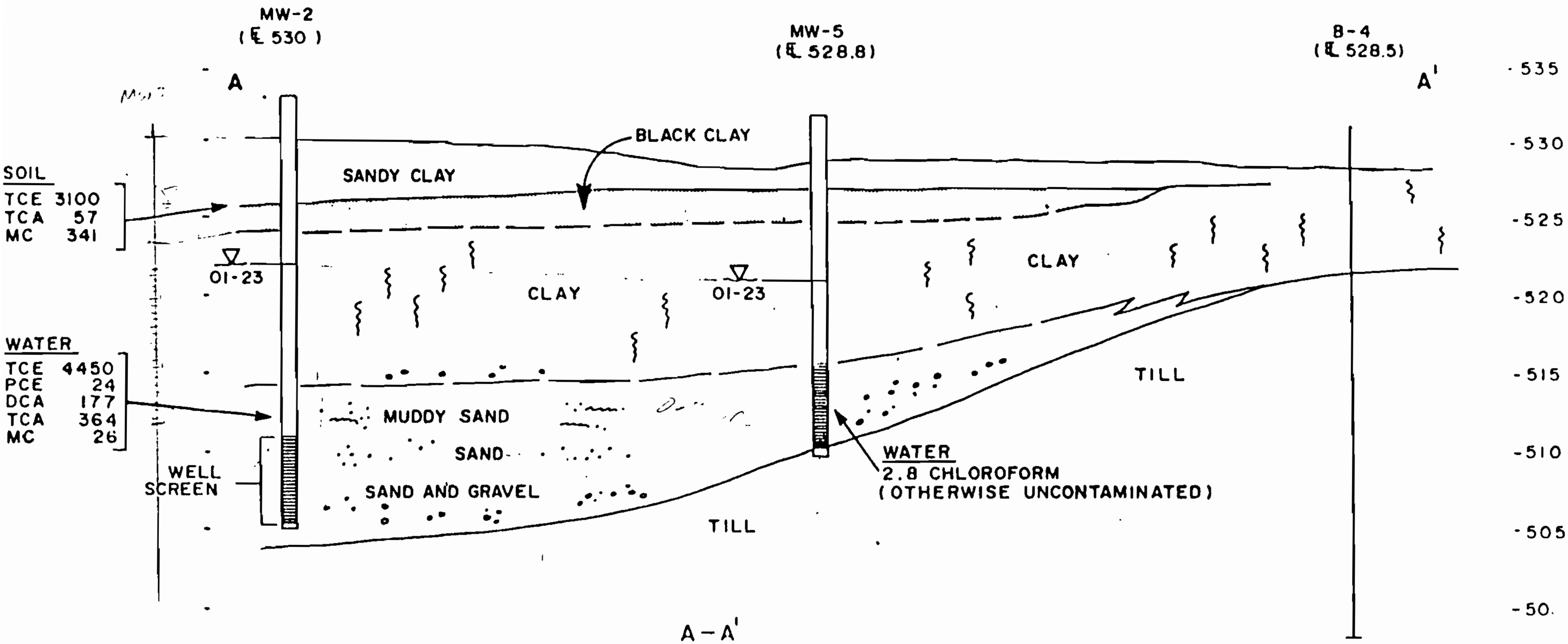
W – WATER BEARING ZONE

(2) about ten feet of plastic clay and silty clay, (3) a stratified sequence of silts, sands, and gravels, (4) dense brown and red unsorted glacial till, and (5) calcareous shale or shaley limestone bedrock of Silurian age.

The stratigraphic sequence shown in Figure 5 comprises three aquifers, or groundwater systems, and two aquitards. The upper part of the sequence is shown in Figure 6, a cross section drawn to scale on the downgradient perimeter of the site to indicate placement of the monitoring wells in relation to the upper and lower aquitards. Aquitards are zones of relatively low permeability that inhibit migration of groundwater between aquifers, and are more or less effective in precluding cross-contamination among successive water-bearing zones. At this site, to the extent that the depicted sequence persists, the upper plastic clay and the lower till probably are effective barriers to cross flow.

In this configuration, groundwater will occur as follows: (1) immediately above the plastic clay at a nominal depth of five feet, (2) between the plastic clay and the till at depths of between 15 and 25 feet, and (3) at the till-bedrock interface at a projected depth of 50 feet.

Distribution of the shallowest groundwater will vary relatively quickly in response to precipitation and infiltration and will be governed largely by transpiration and outflow to the surface water system once it accumulates at the five-foot level. Groundwater restricted to the near-surface environment by the uppermost (plastic-clay) aquitard probably enters the surface-water system along the 520-foot contour within 1000 to 1500 feet of the site. In effect, this groundwater probably will not migrate beyond the nearest tributaries of Red Creek. By the time it reaches the



CROSS-SECTION A-A' SHOWING STRATIGRAPHIC CORRELATIONS AMONG BOREHOLES 2, 5, AND 4; AND THE DISTRIBUTION OF ORGANIC CONTAMINANTS DETECTED AT THESE LOCATIONS.

HORIZ. SCALE : 1" = 40'

VERT. SCALE : 1" = 10'

∇ WATER LEVEL

CONTAMINANTS (ppb)

TCE : TRICHLOROETHENE

PCE : TETRACHLOROETHENE

DCA : 1,1-DICHLOROETHANE

TCA : 1,1,1-TRICHLOROETHANE

MC : METHYLENE CHLORIDE

FIGURE 6

ATTACHMENT 1

Boring Logs 1-5

TEST BORING LOG

BORING NO. 1

PROJECT	
CLIENT	Harter, Secrest, & Emery
DRILLING CONTRACTOR	Rochester Drilling
PURPOSE	Soil Sampling
SHEET	1 OF 2
JOB NO.	3104
ELEVATION	530.5 MSL
DATUM	+100' (site) = +530' (USGS)
DATE STARTED	01/13/87
DATE FINISHED	01/13/87
DRILLER	Dave Reynolds
INSPECTOR	R. Teifke

GROUNDWATER					CASING	SAMPLE	CORE
DATE	TIME	DEPTH	CASING	TYPE	HS Auger		
				DIAMETER	3¼" I.D.		
				WEIGHT	140 LB.	—	
				FALL	30 IN.	—	

