1.

Report

Preliminary Hydrogeologic Site Assessment

Eagle Comtronics, Inc.
Clay, New York

October 1989

O'BRIEN & GERE

2665.002

REPORT

PRELIMINARY HYDROGEOLOGIC SITE ASSESSMENT

EAGLE COMTRONICS, INC.

CLAY, NEW YORK

OCTOBER 1989

O'BRIEN & GERE ENGINEERS, INC.
1304 BUCKLEY ROAD
SYRACUSE, NEW YORK 13221

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SECTION 1 - INTRODUCTION

1.01 Project Background

Eagle Comtronics is involved in the light manufacture of electronic components, primarily for the cable television market. The facility is located at 4562 Waterhouse Road in Clay, New York and include management offices for the firm as well as a separate 12,000 square foot manufacturing building used for assembly of electrical products. The parcel is approximately 18 acres in size and is surrounded by agricultural properties and a few nearby residential homes. The Eagle Comtronics site and these residential homes are all served by municipal water supply and sewer systems. Figures 1 and 2 depict the location and layout of the site.

During a recent environmental assessment conducted by a third party as a routine prerequisite to obtaining a new line of bank financing, detectable concentrations of volatile organic compounds were measured in ground water samples, collected from monitoring wells installed near the manufacturing building.

In response to these findings, Eagle Comtronics retained O'Brien & Gere Engineers, Inc. of Syracuse, New York to conduct further investigations in order to define the extent of the potential ground water contamination, and to develop a remedial action plan for the site.

1.02 Purpose and Scope of Project

The primary objective of this program is to define the physical and chemical nature of the potential ground water contamination on the Eagle Comtronics site. To achieve this objective, O'Brien & Gere initiated a field program which initially included a limited topographic survey to establish ground water elevations and flow characteristics using existing ground water monitoring wells. The field program also consisted of the installation of four additional monitoring wells to augment the three existing wells which were previously installed as part of the assessment. Upon completion of the well installation, all seven wells were developed and sampled for volatile organic compounds using standard analytical methods. Ground water elevations were also obtained from all of the wells.

The initial round of sampling was recently followed up with a second round of samples which were analyzed using similar analytical methods. The purpose of this sampling was to confirm the results obtained in the first round. In addition, samples were obtained from two select monitoring wells and analyzed for total priority pollutants to provide a broader indication of ground water chemistry, and to provide an indication of other possible constituents which may be present within the ground water.

1.03 Report Format

Having introduced the background and intent of this program in this section, the remaining sections of this report provide additional detail regarding the project. Specifically, Section 2 summarizes the available historical information including a spill history and previous investigations done by others. Section 3 presents the field program as implemented by O'Brien & Gere including the topographic survey, ground water monitoring well installation, ground water elevation measurements, and ground water sampling. In Section 4, the results and interpretation of the field program are discussed. Finally, Section 5 provides a summary of the conclusions which have been developed in this report.

The report appendices include boring logs, laboratory reports, and other pertinent data.

SECTION 2 - HISTORICAL INFORMATION

2.01 Spill History

Unbeknownst to senior management, a spill occurred in 1981 in an area by the southwest corner of the existing assembly building. This area was formerly used for storage of spent solvents used in the assembly of the electrical products. Apparently, several drums were located in this area during the winter months and these drums froze to the ground rendering them immobile. To free them, a forklift operated by John E. Fisher Construction Company was used and in doing so, several drums were punctured and waste solvents were spilled in this uncontained area and released to the surrounding soils. The John E. Fisher Construction Company was working under contract to Eagle Comtronics for the express purpose of loading those drums of waste solvent onto a truck for transport to an off-site disposal location.

Until recently, Eagle Comtronics management was unaware of this incident. However, during an environmental property assessment required for completion of a new lending agreement, this incident and some of the details surrounding it became known.

In part, because of employee turnover and the number of intervening years involved, some of the specific details regarding this spill remain unknown. What is known is that as many as six (6) drums were punctured and some material was released. The lost volume, however, is not known since reportedly not all the drums were full and a total loss from each of the punctured drums did not occur.

The type of material that was spilled was likely a waste solvent containing 1,1,1 trichloroethane which was formerly used in the manufacturing operation. This material was used to rinse spent soldering flux from printed circuit boards. In general, the plant used slightly less than 1 drum of solvent per month. The use of this material began in July, 1980 and was discontinued in June of 1982.

2.02 Previous Investigations

Recent environmental inquiries were conducted by a third party as part of the preparation for refinancing. These inquiries involved a two-staged environmental assessment. The initial assessment was conducted in June 1989, and consisted of a background and regulatory review of the site and a visual inspection of the site and the surrounding areas by Adirondack Environmental, Inc.

There were no blatant environmental issues identified in the first stage of the assessment; however, further investigation of a suspect area located at the southwest corner of the assembly building was recommended. This area was used to accumulate waste solvents during the period when 1,1,1 trichloroethane was used.

Upon receipt of this recommendation, Eagle Comtronics authorized Adirondack Environmental to perform a followup assessment which required installation and sampling of three shallow monitoring wells around the assembly building. The locations of these monitoring wells, MW1, MW2, and MW3, are shown on Figure 2.

Sampling and analysis of ground water samples from these wells was conducted, and detectable concentrations of organic compounds were found. Table 1 summarizes these data.

SECTION 3 - FIELD INVESTIGATIONS

3.01 Ground Water Monitoring Well Installation

In response to the findings by Adirondack Environmental, Eagle Comtronics then retained O'Brien & Gere Engineers to conduct more intensive studies. Four additional shallow ground water monitoring wells were installed on-site to collect data pertaining to ground water flow direction, shallow subsurface geologic conditions, aquifer hydraulic conductivity, and shallow ground water quality. These newly installed wells, MW4, MW5, MW6, and MW7 (Figure 2) supplement three existing wells MW1, MW2, and MW3 previously installed by Adirondack Environmental Inc.

Prior to installing the new wells, ground water elevations were collected in the three existing wells. These data were used to assess the shallow ground flow conditions and to optimize the positioning of the downgradient wells.

Monitoring wells MW5 and MW7 (Figure 2) were established as hydraulically downgradient ground water wells to evaluate ground water quality in the vicinity of the northern property boundary. Each of these wells was installed to a depth of approximately 15 feet. Monitoring well MW6 was installed along the east side of the manufacturing building to assess the ground water in this region of the site. Monitoring well MW4 was installed approximately 135 feet south of the assembly building (Figure 2) to a depth of approximately 14.5 feet, to assess the quality of the ground water flowing onto the Eagle Comtronics property.

The ground water monitoring wells (MW4, MW5, MW6, MW7) were installed using hollow-stem drilling methods. Split-spoon soil samples were collected at 5 foot intervals in each boring. Each collected soil sample was visually described and logged by an O'Brien & Gere Hydrogeologist.

The new monitoring wells, MW4, MW5, MW6 and MW7, installed by O'Brien & Gere Engineers, are constructed of two inch diameter PVC well casing and 10 foot sections of 0.020" PVC slotted well screen. A summary of well specifications for these wells is presented in Table 2. Soil boring logs and as-built well construction details are contained in Appendix A. The well screen depths were positioned so that a portion of each well screen extended above the water table such that if non-aqueous phase liquids were present (floating) at the surface of the ground water table, they could be detected.

Depth sounding measurements collected from monitoring wells MW1, MW2, and MW3 indicate they were installed to approximate depths of 13.5 feet, 14.0 feet, and 14.5 feet, respectively. The construction details and specifications for MW1, MW2, and MW3 are not known. However, these wells were installed in a similar manner.

Following installation, the new monitoring wells were developed by use of a bottom loading stainless steel bailer to remove sediment that had accumulated within the well screen during installation. Additionally, the existing monitoring wells were developed in a consistent manner.

Subsequent to completion of installation of the new monitoring wells, a field survey was undertaken to establish locations and elevations for each of these wells relative to the existing pre-surveyed monitoring wells MW1, MW2, and MW3. These elevation data are presented in Table 2.

3.02 In-Situ Hydraulic Conductivity Tests

In-situ hydraulic conductivity tests were performed on the newly installed and existing ground water monitoring wells. The purpose of these tests was to determine the permeability of the shallow overburden materials in order to estimate on-site ground water flow velocities. In-situ hydraulic conductivity data and calculations are included in Appendix B. A summary of these data results are presented in Table 2.

Tests were conducted by evacuating a sufficient volume of water from a given well to create a potential hydraulic difference between the well and the surrounding aquifer. Water levels were measured and recorded at specific time intervals until the water level returned to the initial static water level. The recorded measurements represents the recovery rate of the aquifer material which is the function of the hydraulic conductivity of that material. Values for the in-situ hydraulic conductivities were calculated using Hvorslev's formulae.

The resulting hydraulic conductivity data in conjunction with the static ground water elevation data were evaluated to estimate on-site ground water flow velocities described in Section 4.02.

3.03 Ground Water Quality Monitoring

Ground water samples were collected from the seven (7) on-site monitoring wells on August 18, 1989 (8/18/89) and September 1, 1989 (9/1/89). Prior to sampling, static ground water elevations were measured in each well. These data are presented in Table 2. Prior to sampling, a minimum of three well volumes of water was evacuated from each well. Well purging and ground water sample collection were accomplished using a bottom loading stainless steel bailer attached to an appropriate length of polypropylene rope. Subsequent to sampling, the bailer was decontaminated by washing with Alconox and water followed by a distilled water rinse. A new clean length of polypropylene rope was used for each well sampled.

Appropriate chain of custody procedures and methods of sample preservation were maintained from time of collection to time of delivery to the laboratory. The ground water samples were analyzed by OBG Laboratories in Syracuse, New York. Submitted samples were analyzed for volatile organic compounds as per EPA Method 601 and 602. Additionally monitoring wells MW1 and MW4 were sampled for full priority pollutant analysis during the 9/1/89 sampling event. Laboratory data results for the 8/18/89 and 9/1/89 sampling events including QA/QC trip blanks, equipment blanks, and chain of custody forms are presented in Appendix C. At this writing, all volatile organic results have been completed. The remaining analytical results (priority pollutants) will be included as an Addendum when analyses are completed.

SECTION 4 - INVESTIGATIVE RESULTS

4.01 General Physiography and Site Geology

The project area lies within the Erie-Ontario Lowlands Physiographic Province of New York State. This area is characterized by relatively low relief topography and lies between Lake Ontario to the north and the Appalachian Uplands to the south of Syracuse.

The site is located on an upland area approximately 1500 feet west of the Clay Marsh (Figure 1) which acts as a local surface water drainage discharge point. Surface water drainage from the site is to the northeast toward Waterhouse Road.

Subsurface geologic conditions encountered at the site are described on the test boring logs presented in Appendix A. A review of these data indicate that the shallow on-site geology encountered within 15 feet of the ground surface is characterized by 5 to 10 feet of reddish brown fine to medium sand overlying a dense reddish-brown glacial till comprised of silt, clay, fine sand and imbedded gravel. At location MW6 (Figure 2) a grayish brown fine sand was encountered from approximately 2 to 6 feet. This unit most likely represents backfilled subgrade materials emplaced around the assembly building foundation during construction.

The underlying bedrock formation was not encountered during these investigations.

4.02 Site Ground Water Hydrology

Ground water elevation data were recorded on 8/18/89, 9/1/89, and 9/19/89. These data are summarized in Table 2. Ground water elevation data from 8/18/89 were used to produce the ground water elevation contour map shown as Figure 2. On-site, ground water occurs in the overburden from between 3 feet and 10 feet below the ground surface at wells MW1 and MW7, respectively. In general, the direction of shallow ground water flow is to the northeast toward the Clay Marsh. The calculated hydraulic gradient across the site was calculated to be 0.025 ft/ft on 8/18/89. Hydraulic conductivity values summarized on Table 2, ranged from 1.0 gpd/ft^2 at MW4 to 6.5 gpd/ft^2 at MW2.

The ground water flow velocity across site has been estimated using Darcy's Law.

$$V = \frac{KI}{7.48\ (N)}$$

where:

V = ground water velocity in ft/day

K = average hydraulic conductivity in gpd/ft^2

I = average hydraulic gradient in ft/ft (8/18/89)

N = percent porosity

Therefore, assuming an average site wide hydraulic conductivity of 3.4 gpd/ft^2 and average hydraulic gradient of 0.02 ft/ft, and an estimated porosity of 35%, ground water will flow to the northeast at a rate of approximately 0.03 ft/day (11 feet/year).

