report. Y00110. 1995-02-01, SIR.

FILE COPY

CALDOR SHOPPING CENTER

Pelham Manor, New York

SITE INVESTIGATION

FEBRUARY 1995

AKRF, INC.

117 East 29th Street
New York, NY 10016
(212)-696-0670

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. INTRODUCTION

The project site is approximately 20 acres in size and is occupied by a major shopping center. There are proposed plans to expand the shopping center by adding three new buildings to the shopping complex.

The site was formerly a Consolidated Edison town gas production facility. The surrounding area adjacent to Eastchester Creek was largely used for petroleum off-loading and storage in the past. A Getty storage terminal is currently located adjacent to the site on the west. Earlier investigations (conducted in 1987-1988) detected soil and groundwater contamination at the site in the form of volatile organic compounds, primarily benzene, toluene, ethylbenzene, and xylenes (BTEXs). These compounds exceeded the limits contained in the Class GA Groundwater Standards (6 NYCRR Part 703).

The current site investigation was performed to define the extent and nature of the problem and to aid in the development of a remediation program. The sampling methodologies and the Quality Assurance/Quality Control program were included in the AKRF report "Site Investigation, Detailed Work Plan", March 1993. The report was submitted to the New York State Department of Environmental Conservation (NYSDEC) Division of Water and approved by the NYSDEC prior to the commencement of the site investigation.

The following report contains the results of soil and groundwater testing and discusses the implications for project activities. It recommends a practical and feasible remediation plan that would be protective of human health and the environment, and at the same time does not impede the proposed expansion of the shopping center.

II. SAMPLING AND ANALYSES PROGRAM

The site investigation addressed several issues:

- the extent of soil contamination, thereby enabling the evaluation of appropriate treatment options for achieving source control;
- the levels of groundwater contamination and site hydrogeology, which aided in the conceptual design of a groundwater treatment system;
- off-site disposal options for the soils that would be excavated during construction;
- health and safety considerations during construction; and
- the need for a vapor venting system in the areas of the proposed buildings.

Soil gas samples were analyzed at twenty-eight locations in the area of the proposed buildings to determine if a vapor venting system was required to protect the health and safety of the future occupants of the building. If required, such a system would be designed and installed prior to any construction of the proposed new buildings.

The soil and groundwater sampling locations are shown on Figure 1. Soil samples were collected either from areas of the site with suspected contamination or areas planned for excavation. The proposed expansion of the shopping center would involve installing new stormwater drains as shown by the dotted lines on Figure 1. The excavations for these drains would extend 6 to 7 feet below grade. The construction of the new buildings may require some excavation to facilitate laying down the footings or driving piles.

Groundwater monitoring wells were installed along the Eastchester Creek and in conjunction with the existing wells provided the necessary groundwater quality and flow information to conceptually design a groundwater pump and treat system. A groundwater elevation survey was carried out to verify the groundwater flow direction, slug tests analyses were performed to determine the hydraulic conductivity of the aquifer, and the extent of tidal influence on groundwater levels was evaluated.

All soil and groundwater samples were tested for volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPHs). In addition, the soil samples from the areas slated for excavation were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) parameters to determine their disposal options.

7•93

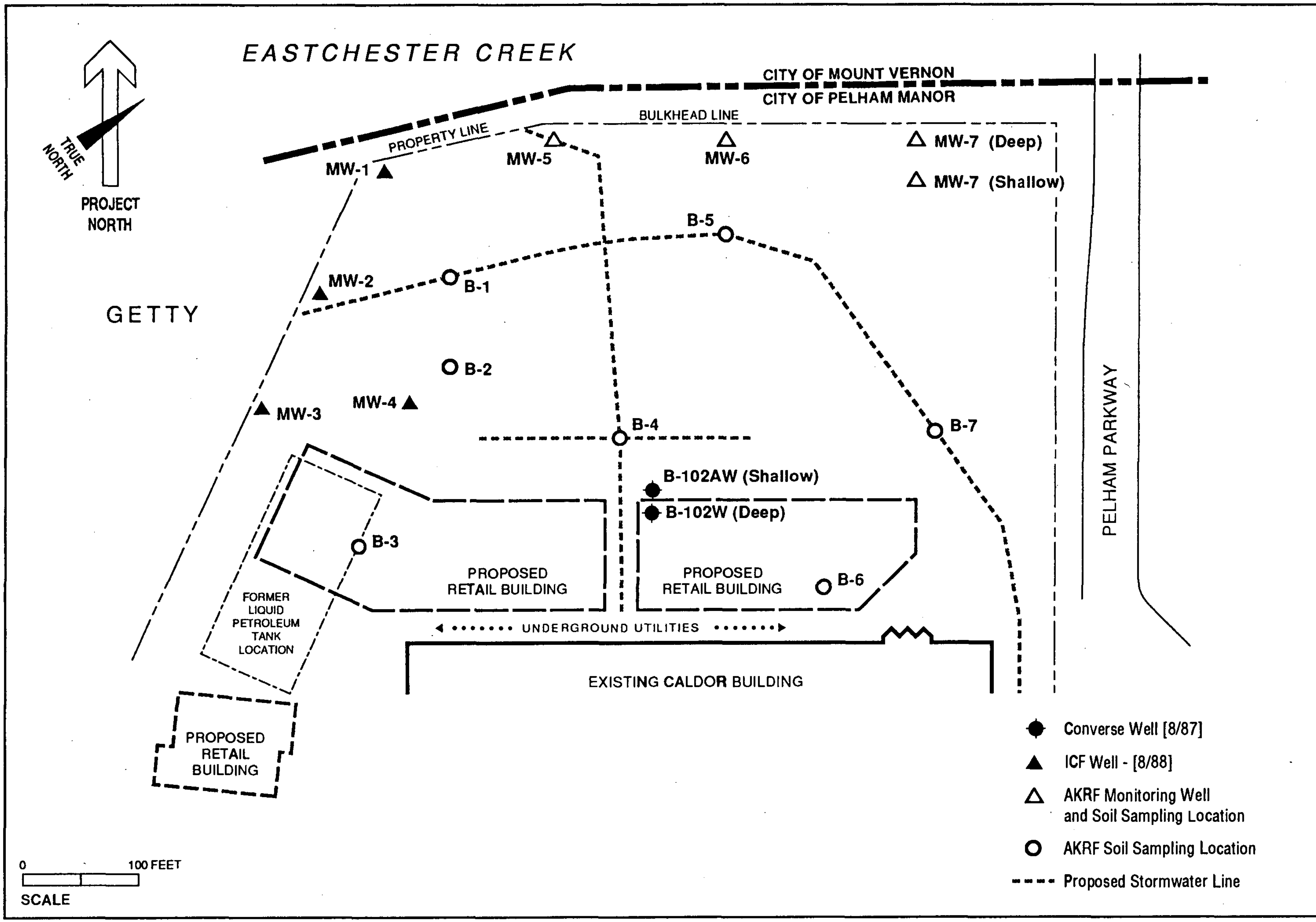


FIGURE 1 **SOIL AND GROUNDWATER SAMPLING LOCATIONS**

III. SOIL SAMPLING RESULTS

The soil sampling locations are shown on Figure 1. The locations were chosen based on past studies performed on the site and on the areas proposed for excavation for construction purposes. For the sake of convenience, locations on the site are described with reference to the project north arrow as shown on the figure. Two soil samples, B-8 and B-9, were collected from the parking lot on the south side of the building, from the area of the proposed location of the storm drains. B-8 is located south of B-6 while B-9 lies to the south of B-3.

A. SITE GEOLOGY

Information on site geology was gathered from AKRF's site observations and from the geotechnical investigation of the site conducted in 1987 by Converse Engineering. The site's geology is characterized by a layer of fill material overlaying a silty peat layer, below which lies fine to coarse sand. The surface fill layer is about 8 to 10 feet thick towards the creek and about 13 to 16 feet thick towards the existing building (in the areas of the proposed expansion). It consists of fine to medium sand with brick, gravel and coal fragments.

The silty peat layer is the remnant of the former tidal wetland that once occupied the site. Near the creek this layer is about 8 to 10 feet below grade and has a thickness of 4 to 6 feet. In the center of the proposed expansion area (i.e. between the proposed retail buildings) the layer is about 16 feet below grade and is about 4 feet thick. In the western portion of the proposed expansion the layer is 13 feet below grade and has a thickness of 9 feet. In the eastern portion of the proposed expansion area there was no evidence of the peat layer but only a 6 inch lens of brown organic silt, 8 feet below grade.

Bedrock was found by Converse Engineering at about 35 feet below grade to the west of the proposed expansion areas and was found to drop to about 50 feet below grade in the center and east of the proposed expansion areas.

B. ORGANIC CONTAMINATION

The concentrations of volatile organic compounds (VOCs) in the soil samples are shown in Table 1. The VOCs that were detected were predominantly benzene, toluene, ethylbenzene, and xylenes. The total VOCs ranged from not detectable to about 500 ppm. The three highest values of total VOCs were found at B-9, B-2, and MW-7 at approximately 520 ppm, 150 ppm, and 110 ppm respectively. The presence of volatile organic compounds in the soil appears to be wide spread over much of the site and extends below the ground-water table. It was also found below the silty peat layer in the one area where it was sampled (MW-7). The Converse field investigation in 1987 showed that the eastern portion of the proposed expansion areas had hydrocarbon contamination that extended to a depth of about 40 feet below grade. In the center and in the western portion of the proposed expansion areas, the peat layer appeared to be acting like a confining layer, since the hydrocarbon contamination found in the shallow fill layer was not found to extend below the peat layer.

Field observations and laboratory analysis of total petroleum hydrocarbons (TPHs) of the soil samples indicate that almost all the locations had some hydrocarbon contamination, with the maximum concentration being found just above the silty peat layer (where encountered). It appeared as if past surficial spills had percolated through the fill layer and had accumulated over the confining peat layer which restricted further downward movement of the contaminants.

