GROUNDWATER EXTRACTION AND TREATMENT SYSTEM DESIGN REPORT

FRANKLIN CLEANERS SITE

Village of Hempstead
Nassau County, New York
(Site Registry No. 1-30-050)

WORK ASSIGNMENT NO. D003600-10

Prepared For

New York State Department of Environmental Conservation

DECEMBER 2000

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CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

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DESIGN REPORT

FOR THE

FRANKLIN CLEANERS SITE
INCORPORATED VILLAGE OF HEMPSTEAD
NASSAU COUNTY, NEW YORK

PREPARED BY

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WOODBURY, NEW YORK

DECEMBER 2000

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Section 1

1.0 INTRODUCTION

1.1 Background

As part of New York State's program to investigate and remediate hazardous waste sites, the New York State Department of Environmental Conservation (NYSDEC) has issued a work assignment to Dvirka and Bartilucci Consulting Engineers (D&B) under its Superfund Standby Contract with NYSDEC to design a remedial measure (RM) to address groundwater contamination migrating from the Franklin Cleaners Site located in the Town of Hempstead, Nassau County, New York.

As a result of the findings of a remedial investigation/feasibility study conducted for the site, and previous investigations on and in the vicinity of the site, a plume of contaminated groundwater has been documented to be migrating from the Franklin Cleaners Site, which poses a potential threat to a number of downgradient public supply wells.

Based on the documented groundwater contamination and potential threat to public water supply, NYSDEC has elected in a Record of Decision issued for the site to control the migration of groundwater contamination near the leading edge of the plume by installing a groundwater extraction and treatment system to mitigate the potential for future impacts to downgradient supply wells. This RM is being performed with funds allocated under the New York State Superfund Program.

1.2 Site Location and Access

The Franklin Cleaners Site is a former dry cleaning facility located at 206-208B South Franklin Street in the Incorporated Village of Hempstead, Nassau County, New York. The groundwater extraction and treatment system will be located near the leading edge of the groundwater plume approximately one mile downgradient (south) of the site.

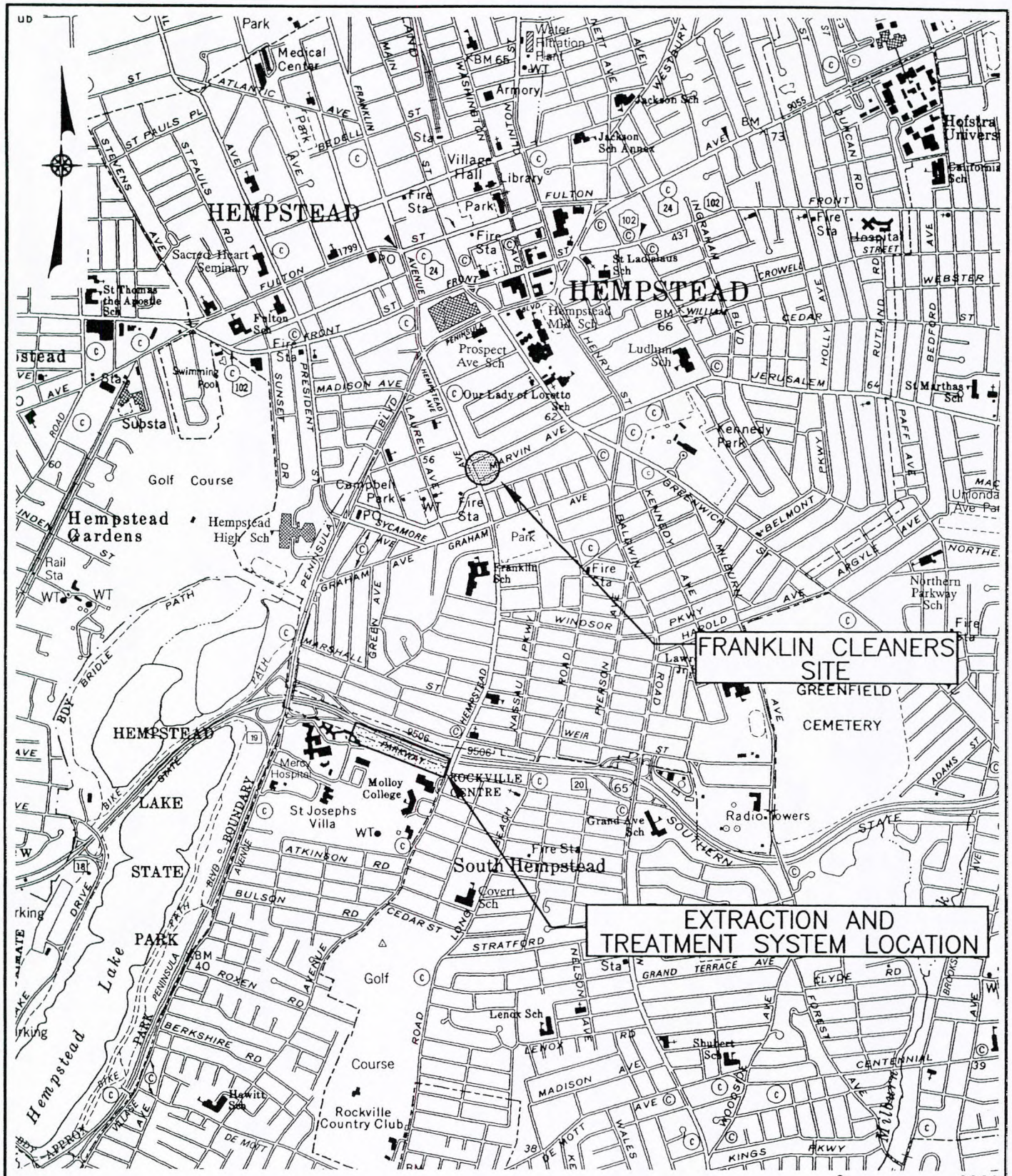
The groundwater extraction and treatment system will be located on property owned by the New York State Office of Parks, Recreation and Historic Preservation. This location is bordered by Molloy College and Mercy Hospital to the south, the Southern State Parkway to the north, Hempstead Avenue to the east and Peninsula Boulevard to the west (see Figure 1-1). Access to the location for construction of the groundwater remediation system will be via Hempstead Avenue or Molloy College pending acceptance of an access agreement with Molloy College.