4.03 Site Ground Water Chemistry

Ground water samples were collected from the existing and newly installed wells on 8/18/89 and 9/1/89. The purpose of the two separate sampling events was to provide a confirmatory round of ground water quality data. Collected samples were submitted for laboratory analyses of volatile organic compounds according to EPA Method 601 and 602. In addition, during the 9/1/89 sampling event monitoring wells MW1 and MW4 located in the suspected source area and upgradient locations respectively were sampled for total priority pollutant analyses. The purpose of these analyses was to establish if any additional compounds were present which might be related to suspected source materials, and to assess the quality of the ground water flowing on to the site from upgradient off-site areas. The following data assessment includes data results from the volatile organic analyses from the 8/18/89 and 9/1/89 sampling events for all seven wells. Remaining priority pollutant data for monitoring wells MW1 and MW4 collected from the 9/1/89 sampling are not available at this time. These data will be submitted as an Addendum to this report subsequent to their receipt and validation.

The results of the 8/18/89 and 9/1/89 volatile organic ground water analyses are summarized on Table 3. A review of these data indicate that ground water samples collected from the six monitoring wells, with the exception of upgradient well MW4, contain concentrations of chlorinated hydrocarbon compounds in excess of NYSDOH ground water standards. Constituent parameters exceeding this standard include vinyl chloride, chloroethane, methylene chloride, 1,1-dichloroethene, 1,1-dichloroethane, trans-1,2-dichloroethene, 1,2-dichlorothane, 1,1,1-trichloroethene and toluene. The presence of these constituents can likely be attributed to the degradation over time of 1,1,1-trichloroethane.

The highest concentrations of these constituents detected during the initial 8/18/89 sampling event were measured in monitoring wells MW1 and MW6, which are located adjacent to the assembly building (Figure 2). Monitoring wells MW1 and MW6 exhibited respective concentrations of chloroethane at 2800 ppb and 590 ppb, 1,1-dichloroethene at 130 ppb and 270 ppb, 1,1-dichloroethane at 1000 ppb and 3300 ppb, trans-1,2-dichloroethene at 1300 ppb and 530 ppb, 1,2-dichloroethane at 59 ppb and 150 ppb, and 1,1,1-trichloroethane at 12 ppb and 66 ppb. MW1 also contained 170 ppb of toluene. Additionally, MW6 contained 18 ppb of vinyl chloride and 27 ppb of methylene chloride. Monitoring wells MW2 and MW3 located along the north side of the assembly building exhibited only concentrations of 1,1-dichloroethane, at levels of 9 ppb and 56 ppb respectively. Further downgradient, concentrations of 1,1-dichloroethane were measured in wells MW5 and MW7 at levels of 90 ppb and 23 ppb, respectively. In addition, 10 ppb of chloroethane was also detected at MW5.

A review of the 9/1/89 volatile organic data summarized on Table 3 indicates that in general the previously identified constituent parameters have decreased or remained unchanged. Monitoring well MW5 did exhibit a slight increase in 1,1-dichloroethane, from 90 ppb to 93 ppb, between the 8/18/89 and 9/1/89 sampling events, respectively. Additionally, monitoring wells MW3 and MW6 also exhibited slight increases (1 ppb and 2 ppb, respectively) in concentrations of trans-1, 2-dichloroethane from 8/18/89 to 9/1/89.

Figures 3 and 4 illustrates the total concentrations of volatile organic constituents measured during the 8/18/89 and 9/1/89 sampling events, respectively, at each monitoring well location. The total organic concentrations presented in Table 3 for both sampling events represent the summation of constituents measured above the detection limit for each sample location. The areal distribution of these values indicates that volatile organic plume is migrating in the general direction of ground water flow. The primary axis of the volatile organic plume lies between wells MW2 and MW7, where total values decrease to below 50 ppb.

SECTION 5 - CONCLUSIONS

5.01 Conclusions

Based on the information reviewed and data collected as part of this investigation, the following can be concluded:

a. Geologic conditions at the site indicate that the shallow subsurface materials encountered within 15 feet of the ground surface consists of 5 to 10 feet of fine to medium sand which overlies a dense reddish brown glacial till.

b. On-site ground water occurs in the overburden materials at a depth between 2 and 10 feet below ground level.

c. Localized ground water flows across the site to the northeast, generally toward Mud Creek and the northern portion of the Clay Marsh at a velocity estimated to be 0.03 ft/day.

d. Ground water quality analyses have detected concentrations of volatile organic compounds in excess of NYSDOH ground water standards.

e. The ground water contamination has likely resulted from an isolated waste solvent spill (1,1,1-trichloroethane) which occurred in 1981 along the southwest corner of the assembly building.

f. The highest concentrations of volatile organics were found in monitoring wells MW1 and MW6 which are located immediately adjacent to the assembly building.

g. A confirmatory round of ground water samples collected on 9/1/89 indicates that concentrations of volatile organics have remained unchanged or decreased slightly subsequent to the initial round of samples taken on 8/18/89.

h. The primary axis of the volatile organic plume trends to the northeast coincident with the general direction of ground water flow.

i. The detected volatile organic constituents likely represent degradation of the 1,1,1-trichloroethane.

Tables

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TABLE 1
SAMPLING RESULTS
PREVIOUS INVESTIGATIONS

Compound	MW-1	MW-2	MW-3
Vinyl Chloride	LT 50	LT 1	12.1
Chloroethane	3940	LT 1	137
1,1-Dichloroethane	971	6.8	833
1,1-Dichloroethene	149	LT 1	19.1
1,2-Dichloroethane	86	LT 1	36.2
Toluene	299	LT 1	LT 10
Trichloroethane	LT 50	1.8	LT 10
Limit of Detection	50	1	10

LT = Less Than

Notes:

A. All results expressed in micrograms per liter (ppb)
B. Analytical method used was EPA Method 625
C. Samples taken on July 18, 1989 by Adirondack Environmental

TABLE 2

EAGLE COMTRONICS
WELL SPECIFICATION AND ELEVATION DATA

WELL NO.	WELL DEPTH (FT)	GROUND ELEV. (FT)	SCREENED-INTERVAL (FT)	(gpd/ft2) HYDRAULIC CONDUCTIVITY	GROUND WATER ELEVATION 8/18/89	9/1/89	9/19/89
MW-1	13.33	100.00	13.33 - 3.33	2.19	97.81	96.26	97.78
MW-2	14.10	99.35	14.10 - 4.10	6.64	92.98	92.34	93.73
MW-3	14.46	99.03	14.46 - 4.46	2.18	93.24	92.16	93.61
MW-4	14.62	102.93	14.62 - 4.62	1.04	98.61	97.86	99.00
MW-5	14.99	95.67	14.99 - 4.99	2.04	89.65	88.70	90.06
MW-6	14.91	100.42	14.91 - 4.91	3.12	94.99	94.20	93.86
MW-7	14.98	98.61	14.98 - 4.98	6.55	89.51	88.70	89.65

TABLE 3

EAGLE CONTRONICS
GROUND WATER QUALITY DATA

WELL NO.	SAMPLE DATE	VINYL CHLORIDE	CHLOROETHANE	METHYLENE CHLORIDE	11DCE	11DCA	t12DCE	12DCA	111TCA	TCE	TOLUENE	TOTAL VOC'S
MW-1	8/18/89	<10	2800	<10	130	1000	1300	59	12	<10	170	5471
	9/1/89	<10	2400	<10	130	850	1100	40	<10	<10	88	4608
MW-2	8/18/89	<1	<1	<1	<1	9	5	<1	<1	1	<1	15
	9/1/89	<1	<1	<1	<1	9	5	<1	<1	1	<1	15
MW-3	8/18/89	<1	4	<1	<1	56	1	1	<1	<1	<1	62
	9/1/89	<1	4	<1	<1	52	2	<1	<1	<1	<1	58
MW-4	8/18/89	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	9/1/89	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	2
MW-5	8/18/89	<1	10	<1	2	90	3	2	<1	<1	<1	107
	9/1/89	<1	4	<1	1	93	5	2	<1	<1	<1	105
MW-6	8/18/89	18	590	27	270	3300	530	150	66	<10	<10	4951
	9/1/89	<10	450	14	210	2400	370	100	35	<10	<10	3579
MW-7	8/18/89	<1	2	<1	<1	23	<1	<1	<1	<1	<1	25
	9/1/89	<1	<1	<1	<1	17	<1	<1	<1	<1	<1	17

NOTES: All concentrations reported in ug/l (ppb).
11DCE - 1,1-Dichloroethene
11DCA - 1,1-Dichloroethane
t12DCE - trans-1,2-Dichloroethene
12DCA - 1,2-Dichloroethane
111TCA - 1,1,1-Trichloroethane
TCE - Trichloroethene

Figures

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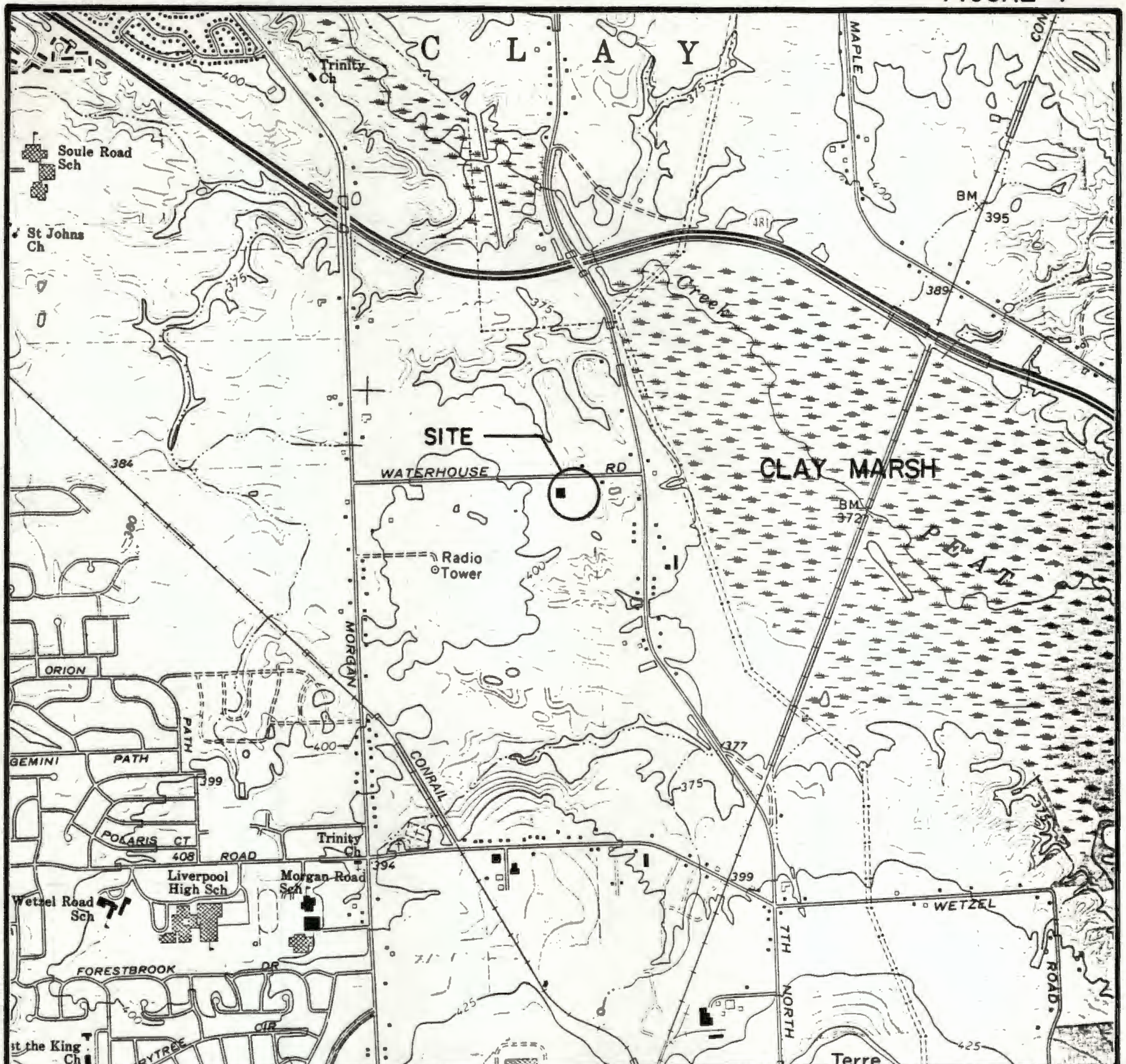
FIGURE 1



NORTH

EAGLE COMTRONICS INC.
CLAY, NEW YORK

SITE LOCATION MAP

0 2000 4000
SCALE IN FEET

ADAPTED FROM U.S.G.S. 7.5 MIN. QUAD. (BREWERTON, N.Y.)

063397

O'BRIEN & GERE ENGINEERS, INC.