TABLE 1

CALDOR - PELHAM MANOR

VOLATILE ORGANICS IN SOIL SAMPLES (mg/kg; ppm)

Compound	B-1 (6-8)	B-2 (6-8)	B-3 (9-11)	B-4 (6-8)	B-5 (2-4)	B-6 (6-8)	B-7 (8-10)	B-8 (2-4)	B-9 (4-6)	B-9 (8-10)	MW-5 (6-8)	MW-6 (6-8)	MW-7 (16-17)	Field Blank	Trip Blank
Chloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromomethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2.0 B	2.7 B	2.2 B	2.2 B	U	U	3.4 B	1.7 B	4.9 B	1.2 B	U	U	9.8 B	0.006 B	0.006 B
Acetone	U	U	U	U	U	U	U	U	2.9 TB	U	U	U	U	U	0.010 J
Carbon Disulfide	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
2-Butanone	U	U	U	U	U	U	U	U	U	U	0.1 T	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Cis-1,3-dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Benzene	3.6	22.0	0.2 J	U	U	U	U	0.4 J	3.7	U	U	U	15.0	U	U
Trans-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Bromoform	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	U	U	U	U	U	U	0.9 J	U	U	U	U	U	U	U	U
2-Hexanone	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrochloroethene	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	2.7	U	U	U	U	U	U	U	U
Toluene	0.7 J	30.0 E	U	0.2 J	U	U	0.3 J	0.5 J	82.0	32.0 E	U	U	8.8	0.002 J	0.002 J
Chlorobenzene	U	U	U	U	U	U	0.3 J	U	U	U	U	U	U	U	U
Ethylbenzene	13.0	21.0	1.2	11.0	U	U	7.7	0.8	69.0	31.0 E	U	U	42.0	U	U
Styrene	U	U	U	U	U	U	U		49.0	47.0 E	U	U	U	U	U
Xylene (total)	12.0	75.0	1.5	17.0	U	U	13.0	2.4	320.0	110.0 E	U	U	44.0	U	U
TOTAL PETROLEUM HYDROCARBONS (mg/kg)	489	4140	3620	544	1090	109	156	448	1580	803	12600	U	294	U	

U = Not Detected
J = Estimated value
B = Found in blank also
E = Exceeds calibration range

pvs\qpro
#24\calsolvo.wq1

C. TCLP ANALYSES

TCLP was performed on soil samples taken along the proposed utility trenches. As shown in Table 2, only lead and barium were found in the TCLP extract, and even these were measured at levels well below their regulatory limits. Hence, the soil excavated for construction purposes would not be a hazardous waste, under either current state or federal definitions and can be disposed of either in an asphalt batching facility or in an industrial landfill or can be incinerated.

D. SOIL GAS SAMPLING

Soil gas was sampled using an Organic Vapor Meter (OVM) in the area of the proposed expansion to evaluate the need for a sub slab venting system. The soil gas sampling locations are shown on Figure 2. The results of the soil gas survey are listed in Table 3. The concentrations were relatively high in several locations in the footprint of the two proposed buildings to the north of the existing building (Buildings A & B). These two buildings would require the use of a soil gas venting system to assure no impact to the occupants of these structures. The system would be installed under the slab of the proposed buildings when construction work begins on the site. The soil gas concentrations were not detectable to negligible in the one proposed building footprint to the west of the existing building (Building C). Hence, Building C would not require a vapor venting system.

7•93

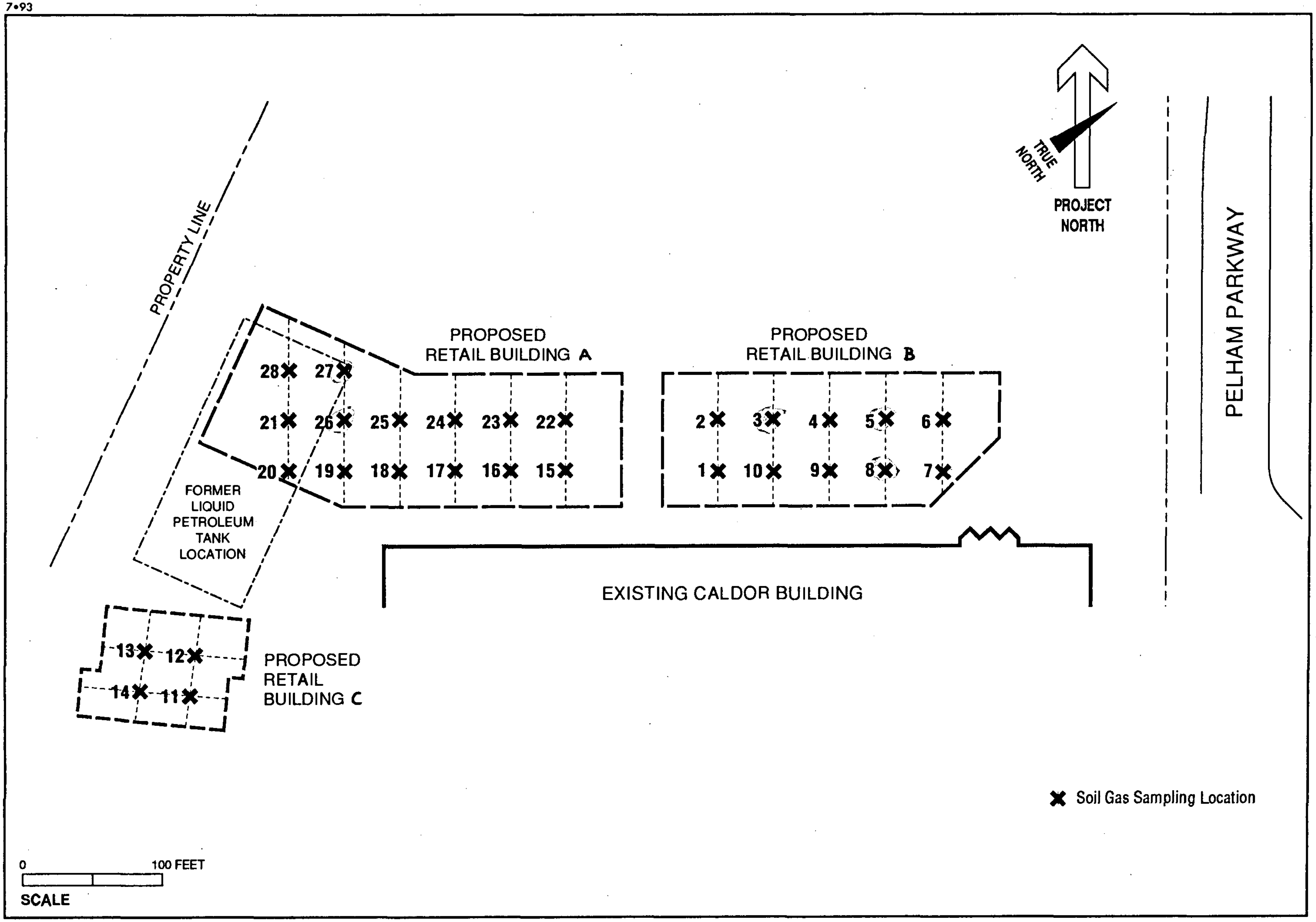


FIGURE 2 **SOIL GAS SAMPLING LOCATION**

TABLE 2

CALDOR - PELHAM MANOR

TCLP Analysis (mg/l)

	Regulatory Levels	B-1 (6-8)	B-4 (6-8)	B-5 (2-4)	B-7 (8-10)	B-8 (2-4)	B-9 (4-6)	FB
VOLATILES								
Benzene	0.50	U	U	U	U	U	U	U
Carbon tetrachloride	0.50	U	U	U	U	U	U	U
Chlorobenzene	100.0	U	U	U	U	U	U	U
Chloroform	6.0	U	U	U	U	U	U	U
1, 2-Dichloroethane	0.5	U	U	U	U	U	U	U
1, 1-Dichloroethylene	0.7	U	U	U	U	U	U	U
Methyl ethyl ketone	200.0	U	U	U	U	U	U	U
Teterachloroethylene	0.7	U	U	U	U	U	U	U
Trichloroethlyne	0.5	U	U	U	U	U	U	U
Vinyl chloride	0.20	U	U	U	U	U	U	U
SEMIVOLATILES								
Cresol	200	U	U	U	U	U	U	U
1, 4-Dichlorobenzene	7.5	U	U	U	U	U	U	U
2, 4-Dinitrotoluene	0.13	U	U	U	U	U	U	U
Hexchlorobenzene	0.13	U	U	U	U	U	U	U
Hexachloro-1, 3-butadiene	0.5	U	U	U	U	U	U	U
Hexachloroehane	3.0	U	U	U	U	U	U	U
Nitrobenzene	2.0	U	U	U	U	U	U	U
Pentachlorophenol	100.0	U	U	U	U	U	U	U
Pyridine	5.0	U	U	U	U	U	U	U
2, 4, 5-Trichlorophenol	400.0	U	U	U	U	U	U	U
2, 4, 6-Trichlorophenol	2.0	U	U	U	U	U	U	U
PEST/HERB								
Chlordane	0.03	U	U	U	U	U	U	U
Endrin	0.02	U	U	U	U	U	U	U
Heptachlor (and its epoxide)	0.008	U	U	U	U	U	U	U
Lindane	0.4	U	U	U	U	U	U	U
Methoxychlor	10.0	U	U	U	U	U	U	U
Toxaphene	0.5	U	U	U	U	U	U	U
2, 4-D	10.0	U	U	U	U	U	U	U
2, 4, 5-TP (Silver)	1.0	U	U	U	U	U	U	U
METALS								
Arsenic	5.0	U	U	U	U	U	U	U
Barium	100.0	0.459	0.542	0.441	0.653	0.332	0.361	0.068
Cadmium	1.0	U	U	U	U	U	0.006	U
Chromium	5.0	U	U	U	U	U	U	U
Lead	5.0	U	U	0.092	U	0.291	U	U
Mercury	0.2	U	U	U	U	U	U	U
Selenium	1.0	U	U	U	U	U	U	U
Silver	5.0	U	U	U	U	U	U	U

U=Undetected

pvs\qpro
#24\caltclp.wq1

TABLE 3

Soil Gas Sampling Results

Sampling Location	OVM ppm	Sampling Location	OVM ppm
SG-1	17.7	SG-15	13.3
SG-2	9.2	SG-16	28.1
SG-3	56	SG-17	26.2
SG-4	2.5	SG-18	19.9
SG-5	50.1	SG-19	4.1
SG-6	3.5	SG-20	10.8
SG-7	6.5	SG-21	6.1
SG-8	104.9	SG-22	28.3
SG-9	10	SG-23	5.1
SG-10	29	SG-24	27.2
SG-11	0	SG-25	13.2
SG-12	0	SG-26	37.5
SG-13	0	SG-27	43.3
SG-14	1.5	SG-28	9.2

IV. GROUNDWATER SAMPLING RESULTS

A. SITE HYDROGEOLOGY

The site was surveyed and depths to the groundwater were measured in each of the monitoring wells. Figure 3 shows the grade elevations at the soil and groundwater sampling locations. The water table elevations at the shallow well locations are shown on Figure 4. MW-4 was found to be dry and is not shown on the map. As expected, the general groundwater flow direction is towards the Eastchester Creek. The water table elevations in the deep wells were lower than that in the adjacent shallow wells. There was a differential of 2.8 feet at MW-7 and 3.1 feet at B-102.