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
0–2		SS-1	2 / 4 / 8 / 11			0-2 silty and pebbly clay.	SS-1 3ppm
2–5				N.A.		2-5 silty brown CLAY; drilled smoothly throughout.	
5–7		SS-2	4 / 3 / 4 / 4	0.2		5-7 yellowish-brown and purplish-brown clayey and gritty silt, w/ some small pebbles; damp. ▼ measured @ 7.0' upon completion of drilling inside csg.	SS-2 8 ppm
7–10				N.A.		7-10 drilled smoothly and uniformly throughout except for zone of coarse gravel at about 8'.	
10–12		SS-3	31 / 38 / 25 / 20	0.2		10-12 dark brown clayey and silty TILL; [illegible] count, pebbles; v. little recovery. ∇ water-line on tools during drilling	SS-3 3 ppm
12–14		SS-4	13 / 16 / 18 / 19	1.0		12-14 brown silty F SAND; saturated. ✓	SS-4 20ppm OUTWASH
14–16		SS-5	25 / 23 / 19 / 16	1.6		14-16 brown sandy TILL, clayey; w/ exotic pebbles up to spoon diam. and larger; damp, but not saturated. clayey silt?	SS-5 200 ppm WASHED TILL
16–18		SS-6	14 / 11 / 10 / 16	1.8		16-18 brown F-M SAND, w/ lenses F [illegible] gvl. moist, locally [illegible] ✓	SS-6 60 ppm OUTWASH
18–20		SS-7	14 / 22 / 31 / 46	1.7		18-20 brown silty F SAND, locally M sand; no clay, moist; v. locally mod. clayey, locally laminated.	SS-7 200 ppm OUTWASH

		TEST BORING LOG	BORING NO. 1
PROJECT			SHEET 2 OF 2
CLIENT	Harter, Secrest, & Emery		JOB NO. 3104

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
		SS-8	19 / 25 / 47 / 69	1.6		20-22 reddish-brown ~~silty CLAY~~ clayey silt; damp; no gravel or grit.	SS-8 110ppm. Drilled to 20' w/ 3¾" augers.
22						E.O.B.	
						8 split-barrel samples taken.	
						• Composite of S·1 and S·2 submitted for Metals analysis on 01/21. • Composite of S·5, S·6, and S·7 submitted for Organics analyses on 01/21.	
						NO WELL INTENDED, NO WELL INSTALLED. TERMINATED IN AQUIFER.	

TEST BORING LOG

BORING NO. 2

PROJECT	
CLIENT	Harter, Secrest, & Emery
DRILLING CONTRACTOR	Rochester Drilling
PURPOSE	Soil Sampling and Monitoring Well
SHEET	1 OF 2
JOB NO.	3104
ELEVATION	530.2 MSL
DATUM	+100' (site) = +530' (USGS)
DATE STARTED	01/13/87
DATE FINISHED	01/15/87 *
DRILLER	Dave Reynolds
INSPECTOR	R. Taifke

GROUNDWATER					CASING	SAMPLE	CORE
DATE	TIME	DEPTH	CASING	TYPE	HS Auger		
				DIAMETER	3¼" ID		
				WEIGHT	140 LB.	—	
				FALL	30 IN.	—	

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
		SS-1	WR / WR / WR+3 / 10	0.2		0-2 reddish-brown sandy and pebbly clay w/ trash.	SS-1 30 ppm
2		GS-1				2-5 reddish-brown sandy clay underlain by dark grey sand clay (sampled gray clay from auger blades)	gy clay 400 ppm
5		SS-2	7 / 8 / 12 / 14	1.5		5.0-5.5 dark gray to black silty CLAY. 5.5-6.5 reddish-brown variegated plastic CLAY w/ high tenacity.	SS-2 >2000 ppm
7						▽ 7-10 brown and reddish-brown tough plastic clay; sl. damp. (measured) ▽ 9.8 on tools (?)	
10		SS-3	4 / 6 / 14 / 18	1.4		0.4 orange-brown silty clay w/ gravel. 1.0 brownish-red variegated tough clay. ▽ (for rods)	SS-3 200 ppm
12		SS-4	14 / 20 / 19 / 22	1.4		12.0-12.4 tough red plastic CLAY. 12.4-13.4 tough drab reddish-brown plastic CLAY.	SS-4 9 ppm
14		SS-5	46 / 6 / 10	1.7		14.0-14.2 tough red plastic CLAY. 14.2-15.7 reddish-brown silty CLAY, w/ scattered small to medium rounded pebbles; moist.	SS-5 8 ppm
16		SS-6	8 / 7 / 10 / 15	1.1		16-17.1 reddish-gray clayey and silty SAND w/ abundant fine-grained gravel; moist to wet.	SS-6 20 ppm
18		SS-7	15 / 12 / 15 / 15	1.6		18-19.6 reddish-gray slightly clayey silty SAND and fine-grained GRAVEL.	SS-7 10 ppm
20							

* [illegible]

	TEST BORING LO	BORING NO. 2
PROJECT		SHEET 2 OF 2
CLIENT Harter, Secrest, & Emery		JOB NO. 3104

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
22		SS-8	8 / 10 / 13 / 16	1.7		20-22 reddish-gray F-VC, poorly sorted pebbly SAND; wet to saturated.	SS-8 14 ppm
24		SS-9	12 / 15 / 19 / 20	1.8		22-23.8 reddish-gray, fairly well sorted, F-C SAND w/ small percentage VF-grained gravel; moist to wet.	SS-9 13 ppm Measure SWL in the morning.

~~E.O.B.~~

Auger to 25.0' (6¾") on 01/19.

∇ @ 7.0' below grade @ well completion. 2030 on 01/19.

∇ @ 7.5' below grade @ beginning of development @ 1730 on 01/20

Well construction as indicated p.1.

* re-occupied drilling location on 01/19 to install well.

- GS:1 submitted for Metals analysis (+ CN) on 01/21.
- Composite of GS·1 and S·2 submitted for Organics analysis on 01/21.

∇ 7.0' below grade @ well completion on 01/19.

∇ 7.5' below grade

Date Depth (BGL) & site & USGS

9 split-spoon samples
Drilled w/ 3" augers : 24'
Drilled w/ 6" augers : 25'
Well footage : 24'
01/19

	TEST BORING LOG	BORING NO. 3
PROJECT		
CLIENT	Harter, Secrest, & Emery	SHEET 1 OF 2
DRILLING CONTRACTOR	Rochester Drilling	JOB NO. 2104
PURPOSE	Soil Sampling and Monitoring Wel	ELEVATION 530.9 MSL

GROUNDWATER					CASING	SAMPLE	CORE	
DATE	TIME	DEPTH	CASING	TYPE	HS Auger			DATUM +100'(site) = +530' (USGS)
				DIAMETER	6¼ ID			DATE STARTED 01/14/87
				WEIGHT	140 LB.	—		DATE FINISHED 01/15/87
				FALL	30" IN.	—		DRILLER Dave Reynolds
								INSPECTOR R. Teifke