1.3 Site History

In March 1990, the Nassau County Department of Health (NCDOH) investigated a complaint of tainted drinking water from a private residence on Linden Avenue. The residence was found to have two private water supply wells: a drinking water well (approximately 45 feet deep) and an irrigation well (approximately 32 feet deep). The water supply well was sampled and found to contain tetrachloroethene (PCE) at 5,500 micrograms per liter (ug/l). The irrigation well contained PCE at 29,000 ug/l. The drinking water and groundwater standard for PCE is 5 ug/l. The residence was connected to the Village of Hempstead public water supply system following the detection of PCE.

Since the Franklin Cleaners Site is located upgradient of the wells on Linden Avenue, NCDOH performed an inspection of the dry cleaner premises and collected surface soil samples from the basement of the existing building and at the rear of the former dry cleaner property. Soil samples from the basement were found to contain PCE concentrations as high as 9,400 micrograms per kilogram (ug/kg). A sample from the rear of the property contained PCE at 650,000 ug/kg, trichloroethene (TCE) at 1,700 ug/kg and dichloroethene (DCE) at 680 ug/kg.

In 1993, the Nassau County Department of Public Works (NCDPW) performed a Preliminary Site Assessment at the Franklin Cleaners site. As part of this investigation, four groundwater monitoring wells were installed. One of the wells, FC-1, was installed upgradient of the former dry cleaner site to a depth of 40 feet. The other three wells, FC-2, FC-3 and FC-4, were installed downgradient of the site, each to a depth of 37 feet. Groundwater samples



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FRANKLIN CLEANERS SITE
TOWN OF HEMPSTEAD, NEW YORK

SITE LOCATION MAP

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FIGURE 1-1

collected from the wells showed that monitoring well FC-2 contained PCE at 83 ug/l and that none of the contaminants of concern were detected in FC-1, FC-3 and FC-4.

As a result of these findings, the Franklin Cleaners site was listed on the Registry of Inactive Hazardous Waste Disposal Sites in New York State on June 17, 1993 (site registry number 1-30-050). In response to a determination that the presence of hazardous waste at the site presents a significant threat to human health and the environment, the New York State Department of Environmental Conservation (NYSDEC) completed a Remedial Investigation/Feasibility Study (RI/FS). The purpose of the RI was to define the nature and extent of contamination resulting from previous activities at the site. The RI was conducted between December 1996 and April 1997. A draft RI report was issued in October 1997 and a final RI report was issued in February 1998.