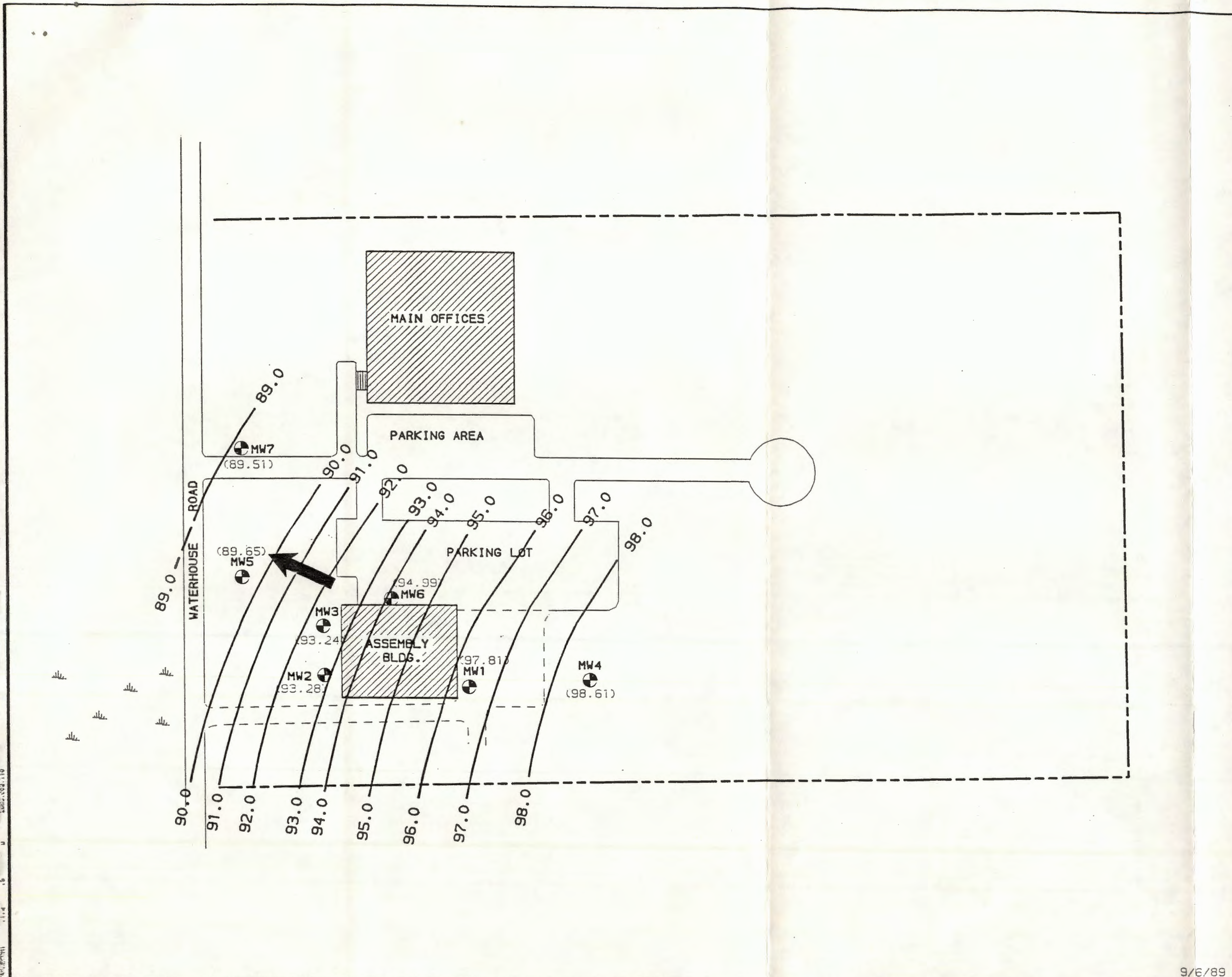


FIGURE 2

EAGLE COMTRONICS
CLAY, NEW YORK

GROUND WATER FLOW MAP
(8/18/89)

LEGEND

PROPERTY LINE
MONITORING WELL LOCATION
SHALLOW GROUND WATER CONTOUR 8/18/89
GROUND WATER FLOW DIRECTION

0 100 200
SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC.

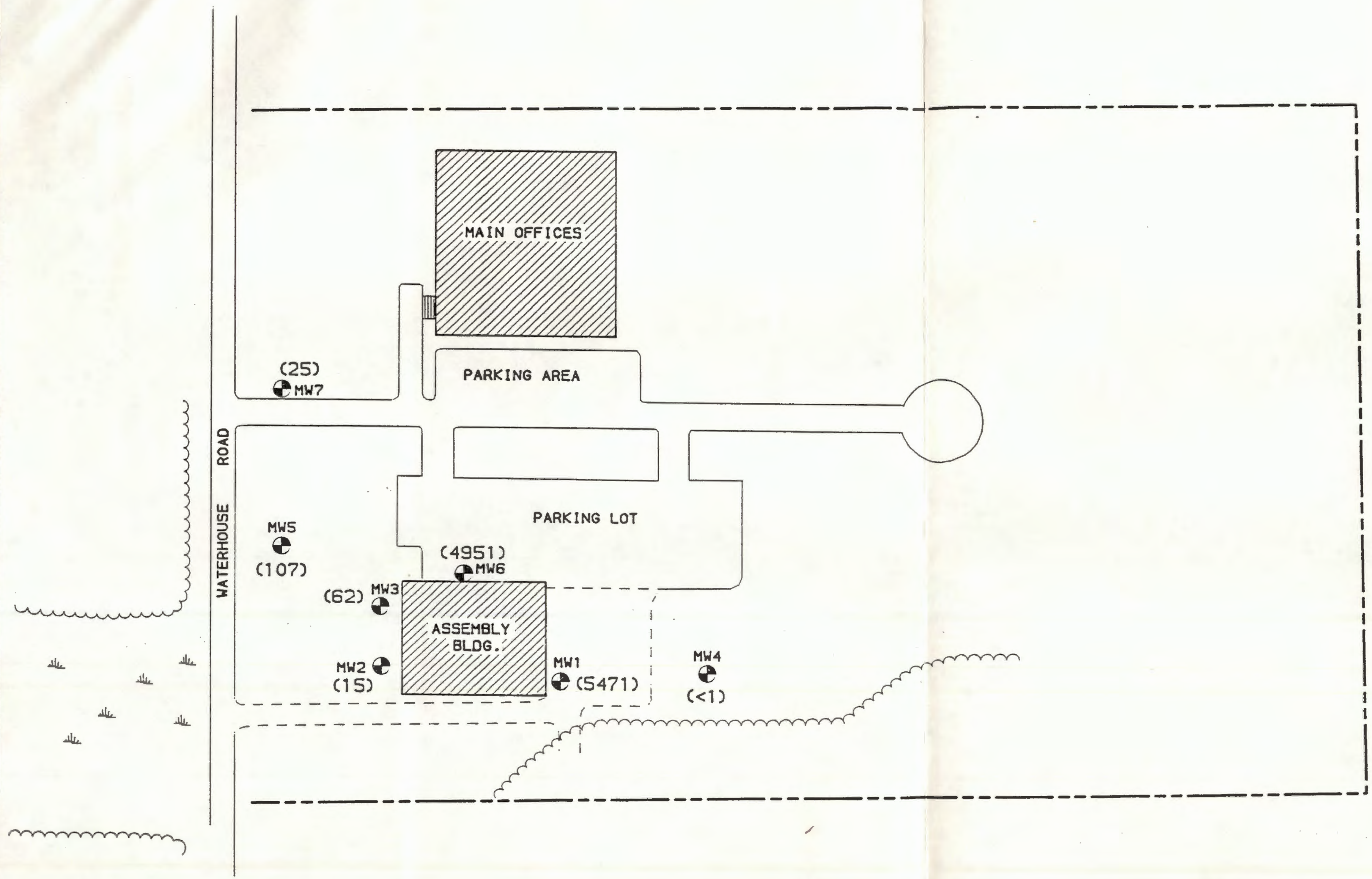


FIGURE 3

EAGLE COMTRONICS
CLAY, NEW YORK

TOTAL VOLATILE ORGANIC CONSTITUENTS IN GROUND WATER (8/18/89)

LEGEND

- PROPERTY LINE
- MONITORING WELL LOCATION
- TREE LINE
- (<1) TOTAL VOLATILE ORGANICS CONSTITUENT VALUE (PPB)

0 100 200

SCALE IN FEET

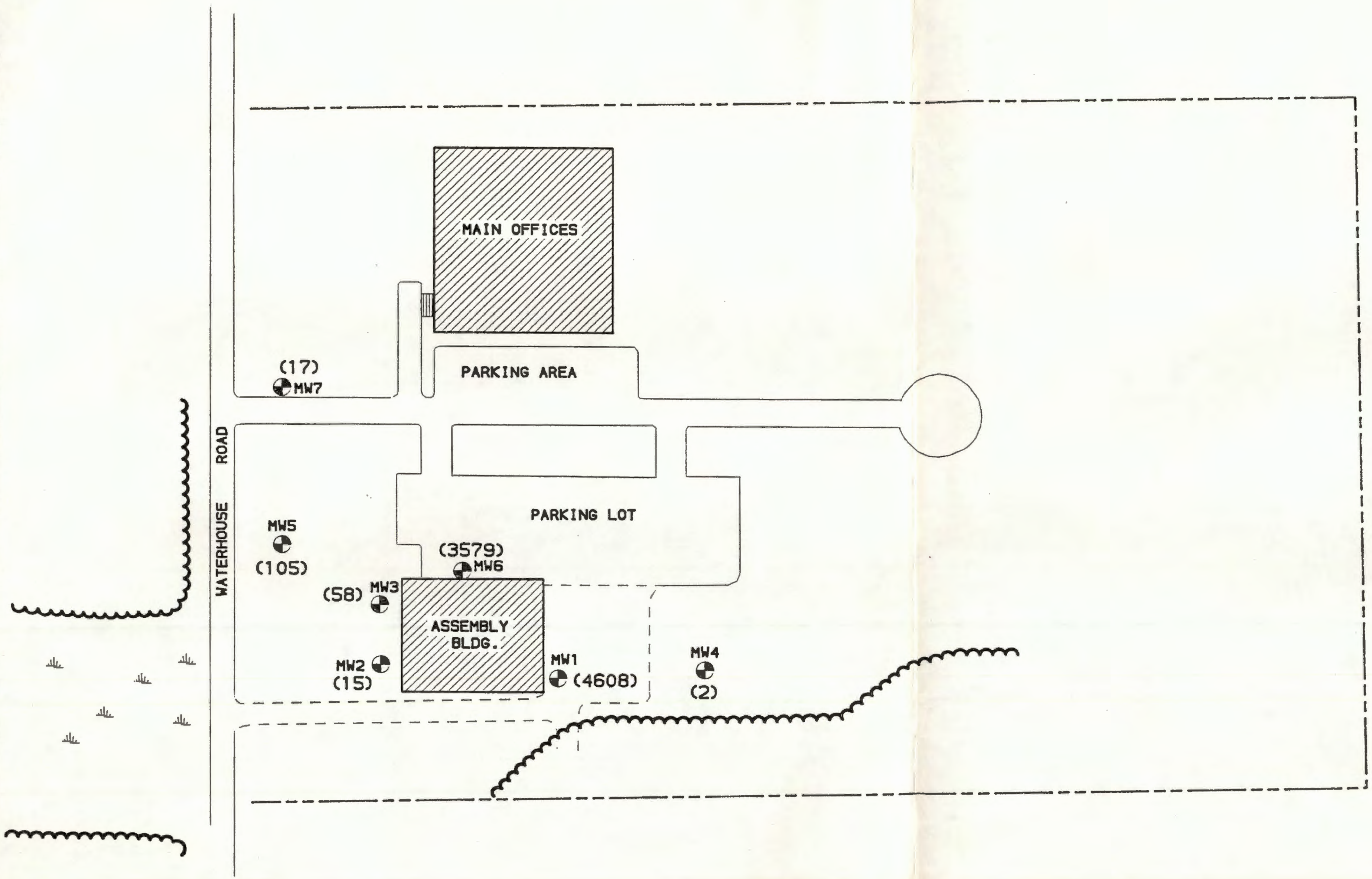
9/6/89

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 4

EAGLE COMTRONICS
CLAY, NEW YORK

TOTAL VOLATILE ORGANIC CONSTITUENTS IN GROUND WATER (9/1/89)



LEGEND

PROPERTY LINE

MONITORING WELL LOCATION

TREE LINE

(<1) TOTAL VOLATILE ORGANICS CONSTITUENT VALUE (PPB)