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
		SS-1	6, 5, 9, 12	0.1		0-2 crushed rock w/ some reddish-brown tough plastic clay.	20ppm
2		GS-1 GS-2		N.A.		2.0-3.5 brick red gritty CLAY; dry. 3.5-5.0 reddish-brown, silty and clayey VF SAND; damp; w/ admixed grit.	10 ppm 15 ppm
5		SS-2	7, 16, 15, 14	1.9		5-5.3 red tough CLAY 5.3-6.9 silty brown VF SAND w/ thin beds M-C sand; w/ [illegible] gravel incl green (-red) shale; damp, to dry.	8 ppm
7		GS-3		N.A.		7-10 reddish-brown and brown TILL, variously clayey and silty, w/ abundant cobbles. Driller: base TILL unit @ 8.5'. clayey silt; damp to moist. W?	12 ppm
10		SS-3	23, 33, 42, 40	1.6		10-12 reddish-gray, VF sandy, & silty sl. clayey TILL, w/ v. abund. F-M (to 2") pebble gravel; damp, dense.	9 ppm
12		SS-4	35, 53, 31, 20	1.3		12-14 A.A., except reddish-brown in upper one-half, reddish-grey in lower one half.	8 ppm
14		SS-5	25, 49, 52, 90	1.7		(W) 14-14.4 brown silty TILL, w/ F grvl.; wet. 14.4-15.7 brown/purple/red clayey TILL, dry, v. dense; w/ frags. green shale.	10 ppm wet interval [illegible] 10
15							
16		SS-6	78, 100/6", —, —	1.3		16-17 reddish-brown TILL; dry; v. dense. (W) 17-18 borehole flowed thin muddy sand (W) and drilled more-or-less smoothly	[illegible] 3 ppm
18		SS-7	50, 84, 88, 85	1.7		18-18.9 reddish-gray silty TILL; damp. 18.9-19.7 brownish-red clayey TILL; dense. dry.	3 ppm
20							

TEST BORING LOG

BORING NO. 3

PROJECT

SHEET 2 OF 2

CLIENT Harter, Secrest, & Emery

JOB NO. 3104

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
		SS-8	39 60 94 95	1.8		20-22 reddish-brown TILL; dense; damp to dry (essentially as above.	7 ppm
22		SS-9	57 100/4"	0.3		22-24 A.A. WED	Refusal [illegible] 5 ppm
24		SS-10	45 82 100/4"	1.5		THUR Fluid in hole to 6' from surface 23-24' (not smpld WED.) [illegible] easily. [illegible] 24-26 reddish-brown clayey till w/ ~ 0.4' reddish-grey silty till at base.	
26		SS-11	56 82 100/4"	1.4		26-27.1 reddish-brown clayey silty till; dense, damp to dry. 27.1-27.4 brown clayey silt w/ grit and F gravel, wet.	
28		SS-12	66 100/6"	1.0		28-30 brick-red clayey silty till; dense; damp.	Drilled to 30' w/ 6 5/8" augers.
30						E.O.B.	

Set well screen at 8.5' - 18.5' below grade.

Sand pack top @ 6.5' below grade
Bentonite seal top @ 4.5 below grade

3 bags ± #3-Q-ROK
pails Bentonite Pellets
Large [illegible] of grout required.

- GS-2 submitted for Metals analysis on 01/21.

▽ @ 3.5' TOC @ 1000 on 01/20, imm. prior to development.

TEST BORING LOG

BORING NO.	4
PROJECT	
CLIENT	Harter, Secrest, & Emery
SHEET 1 OF 2	
DRILLING CONTRACTOR	Rochester Drilling
JOB NO.	3104
PURPOSE	Soil Sampling
ELEVATION	528.3 MSL
DATUM	+100'(site) = +530'(USGS)
DATE STARTED	01/16/87
DATE FINISHED	01/19/87
DRILLER	Dave Reynolds
INSPECTOR	R. Teifke

GROUNDWATER					CASING	SAMPLE	CORE
DATE	TIME	DEPTH	CASING	TYPE	HS Auger		
				DIAMETER	6¾ ID		
				WEIGHT	140 LB.	—	
				FALL	30 IN.	—	

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
0–2		SS-1	3, 4, 4, 6	1.0		0-1 reddish-brown CLAY, w/ plant roots.	
2–5		GS-1		N.A.		2-5 reddish-brown slightly silty CLAY; damp.	
5–7		SS-2	9, 15, 16, 23	1.7		5-7 brick red plastic CLAY; gritty, dense, damp. TOP OF TILL @ 7'.	
7–9		SS-3	22, 21, 34, 46	1.0		7-9 variegated TILL w/ brick red aspect clayey, w/ cobbles; damp to moist.	
9–11		SS-4	15, 16, 18, 17	1.4		9-11 brick red TILL, variegated locally green; damp.	
11–12		SS-5	16, 20	1.0		11-12 A.A.	
12–14		SS-6	20, 27, 25, 25	1.8		12-14 A.A. except, bottom 0.1' is grayish-brown clayey silt (wet). BASE VARIEGATED TILL @ 14'.	01/16
14–16		SS-7	25, 53, 65, 100/4"	1.5		14-16 reddish-brown silty and clayey TILL; damp.	01/18; 15 ppm
16–18		SS-8	58, 42, 66, 60	1.0		16-18 A.A.	12 ppm
18–20		SS-9	54, 100/4", —, —	0.4		18-20 A.A.	12 ppm

TEST BORING LOG

BORING NO. 4

SHEET 2 OF 2

PROJECT

CLIENT Harter, Secrest, & Emery

JOB NO 3104

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
		SS-10	95 100/2"	0.9		20-22 brownish-gray clayey TILL; dense, damp.	20 ppm
22		SS-11	43 77 95 100/4"	1.5		22-24 A.A.	15 ppm
24		SS-12	62 88 91 100	1.5		24-26 A.A.	15 ppm
26		SS-13	82 100/4"	0.5		26-28 reddish-brown clayey TILL; dense, damp.	
28		SS-14	85 88 100/3"	1.3		28-30 A.A.	15 ppm Drilled to 30' w/ 6 5/8" augers.
30		SS-15	70 100	1.1		30-31 reddish-brown silty TILL; dense, moist in lowermost 0.4'.	11 ppm
31		SS-16	53 100/5"	1.4		31-33 reddish-brown silty TILL; moist.	12 ppm ↑ 01/19
33						E.O.B.	

16 split-barrel samples taken.

NO GROUNDWATER DETECTED;
NO WELL INSTALLED.

- GS-1 submitted for metals analysis on 01/21.
- No submittal for Organics analysis.