Based on the results of interior soil sampling, elevated levels of contamination exist primarily in the vicinity of the former "cooker" and other dry cleaning equipment which was located near the concrete pad in the southeast corner of the basement. The elevated levels found at this location indicate that PCE spills or disposal occurred in this portion of the basement. The basement floor of the building is in poor condition with numerous cracks and broken concrete, which apparently allowed the spilled PCE to migrate to the underlying soil. The contamination in the vicinity of the "cooker" appears to be limited to the surface soil and shallow subsurface soil less than 4 feet in depth. Although the surface soil samples exhibited very high levels of PCE (maximum concentration of 240,000 ug/kg), the samples collected with depth (greater than 4 feet), in general, did not exhibit elevated levels of PCE (maximum concentration of 140 ug/kg). The area of significant contamination appears to be approximately 450 to 500 square feet.

As part of the RI, surface soil samples were also collected along the rear (eastern) portion of the building. Subsurface soil borings were constructed at nine of the surface soil sample locations. The borings were continuously sampled to a depth of approximately 20 feet below grade. Elevated levels of contamination (maximum PCE concentration of 280,000 ug/kg) appear to be limited to an area immediately adjacent to the back door of the former dry cleaning facility where dry cleaning fluid was evidently disposed. This area is approximately 250 to 300 square

feet. Based on the subsurface sample results and the significant groundwater contamination associated with this site, elevated PCE contamination in these soils is likely to be present down to the depth of the water table (approximately 20 feet).

The results of the groundwater sampling conducted as part of the RI are summarized below.

Shallow Upper Glacial Aquifer

Elevated levels of PCE were detected in shallow/water table groundwater in the immediate vicinity of the Franklin Cleaners Site. The highest concentration detected was 1,502 ug/l in the well installed on site. The two shallow private wells sampled downgradient of the site showed PCE at 780 ug/l and 100 ug/l, respectively. VOC levels decrease in concentration in the shallow aquifer downgradient (south) of the site to below the groundwater standard of 5 ug/l approximately 3,000 feet downgradient of the site.

Intermediate Upper Glacial Aquifer

Elevated levels of VOCs were detected farther downgradient of the site in the intermediate depth samples (33 to 57 feet below the water table) collected from the Upper Glacial aquifer. Concentrations of PCE greater than 1,000 ug/l were detected approximately 1,000 feet downgradient of the site. Concentrations greater than 100 ug/l were detected at a distance of approximately 3,500 feet downgradient of the site in this zone.