The silty peat layer was found to be a confining layer that separated the groundwater into a shallow and a deeper aquifer. It appears as if this confining layer has perforations probably due to past construction activity, since the contamination found in the shallow aquifer is also detected in the deeper aquifer, as discussed later.

B. ORGANIC CONTAMINATION

The concentrations of VOCs in the groundwater samples are shown in Table 4. MW-4 was found to be totally dry and hence no groundwater sample could be collected from this location. The VOCs that were detected in the other wells were predominantly benzene, toluene, ethylbenzene, and xylenes (BTEXs). MW-2 had a 1/4 inch floating product in it. However, this floating product was not seen in the adjacent wells, indicating that this contamination is localized in extent. It is not clear whether the contamination seen on the western portion of the site is due to an on-site spill in that area or due to an off-site spill just across the property line.

The BTEXs were found in quantities significantly higher than the NYSDEC standards and guidance values in three of the sampling locations: MW-2; B-102; and MW-7. The standards are for Class GA groundwater, which is used as a source of drinking water. Since the groundwater under the site is unlikely to be ever used as a source of potable water, the potential impact of this contamination is primarily from the seepage of these contaminants into the surface waters of Eastchester Creek.

DWG. NO. 1701.00 FILE NO. 340 DRAFT ______ COMP. ______ PROOF ______

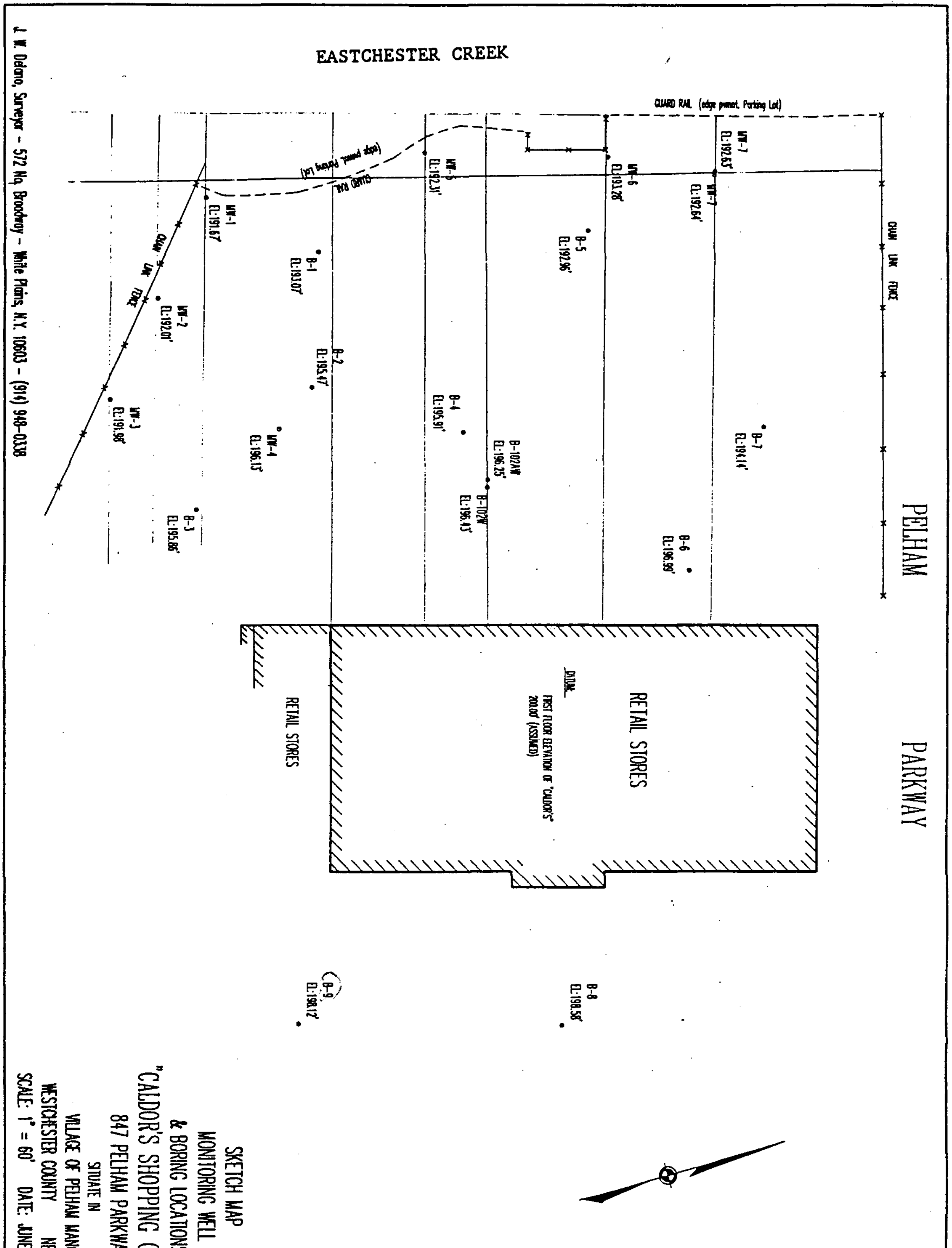
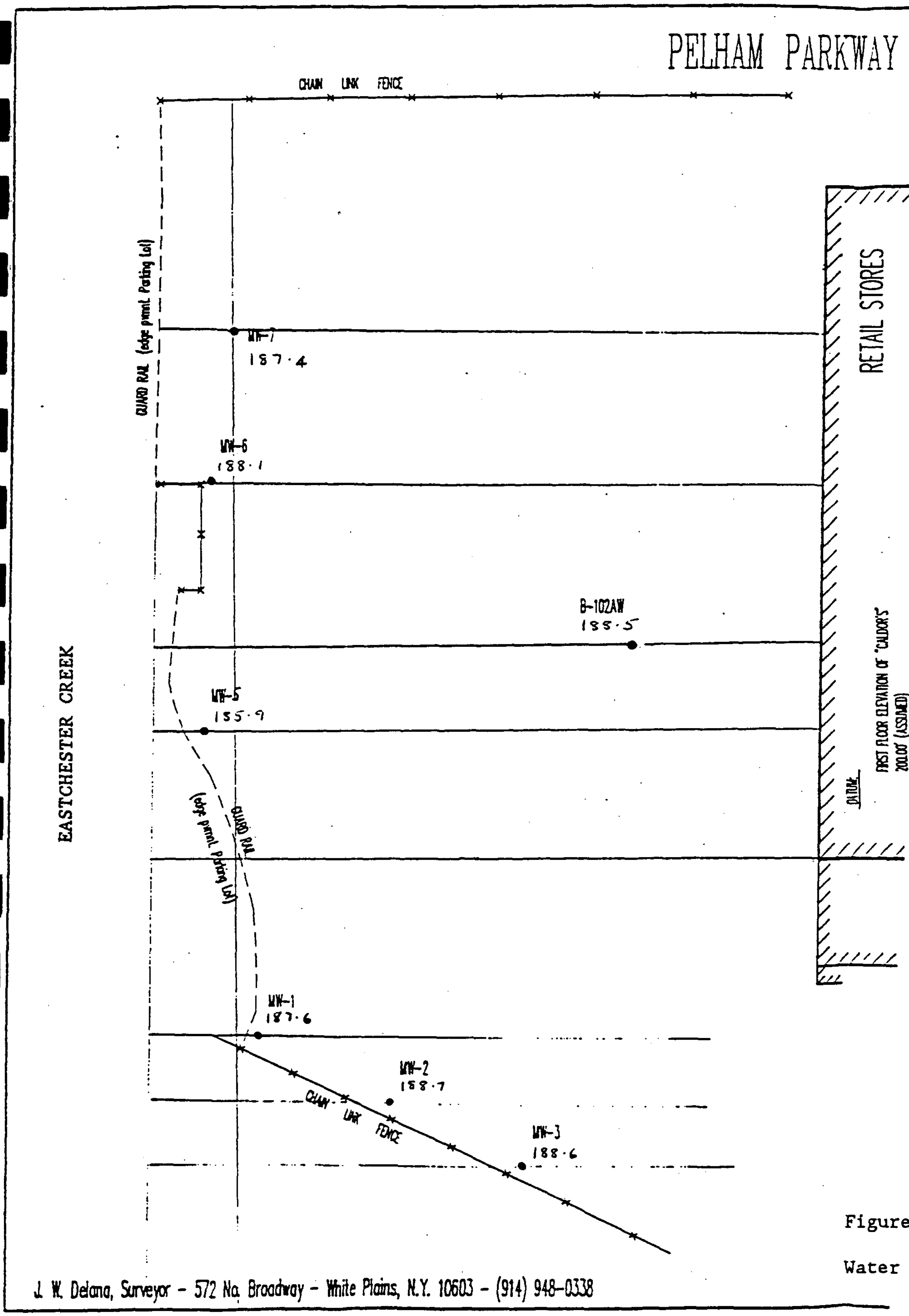


Figure 3

Site survey



J. W. Delana, Surveyor - 572 No. Broadway - White Plains, N.Y. 10603 - (914) 948-0338

Figure 4

Water table elevations

TABLE 4

CALDOR - PELHAM MANOR

VOLATILE ORGANICS IN GROUNDWATER SAMPLES (ug/l; ppb)