TEST BORING LOG

BORING NO.	5
SHEET 1 OF	2
JOB NO.	3104
ELEVATION	528.8 MSL
DATUM	+100' (site) = +530' (USGS)
DATE STARTED	01/19/87
DATE FINISHED	01/19/87
DRILLER	Dave Reynolds
INSPECTOR	R. Teifke

PROJECT

CLIENT Harter, Secrest, & Emery

DRILLING CONTRACTOR Rochester Drilling

PURPOSE Soil Sampling and Monitoring Well

GROUNDWATER					CASING	SAMPLE	CORE
DATE	TIME	DEPTH	CASING	TYPE	HS Auger		
				DIAMETER	6¾" ID		
				WEIGHT	140 LB.		
				FALL	30 IN.		

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
		SS-1	2 / 4 / 3 / 4	1.4		0.0-2.0 brown pebbly silty CLAY, w/ plant roots in upper 0.3'.	12 ppm
2		GS-1		N.A.		2.0-4.0 dark gray to black silty CLAY. 4.0-5.0 reddish-brown silty CLAY w/ fine gravel.	12 ppm
5		SS-2	4 / 8 / 12 / 16	1.8		5.0-5.5 reddish-brown variegated plastic CLAY; silty and pebbly at very top. 5.5-6.8 brick red plastic CLAY, mottled gray, green, orange.	12 ppm
7		SS-3	17 / 21 / 24 / 28	1.4		7.0-7.4 reddish-brown variegated plastic CLAY. 7.4-8.4 brick red variegated plastic CLAY.	12 ppm
9, 10				N.A.		w/ reference to Boring #2, drilled through from 9' to 13'. tough red plastic clay throughout interval.	
13, 14		SS-4	8 / 8 / 8 / 8	2.0		13.0-13.5 uniform brown silty CLAY; wet. W 13.5-14.0 brown, silty, mod. clayey SAND and fine GRAVEL; wet. 14.0-15.0 A.A., except fine to medium GRAVEL predominant. W	12 ppm
15		SS-5	7 / 4 / 4 / 22	2.0		W 15.0-15.4 reddish-brown CLAY-SILT; wet. W 15.4-16.7 interbedded coarse SANDS, fine GRAVELS, silty SANDS; saturated. 16.7-17.0 brownish-red silty TILL, damp to moist.	10 ppm
17, 18		SS-6	35 / 100	1.0		W 17-18 reddish-brown silty and clayey TILL, w/ 0.2' lens saturated silty SAND and GRAVEL	7 ppm
19						E.O.B.	
20						Auger to 19.0'	

grout / benton. / sand / 0.010" PVC screen

	TEST BORING LOG	BORING NO. 5
PROJECT		SHEET 2 OF 2
CLIENT Harter, Secrest, & Emery		JOB NO. 3104

DEPTH FT.	CASING BLOWS	SAMPLE NO.	BLOWS ON SAMPLE SPOON, PER 6"	Rec. Ft	GRAPHIC LOG	IDENTIFICATION	REMARKS
						▽ @ 1600 : 6.0' from surface.	
						(6) split spoon samples 19 feet of drilling (6¾" augers) Well construction as indicated p.1.	
						• GS-1 submitted for Metals analysis (+CN) on 01/21. • GS-1 submitted for Organics analysis on 01/21.	

ATTACHMENT 2

Groundwater Analyses

LOZIER LABORATORIES
23 N. Main Street-Fairport, New York 14450 - 716/425-2210

Client: Lozier A/E
600 Perinton Hills
Fairport, NY 14450

Attn; Mr. Bob Teifke
Stuart Oliver Holtz

Date Received: 1-22-87
Laboratory No.: 87010082
Purchase Order No.:
Report Date: 1-30-87
Auth. Signature: [signature]
Lab Director: Alan J. Laflin

Sample Identification:

A. MW 2
B. MW 3
C. MW 5
D. Well X
E. Well Y
F. Trip Blank
G.
H.
I.
J.

Comments: Sampled By: Richard D. Rinehar
Time Sampled: 10:20am-3:00pm

Parameters	A	B	C	D	E	F	G	H	I	J
pH	8.2	7.3	7.4	7.6	7.4					
Cyanide	<0.006	<0.006	0.010	<0.006	<0.006					
Cadmium	<0.06	<0.06	<0.06	<0.06	<0.06					
Chromium, Total	<0.02	<0.02	0.05	0.03	<0.02					
Nickel	<0.06	<0.06	0.09	0.13	1.17					
Lead	<0.2	<0.2	<0.2	<0.2	<0.2					
Zinc	<0.02	0.04	0.14	0.10	0.13					
Tin	<5.0	<5.0	<5.0	<5.0	<5.0					
Silver	<0.02	<0.02	<0.02	<0.02	<0.02					
Copper	<0.02	0.02	0.05	0.03	0.11					
Calcium	113	146	240	520	368					

Note: All results expressed in Mg/L unless noted otherwise.

Analysis Comments:

NYSDOH Lab I.D. #10390

601

Client: Losier A/E

Stuart Oliver Holtz

PURGEABLE HALOCARBONS

Date Rec'd.: 1-22-87
Project No.: 87010082
Report Date: 2-5-87

Lab ID No:		87010082 A	87010082 B	87010082 C	87010082 D	87010082 E	87010082 F		
PARAMETER	UNITS	MW 2	MW 3	MW 5	Well X	Well Y	Trip Blank		
Chloromethane	µg/l	<1	<1	<1	<1	<1	<1		
Bromomethane	µg/l	<1	<1	<1	<1	<1	<1		
Dichlorodifluoromethane	µg/l	<1	<1	<1	<1	<1	<1		
Vinyl Chloride	µg/l	<1	<1	<1	<1	<1	<1		
Chloroethane	µg/l	<1	<1	<1	<1	<1	<1		
Methylene Chloride	µg/l	25.7	<1	<1	<1	45.5	<1		
Trichlorofluoromethane	µg/l	<1	<1	<1	<1	<1	<1		
1,1-Dichloroethene	µg/l	<1	<1	<1	<1	<1	<1		
1,1-Dichloroethane	µg/l	177	94.2	<1	19.9	4.2	<1		
trans-1,2-Dichloroethene	µg/l	<1	<1	<1	<1	<1	<1		
Chloroform	µg/l	<1	3.2	2.8	<1	<1	<1		
1,2-Dichloroethane	µg/l	<1	<1	<1	<1	<1	<1		
1,1,1-Trichloroethane	µg/l	364	<1	<1	<1	93.2	<1		
Carbon Tetrachloride	µg/l	<1	<1	<1	<1	<1	<1		
Bromodichloromethane	µg/l	<1	<1	<1	<1	<1	<1		
1,2-Dichloropropane	µg/l	<1	<1	<1	<1	<1	<1		
trans-1,3-Dichloropropene	µg/l	<1	<1	<1	<1	<1	<1		
Trichloroethene	µg/l	4550	18.0	<1	995	917	<1		
Dibromochloromethane	µg/l	<1	<1	<1	<1	<1	<1		
1,1,2-Trichloroethane	µg/l	<1	<1	<1	<1	<1	<1		
cis-1,3-Dichloropropene	µg/l	<1	<1	<1	<1	<1	<1		
2-Chloroethylvinyl Ether	µg/l	<1	<1	<1	<1	<1	<1		
Bromoform	µg/l	<1	<1	<1	<1	<1	<1		
1,1,2,2-Tetrachloroethane	µg/l	<3	<3	<3	<3	<3	<3		
Tetrachloroethene	µg/l	24.1	<3	<3	<3	<3	<3		