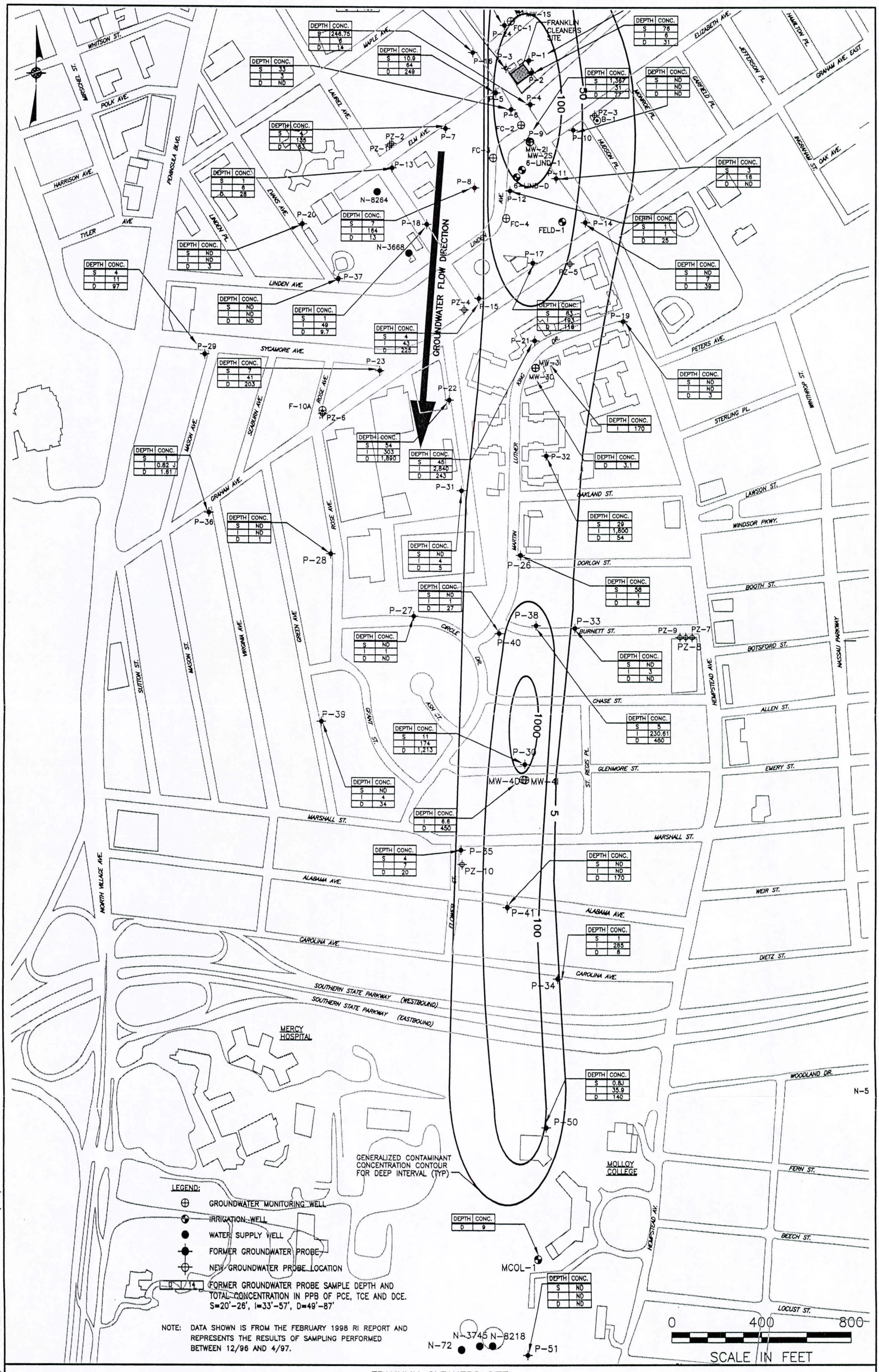
Deep Upper Glacial Aquifer

Elevated levels of VOCs were detected in the deep Upper Glacial aquifer (49 to 87 feet below the water table) both upgradient and downgradient of the site. Concentrations in the immediate vicinity of the site in the deep zone exhibited slightly elevated VOC levels up to 72 ug/l. Overall, the deep aquifer data indicates a discontinuous plume/slug of highly contaminated groundwater (greater than 1,000 ug/l) migrating southerly from the site.

Concentrations greater than 100 ug/l have been detected in the deep Upper Glacial aquifer as far as 4,500 feet downgradient of the site.

General Conclusions Regarding Groundwater Contamination

Based on the results of the RI, the groundwater plume which emanates from the Franklin Cleaners Site can be traced to nearly 1 mile downgradient (south) of the site where it ends at the northern boundary of the Molloy College property and Mercy Hospital, just south of the Southern State Parkway (see Figure 1-2). The width of the plume remains narrow throughout its length, generally less than 500 feet. In comparing the contaminant levels in the shallow, intermediate and deep Upper Glacial aquifer, it is apparent that contamination migrates downward as it travels away from the site. Due to the presence of a low permeability unit at the interface of the Upper Glacial and Magothy aquifers, it is unlikely that significant contamination associated with the site has migrated into the Magothy aquifer.



FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

GROUNDWATER CONTAMINATION PLUME MAP

FIGURE 1-2

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Section 2

2.0 REMEDIAL PREDESIGN STUDIES

2.1 Background/Purpose

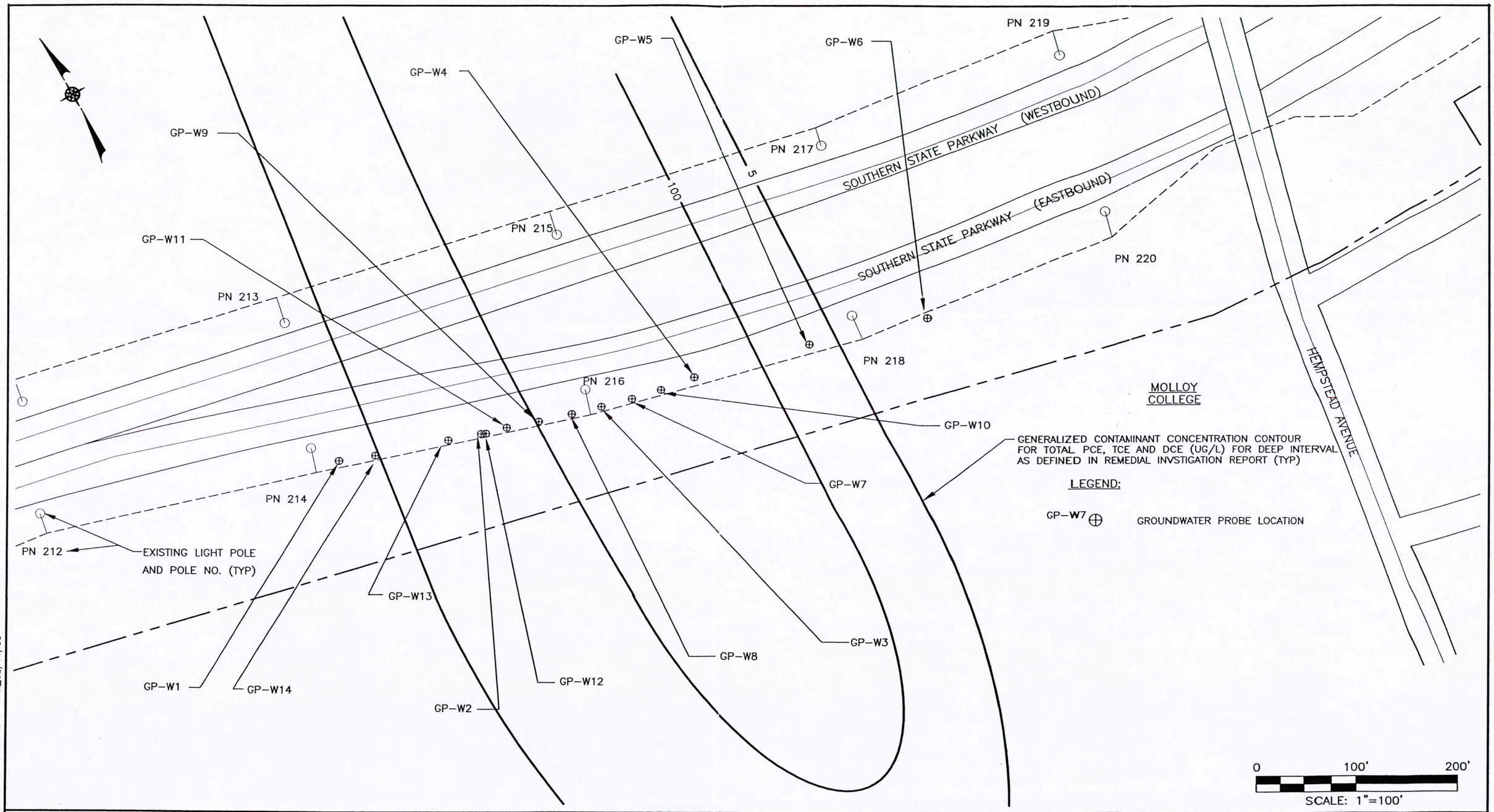
The purpose of the predesign studies was to further delineate the groundwater contamination plume emanating from the Franklin Cleaners Site and to obtain the data necessary to characterize the aquifer for the design of the groundwater remediation system to effectively contain and treat the plume. The activities completed as part of the predesign studies included a groundwater sampling program and a pump test performed near the leading edge of the plume. Descriptions of each phase of the plume delineation program and pump test are presented below.

2.2 Groundwater Contamination Plume Delineation Program

Several rounds of sample collection and analysis were required to delineate the horizontal and vertical extent of the groundwater contamination plume in the area of the planned groundwater extraction wells. Sample collection was performed along a line perpendicular to the flow path of the plume at a location which was believed to be near the leading edge of the plume and available for construction of the pump test well (see Figure 2-1).