Compound	GA Standard	SB Guidance Value	MW-1	MW-2	MW-3	MW-5	MW-6	MW-7 (Shallow)	B-102AW (Shallow)	MW-7 (Deep)	B-102W (Deep)	Field Blank	Trip Blank
Chloromethane			U	U	U	U	U	U	U	U	U	U	U
Bromomethane			U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride			U	U	U	U	U	U	U	U	U	U	U
Chloroethane			U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride			5 B	3 B	5 B	6 B	5 B	2 B	6 B	5 B	6 B	5 B	U
Acetone			U	U	U	U	U	U	U	U	U	U	10 J
Carbon Disulfide			U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene			U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane			U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (total)			U	U	U	U	U	U	U	U	U	U	U
Chloroform			U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane			U	U	U	U	U	U	U	U	U	U	U
2-Butanone			U	U	U	U	U	U	10 J	U	U	U	U
1,1,1-Trichloroethane			U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride			U	U	U	U	U	U	U	U	U	U	U
Vinyl Acetate			U	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane			U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane			U	U	U	U	U	U	U	U	U	U	U
Cis-1,3-dichloropropene			U	U	U	U	U	U	U	U	U	U	U
Trichloroethene			U	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane			U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane			U	U	U	U	U	U	U	U	U	U	U
Benzene	0.7	6	120	2500	27	18	640	1500	2100	7400	2900	U	U
Trans-1,3-Dichloropropene			U	U	U	U	U	U	U	U	U	U	U
Bromoform			U	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone			U	U	U	U	U	U	U	U	U	U	U
2-Hexanone			U	U	U	U	U	U	U	U	U	U	U
Tetrochloroethene			U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane			U	U	U	U	U	U	U	U	U	U	U
Toluene	5	---	2 J	2200	2 J	5	2 J	180	54	1700	6200	2 J	5 J
Chlorobenzene			U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	5	---	19	2100	51	55	53	210	1200	940	4000	U	U
Styrene			U	9	U	U	U	4 J	3 J	8	620	U	U
Xylene (total)	5	---	17	2100	20	72	10	210	620	1200	4600	U	U
TOTAL PETROLEUM HYDROCARBONS (mg/l)			8.7	>50%	7.4	<1.0	<1.0	<1.0	<1.0	<1.0	10.1	<1.0	

U = Not Detected
J = Estimated Value
B = Found in blank also

pvs\qpro
#24\calwatvo.wql

The Eastchester Creek is classified as a Class SB water, which is protected for fish propagation or wildlife consumption of fish. There is a guidance value of 6 ug/l for benzene and no standard or guidance value for toluene, ethylbenzene, or xylenes. The highest value of benzene was 7,400 ug/l in MW-7 (Deep). The groundwater concentrations would be diluted by the flow of water in the Eastchester Creek and also by the tidal effects (dispersion), resulting in lower concentration in the creek.

To assess the potential impact of contaminated groundwater flow on the water quality of Eastchester Creek, the estimated groundwater flow was combined with the highest measured concentration to estimate the total maximum daily load of organics to the creek. This load was applied to the drought flow conditions in the Eastchester Creek; MA7CD2 & MA7CD10 (Minimum Average 7 Consecutive Day flow with a recurrence interval of once in 2 and 10 years) of 90 and 23 gallons per minute respectively (*Low Flow Frequency Analysis Of Streams in New York, US Department of Interior - Geological Survey and NYSDEC - Bulletin 74, 1979*).

The predicted concentration from this fresh water flow only dilution model results in a benzene concentration of 32 ug/l, above the guidance value of 6 ug/l. Considering that the creek is within the tidal excursion of the Eastchester Bay at this point and that there would be additional dilution through tidal dispersion, lower concentration than this would occur in the creek. Considering that the value of 7,400 ug/l was the highest value, and that the average concentrations of benzene in wells along the creek is 1,935 ug/l, the actual resulting concentration in the stream would be quite close to, if not lower than, the guidance value of 6 ug/l.

C. HYDROGEOLOGICAL PARAMETERS

1. Slug Test

Slug tests were conducted to calculate the hydraulic conductivity of the aquifer. The results are listed in Table 5. MW-4 was dry and MW-2 was not tested since the floating product would have damaged the data logger and may have caused cross-contamination. The hydraulic conductivity along with the hydraulic gradient was used to calculate the flow of groundwater into the creek, and was determined to be about 0.1 gallon per minute (gpm).

Table 5

Hydraulic conductivity, K (ft/min)

Well #	K (x 10^{-4} ft/min)
MW - 1	1
MW - 2	---
MW - 3	17
MW - 4	---
MW - 5	94
MW - 6	54
MW - 7 (Shallow)	12
B- 102AW (Shallow)	11

2. Tidal Influence

The depth to water in the wells and the water levels in the creek were measured over a complete tidal cycle to determine the effect, if any, of the tide on groundwater levels. The results indicated that the extent of hydraulic connection between the shallow wells and Eastchester Creek is very limited, perhaps due to the presence of a retaining wall along the creek and the peat layer under the recent fill. The water levels in the creek varied by about six feet over the tidal cycle. During this time only MW-5 showed some tidal influence with a variation of 1.5 feet in water levels, while the rest of the shallow wells showed negligible or no fluctuations in water levels. The deeper aquifer did show some hydraulic connection with the creek. In the monitoring wells B-102W (Deep) and MW-7 (Deep), there was a change of 1.5 feet and 1.3 feet respectively over the tidal cycle. It is possible that the silty peat layer curves downwards towards the creek bottom but has been broken through due to dredging activities, thereby allowing some hydraulic connection between the deeper aquifer and the creek.

V. CONCLUSIONS AND RECOMMENDATIONS

The following remediation program and response measures are outlined on a conceptual level. The Remediation Plan (that would be prepared after the NYSDEC accepted these measures on a conceptual level) would address these matters on a more detailed level and would include the actual design of the remediation systems, that would be installed prior to the expansion of the site.

A. SOURCE CONTROL

1. Contaminated soils

The results of the sampling of soils to date show a consistent pattern of hydrocarbon contamination in the shallow fill material all over the site, and in the deeper sand deposits on the eastern side of the site. Contaminated soils could be a potential source of groundwater contamination, which could possibly lead to surface water contamination. It could also pose a potential health risk to the future users of the site. Therefore, source control (removal of contaminated soils) needs to be addressed. The contamination found below the groundwater table would be treated as a groundwater condition and is discussed later. Remediation of the shallow fill layer (above the groundwater table) would require some form of soil removal and treatment and/or disposal.

The proposed expansion of the shopping center would involve installing new stormwater drains as shown by the dotted lines on Figure 1. The excavations for these drains would extend 6 to 7 feet below grade and all the excavated soil would be disposed of off-site, thereby achieving source control, in instances where the excavated material is contaminated with organics. The construction of the new buildings may require some excavation to facilitate laying down the footings or driving piles. Any such excavated material would be disposed of off-site, thereby achieving further source control, if the soil is contaminated. Additional source control is not considered necessary due to the reasons listed below.

The proposed development of the site would require the site to be filled to raise the new building and parking lots above the 100 year flood plain. The result of the development of the site would be to add approximately 2 feet of clean fill over the existing paved surface and re-paving over the fill. The filling of the site with new pavement on top would eliminate the potential for stormwater to percolate through the soil and wash some of the soil contaminants into the groundwater. It would also eliminate the potential for stormwater to pick up any of the site hydrocarbons and wash them into surface waters. Seepage of contaminated groundwater into Eastchester Creek would be controlled with a pump-and-treat system designed to remove a volume of groundwater equal or greater than the estimated flow through the site, thereby eliminating this potential discharge. Repair of the bulkhead to eliminate localized tidal effects in the shallow groundwater would eliminate the potential interchange of creek water with the site groundwater. Together, the pumping and bulkhead repair (described in more detail under groundwater remediation in section V. B) would eliminate any potential for significant impact to surface waters from the site's groundwater.

Clean fill would be brought in to replace any soil removed during construction and to cap the site. Once construction is completed, the entire site would be covered with structures and paving over clean fill, preventing direct or indirect exposure to site occupants. The presence of organic gas in the site soils would be remediated through a soil gas venting system under the new building slabs. Implementation of a Health and Safety plan during construction will minimize potential exposure of site workers and other site visitors.

If the site is remediated and constructed as outlined above, the encapsulated hydrocarbon contaminated soils would not represent a significant risk to public health and safety or the environment. Hence, source control that would consist of excavation and off-site disposal of contaminated soil is not considered to be necessary.

Moreover, based on the current sampling program about half of the 20 acre site soils are contaminated from grade down to the water table. If the contaminated soils are remediated to a depth of 6 feet (depth to groundwater varies between 5 to 8 feet below existing grade), a total of approximately 97,000 cubic yards of soil would be affected. Although the site soils are not hazardous, they would have to be treated as petroleum contaminated soils and could be disposed of at an industrial waste landfill, incinerated, or used as substrate for the manufacture of asphalt. The least costly available option, use of the soil for asphalt, costs approximately $75 per cubic yard. Therefore, source control would cost $7.3 million, exclusive of excavation and re-placement of clean fill on site. Furthermore, in order to accomplish source control, the retail facility on site would have to be closed for the duration of the remediation activity (a year or more). Due to the high cost and disruption of the existing commercial activity on the site, this level of source control is not judged to be feasible.

2. Floating Product

Source control is feasible for the area where floating product was found (at MW-2). The free product would be removed with a pumping system, equipped with a specially designed sensor to differentiate between hydrocarbon contamination and water, thereby permitting retrieval of 100% water-free oil. The recovered contaminants would be automatically pumped from the well into a recovery tank. When the recovery tank becomes full, a tankfull sensor would shut down the pump to prevent overflow. This source control would be part of the overall groundwater remediation system.

The free oil removal system would be installed in MW-2 as a product-only pumping system. The oil was observed during sampling to flow easily. A groundwater depression pump (that would create a cone of depression in the water table and accelerate the flow of hydrocarbons into the recovery well) was considered but rejected due to its potential to induce flow from the adjacent Oil Storage site that may draw contamination from that site onto this site.

B. GROUNDWATER REMEDIATION

Based on the results of the site investigation, it appears that a groundwater treatment system is required to prevent the possibility that the contaminants on the site may cause the water quality in the Eastchester Creek to exceed the NYSDEC guidance values. The direction of the groundwater flow and the groundwater concentration patterns indicate that the best place to pump out the groundwater would be from the region between MW-6 and MW-7.