0 100 200

SCALE IN FEET

9/6/89

O'BRIEN & GERE ENGINEERS, INC.
Syracuse, New York

Appendices

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APPENDIX A

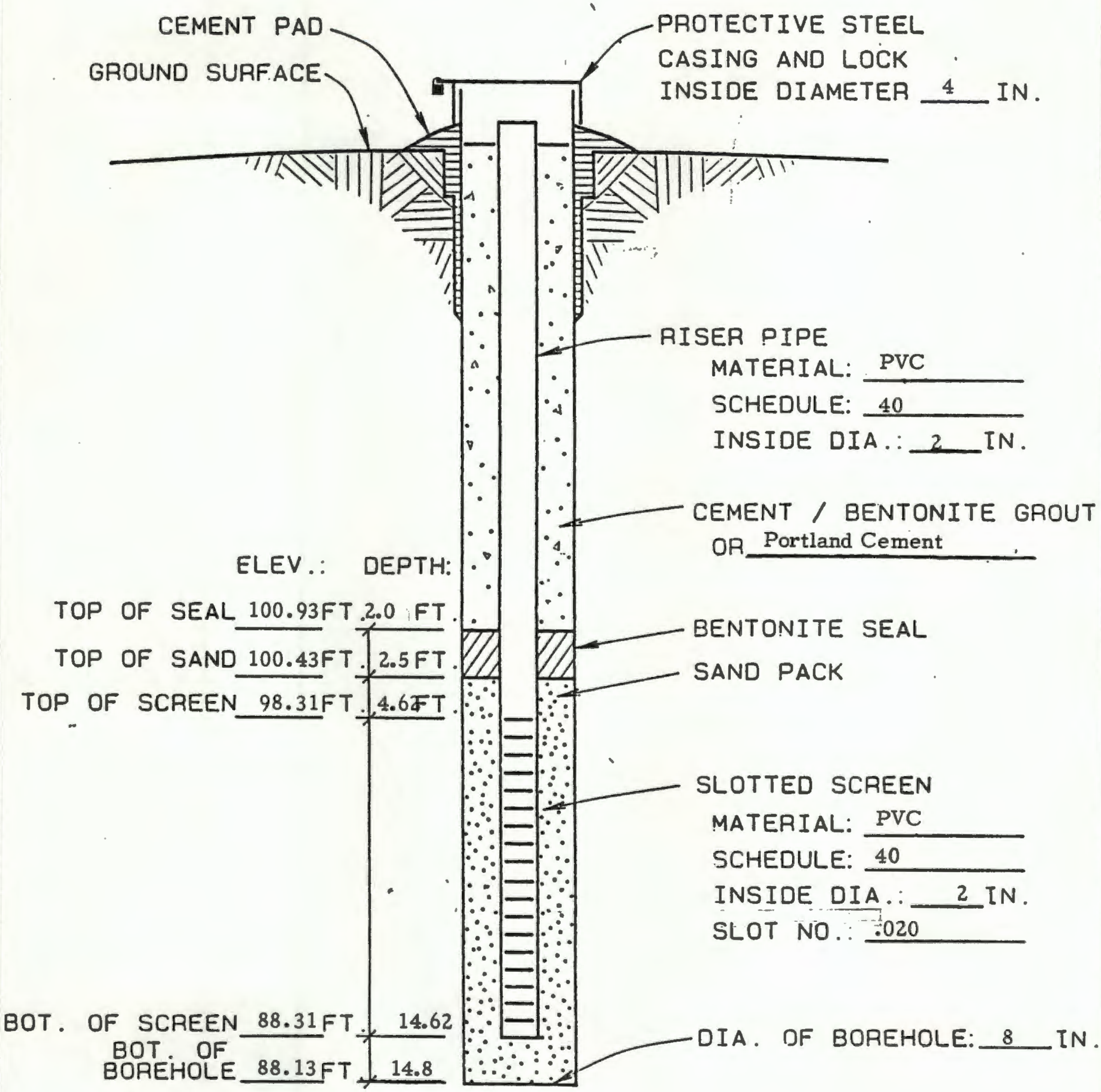
O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	Report of Boring No. MW-4 Sheet 1 of 1
Project Location: Clay, NY Client: Eagle Comtronics	SAMPLER Type: Split Spoon Hammer: 140 lbs. Fall: 30 inches	Ground Water Depth Date Depth Date File No.: 2665.002.130

Boring Co.: Parratt-Wolff Foreman: Barney Waters OBG Geologist: Tim Eddy	Boring Location: Ground Elevation: 102.93' Dates: Started: 8/16/89 Ended: 8/16/89

Depth	Sample No	Sample Depth	Blows /6"	Penetr/ Recovry	"N" Valve	Sample Description	Stratum Change General Descript	Equipment Installed	Field Testing pH	Sp Cond	HNU	Rmks#
0				GRAB		Brown, damp, fine/medium SAND, some fine/ medium gravel, trace silt, apparent fill.						
5	1	5-7'	5-22- 23-27	2'/1.8'	45	Brown with reddish tinge, wet, fine SAND, some fine/medium gravel, little silt, very stiff, apparent fill.						
10	2	10-10.9	16-50/4'	.9'/.9'	—	Red, wet, hard, clayey SILT, some fine gravel, trace fine sand, poorly sorted, unstratified, apparent till.	14.8'					
15	3	15-15.9	21-60/4'	.9'/.9'	—	- Same as above. Bottom of boring at 14.8'.						

MW4.KJK
8/18/89

MW-4



TYPICAL OVERBURDEN MONITORING WELL

N.T.S.

OBRIEN & GERE

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	Report of Boring No. MW-5 Sheet 1 of 1
Project Location: Clay, NY Client: Eagle Comtronics	SAMPLER Type: Split Spoon Hammer: 140 lbs. Fall: 30 inches	Ground Water Depth Date Depth Date File No.: 2665.002.130

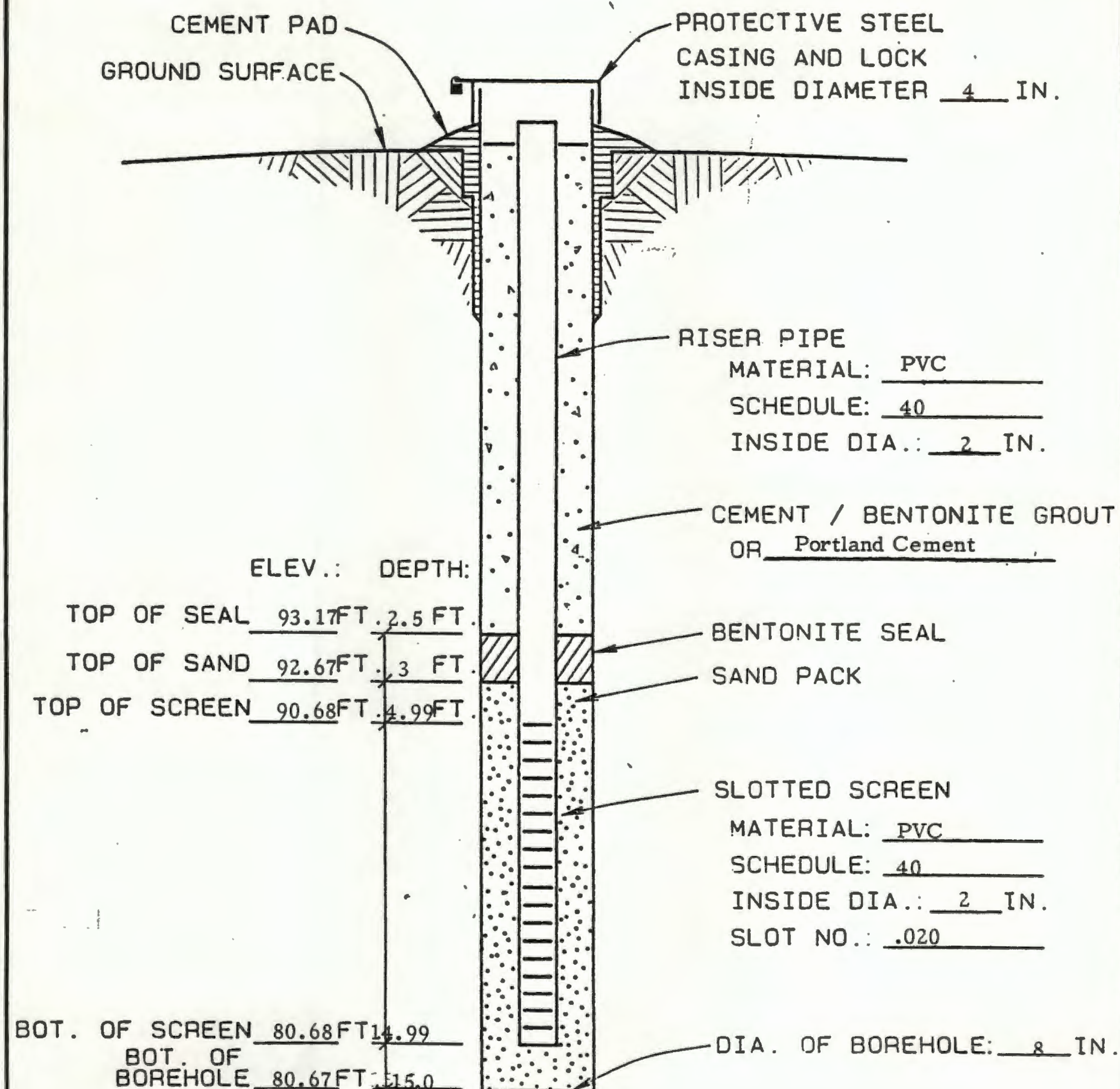
Boring Co.: Parratt-Wolff
Foreman: Barney Waters
OBG Geologist: Tim Eddy

Boring Location:
Ground Elevation: 95.67'
Dates: Started: 8/15/89 Ended: 8/15/89

Depth	Sample No	Sample Depth	Blows /6"	Penetr/ Recovry	"N" Valve	Sample Description	Stratum Change General Descript	Equipment Installed	Field Testing pH	Field Testing Sp Cond	Field Testing HNU	Rmks#
0				GRAB		0-2' Damp, reddish-brown, fine/medium SAND, little fine/medium gravel, little silt.						
5	1	5-7'	3-3-4-9	2/1.5'	7	Red, wet, clayey SILT, some fine/medium gravel, poorly sorted, unstratified, apparent till.						
10	2	10-12'	14-5- 24-50/.2	1.7/1.2'	---	Reddish-brown, saturated, stiff, clayey SILT, some fine/medium gravel, poorly sorted, unstratified, apparent till.						
							15.0'					
15	3	15-15.7	20-50/.2		---	Wet, red-gray, fine/medium angular GRAVEL, some silt, some clay, little fine sand, unstratified, poorly sorted, hard, apparent till.						
						Bottom of boring at 15 ft.						

MW5.KJK
8/18/89

MW-5



TYPICAL OVERBURDEN MONITORING WELL

N.T.S.

WELL31C R42 L1

OBRIEN&GERE

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	Report of Boring No. MW-6 Sheet 1 of 1
Project Location: Clay, NY Client: Eagle Comtronics	SAMPLER Type: Split Spoon Hammer: 140 lbs. Fall: 30 inches	Ground Water Depth Date Depth Date File No.: 2665.002.130