Analyst

Director

PURGEABLE AROMATICS

Client: Lozier A/E

Stuart Oliver Holtz

Page 4

Date Rec'd : 1-22-87
Lab. No. : 87010082
Report Date: 2-5-87

Lab ID No:		87010082 A	87010082 B	87010082 C	87010082 D	87010082 E
Parameter	Units	MW 2	MW 3	MW 5	Well X	Well Y
Benzene	µg/l	<1	<1	<1	<1	<1
Toluene	µg/l	<1	<1	<1	<1	<1
Ethylbenzene	µg/l	<2	<2	<2	<2	<2
Chlorobenzene	µg/l	<2	<2	<2	<2	<2
o-Xylene	µg/l	<5	<5	<5	<5	<5
m-Xylene	µg/l	7.4	7.4	7.4	5.5	7.4
p-Xylene	µg/l	<5	<5	<5	<5	<5
o-Dichlorobenzene	µg/l	<10	<10	<10	<10	<10
m-Dichlorobenzene	µg/l	<10	<10	<10	<10	<10
p-Dichlorobenzene	µg/l	<10	<10	<10	<10	<10

Analyst

Lab Director

PURGEABLE AROMATICS

Client: Lozier A/E

Stuart Oliver Holtz

Page 5

Date Rec'd : 1-22-87

Lab. No. : 87010082

Report Date: 2-5-87

Lab ID No: 87010082 F

Parameter	Units	Trip Blank				
Benzene	µg/l	<1				
Toluene	µg/l	<1				
Ethylbenzene	µg/l	<2				
Chlorobenzene	µg/l	<2				
o-Xylene	µg/l	<5				
m-Xylene	µg/l	<5				
p-Xylene	µg/l	<5				
o-Dichlorobenzene	µg/l	<10				
m-Dichlorobenzene	µg/l	<10				
p-Dichlorobenzene	µg/l	<10				

Analyst

Lab Director

ATTACHMENT 3

Soils Analyses

LOZIER LABORATORIES
23 N. Main Street-Fairport, New York 14450 - 716/425-2210

Client: Lozier A/E
600 Perinton Hills
Fairport, NY 14450

Attn: Mr. Bob Teifke
Stuart Oliver Holtz

Date Received : 1-22-87
Laboratory No. : 37010077
Purchase Order No. :
Report Date : 1-30-87
Auth. Signature : Alan J. Laffin
Lab Director : Alan J. Laffin

Sample Identification:

A. B-1 Comp S-1&S-2
B. B-2 Grab S-1
C. B-3 Grab S-2
D. B-4 Grab-1
E. B-5 Grab S-1
F. B-1 Comp S-5 S-6 S-7
G. B-2 Comp S-1&
H.
I.
J.

Comments: Sampled By: Client

Parameters	A	B	C	D	E	F	G	H	I	J
Cadmium	<1.2	<1.1	<1.2	<1.2	<1.1	---	---			
Chromium, Hexavalent	0.23	<0.16	<0.16	<0.13	<0.16	---	---			
Cobalt	5.40	5.00	6.76	11.3	4.94	---	---			
Nickel	9.40	7.73	10.4	21.1	9.35	---	---			
Lead	10.4	10.9	<3.9	<4.0	<3.5	---	---			
Zinc	34.2	31.7	67.6	43.9	40.0	---	---			
Selenium	<0.10	<0.09	<0.10	<0.10	0.14	---	---			
Tin	<100	<100	<100	<100	<100	---	---			
Silver	0.8	0.93	0.97	0.79	0.71	---	---			
Copper	9.80	9.81	13.3	13.4	7.23	---	---			
Arsenic	1.30	0.83	1.43	1.48	0.99	---	---			

Note: All results expressed in ~~**Mg/L**~~ mg/kg **unless noted otherwise.**

Analysis Comments:

NYSDOH Lab I.D. #10390

LOZIER LABORATORIES
23 N. Main Street-Fairport, New York 14450 - 716/425-2210

Client: Lozier A/E

Stuart Oliver Holtz

Page 2

Date Received : 1-22-87
Laboratory No. : 87010077
Purchase Order No. :
Report Date : 1-30-87
Auth. Signature : [signature]
Lab Director : Alan J. Laffin

Sample Identification:

A. B-1 Comp S-1&S-2
B. B-2 Grab S-1
C. B-3 Grab S-2
D. B-4 Grab-1
E. B-5 Grab S-1
F. B-1 Comp S-5 S-6 S-7
G. B-2 Comp S-1& S-
H.
I.
J.

Page ___ of ___

Comments:

Parameters	A	B	C	D	E	F	G	H	I	J
Cyanide	---	<0.3mg/kg	---	---	<0.3mg/kg	---	---			

Note: All results expressed in Mg/L unless noted otherwise.

Analysis Comments:

NYSDOH Lab I.D. #10390

PURGEABLE HALOCARBONS

Client: Lozier A/E

Page 3

Attn: Mr. Bob Teifke
Stuart Oliver Holtz

Date Rec'd : 1-22-87
Project No.: 87010077
Report Date: 2-3-87

PARAMETER	UNITS	87010077 E B-5 Grab S-1	87010077 F B-1 Comp S-5,S-6, S-7	87010077 G B-2 Comp S-1&S-2	
Chloromethane	µg/kg	<4	<4	<4	
Bromomethane	µg/kg	<4	<4	<4	
Dichlorodifluoromethane	µg/kg	<4	<4	<4	
Vinyl Chloride	µg/kg	<4	<4	<4	
Chloroethane	µg/kg	<4	<4	<4	
Methylene Chloride	µg/kg	47.1	315	341	
Trichlorofluoromethane	µg/kg	<4	<4	<4	
1,1-Dichloroethene	µg/kg	<4	<4	<4	
1,1-Dichloroethane	µg/kg	<4	<4	<4	
trans-1,2-Dichloroethene	µg/kg	<4	<4	<4	
Chloroform	µg/kg	<4	<4	<4	
1,2-Dichloroethane	µg/kg	<4	<4	<4	
1,1,1-Trichloroethane	µg/kg	<4	<4	56.6	
Carbon Tetrachloride	µg/kg	<4	<4	<4	
Bromodichloromethane	µg/kg	<4	<4	<4	
1,2-Dichloropropane	µg/kg	<4	<4	<4	
trans-1,3-Dichloropropene	µg/kg	<4	<4	<4	
Trichloroethene	µg/kg	<4	84.0	3100	
Dibromochloromethane	µg/kg	<4	<4	}	
1,1,2-Trichloroethane	µg/kg	<4	<4	} 14.9	
cis-1,3-Dichloropropene	µg/kg	<4	<4	}	
2-Chloroethylvinyl Ether	µg/kg	<4	<4	<4	
Bromoform	µg/kg	<4	<4	<4	
1,1,2,2-Tetrachloroethane	µg/kg	<10	<10	<10	
Tetrachloroethene	µg/kg	<10	<10	<10	

William A Richards
Analyst

Director

surface environments, or shortly thereafter, organic compounds of the types detected at the site will have largely dissipated due to volatilization and dilution.