As indicated in section C.2, the flow of groundwater into the creek is about 0.1 gpm. Hence, the flow rate of the treatment system would be 10 gpm, which would more than adequately collect and treat any groundwater escaping into the creek. Such a treatment system would pump water out from both the shallow and the deeper aquifer and treat the groundwater using air stripping units and carbon adsorption systems. The treated effluent would be discharged into the sanitary sewer system. The Westchester County Environmental Facilities Sewer Act places limitations on the permissible concentrations of toxic substances that may discharged into the sewer system. Oil and Grease may not exceed 100 mg/l, while Total Toxic Organics may not exceed 2.1 mg/l. With the air strippers and the polishing step of the carbon absorbers, the effluent will be well below these levels.

Since MW-5 was the only shallow well along the creek that showed any tidal influence, it appears that the retaining wall may have been damaged in this area. Therefore, some reconstruction work should be done in the area between MW-1 and MW-6 to repair the retaining wall and minimize the hydraulic connection between the groundwater and the creek. The bulkhead repair would eliminate the potential interchange of creek water with the site groundwater.

The pumping and treating of contaminated groundwater and the bulkhead repair would eliminate any potential for significant impact to surface waters from the site's groundwater.

C. SOIL GAS VENTING

The results of soil gas sampling indicate the need to install soil gas venting systems in the two proposed buildings to the north of the existing building (Buildings A & B). Such a system could be either an active system with exhaust fans or a passive system with the vapors just being routed towards the sides and top of the proposed buildings, from where they would be vented to the atmosphere. The vapor venting system would be installed under the slab of the proposed buildings and would be laid down just prior to the construction of the new buildings. The smaller building to the west of the existing building does not need any kind of treatment system due to the low or non-detectable soil gas concentrations in that area.

D. HEALTH AND SAFETY

Since the site is to be filled to raise it above the 100 year flood plain, only the drainage system and possibly the area of the footprints of the proposed buildings would require excavation into the contaminated soils. The buildings would be built on piles above the existing grade, thereby minimizing disturbance of the contaminated soils. There are high concentrations of VOCs and TPHs at several locations along the proposed drainage system. There are potential health risks for several pathways of exposure that could occur during construction activities. Potential significant routes of exposure include inhalation, incidental ingestion, skin absorption and/or eye contact.

A Health and Safety Plan (HASP) would be prepared based on the results of the site investigation and would be implemented during construction activities to minimize health risks. The HASP would address the measures that will be adopted to minimize the health risks from the different routes of exposure.

Some of the steps that could be taken are briefly described below. The inhalation pathway could be significantly reduced by the use of respirators. Skin absorption and skin contact could be reduced by the use of protective clothing (e.g. work boots, coveralls, and gloves) and by dust suppression. Eye contact could be avoided by the use of safety glasses.

The HASP would include at a minimum:

- specifications for respirators for protection against organic vapors and airborne particulates;

- frequency of air monitoring, threshold levels, and appropriate actions to be taken in the event that a threshold value is exceeded;

- levels of protection (personnel protective clothing and equipment) for different types of work;

- decontamination procedures for the construction crew, and personnel protective clothing, and equipment; and

- emergency response actions (procedures to be followed, equipment required, and emergency first-aid supplies).

E. CONCLUSIONS

The contamination of the site soils and groundwater has been confirmed by the past and current sampling program. The risks to public health and the environment from the site comes from: exposure to the site's hydrocarbons during construction (dust, dermal contact and ingestion); from soil gas migrating into and accumulating in enclosed spaces; and through discharge of these contaminants into surface waters. The proposed remediation plan addresses each of these pathways and includes several measures that would adequately protect public health and the environment.

Implementation of a Health and Safety plan during construction will minimize potential exposure of site workers and other site visitors. The presence of organic gas in the site soils would be remediated through a soil gas venting system under the new building slabs. The proposed groundwater treatment system and bulkhead repair would eliminate any potential for significant impact to surface waters from the site's groundwater.

The remediation proposed would begin with the installation of the groundwater pump-and-treat system and bulkhead repair. This can be accomplished while existing retail operations continue on site. Once this system is satisfactorily installed and operational, we recommend that the retail facility be expanded by constructing three new buildings (on piles and above grade) with filling and paving following. Soil gas venting systems would be installed under two of the buildings. All construction work would be performed under a site Health and Safety plan.

If the site is remediated and constructed as outlined above, the encapsulated hydrocarbon contaminated soils would not represent a significant risk to public health and safety or the environment.

APPENDIX A

BORING LOGS

CLIENT: AKRF, Inc.	**General Borings, Inc.** P.O. BOX 7135 PROSPECT, OT 06712	SHEET 1 OF 1 HOLE NO. B-1
GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS
AT 8.5 FT. AFTER 0 HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	4¼"	1-3/8"	
HAMMER WT.		140 LBS.	BIT
HAMMER FALL		30"	

DATE Start 5/17 Finish 5/17/93
SURFACE ELEV.
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	SS	24"	12"	2.0'	25	18	50	55	Dry/Very Dense		1) Brown fine-coarse SAND, some white brick, little medium-fine gravel.
		2	SS	24"	18"	4.0'	32	39	63		Dry		
									44		Very Dense		
		3	SS	24"	17"	6.0'	18	25	25		Wet		2) Brown-black fine-coarse SAND, some fine-medium gravel, some brick.
5									26		Very Dense		
		4	SS	24"	17"	8.0'	10	18	10		Wet		
									9		Medium		
		5	SS	24"	24"	10.0'	1	2	3		Wet	8.5'	3) Black fine-medium SAND, some coal, little medium-fine gravel.
									5		Medium		
10												10.0' EOB	4) (same as S-3)
													5) Gray organic PEAT.
													END OF BORING 10.0' Soil
15													
													Note: 1" Blacktop but drilled to .5' to take sample, still called 0-2.0'.
20													
25													
30													
35													
40													

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

General Borings, Inc.

P.O. BOX 7135 PROSPECT, CT 06712

CLIENT: AKRF, Inc.		SHEET 1 OF 1 HOLE NO. B-2
GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS
AT 7 FT. AFTER 0 HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	$4\frac{1}{4}$"	1-3/8"	
HAMMER WT.		140 LBS.	BIT
HAMMER FALL		30"	

	Start	Finish
DATE	5/19	5/19/93
SURFACE ELEV.		
GROUND WATER ELEV.		

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.
		1	SS	24"	11"	2.0'	8	13	18	12	Dry/Medium	
		2	SS	24"	10"	4.0'	14	8	7		Dry	
									10		Medium	
		3	SS	24"	15"	6.0'	14	27	36		Dry	
5									51	Very	Dense	
		4	SS	24"	19"	8.0'	42	89	63		Wet	
									41	Very	Dense	
		5	SS	24"	15"	10.0'	8	7	7		Wet	
									8		Medium	
10												10.0' EOB
15												
20												
25												
30												
35												
40												

FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.

1) Brown fine-medium SAND, little medium-fine gravel, little fractured, little silt.

2) Brown fine-medium SAND, little red brick, little silt Top 14" split spoon light brown fine-medium sand, little silt.

3) Black COAL.

4) Black COAL, some fine-medium sand, little fine-medium gravel.

5) (same as S-4) free product.

END OF BORING 10.0' Soil

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

General Borings, Inc.

P.O. BOX 7135 PROSPECT, CT 06712

CLIENT: AKRF, Inc.

SHEET 1 OF 1

HOLE NO. B-3

GBI JOB NO.	PROJECT NAME	LINE
56-93	Caldor	
FOREMAN-DRILLER: J.M. S.M.	LOCATION: Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS

AT 7 FT. AFTER 0 HOURS

AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	$4\frac{1}{4}$"	1-3/8"	
HAMMER WT.		140 LBS.	BIT,
HAMMER FALL		30"	

DATE Start 5/19 Finish 5/19/93

SURFACE ELEV.

GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	SS	24"	10"	2.0'	11	13	7	12Dry	/Medium		1) Black COAL and black fine SAND, little fine-medium gravel.
		2	SS	24"	9"	4.0'	13	13	17		Dry		
									11		Medium		2) Brown fine-medium SAND, some black fine-medium sand, little coal, little fine-medium gravel.
		3	SS	24"	8"	6.0'	13	14	14		Dry		
5									13		Medium		
		4	SS	24"	13"	8.0'	15	18	21		Wet		3) Brown-black fine-medium SAND, little fine-medium gravel.
									27		Dense		
		5	SS	24"	19"	10.0'	28	34	40		Wet		4) Brown fine-medium SAND, little fine gravel, trace coal, little wood.
									43	Very	Dense		
10												10.0' EOB	5) Black fine-medium SAND, some fine-medium gravel.
15													Wood from 8.0'-9.0' Fuel odor.
													END OF BORING 10.0' Soil
20													
25													
30													
35													
40													

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

CLIENT: AKRF, Inc.

General Borings, Inc.

P.O. BOX 7135 PROSPECT, CT 06712

SHEET 1 OF 1
HOLE NO. B-4

GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS
AT 8 FT. AFTER 0 HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	4¼"	1-3/8"	
HAMMER WT.		140 LBS.	BIT
HAMMER FALL		30"	

DATE Start 5/17 Finish 5/17/93
SURFACE ELEV.
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.
		1	SS	24"	19"	2.0'	31	35	38	33 Dry	/Very Dense	
		2	SS	24"	19"	4.0'	75	75	81		Dry	
									70	Very	Dense	
		3	SS	24"	19"	6.0'	7	20	31		Dry	
5									22	Very	Dense	
		4	SS	24"	19"	8.0'	20	18	14		Wet	
									7		Dense	
		5	SS	24"	22"	10.0'	2	2	2		Wet	
									2	Very	Loose	
10												10.0' EOB
15												
20												
25												
30												
35												
40												

FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.

Note: Start sampling at 2.5' but will still call it 2.0'

1) Brown-black fine-medium SAND, some brick, some coarse-fine gravel.

2) Black-brown fine-medium SAND and black COAL, little fine-medium gravel.

3) Black-brown fine-medium SAND, little silt, little fine-medium gravel.

4) Brown fine-medium SAND, little fine-medium gravel, little silt, oil sheen.

5) Brown fine-medium SAND, some plus silt, oil sheen. Top 14" Free Product.