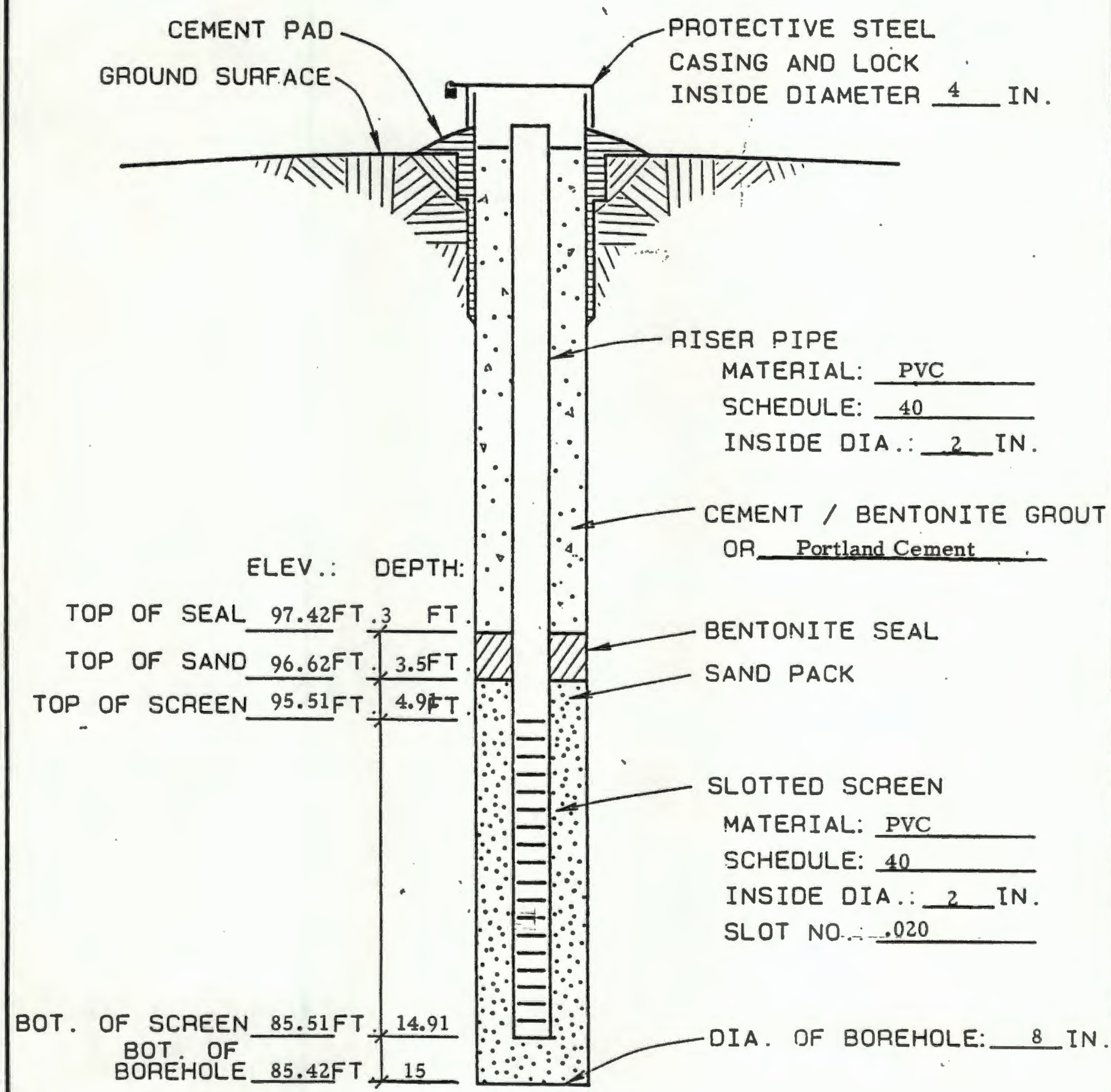
Boring Co.: Parratt-Wolff
Foreman: Barney Waters
OBG Geologist: Tim Eddy

Boring Location:
Ground Elevation: 100.42'
Dates: Started: 8/15/89 Ended: 8/15/89

Depth	Sample No	Sample Depth	Blows /6"	Penetr/ Recovry	"N" Valve	Sample Description	Stratum Change General Descript	Equipment Installed	Field Testing pH	Sp Cond	HNU	Rmks*
0				GRAB		Reddish-brown, fine/medium SAND, some fine/ medium gravel, trace silt, damp, apparent fill.						
						Grayish brown, moist, fine SAND, little silt, apparent fill.	2.0'					
5	1	5-7'	2-4-7-5	2'/1.8'	11	Soft, gray-brown, fine SAND, grading to clayey SILT with some fine/medium gravel poorly sorted, unstratified, apparent till.						
10	2	10-12'	12-8-10-16	2'/1.8'	18	Reddish-brown, saturated wet, medium stiff clayey SILT, ends in yellowish, weathered rock.						
15	3	15-15.8	45-50/.3	1.8/1.5'	---	Reddish-brown, clayey SILT, little fine/ medium gravel, saturated, grading to hard, reddish till, ending in reddish gray, fissle shale, apparent till.	15.0'					
						Bottom of boring at 15.0 ft.						

MW6.KJK
8/18/89

MW-6



TYPICAL OVERBURDEN MONITORING WELL

N.T.S.

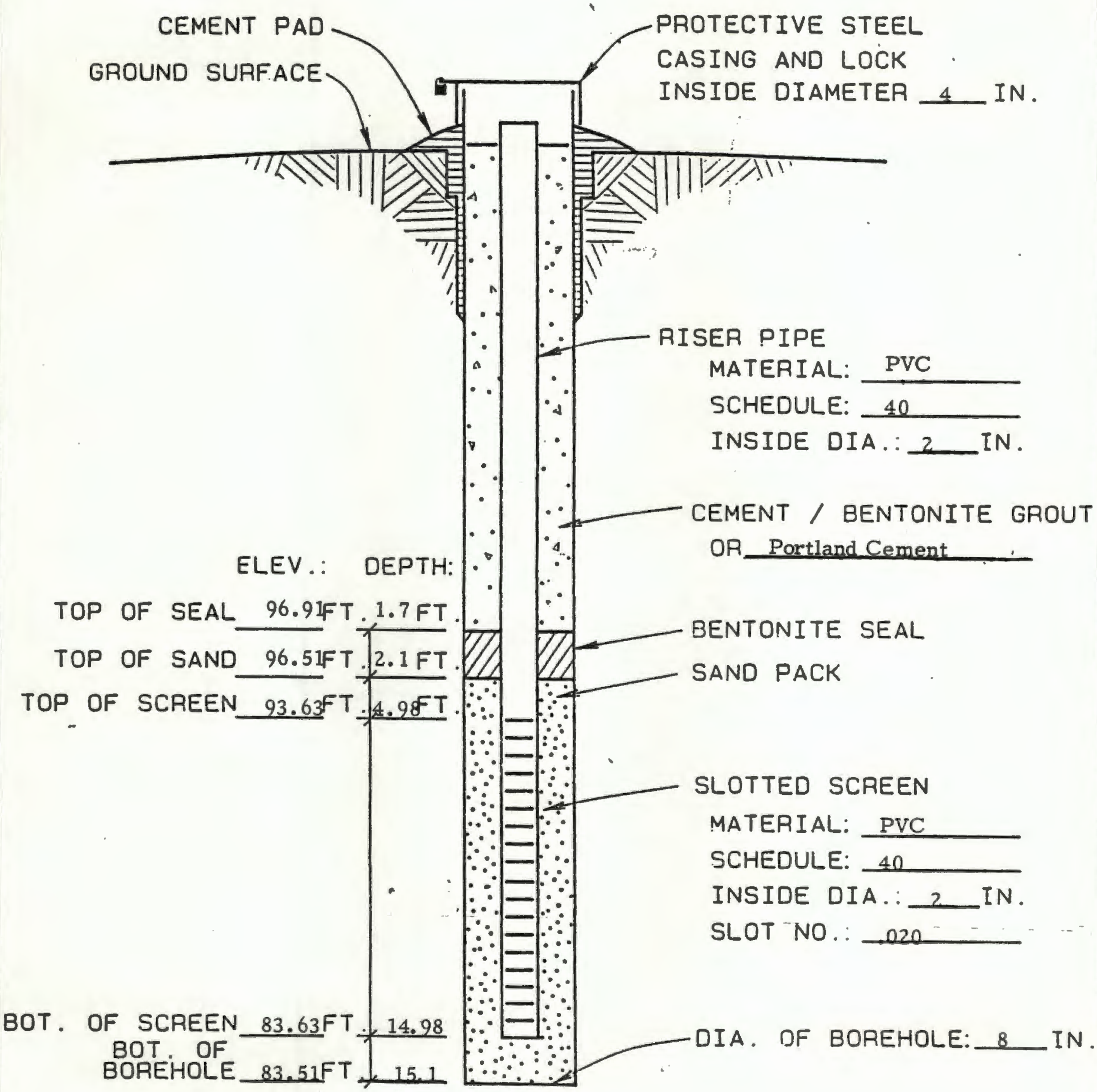
OBRIEN&GERE

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	Report of Boring No. MW-7 Sheet 1 of 1
Project Location: Clay, NY Client: Eagle Comtronics	SAMPLER Type: Split Spoon Hammer: 140 lbs. Fall: 30 inches	Ground Water Depth Date Depth Date File No.: 2665.002.130
Boring Co.: Parratt-Wolff Foreman: Barney Waters OBG Geologist: Tim Eddy	Boring Location: Ground Elevation: 98.61' Dates: Started: 8/16/89	Ended: 8/16/89

Depth	Sample No	Sample Depth	Sample Blows /6"	Sample Penetr/ Recovry	Sample "N" Valve	Sample Description	Stratum Change General Descript	Equipment Installed	Field Testing pH	Field Testing Sp Cond	Field Testing HNU	Rmks*
0				GRAB		Reddish brown, fine SAND, damp, apparent fill.						
5	1	5-7'	4-3-4-5	2'/1.5'	7	Brown, damp, fine SAND, trace silt, apparent fill (soft).						
10	2	10-11.4	24-41-50/.4'	2'/1.8'	—	Red, wet, hard, clayey SILT, some coarse sand, fine gravel, trace coarse gravel, poorly sorted, unstratified, apparent till.						
							15.1'					
15						Bottom of boring at 15.1 ft.						

MW7.KJK
8/18/89

MW-7



TYPICAL OVERBURDEN MONITORING WELL

N.T.S.

OBRIEN & GERE

APPENDIX B

OBRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

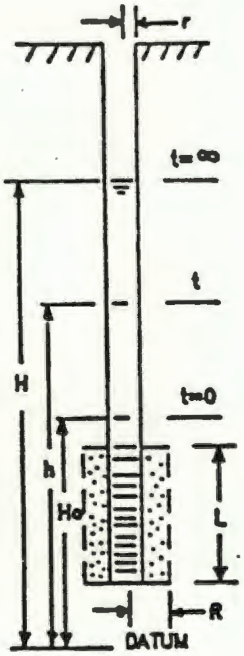
PROJECT Eagle Comtronics

WELL NUMBER MW 1

DATE 8/29/89

LOCATION Clay, NY

ELEVATION



STATIC HEAD (H) 10.13

PIPE RADIUS (r) .083

SCREEN RADIUS (R) .333

SCREEN LENGTH (L) 10

INITIAL HEAD (Ho) 9.13

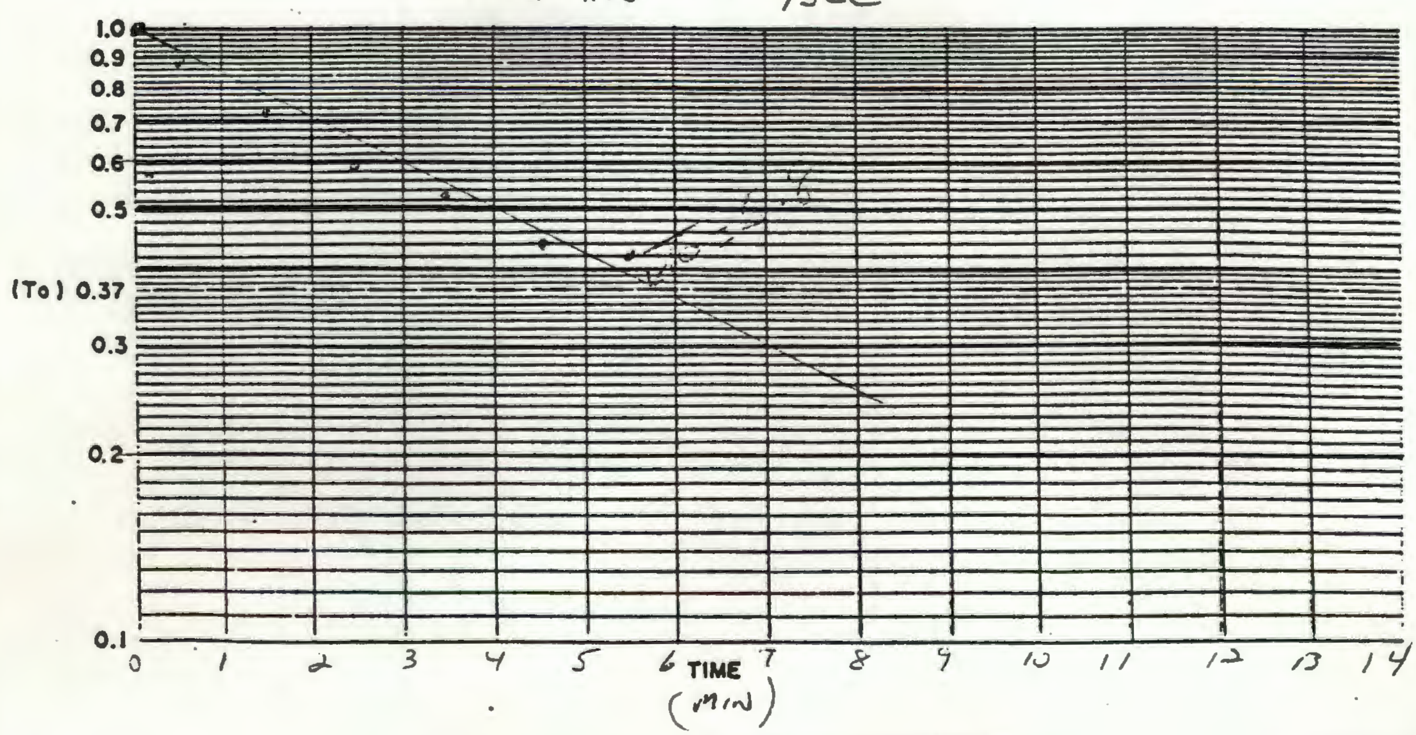
HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o}$$