A Geoprobe sampling system operated by Zebra Environmental Corp. was used for the initial phase of the sampling program. The Geoprobe sampling system consists of a groundwater sampling device mounted to the front of a skid steer loader. The sampling device is a 4-foot long screen point. The sampling device is threaded to the Geoprobe drive rods and driven into the water table to the desired sampling interval. When the desired depth is reached, the drive rods are retracted four feet, exposing approximately four feet of stainless steel screen. Dedicated polyethylene tubing fitted with a stainless steel check valve was inserted into the drive rods and used to extract a sample. Approximately three to five gallons of water were purged prior to sample collection.

The initial round of groundwater sampling was performed between July 29 and August 5, 1999. The program comprised collection of Geoprobe samples at six locations (GP-W1 through



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FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

LOCATIONS OF GROUNDWATER SAMPLE POINTS

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FIGURE 2-1

GP-W6). At each probe location, samples were collected at depths of approximately 20, 50 and 84 feet below ground surface. Sample depths were based on depths established as part of the RI. The results of the Geoprobe program are presented in Table 2-1 and illustrated on Figure 2-2. As can be seen from the results, during the first round of sampling the highest concentrations of tetrachloroethene (PCE) were detected at probe points GP-W2 and GP-W3. PCE was detected at 460 ug/l and 770 ug/l, 84 feet below ground surface, at GP-W2 and GP-W3, respectively.

The second round of groundwater sampling was performed between September 28 and 29, 1999. The program comprised collection of groundwater samples at five locations (GP-W7 through GP-W11) surrounding GP-W3. One groundwater sample was collected from each probe location. Samples were collected at depths ranging from 78 to 92 feet below ground surface. The results of this phase of the Geoprobe program are also presented in Table 2-1 and illustrated on Figure 2-2. As shown, the highest concentrations of PCE were detected at probe points GP-W7, GP-W8 and GP-W11. PCE was detected at concentrations of 210 ug/l and 430 ug/l in the samples collected at probe points GP-W7 and GP-W8, both advanced to 84 feet below ground surface. At probe point GP-W11, the western-most point advanced during the second round of groundwater sampling, PCE was found at a concentration of 1,200 ug/l at a depth of 92 feet below ground surface. At probe point GP-W10, the eastern-most point advanced during the second round of groundwater sampling, PCE was detected at 150 ug/l at 92 feet below ground surface. As a result, the second round of sampling indicated that the highest concentrations of PCE exist directly above the confining clay layer located approximately 95 feet below ground surface (see Section 2.3.1 below). The results of the second round of sampling also show that the plume extends further to the west than the initial round of sampling at shallower depths indicated.

The third round of groundwater sampling was performed on January 5, 2000. Collection of five Geoprobe groundwater samples at 92 feet below ground surface was planned, however, only one sample (GP-W12) was collected due to the equipment limitations. PCE was detected at a concentration of 960 ug/l at GP-W12 (see Table 2-1 and Figure 2-2).

TABLE 2-1

Franklin Cleaners Site
Summary Of Groundwater Investigation Results
Volatile Organic Compounds