The distribution of the confined aquifer defined at on-site locations 1, 2, and 5 will be a function of the distribution of the confining plastic clay. Assuming that the plastic clay is horizontal and maintains its thickness downgradient, confining conditions might be expected to persist northward and northwestward to the canal and the river or at least as far as the 515-foot contour. Should that be the case, contaminants detected in this aquifer on the site will be present in this aquifer beneath an extensive area downgradient of the site.

Groundwater data collected at the site in January 1987 are presented in Table 1. These data were used to construct Figure 7, a flow-net of the confined aquifer in which the monitoring wells were placed. The water levels measured at locations 1, 2, 3, and 5 indicate the hydraulic potential at each point. The water-level data are mapped much the same as any other data and the contours are lines along which the hydraulic potential in the aquifer is equal (equipotential lines).

Table 1

WATER-LEVEL DATA COLLECTED IN JANUARY 1987

	Elev.(ft.) Ground	Depth(ft.) Screen	Elev.(ft.) Screen	Depth (ft.) Static Water Level	Elev.(ft.) Static Water Level
MW2	530.2	19.0-24.0	54.2-506.2	7.7	522.5
MW3	530.9	8.5-18.5	522.4-512.4	4.4	526.5
MW5	528.8	13.0-18.0	515.8-510.8	7.5	521.3
MW-1	530.8			7.8	523.0
Well X	535.5[2]	>40	<490	10.5[2]	523.0[2]
Well Y	535.5[2]	>40	<490	11.5[2]	522.0[2]

1. No well installed. Water level measured in open borehole on January 13, 1987.

2. Reference elevation is 533.5' (finished floor).

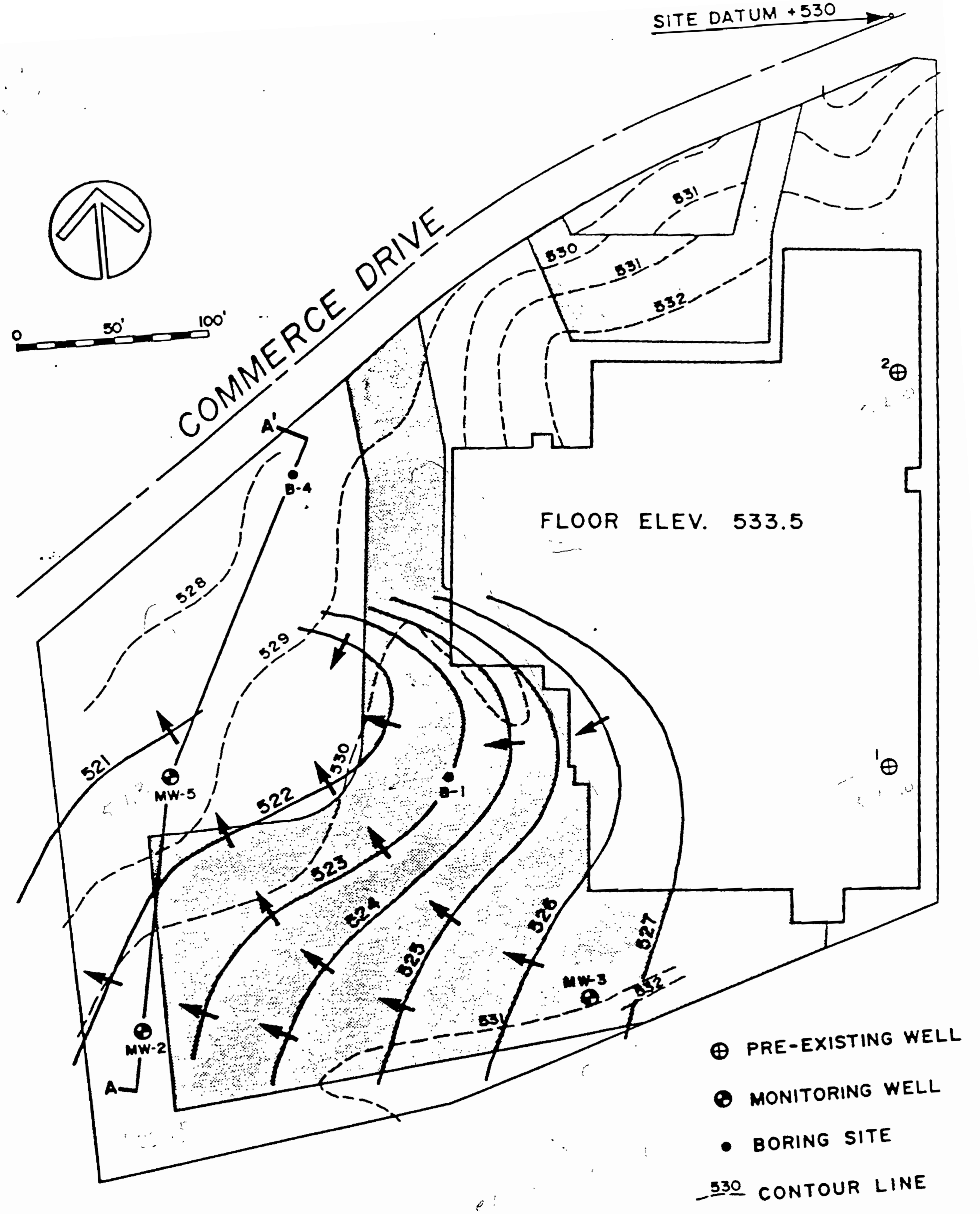


FIGURE 7
FLOW NET - CONFINED AQUIFER

The potential at a given point is a measure of the energy available to drive groundwater through the formation and groundwater will flow from areas of higher potential to areas of lower potential. By definition, groundwater flow will be perpendicular to the equipotential lines and the pressure surfaces that they represent. The flow paths, represented by the arrows in Figure 7, and the equipotential lines, constitute the flow net for the area of investigation. Each set of lines represents an infinite number of such lines in that change in potential and the movement of groundwater each is a continuum.