K= 2.03 X 10^{-4} Ft/min

1.03 X 10^{-4} cm/sec

	RECOVERY		SLUG	
TIME	h	$\frac{H-h}{H-H_o}$	h	$\frac{H-h}{H-H_o}$
0	9.13	1		
.5	9.25	.88		
1.5	9.4	.73		
2.5	9.54	.59		
3.5	9.6	.53		
4.5	9.69	.44		
5.5	9.71	.42		

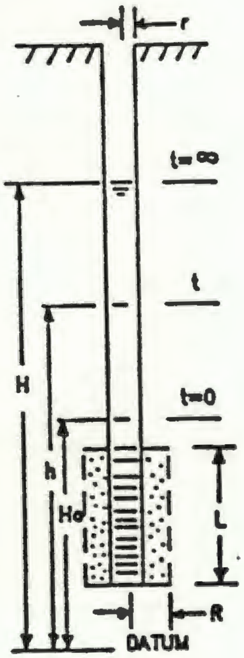


OBRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT EAGLE COMTRONICS
WELL NUMBER MW-2
DATE 8/29/62

LOCATION CLAY, NY
ELEVATION



STATIC HEAD (H) 7.63

PIPE RADIUS (r) .083

SCREEN RADIUS (R) ..33

SCREEN LENGTH (L) 7.63

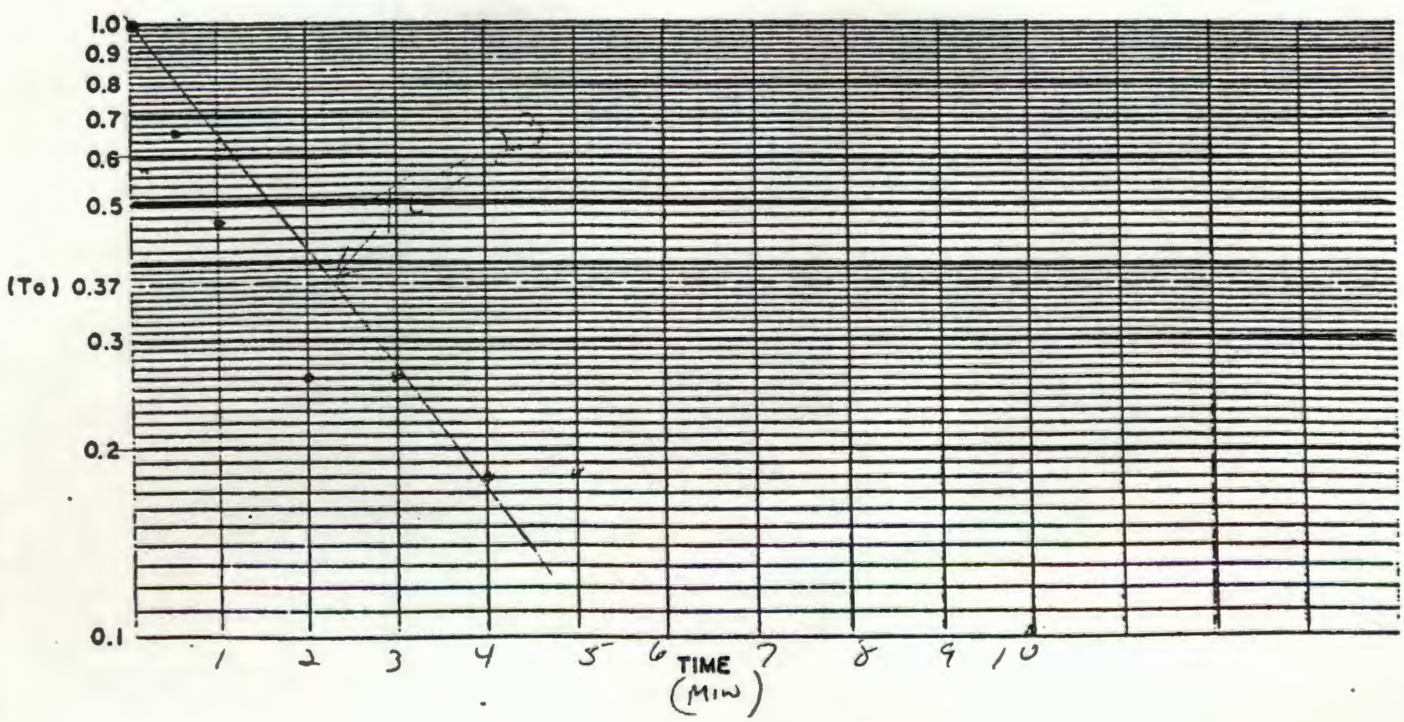
INITIAL HEAD (Ho) 6.9

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2 L T_o}$$

K= 6.17 X10^{-4} Ft/min
3.13 X10^{-4} cm/sec

	RECOVERY		SLUG	
TIME	h	$\frac{H-h}{H-H_o}$	h	$\frac{H-h}{H-H_o}$
0	6.9	1		
.5	7.15	.66		
1	7.29	.47		
2	7.44	.26		
3	7.44	.26		
4	7.5	.18		
5	7.5	.18		
10	7.56	.1		

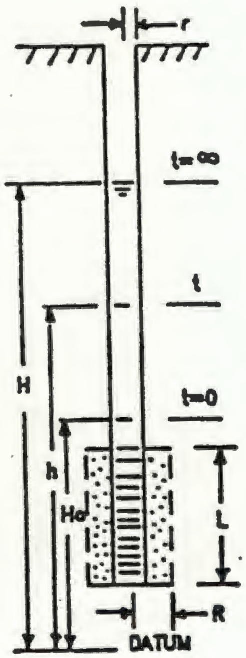


O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT EAGLE COMTRONICS
WELL NUMBER MW-3
DATE 8/29/89

LOCATION CLAY, NY
ELEVATION



STATIC HEAD (H) 8.55

PIPE RADIUS (r) .083

SCREEN RADIUS (R) .33

SCREEN LENGTH (L) 8.55

INITIAL HEAD (Ho) 5.92

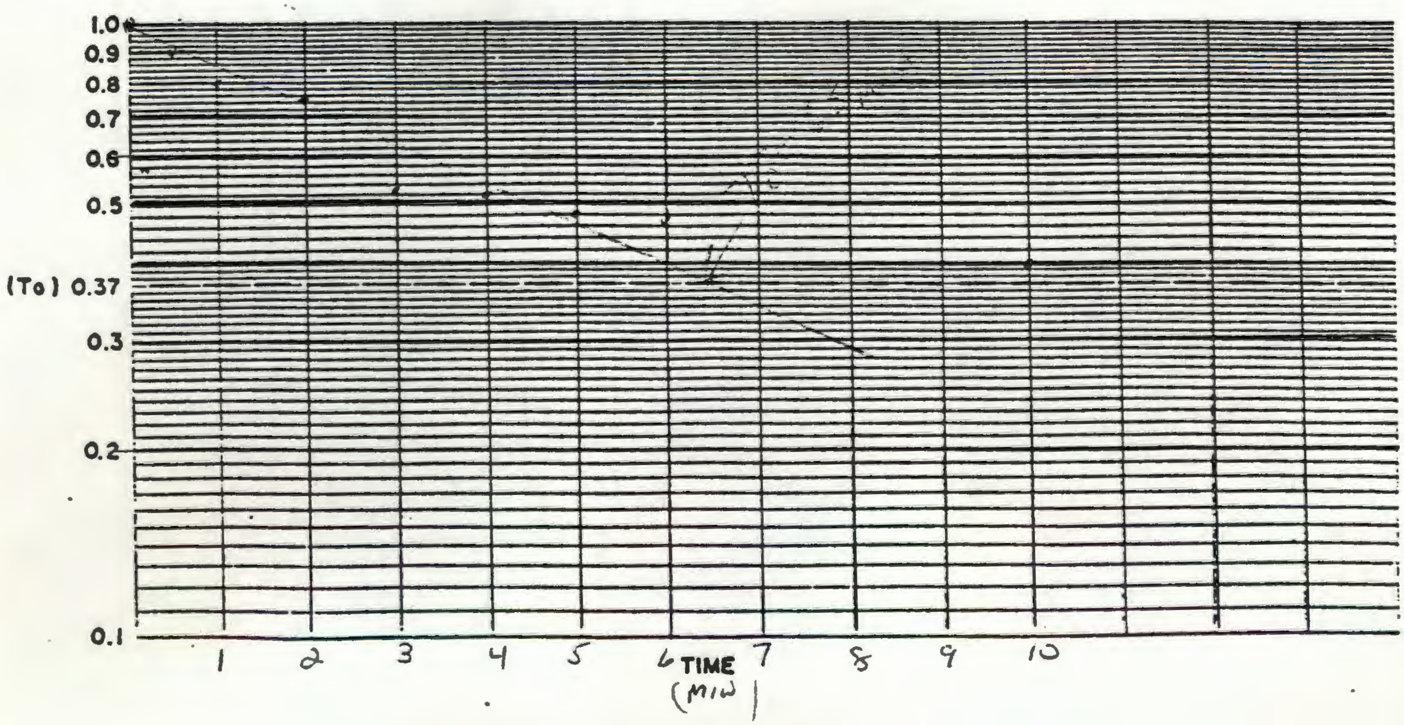
HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o}$$

$K = 2.02 \times 10^{-4}$ Ft/MIN

1.03×10^{-4} cm/sec

	RECOVERY		SLUG	
(MIN) TIME	h	$\frac{H-h}{H-H_o}$	h	$\frac{H-h}{H-H_o}$
0	5.92	1		
.5	6.17	.90		
1	6.44	.80		
2	6.59	.75		
3	7.15	.53		
4	7.14	.52		
5	7.28	.48		
6	7.32	.47		
10	7.51	.40		

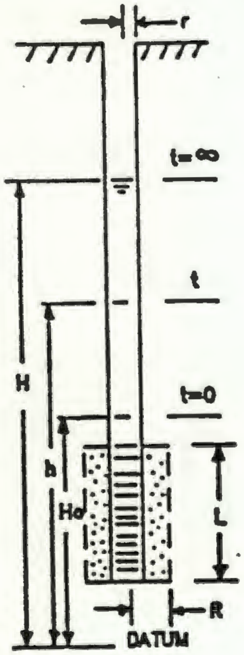


O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT EAGLE CONTRONICS
WELL NUMBER MW-4
DATE 8/29/62

LOCATION CLAY, NY
ELEVATION



STATIC HEAD (H) 9.93

PIPE RADIUS (r) .083

SCREEN RADIUS (R) .33

SCREEN LENGTH (L) 993

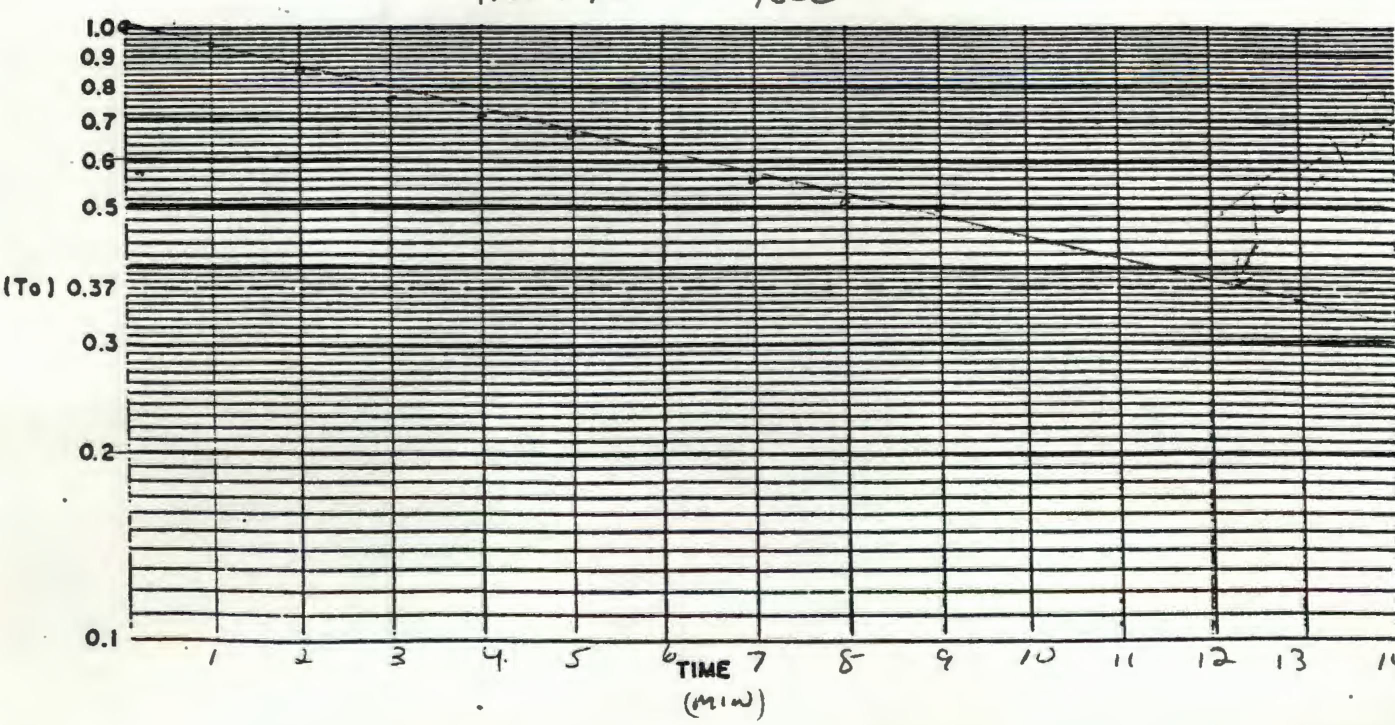
INITIAL HEAD (Ho) 8.56

HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o}$$

K= 9.6×10^{-5} Ft/MIN
4.88×10^{-5} cm/sec

	RECOVERY		SLUG	
TIME	h	$\frac{H-h}{H-H_o}$	h	$\frac{H-h}{H-H_o}$
0	8.56	1		
1	8.64	.94		
2	8.77	.85		
3	8.89	.76		
4	8.96	.71		
5	9.02	.66		
6	9.12	.54		
7	9.16	.56		
8	9.23	.51		
9	9.25	.50		