END OF BORING 10.0' Soil

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

CLIENT: AKRF, Inc.	General Borings, Inc. P.O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1 HOLE NO. B-5
GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS
AT 8 FT. AFTER 0 HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	4¼"	1-3/8"	
HAMMER WT.		140 LBS.	BIT
HAMMER FALL		30"	

DATE Start 5/17 Finish 5/17/93
SURFACE ELEV.
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.
		1	SS	24"	11"	2.0'	15	13	10	8	Dry/Medium	
		2	SS	24"	5"	4.0'	4	5	7		Dry	
									5		Medium	
		3	SS	24"	6"	6.0'	3	4	3		Moist	
5									3		Loose	
		4	SS	24"	24"	8.0'	7	5	8		Wet	
									7		Medium	
		5	SS	24"	24"	10.0'	7	6	3		Wet	
									4		Loose	8.75
10												10.0' EOB
15												
20												
25												
30												
35												
40												

FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.

Note: Augered to .5' Sample will still be called 0-2.0'

1) Brown fine-medium sAND, some fine-medium gravel, little silt.

2) Brown-gray fine-medium SAND, little fine gravel, little silt, oil odor.

3) Brown-black fine-coarse SAND, little fine gravel, oil odor.

4) Brown-black-gray fine-coarse SAND, little fine gravel, little silt.

5) Top 10" Brown fine-medium SAND, little fine gravel. Bottom 14" Gray-brown PEAT.

END OF BORING 10.0' Soil

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

CLIENT: AKRF, Inc.	**General Borings, Inc.** P.O. BOX 7135 PROSPECT, OT 06712	SHEET 1 OF 1 HOLE NO. B-6
GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS
AT None FT. AFTER 0 HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	4½"	1-3/8"	
HAMMER WT.		140 LBS.	BIT
HAMMER FALL		30"	

DATE Start 5/18 Finish 5/18/93
SURFACE ELEV.
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	SS	24"	10"	2.0'	26	18	9	4	Dry/Medium		1) Brown fine-coarse SAND, some fine-medium gravel, trace silt.
		2	SS	24"	10"	4.0'	5	7	6		Dry		2) (same as S-1)
									8		Medium		
		3	SS	24"	16"	6.0'	7	3	1		Moist		3) Brown fine-medium SAND and SILT.
5									2		Very Loose		
		4	SS	24"	7"	8.0'	4	5	3		Moist		4) Brown fine-medium SAND, some plus silt, trace fine gravel.
									4		Loose		
		5	SS	24"	11"	10.0'	7	12	13		Moist		
									15		Medium		
10												10.0' EOB	5) Light brown fine-coarse SAND, little fine gravel.
													END OF BORING 10.0' Soil
15													
20													
25													
30													
35													
40													

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

General Borings, Inc.

P.O. BOX 7135 PROSPECT, CT 06712

CLIENT: AKRF, Inc.

SHEET 1 OF 1

HOLE NO. B-7

GBI JOB NO. 56-93

PROJECT NAME Caldor

LINE

FOREMAN-DRILLER J.M. S.M.

LOCATION Pelham Manor, NY

STATION

INSPECTOR

OFFSET

GROUND WATER OBSERVATIONS

AT 6 FT. AFTER 0 HOURS

AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	4½"	1-3/8"	
HAMMER WT.		140 LBS.	BIT
HAMMER FALL		30"	

DATE Start 5/19 Finish 5/19/93

SURFACE ELEV.

GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.
		1	SS	18"	14"	1.5'	11	16	100/6"		Dry/Very Dense	
		2	SS	16"	6"	4.0'	17	16	13		Dry	
									12		Medium	
		3	SS	24"	24"	6.0'	12	13	11		Wet	
5									11		Medium	
		4	SS	24"	15"	8.0'	4	6	7		Wet	
									8		Medium	
		5	SS	24"	24"	10.0'	2	2	3		Wet	
									2		Medium	
10												10.0' EOB
15												
20												
25												
30												
35												
40												

FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.

1) Black fine-medium SAND, COAL, TAR and CONCRETE, fine-medium gravel.

2) Light brown fine-coarse SAND, some fine-medium gravel, trace silt.

3) (same as S-2)

4) Brown-gray fine-coarse SAND, little silt, fuel odor.

5) Gray-brown silty CLAY, some fine-medium sand, free product.

END OF BORING 10.0' Soil

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

CLIENT: AKRF, Inc.	**General Borings, Inc.** P.O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1 HOLE NO. B-8, 8A, 8B, 8C
GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS
AT 2.5 FT. AFTER 0 HOURS
Drill Water
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	4¼"	1-3/8"	
HAMMER WT.		140 LBS.	BIT
HAMMER FALL		30"	

DATE Start 5/18 Finish 5/18/93
SURFACE ELEV.
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		1	SS	24"	14"	2.0'	24	37	33	38	Dry/Very Dense		1) Brown fine-medium SAND and black COAL, little fine-medium gravel, trace silt.
		2	SS	24"	11"	4.0'	22	27	31		Dry		
									61		Very Dense		
5													2) Black-brown fine-medium SAND, some silt, fine-medium gravel, little red brick.
		3	SS	24"	19"	8.5'	17	19	21		Wet		
									19		Dense		
		4	SS	24"	24"	10.5'	45	40	37		Wet		Note: Hollow auger refused at 4.5'
									30		Very Dense		END OF BORING 4.5' Soil
10												10.5' EOB	Moved 5.0' East Drilled B-8A Hollow Auger refused at 4.5'
													END OF BORING 4.5' Soil
15													Moved 10.0' West Drilled B-8B Hollow Aguer refused at 4.5'
													END OF BORING 4.5' Soil
													3) Light brown fine-medium SAND, some fine-medium gravel.
20													4) Brown fine-coarse SAND, little fine-medium gravel, oil odor.
25													Note: Core through concrete slab 4.5'-6.5'
													END OF BORING 10.5' Soil
30													Total footage drilled 24.0'
35													
40													

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

CLIENT: AKRF, Inc.

General Borings, Inc.

P.O. BOX 7135 PROSPECT, CT 06712

SHEET 1 OF 1
HOLE NO. B-9

GBI JOB NO.	PROJECT NAME	LINE
56-93	Caldor	
FOREMAN-DRILLER: J.M. S.M.	LOCATION: Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS
AT 9 FT. AFTER 0 HOURS
AT ___ FT. AFTER ___ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	$4\frac{1}{4}$"	1-3/8"	
HAMMER WT.		140 LBS.	BIT
HAMMER FALL		30"	

DATE Start 5/18 Finish 5/18/93
SURFACE ELEV.
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.
		1	SS	24"	11"	2.0'	7	13	35	37	Dry/Dense	
		2	SS	24"	4"	4.0'	18	9	9		Dry	
									4		Medium	
		3	SS	24"	11"	6.0'	7	10	11		Wet	
5									12		Medium	
		4	SS	24"	15"	8.0'	10	13	15		Wet	
									11		Medium	
		5	SS	24"	16"	10.0'	8	7	13		Wet	
									14		Medium	
10												10.0' EOB
15												
20												
25												
30												
35												
40												

FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.

1) Brown fine-medium SAND and COAL, fine-medium GRAVEL, little silt.

2) Black fine-medium SAND, some fine-medium gravel and coal.

3) Brown fine-medium SAND, some clay and silt, trace fine gravel, free product.

4) Brown fine-coarse SAND, little fine-medium gravel, little silt, fuel odor.

5) Brown fine-coarse SAND, trace fine gravel, trace silt, fuel odor.

END OF BORING 10.0' Soil

TYPE OF SAMPLES:
D= DRY W= WASHED C= CORED A= AUGER SS= SPLIT SPOON
UB= UNDISTURBED BALL CHECK UP= UNDISTURBED PISTON VT= VANE SPOON
PROPORTIONS USED TRACE= 0-10% LITTLE= 10-20% SOME= 20-35%, AND= 35-50%

CLIENT: AKRF, Inc.	**General Borings, Inc.** P.O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1 HOLE NO. MW-5
GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.		Start	Finish
AT 6 FT. AFTER 0 HOURS	TYPE	HA	SS		DATE	5/20	5/20/93
AT ___ FT. AFTER ___ HOURS	SIZE I.D.	4¼"	1-3/8"		SURFACE ELEV.		
	HAMMER WT.		140 LBS.	BIT	GROUND WATER ELEV.		
	HAMMER FALL		30"				

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.
		1	SS	24"	13"	2.0'	5	7	10	5	Dry/Medium	
		2	SS	24"	8"	4.0'	7	9	11		Dry	
									8		Medium	3.5'
		3	SS	24"	10"	6.0'	5	8	12		Wet	
									12		Medium	
5		4	SS	24"	5"	8.0'	3	1	2		Wet	
									1		Very Loose	
		5	SS	24"	5"	10.0'	2	1	1		Wet	
									2		Very Soft	9.0'
		6	SS	24"	9"	12.0'	2	2	1		Wet	
10									2		Soft	
		7	SS	24"	24"	14.0'	2	1	3		Wet	
									4		Soft	13.0' EOB
15												
20												
25												
30												
35												
40												

FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.

1) Brown fine-medium SAND, little fine-medium gravel, trace red brick.

2) Top 6" Brown fine-medium SAND, little red brick, little fine-medium gravel.
Bottom 2" Black fine-medium SAND and black COAL.

3) Black fine-medium SAND and COAL, oil sheen.

4) COAL and coarse-fine SAND, some fine gravel.

5) Brown organic PEAT.

6) Brown organic PEAT.

7) (same as S-6)

END OF BORING 13.0' Soil

Installed Monitor Well at 13.0'

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

MONITOR WELL INSTALLATION DETAIL FOR WELL IN UNCONSOLIDATED DEPOSIT

DRILLER: John Muccino BORING NO.: MW-5 GBI JOB NO.: 56-93

SITE: Caldor CLIENT: AKRF, Inc.

Pelham Manor, NY INSPECTOR: M.K.A.