Specifically, and by definition, the elevation to which groundwater will rise in a well that penetrates a confined aquifer will be higher than the elevation at the base of the confining layer (aquitard) at that location. This relationship is shown in Figure 6. Additionally, the water in a penetrating well stands at an elevation lower than that of groundwater in wells screened in the next higher aquifer, then the pressure gradient across the intervening aquitard will be downward and vertical leakage from the higher aquifer to the lower aquifer will be favored. Although significant quantities of groundwater were not observed above the clay aquitard during this study, downward infiltration is indicated whenever significant amounts of groundwater accumulate and persist above the plastic clay. The detection in the uppermost part of the plastic clay of contaminants probably introduced as surface spills is consistent with this relationship.

8.0 GROUNDWATER CONTAMINATION

Organic priortiy pollutants are distributed in site groundwater as indicated in Table 2 and Figure 8. The site flow net (Fig. 7) suggests that contaminants in the aquifer at MW-2 originated along the southern boundary of the property. This area had been used for drum storage and even a few minor spills would explain groundwater quality in MS-2. The contaminant profile of MW-3 and the organic contaminants present in soils taken from the aquifer at B-1 each indicate spills in this former drum staging area. There is nothing to indicate that the plant itself is a source of organic contaminants in the confined aquifer. In fact, the geology encountered at B-4 and MW-3 suggests that the plant buildings are underlain as far as bedrock by a sequence consisting mainly of dense till and that the outwash deposits are not present beneath the buildings.

Comparison of the stratigraphic sequence at MW-3 with the sequence penetrated at MW-2, MW-5 and B-1 reveals that MW-3 is on the southern edge of the lobe of outwash deposits (and of the confined aquifer). This suggests that migration of groundwater onto the site from beyond MW-3 is quite limited. Accordingly, contaminants detected in MW-3 likely originated on the surface in close proximity to MW-3.

Analyses of groundwater taken in January during the present study reveal the presence of trichloroethene, methylene chloride, and several other organic priority pollutants (Fig. 8). Water level measurements taken in these wells in January indicate that both are screened in

Table 2

DISTRIBUTION OF PURGEABLE HALOCARBONS IN SITE GROUNDWATER

Parameter	MW2	MW3	MW5	Well X	Well Y	EPA WQC
Methylene Chloride	25.7	<1	<1	<1	45.5	0.19
1,1-Dichoroethane	177	94.2	<1	19.9	4.2	
Chloroform	1	3.2	2.8	<1	<1	0.19
1,1,1-Tri-chloroethane	364	<1	<1	<1	93.2	
Trichloroethene	4550	18.0	<1	995	917	2.80
Tetrachloroethene	24.1	<3	<3	<3	<3	0.88

[1] EPA Ambient Water Quality Criteria for Protection of Human Health:

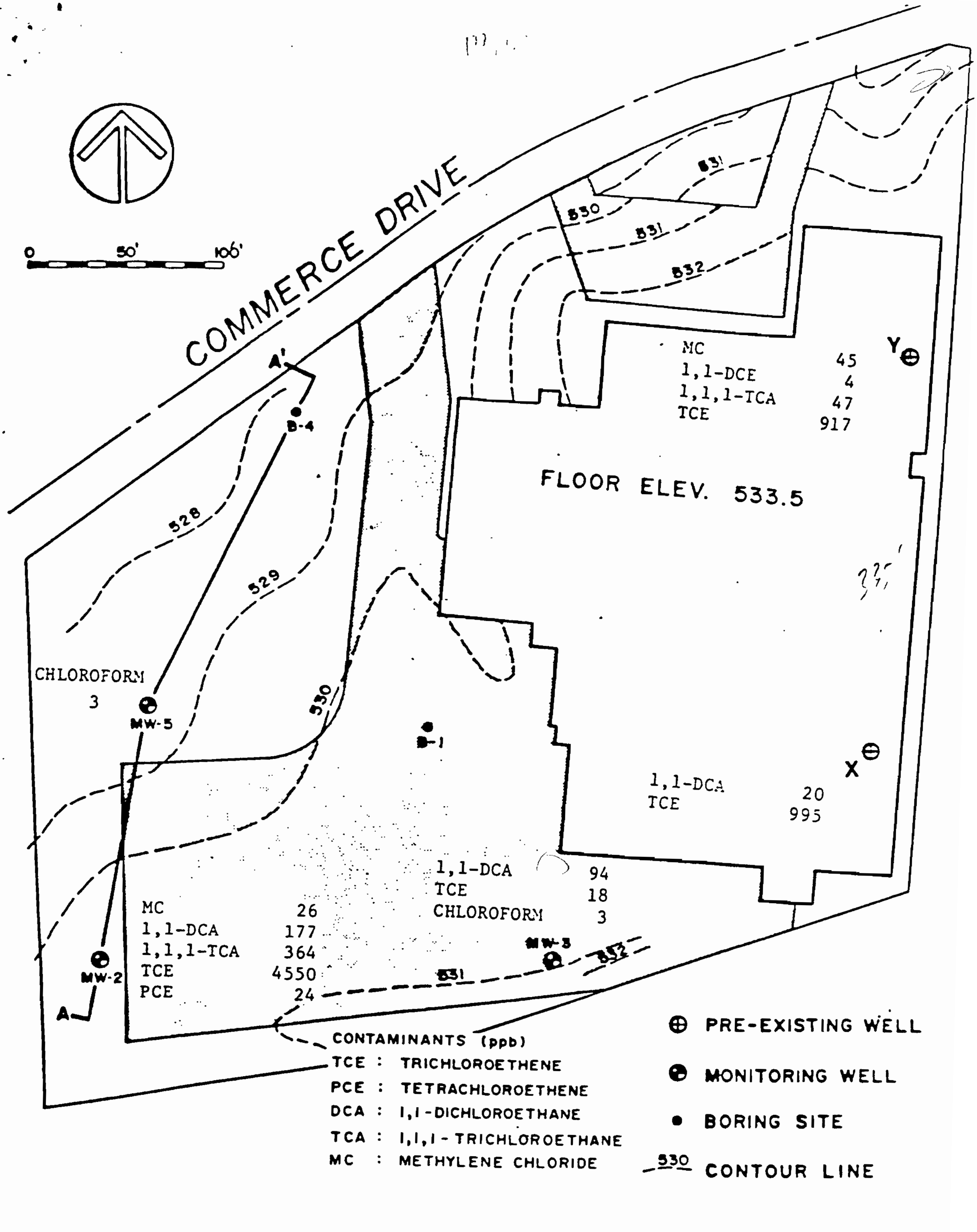


FIGURE 8 DISTRIBUTION OF ORGANIC CONTAMINANTS IN SITE GROUNDWATER

a confined aquifer and that the hydraulic potentials are nearly equal; neither well therefore can be considered upgradient of the other. Moreover, because Wells X and Y are thought to be screened in a different aquifer than MW-2, -3 and -5, neither water-level data nor chemical data can be integrated with data from the monitoring wells.