O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

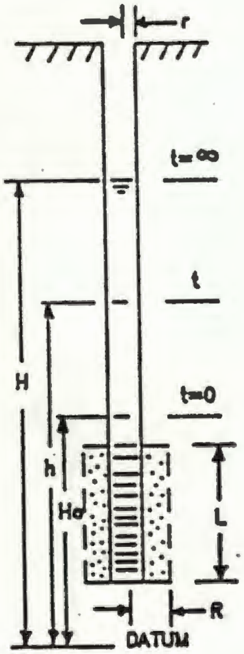
PROJECT EAGLE COMTRONICS

WELL NUMBER MW-5

DATE 9/1/89

LOCATION CLAY, NY

ELEVATION



STATIC HEAD (H) 8.36

PIPE RADIUS (r) .083

SCREEN RADIUS (R) .33

SCREEN LENGTH (L) 10

INITIAL HEAD (Ho) 7.86

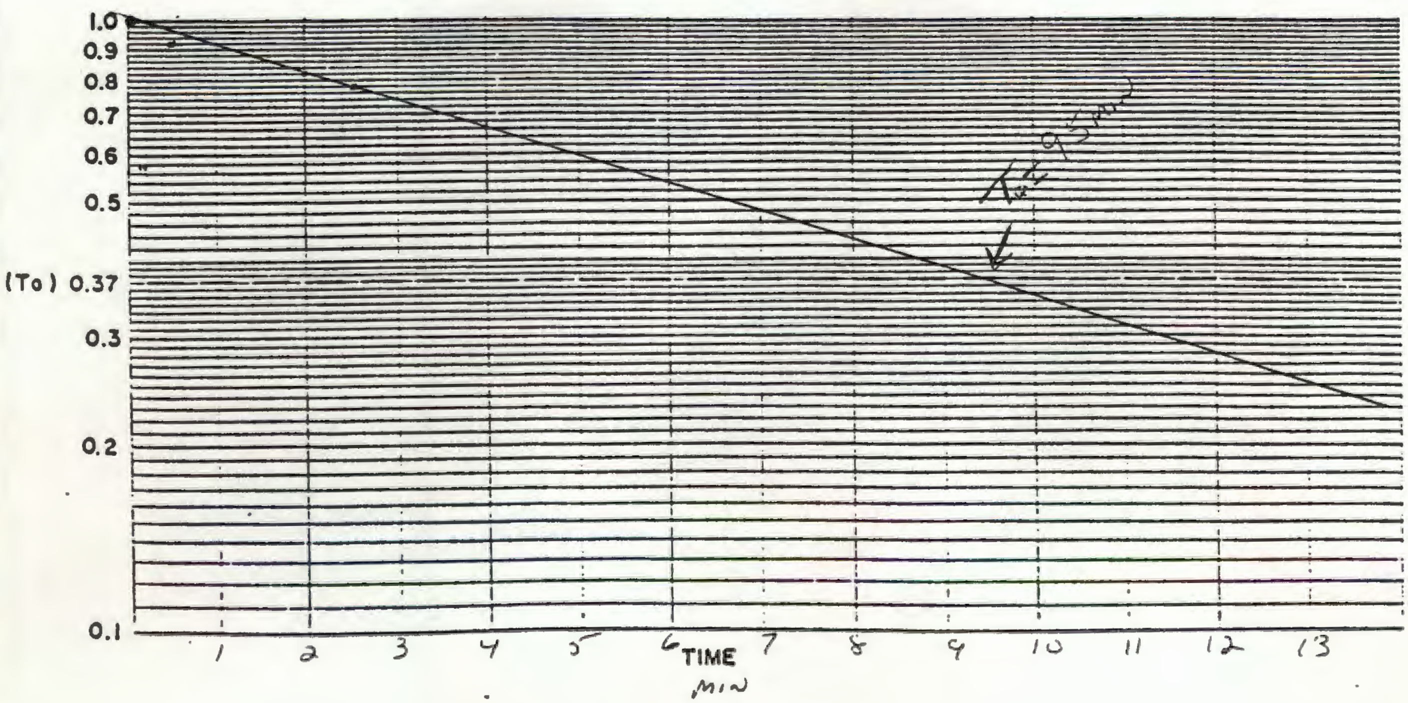
HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o}$$

K= 1.24×10^{-4} ft/min

6.28×10^{-5} cm/sec

	RECOVERY		SLUG	
MIN TIME	h	$\frac{H-h}{H-H_o}$	h	$\frac{H-h}{H-H_o}$
0	7.86	1		
.5	7.9	.92		
2	7.95	.82		
2.5	7.97	.78		

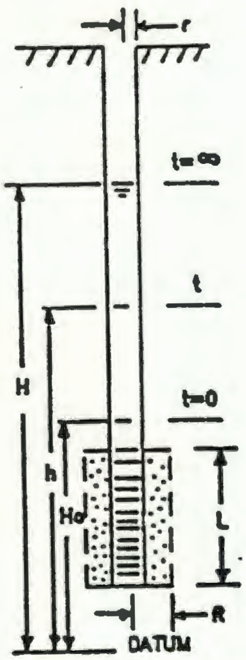


O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT EAGLE COMTRONICS
WELL NUMBER MW-6
DATE 8/29/62

LOCATION CLAY, NY
ELEVATION



STATIC HEAD (H) 8.61

PIPE RADIUS (r) .083

SCREEN RADIUS (R) .33

SCREEN LENGTH (L) 8.61

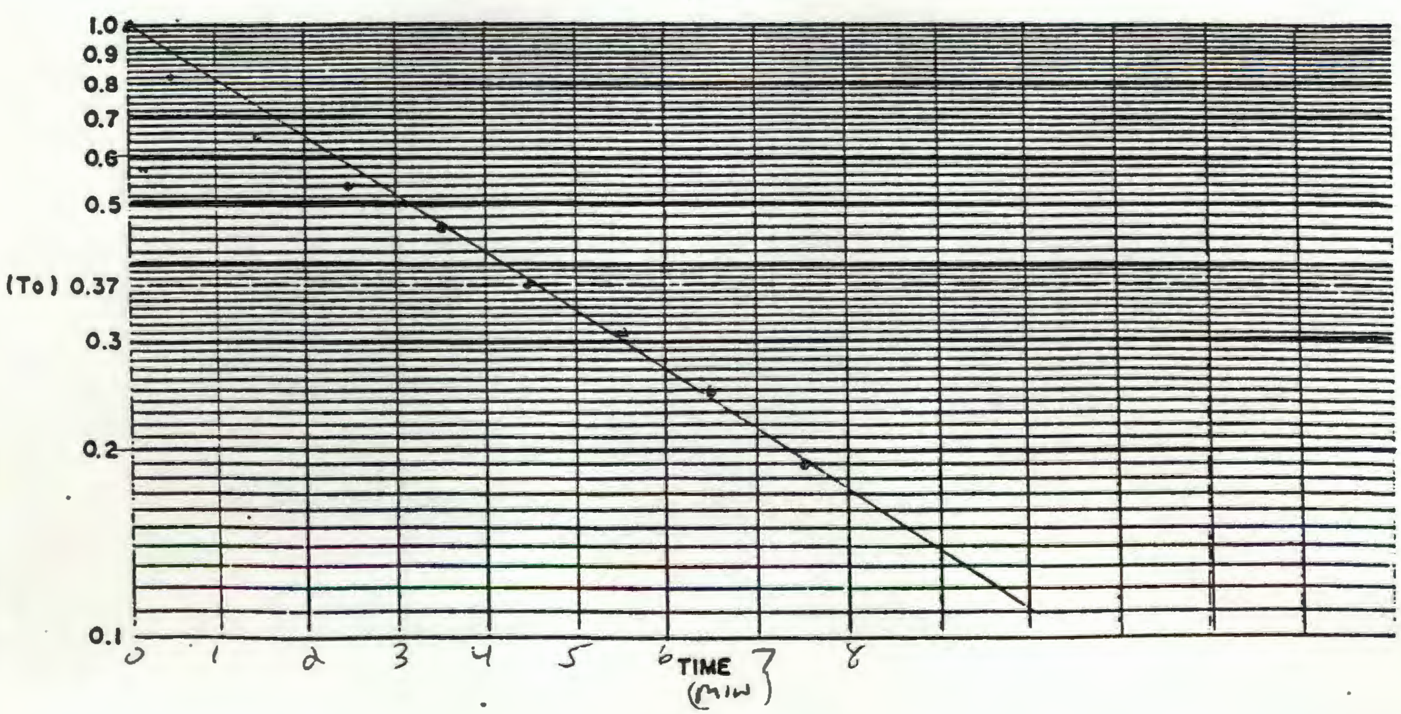
INITIAL HEAD (Ho) 7.11

HYDRAULIC CONDUCTIVITY :

$$K=\frac{r^2\ln(L/R)}{2LT_o}$$

K= 2.9 X10^{-4} ft/min
1.47X10^{-4} cm/sec

	RECOVERY		SLUG	
TIME	h	$\frac{H-h}{H-H_o}$	h	$\frac{H-h}{H-H_o}$
0	7.11	1		
.5	7.38	.82		
1.5	7.63	.65		
2.5	7.8	.54		
3.5	7.92	.46		
4.5	8.05	.37		
5.5	8.15	.31		
6.5	8.23	.25		
7.5	8.32	.19		