DATE: 5/20/93

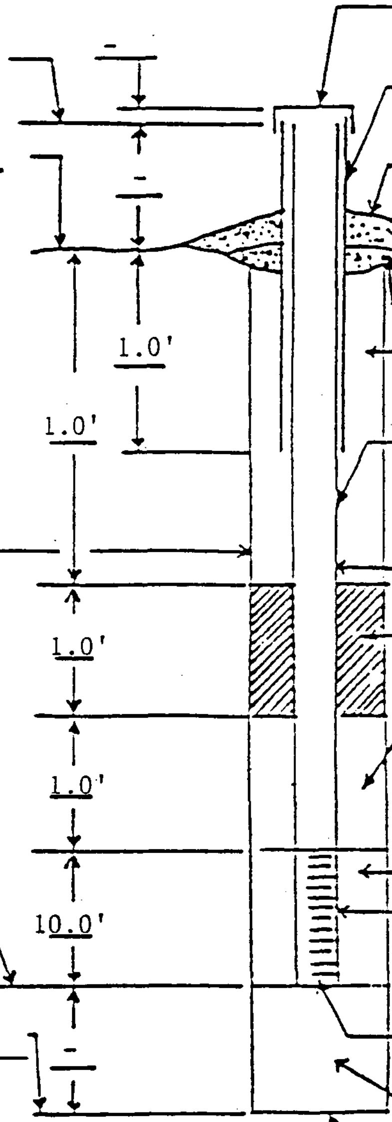
VENTED LOCKING STEEL CAP: ___ YES X NO

TOP OF CASING EL. ___

CURB BOX NJ X YES ___ NO

GROUND SURFACE EL. ___

MOUNDED BACKFILL: ___ YES X NO



CONCRETE COLLAR: X YES ___ NO

BACKFILL MATERIAL: Morie #1

TYPE OF CASING & SCREEN: PVC

INSTALLED (3') RISER (10') SCREEN

BOREHOLE DIAMETER 6½"

I.D. 4" O.D. 4-3/8"

JOINT TYPE: Threaded

IMPERMEABLE BACKFILL: Bentonite Pellets

BACKFILL MATERIAL: Morie #1

SCREEN PACKING: Morie #1

WELL POINT 13.0'

FILTER FABRIC: ___ YES X NO

IF YES, TYPE: ___

BOTTOM OF BORING 13.0'

SCREEN SLOT SIZE: .020

BACKFILL MATERIAL: Morie #1

REFUSAL: ___ YES X NO

6 BAGS OF GRAVEL
1 BUCKETS OF BENTONITE PELLETS
½ BAGS OF PORTLAND TYPE II CEMENT
- BAGS OF POWDERED BENTONITE - FOR GROUT
1 NJ CURB BOX
1 Small Padlock
1 Expansion Plug

General Borings, Inc.

P.O. BOX 7135 PROSPECT, CT 06712

CLIENT: AKRF, Inc.		SHEET 1 OF 1 HOLE NO. MW-6
GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS
AT 5 FT. AFTER 0 HOURS
AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA	SS	
SIZE I.D.	6¼"	1-3/8"	
HAMMER WT.		140 LBS.	BIT
HAMMER FALL		30"	

DATE Start 5/17 Finish 5/17/93
SURFACE ELEV.
GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.
		1	SS	24"	16"	2.0'	15	13	23	12	Dry/Dense	
		2	SS	24"	14"	4.0'	12	13	12		Moist	
									9		Medium	
		3	SS	24"	15"	6.0'	7	7	7		Wet	
5									9		Medium	
		4	SS	24"	24"	8.0'	4	5	9		Wet	
									10		Medium	
		5	SS	24"	17"	10.0'	2	3	2		Wet	
									2		Loose	9.5'
10		6	SS	24"	19"	12.0'	2	3	3		Wet	
									2		Soft	10.5'
		7	SS	24"	18"	14.0'	3	5	5		Wet	12.0'
									7		Medium	13.0'
												EOB
15												
20												
25												
30												
35												
40												

FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR. LOSS OF WASH WATER. SEAMS IN ROCK. ETC.

1) Black fine-medium SAND and black COAL, some brown fine-medium sand, little fine-medium gravel, little silt.

2) Orange-brown fine-medium SAND, some silt, little fine-medium gravel.

3) Brown-orange-black fine-medium SAND, little fine-medium gravel.

4) Black fine-medium SAND, some silt, oil odor.

5) Gray fine-coarse SAND and SILT, trace fine gravel.

5) Gray clayey PEAT.

7) Gray fine-coarse SAND, some silt.

END OF BORING 13.0' Soil

Installed Monitor Well at 13.0'

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

MONITOR WELL INSTALLATION DETAIL FOR WELL IN UNCONSOLIDATED DEPOSIT

DRILLER: John Muccino

BORING NO.: MW-6

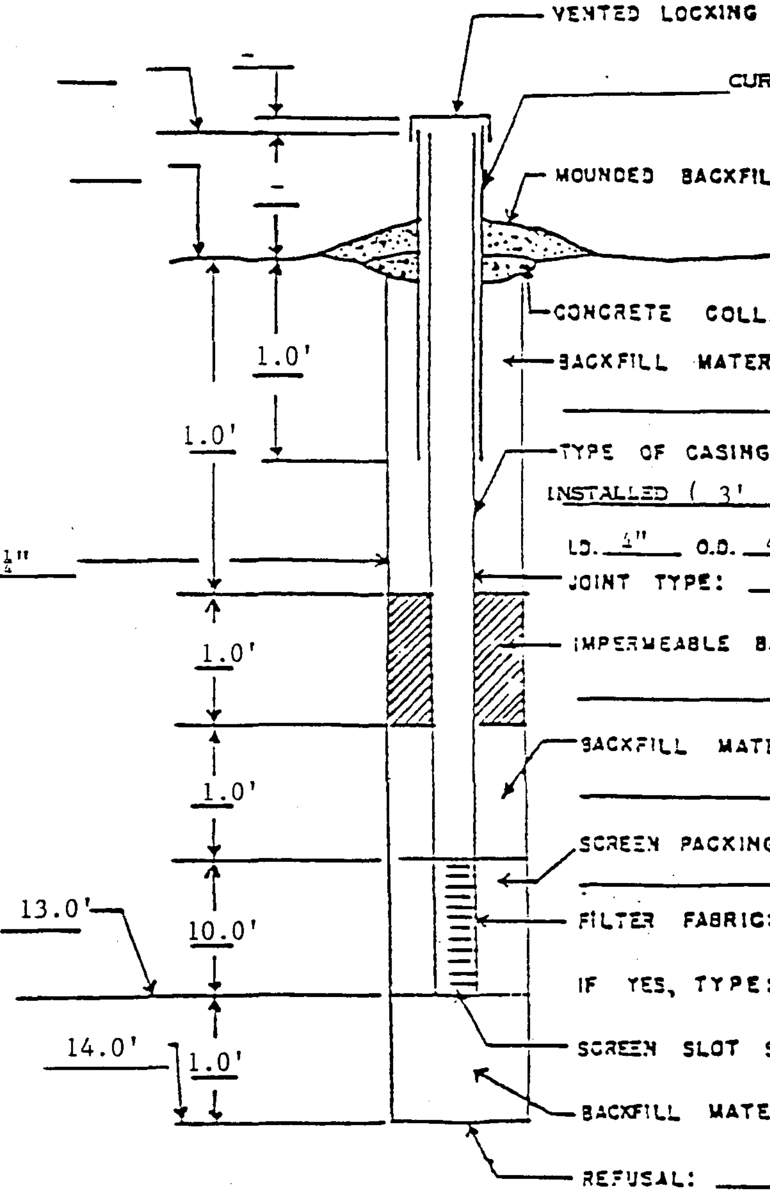
GBI JOB NO.: 56-93

SITE: Caldor, Pelham Manor, NY

CLIENT: AKRF, Inc.

INSPECTOR:

DATE: 5/17/93



TOP OF CASING EL.

GROUND SURFACE EL.

BOREHOLE DIAMETER 6¼"

WELL POINT 13.0'

BOTTOM OF BORING 14.0'

VENTED LOCKING STEEL CAP: ___ YES X NO

CURB BOX NJ X YES ___ NO

MOUNDED BACKFILL: ___ YES X NO

CONCRETE COLLAR: X YES ___ NO

BACKFILL MATERIAL: Grout

TYPE OF CASING & SCREEN: PVC

INSTALLED (3') RISER (10') SCREEN

I.D. 4" O.D. 4-3/8"

JOINT TYPE: Threaded

IMPERMEABLE BACKFILL: Bentonite Pellets

BACKFILL MATERIAL: Morie #1

SCREEN PACKING: Morie #1

FILTER FABRIC: ___ YES X NO

IF YES, TYPE:

SCREEN SLOT SIZE: .020

BACKFILL MATERIAL: Morie #1

REFUSAL: ___ YES X NO

5	BAGS OF GRAVEL
1	BUCKETS OF BENTONITE PELLETS
½	BAGS OF PORTLAND TYPE II CEMENT
–	BAGS OF POWDERED BENTONITE - FOR GROUT
1	NJCURB BOX
1	Small Padlock
1	Expansion Plug

CLIENT: AKRF, Inc.	**General Borings, Inc.** P.O. BOX 7135 PROSPECT, CT 06712	SHEET 1 OF 1 HOLE NO. MW-7
GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS

AT ____ FT. AFTER ____ HOURS

AT ____ FT. AFTER ____ HOURS

	CASING	SAMPLER	CORE BAR.
TYPE	HA		
SIZE I.D.	6¼"		
HAMMER WT.		LBS.	BIT
HAMMER FALL			

DATE Start 5/20 Finish 5/20/93

SURFACE ELEV.

GROUND WATER ELEV.