Presently, there is no basis for determining the source of the contaminants found in samples from Wells X and Y, and in the absence of other wells of comparable depth in the vicinity of the site, groundwater quality at the top of rock cannot be otherwise evaluated. The direction of groundwater flow cannot be determined for this aquifer, although it is assumed to be northward.

9.0 SOILS CONTAMINATION

Organic priority pollutants are distributed in site soils as indicated in Figure 9. The situation at MW-2 undoubtedly is the result of nearby surfaces releases. The presence of methylene chloride in the shallow subsurface at MW-5 also can be attributed to surface releases and limited migration of contaminated groundwater along the top of the plastic clay.

Soil samples were taken at B-1 on the basis of hNu monitoring in the field. The contaminants probably migrated through the confined aquifer to B-1 from the souther perimeter of the site, according to the flow pattern presented in Figure 7.

Aside from TCE and methylene chloride, soils contamination is not pronounced. Cyanides were not detected, and concentrations of heavy metals are within acceptable limits as shown in Table 3.

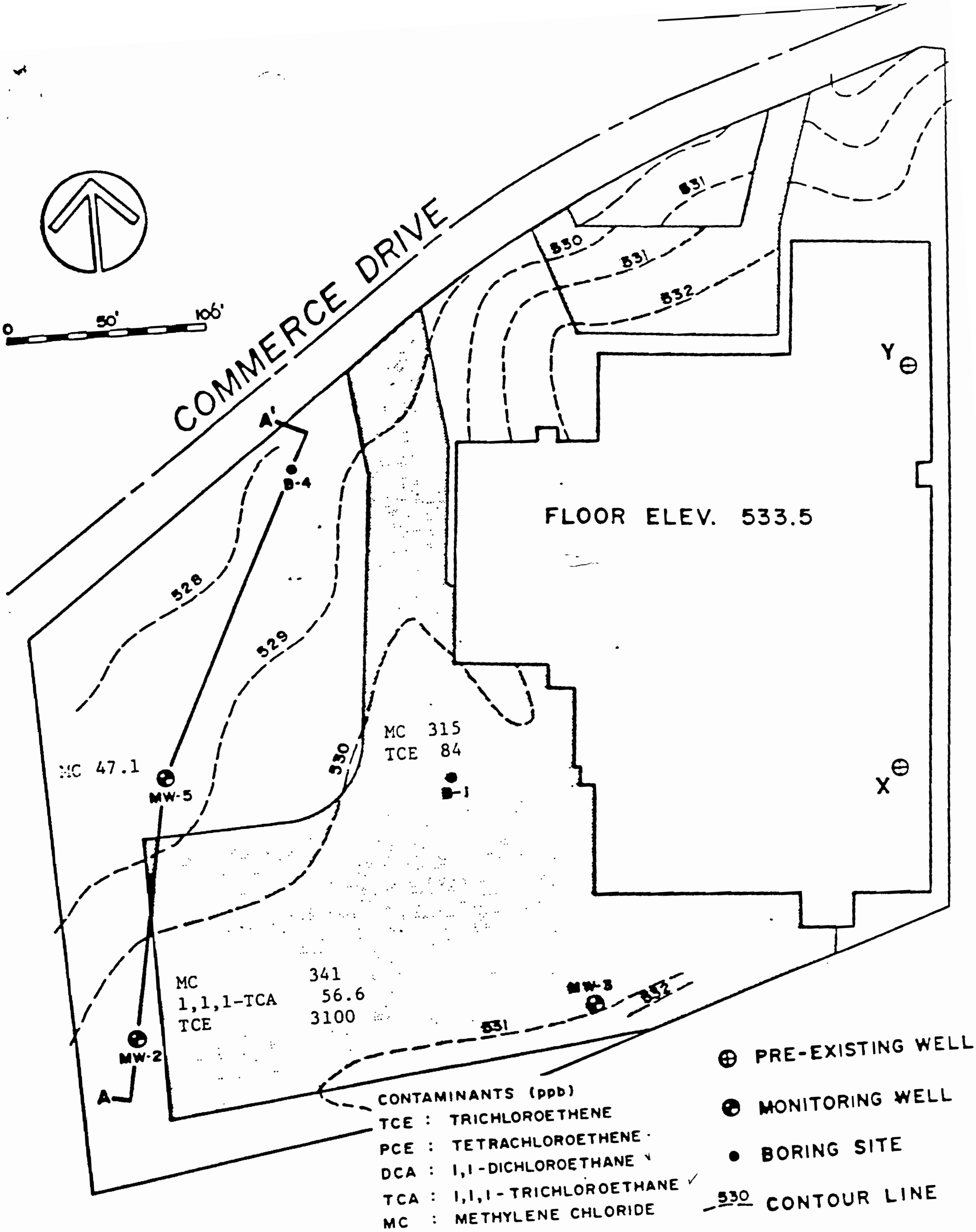


FIGURE 9 DISTRIBUTION OF ORGANIC CONTAMINANTS IN SITE SOILS

Table 3

Elemental Composition of Soils vs. Metals Concentrations
Detected in On-Site Soils (ppm)

Element	Max. Concentration Detected on Site	Reference Concentration: Range	Typical Median Concentration	Source	Comments
Cd	<1.2	0.01 - 7	0.5	3	Detected concentration within background range
Cr	0.23	5 - 3000	100	3	"
Co	11.3	0.05 - 65	8	1	"
Ni	21.1	0.1 - 1530	50	1,2	"
Pb	10.9	1 - 888	29	2	"
Zn	67.6	1 - 2000	90	1,2	"
Se	0.14	0.1 - 38	0.4	1,3	"
Sn	<100	1 - 200	10	1,3	"
Ag	0.97	0.1 - 8	0.4	2	"
Cu	13.4	2 - 250	30	1	"
As	1.48	0.1 - 194	11	2	"

1. Bowen, H.J.M., Environmental Chemistry of the Elements, Academic Press, New York, 1979.

2. Ure, A.M., et al., Elemental Constituents in Soils, Environmental Chemistry, Vol. 2, pp. 94-204; ed. H.J.M. Bowen, Royal Society of Chemistry, Burlinghouse, Landon, U.K., 1983.

3. Parr, James R., et al., Land Treatment of Hazardous Wastes, Agricultural Environmental Quality Institute, Agricultural Research Service, USDA, Beltsville, Maryland, Noyes Data Corporation, Park Ridge, New Jersey, 1983.