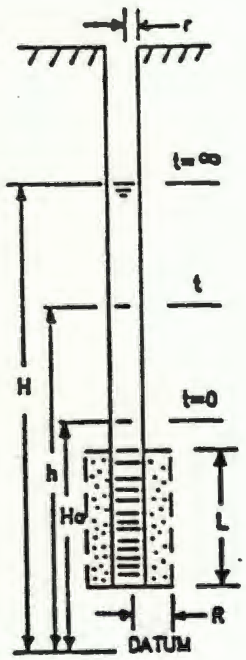


O'BRIEN & GERE

IN-SITU PERMEABILITY TEST
FIELD LOG

PROJECT EAGLE COMTRONICS
WELL NUMBER MW-7
DATE 8/29/89

LOCATION CLAY, NY
ELEVATION

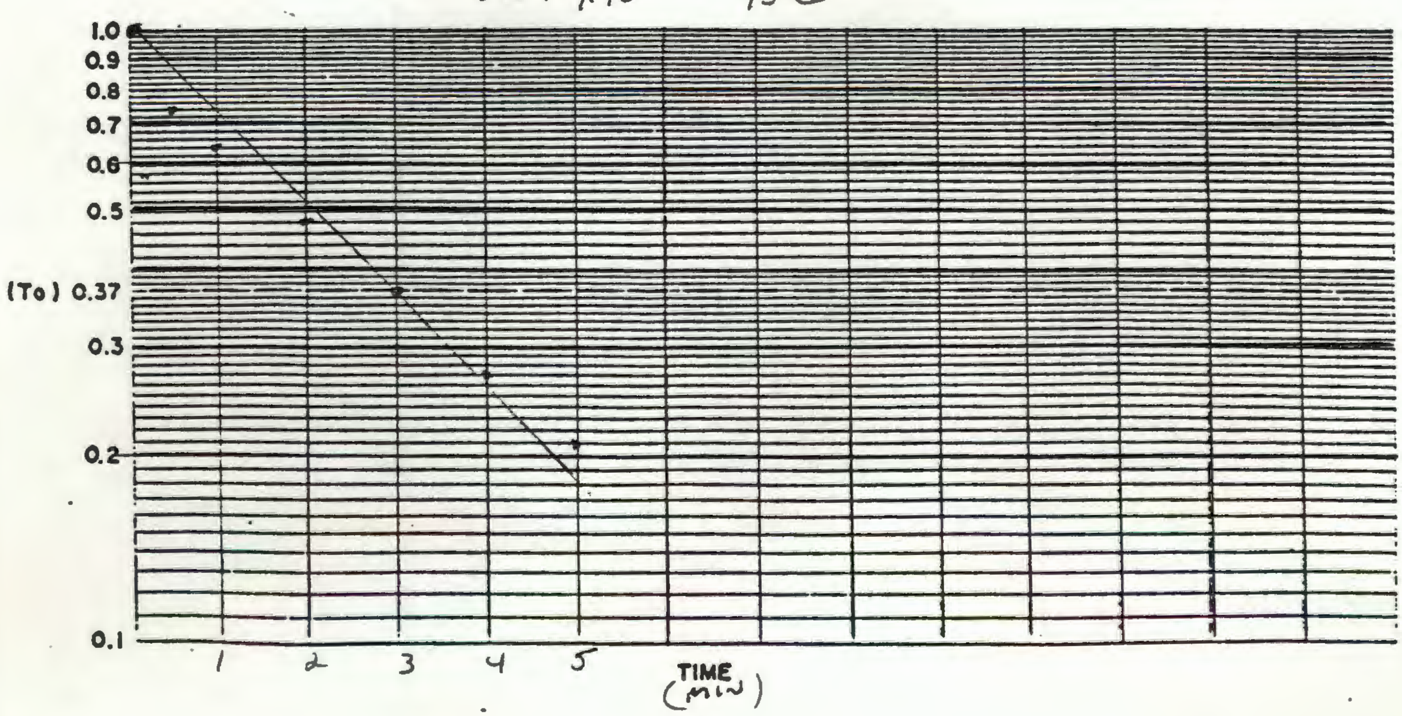


STATIC HEAD (H) 5.21
PIPE RADIUS (r) .083
SCREEN RADIUS (R) .33
SCREEN LENGTH (L) 5.21
INITIAL HEAD (Ho) 3.7
HYDRAULIC CONDUCTIVITY :

$$K = \frac{r^2 \ln(L/R)}{2LT_o}$$

K= 1.08 X10^{-4} Ft/min
3.09 X10^{-4} cm/sec

	RECOVERY		SLUG	
TIME	h	$\frac{H-h}{H-H_o}$	h	$\frac{H-h}{H-H_o}$
0	3.7	1		
.5	4.09	.74		
1	4.25	.64		
2	4.48	.48		
3	4.65	.37		
4	4.8	.27		
5	4.9	.21		



APPENDIX C

OBG LABORATORIES, INC.

Purgeable Priority Pollutants

CLIENT: O'BRIEN & GERE ENGINEERS, INC. JOB NO. 3435.001.100

DESCRIPTION: Eagle Comtronics, Inc. Waterhouse Road - Water

DATE COLLECTED: 8-18-89 DATE REC'D. 8-21-89 DATE ANALYZED: 8-21-89

DESCRIPTION:	MW1(E)	MW2(E)	MW3(E)	MW 4	MW 5	MW 6
SAMPLE NO.:	I9401	I9402	I9403	I9404	I9405	I9406
Chloromethane	<10.	<1.	<1.	<1.	<1.	<10.
Bromomethane						
Vinyl chloride						18.
Chloroethane	2800.		4.		10.	590.
Methylene chloride	<10.		<1.		<1.	27.
1,1-Dichloroethene	130.				2.	270.
1,1-Dichloroethane	1000.	9.	56.		90.	3300.
t-1,2-Dichloroethene	1300.	5.	1.		3.	530.
Chloroform	<100.	<1.	<1.		<1.	<10.
1,2-Dichloroethane	59.		1.		2.	150.
1,1,1-Trichloroethane	12.		<1.		<1.	66.
Carbon tetrachloride	<10.					<10.
Bromodichloromethane						
1,2-Dichloropropane						
t-1,3-Dichloropropene						
Trichloroethene		1.				
Benzene		<1.				
Dibromochloromethane						
1,1,2-Trichloroethane						
c-1,3-Dichloropropene						
2-Chloroethylvinyl ether	<100.	<10.	<10.	<10.	<10.	<100.
Bromoform	<100.	<10.	<10.	<10.	<10.	<100.
1,1,2,2-Tetrachloroethane	<10.	<1.	<1.	<1.	<1.	<10.
Tetrachloroethene						
Toluene	170.					
Chlorobenzene	<10.					
Ethylbenzene						
Xylenes						

UNITS: µg/l

Methodology: Federal Register—40 CFR, Part 136, October 26, 1984

Units: *µg/l* (ppb) unless otherwise noted

Comments:

Authorized: Thomas A. Alexander

Date: September 1, 1989

OBG Laboratories, Inc.
Box 4942 / 1304 Buckley Rd. / Syracuse, NY 13221 / (315) 457-1494

OBG LABORATORIES, INC.

Purgeable Priority Pollutants

CLIENT O'BRIEN & GERE ENGINEERS, INC. **JOB NO.** 3435.001.100

DESCRIPTION Eagle Comtronics, Inc. Waterhouse Road - Water

DATE COLLECTED 8-18-89 **DATE REC'D.** 8-21-89 **DATE ANALYZED** 8-21/22-89

DESCRIPTION:	MW 7	Equipment Blank	QC Trip Blank			
SAMPLE NO.:	I9407	I9408	I9409			
Chloromethane	<1.	<1.	<1.			
Bromomethane						
Vinyl chloride						
Chloroethane	2.					
Methylene chloride	<1.					
1,1-Dichloroethene						
1,1-Dichloroethane	23.					
t-1,2-Dichloroethene	<1.					
Chloroform		1.				
1,2-Dichloroethane		<1.				
1,1,1-Trichloroethane						
Carbon tetrachloride						
Bromodichloromethane						
1,2-Dichloropropane						
t-1,3-Dichloropropene						
Trichloroethene						
Benzene						
Dibromochloromethane						
1,1,2-Trichloroethane						
c-1,3-Dichloropropene						
2-Chloroethylvinyl ether	<10.	<10.	<10.			
Bromoform	<10.	<10.	<10.			
1,1,2,2-Tetrachloroethane	<1.	<1.	<1.			
Tetrachloroethene						
Toluene						
Chlorobenzene						
Ethylbenzene						
Xylenes						
				UNITS: µg/l		

Methodology: Federal Register—40 CFR, Part 136, October 26, 1984

Units: *µg/l* (ppb) unless otherwise noted

Comments:

Authorized: Thomas G. Alexander

Date: September 1, 1989

OBG Laboratories, Inc.
Box 4942 / 1304 Buckley Rd. / Syracuse, NY 13221 / (315) 457-1494

LABORATORIES, INC.

CHAIN OF CUSTODY RECORD

SURVEY	SAMPLERS: (Signature)
EAGLE COMTRONICS INC.	[illegible signature]

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE Water Comp.	Grab	Air	SEQ. NO.	NO. OF CONTAINERS	ANALYSIS REQUIRED
MW-7	WATERHOUSE RD	8/18/89	8:30Am		✓		1	2	
MW-5	"	"	8:45Am		✓		2	2	
MW-3E	"	"	9:15Am		✓		3	2	601, 602
EQUIPMENT BLANK	"	"	9:30Am		✓		4	2	
MW-2E	"	"	2:15		✓		5	2	
MW-1E	"	"	2:30Pm		✓		6	2	
MW-4	"	"	2:40Pm		✓		7	2	
MW-6	"	"	2:50Pm		✓		8	2	

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
[illegible signature]		
Relinquished by: (Signature)	**Received by:** (Signature)	**Date/Time**
Relinquished by: (Signature)	**Received by:** (Signature)	**Date/Time**
Relinquished by: (Signature)	**Received by Mobile Laboratory for field analysis:** (Signature)	**Date/Time**

Dispatched by: (Signature)	Date/Time	Received for Laboratory by:	Date/Time
[illegible signature]	8-18-89	[illegible signature]	8-21-89 0760

Method of Shipment:

OBG Laboratories, Inc.
Box 4942 / 1304 Buckley Road / Syracuse, New York 13221 / (315) 457-1494
Oakdale Medical Building / 700 Harry L. Drive / Johnson City, New York 13790

OBG LABORATORIES, INC.

Purgeable Priority Pollutants

CLIENT O'BRIEN & GERE ENGINEERS, INC. **JOB NO.** 3435.001.760

DESCRIPTION Eagle Comtronics, Clay, NY - Waters

DATE COLLECTED 9-1-89 **DATE REC'D.** 9-1-89 **DATE ANALYZED** 9-8-89

DESCRIPTION:	MW-2	MW-7	MW-3	MW-5	MW-6	MW-4
SAMPLE NO.:	J0092	J0093	J0094	J0095	J0096	J0097
Chloromethane	<1.	<1.	<1.	<1.	<10.	<1.
Bromomethane						
Vinyl chloride			↓	↓	↓	
Chloroethane			4.	4.	450.	
Methylene chloride			<1.	<1.	14.	
1,1-Dichloroethene	↓	↓	↓	1.	210.	
1,1-Dichloroethane	9.	17.	52.	93.	2400.	
t-1,2-Dichloroethene	5.	<1.	2.	5.	370.	
Chloroform	<1.		<1.	<1.	<10.	
1,2-Dichloroethane				2.	100.	
1,1,1-Trichloroethane				<1.	35.	
Carbon tetrachloride					<10.	
Bromodichloromethane						
1,2-Dichloropropane						
t-1,3-Dichloropropene	↓					↓
Trichloroethene	1.					2.
Benzene	<1.					<1.
Dibromochloromethane						
1,1,2-Trichloroethane						
c-1,3-Dichloropropene	↓	↓	↓	↓	↓	↓
2-Chloroethylvinyl ether	<10.	<10.	<10.	<10.	<100.	<10.
Bromoform	<10.	<10.	<10.	<10.	<100.	<10.
1,1,2,2-Tetrachloroethane	<1.	<1.	<1.	<1.	<10.	<1.
Tetrachloroethene						
Toluene						
Chlorobenzene						
Ethylbenzene						
Xylenes	↓	↓	↓	↓	↓	↓

UNITS: µg/l

Methodology: Federal Register—40 CFR, Part 136, October 26, 1984

Units: µg/l (ppb) unless otherwise noted

Comments:

Authorized: Thomas A. Alexander

Date: October 5, 1989

OBG Laboratories, Inc.
Box 4942 / 1304 Buckley Rd. / Syracuse, NY 13221 / (315) 457-1494

LABORATORIES, INC.

Purgeable Priority Pollutants

CLIENT O'BRIEN & GERE ENGINEERS, INC. JOB NO. 3435.001.760

DESCRIPTION Eagle Comtronics, Clay, NY - Waters

DATE COLLECTED 9-1-89 DATE REC'D. 9-1-89 DATE ANALYZED 9-8-89

DESCRIPTION:	MW-1	Bailer Blank	QC Trip Blank			
SAMPLE NO.:	J0098	J0099	J0100			
Chloromethane	<10.	<1.	<1.			
Bromomethane						
Vinyl chloride	↓					
Chloroethane	2400.					
Methylene chloride	<10.					
1,1-Dichloroethene	130.					
1,1-Dichloroethane	850.					
t-1,2-Dichloroethene	1100.					
Chloroform	<100.					
1,2-Dichloroethane	40.					
1,1,1-Trichloroethane	<10.					
Carbon tetrachloride						
Bromodichloromethane						
1,2-Dichloropropane						
t-1,3-Dichloropropene		↓				
Trichloroethene		4.				
Benzene		<1.				
Dibromochloromethane						
1,1,2-Trichloroethane						
c-1,3-Dichloropropene	↓	↓	↓			
2-Chloroethylvinyl ether	<100.	<10.	<10.			
Bromoform	<100.	<10.	<10.			
1,1,2,2-Tetrachloroethane	<10.	<1.	<1.			
Tetrachloroethene	↓					
Toluene	88.					
Chlorobenzene	<10.					
Ethylbenzene						
Xylenes	↓	↓	↓			

UNITS: µg/1

Methodology: Federal Register—40 CFR, Part 136, October 26, 1984

Units: µg/l (ppb) unless otherwise noted

Comments:

Authorized: Thomas [signature]

Date: October 5, 1989

OBG Laboratories, Inc.
Box 4942 / 1304 Buckley Rd. / Syracuse, NY 13221 / (315) 457-1494