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
													Augered to 14.0'
													Note: 3 attempts before getting down one of the borings.
5													Drilled to 5.0' seemed to be brick and concrete wall.
10													
												14.0'	
15												EOB	END OF BORING 14.0' Soil
20													
25													Total 9 drums
30													
35													
40													

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%. AND=35-50%

MONITOR WELL INSTALLATION DETAIL FOR WELL IN UNCONSOLIDATED DEPOSIT

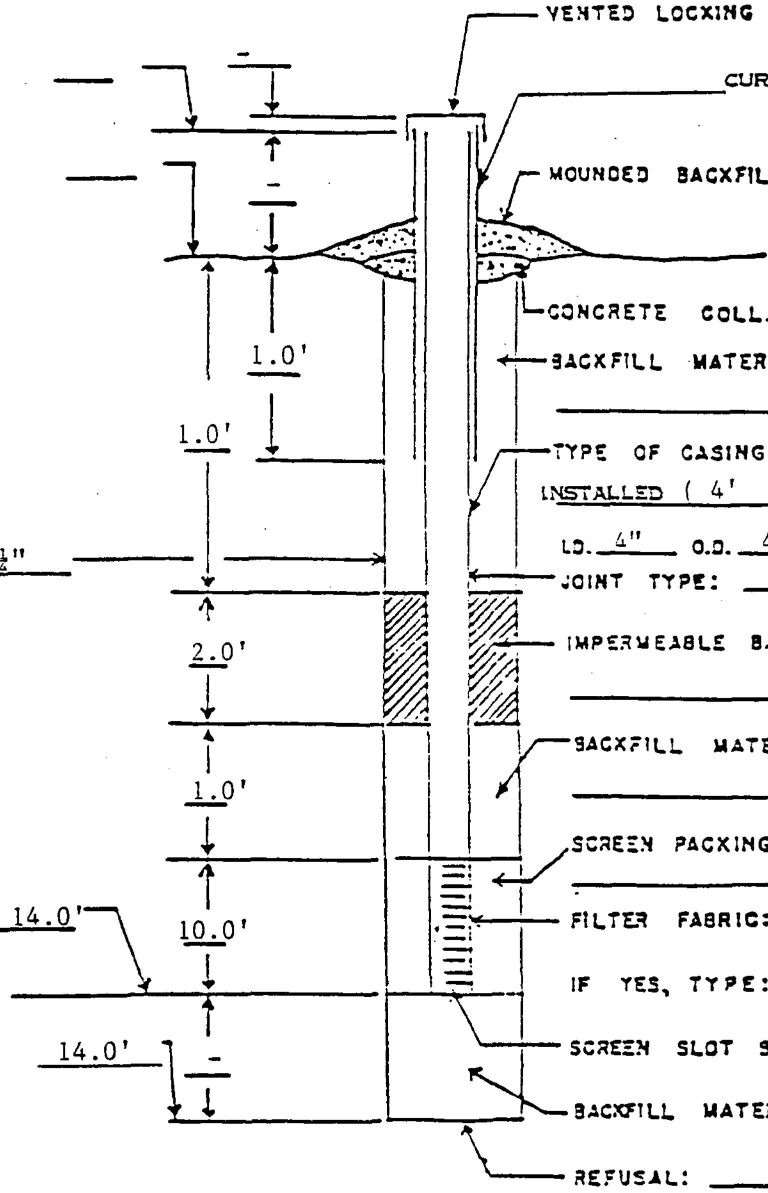
DRILLER: John Muccino

BORING NO.: MW-7-Shallow GBI JOB NO.: 56-93

SITE: Caldor CLIENT: AKRF, Inc.

Pelham Manor, NY INSPECTOR: ______

DATE: 5/20/93



TOP OF CASING EL. ______

GROUND SURFACE EL. ______

BOREHOLE DIAMETER 6¼"

WELL POINT 14.0'

BOTTOM OF BORING 14.0'

VENTED LOCKING STEEL CAP: ___ YES _X_ NO

CURB BOX NJ _X_ YES ___ NO

MOUNDED BACKFILL: ___ YES _X_ NO

CONCRETE COLLAR: _X_ YES ___ NO

BACKFILL MATERIAL: Morie #1

TYPE OF CASING & SCREEN: PVC

INSTALLED (4') RISER (10') SCREEN

I.D. 4" O.D. 4-3/8"

JOINT TYPE: Threaded

IMPERMEABLE BACKFILL: Bentonite Pellets

BACKFILL MATERIAL: Morie #1

SCREEN PACKING: Morie #1

FILTER FABRIC: ___ YES _X_ NO

IF YES, TYPE: ______

SCREEN SLOT SIZE: .020

BACKFILL MATERIAL: Morie #1

REFUSAL: ___ YES _X_ NO

6 BAGS OF GRAVEL
1 BUCKETS OF BENTONITE PELLETS
¼ BAGS OF PORTLAND TYPE II CEMENT
– BAGS OF POWDERED BENTONITE - FOR GROUT
1 NJ CURB BOX
1 Small Padlock
1 Expansion Plug

General Borings, Inc.

P.O. BOX 7135 PROSPECT, CT 06712

CLIENT: AKRF, Inc.		SHEET 1 OF 1 / HOLE NO. MW-7
GBI JOB NO. 56-93	PROJECT NAME Caldor	LINE
FOREMAN-DRILLER J.M. S.M.	LOCATION Pelham Manor, NY	STATION
INSPECTOR		OFFSET

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR.			
AT 5 FT. AFTER 0 HOURS	TYPE	HA	SS		DATE	Start 5/18	Finish 5/18/93
	SIZE I.D.	6¼"	1-3/8"		SURFACE ELEV.		
AT ___ FT. AFTER ___ HOURS	HAMMER WT.		140	LBS. BIT	GROUND WATER ELEV.		
	HAMMER FALL		30"				

DEPTH	CASING BLOWS PER FOOT	SAMPLE NO.	TYPE	PEN	REC.	DEPTH @ BOT.	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE) 0-6	6-12	12-18	CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.
		1	SS	24"	10"	6.0'	2	1	1		Moist	
									2	Very	Loose	
			SS	24"	0"	8.0'	2	2	2			
5									2			
		2	SS	24"	20"	10.0'	1	2	2		Wet	
									1		Medium	
		3	SS	24"	3"	12.0'	3	2	3		Wet	
10									4		Medium	
		4	SS	24"	4"	14.0'	3	3	4		Wet	
									3		Medium	
		5	SS	24"	5"	16.0'	3	4	4		Wet	
									13		Medium	
15		6	SS	18"	16"	17.5'	18	27	100/6"		Wet	
											Very	16.0'
											Dense	
		7	SS	24"	16"	22.0'	17	24	29		Wet	
20									29		Very	
											Dense	
25												25.0' EOB
30												
35												
40												

FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.

Note: 4 attempts to get drill through concrete.

1) Gray SILT, little fine-medium sand.

No recovery 6.0'-8.0'

2) Gray clayey SILT.

3) Gray clayey PEAT and gray-brown fine SAND in tip.

4) Gray silty CLAY lenses of brown fine-medium sand, free product.

5) Gray clayey PEAT, brown fine-medium sand in tip of split spoon.

6) Gray-brown coarse-fine SAND, little fractured rock, little medium-fine gravel, little silt.

7) Gray-brown fine-coarse SAND, little fine gravel.

Note: Drilled to 22.5', hit oil free product.

Augered to 25.0'

END OF BORING 25.0' Soil

Installed Monitor Well at 23.0'

TYPE OF SAMPLES:
D=DRY W=WASHED C=CORED A=AUGER SS=SPLIT SPOON
UB=UNDISTURBED BALL CHECK UP=UNDISTURBED PISTON VT=VANE SPOON
PROPORTIONS USED TRACE=0-10% LITTLE=10-20% SOME=20-35%, AND=35-50%

MONITOR WELL INSTALLATION DETAIL FOR WELL IN UNCONSOLIDATED DEPOSIT

DRILLER: John Muccino

BORING NO.: MW-7-Deep GBI JOB NO.: 56-93

SITE: Caldor CLIENT: AKRF, Inc.

Pelham Manor, NY INSPECTOR: ______

DATE: 5/18-19/93

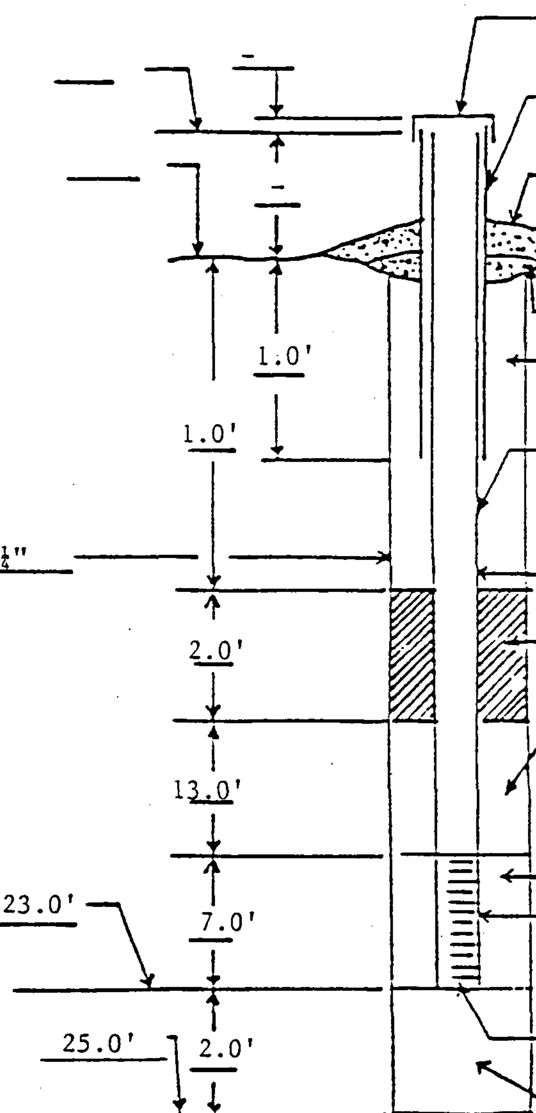
TOP OF CASING EL. ______

GROUND SURFACE EL. ______

BOREHOLE DIAMETER 6¼"

WELL POINT 23.0'

BOTTOM OF BORING 25.0'



VENTED LOCKING STEEL CAP: ___ YES X NO

CURB BOX NJ X YES ___ NO

MOUNDED BACKFILL: ___ YES X NO

CONCRETE COLLAR: X YES ___ NO

BACKFILL MATERIAL: Morie #1

TYPE OF CASING & SCREEN: PVC

INSTALLED (16') RISER (7') SCREEN

I.D. 4" O.D. 4-3/8"

JOINT TYPE: Threaded

IMPERMEABLE BACKFILL: Bentonite Pellets

BACKFILL MATERIAL: Morie #1

SCREEN PACKING: Morie #1

FILTER FABRIC: ___ YES X NO

IF YES, TYPE: ______

SCREEN SLOT SIZE: .020

BACKFILL MATERIAL: Morie #1

REFUSAL: ___ YES X NO

10	BAGS OF GRAVEL
1	BUCKETS OF BENTONITE PELLETS
½	BAGS OF PORTLAND TYPE II CEMENT
-	BAGS OF POWDERED BENTONITE - FOR GROUT
1	NJ CURB BOX
1	Small Padlock
1	Expansion Plug

Needed:

1. Site topography map
2. Groundwater contour map (piezometric map) and flow directions
3. Geologic cross sections including groundwater table, surface topography and geologic formations, borings etc.
4. Site location map from USGS Quad sheet etc.
5. An attempt should have been made during investigations to identify and isolate source area of the contamination.