SAMPLE IDENTIFICATION	GP-W 1	GP-W 1	GP-W 1	GP-W 2	GP-W 2	GP-W 2	GP-W 3	GP-W 3	GP-W 3	CONTRACT REQUIRED DETECTION LIMIT	NYSDEC CLASS GA GROUNDWATER STANDARD/ GUIDELINE
SAMPLE DEPTH	20'	50'	84'	21'	50'	84'	21'	50'	84'		
DATE OF COLLECTION	07/29/99	07/29/99	07/29/99	08/04/99	08/04/99	07/29/99	08/04/99	08/04/99	08/04/99		
DILUTION FACTOR	1	1	1	1	1	1	1	1	1		
VOLATILE ORGANICS	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Vinyl Chloride	U	U	U	U	U	U	U	U	U	1	2 ST
1,1-Dichloroethene	U	U	U	U	U	4	U	U	U	1	5 ST
Methylene Chloride	2 B	2 B	**8**	2 B	2 B	2 B	3 B	U	U	1	5 ST
t-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	1	5 ST
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	1	5 ST
1,1,1-Trichloroethane	U	1	U	U	U	**8**	U	1	**21**	1	5 ST
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	1	5 ST
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	1	0.6 ST
Trichloroethene	U	U	U	U	U	**7**	U	U	U	1	5 ST
Tetrachloroethene	U	1	U	U	U	**460 D**	2	**16**	**770**	1	5 ST
Chlorobenzene	U	U	U	U	U	U	U	U	U	1	5 ST
c-1,2-Dichloroethene	U	U	U	U	U	5	U	U	U	1	5 ST
Chloromethane	U	U	U	U	U	U	U	U	U	1	----
Bromomethane	U	U	U	U	U	U	U	U	U	1	5 ST
Chloroethane	U	U	U	U	U	U	U	U	U	1	5 ST
Trichlorofluoromethane	U	U	2	U	U	U	U	U	U	1	5 ST
Chloroform	U	U	U	U	U	U	U	U	U	1	7 ST
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	1	1 ST
Bromodichloromethane	U	U	U	U	U	U	U	U	U	1	50 ST
2-Chloroethyl vinyl ether	U	U	U	U	U	U	U	U	U	1	----
c-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	1	0.4 ST
t-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	1	0.4 ST
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	1	1 ST
Dibromochloromethane	U	U	U	U	U	U	U	U	U	1	50 ST
Bromoform	U	U	U	U	U	U	U	U	U	1	50 ST
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	1	3 ST
1,4-Dichlorobenzene	U	U	U	U	U	U	U	U	U	1	3 ST
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	U	1	3 ST
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	U	1	5 ST
TOTAL VOCs	2	4	10	2	2	486	5	17	791		

QUALIFIERS/ABBREVIATIONS:
U: Compound analyzed for but not detected
B: Indicates potential laboratory contamination
D: Compound Analyzed at Dilution
CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
ug/L: Microgram per liter

NOTES
1) Sample depth in feet below ground surface.

[ ] - Compound detected above Class GA Standards

[redacted]BLE [redacted](Continued) [redacted]

Franklin Cleaners Site
Summary Of Groundwater Investigation Results
Volatile Organic Compounds

SAMPLE IDENTIFICATION	GP-W 4	GP-W 4	GP-W 4	GP-W 5	GP-W 5	GP-W 5	GP-W 6	GP-W 6	GP-W 6	CONTRACT REQUIRED DETECTION LIMIT	NYSDEC CLASS GA GROUNDWATER STANDARD/ GUIDELINE
SAMPLE DEPTH	20'	50'	84'	21'	50'	84'	21'	50'	84'		
DATE OF COLLECTION	08/04/99	08/04/99	08/04/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99	08/05/99		
DILUTION FACTOR	1	1	1	1	1	1	1	1	1		
VOLATILE ORGANICS	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Vinyl Chloride	U	U	U	U	U	U	U	U	U	1	2 ST
1,1-Dichloroethene	U	U	U	U	U	U	U	U	U	1	5 ST
Methylene Chloride	3 B	2 B	3 B	U	U	U	1	U	U	1	5 ST
t-1,2-Dichloroethene	U	U	U	U	U	U	U	U	U	1	5 ST
1,1-Dichloroethane	U	U	U	U	U	U	U	U	U	1	5 ST
1,1,1-Trichloroethane	U	U	U	U	U	U	U	U	U	1	5 ST
Carbon Tetrachloride	U	U	U	U	U	U	U	U	U	1	5 ST
1,2-Dichloroethane	U	U	U	U	U	U	U	U	U	1	0.6 ST
Trichloroethene	U	U	U	U	U	U	U	U	U	1	5 ST
Tetrachloroethene	U	U	5	U	**6**	2	U	U	U	1	5 ST
Chlorobenzene	U	U	U	U	U	U	U	U	U	1	5 ST
c-1,2-Dichloroethene	U	U	**7**	U	U	U	U	U	U	1	5 ST
Chloromethane	U	U	U	U	U	U	U	U	U	1	----
Bromomethane	U	U	U	U	U	U	U	U	U	1	5 ST
Chloroethane	U	U	U	U	U	U	U	U	U	1	5 ST
Trichlorofluoromethane	U	U	U	U	U	U	U	U	U	1	5 ST
Chloroform	U	U	U	U	U	U	U	U	U	1	7 ST
1,2-Dichloropropane	U	U	U	U	U	U	U	U	U	1	1 ST
Bromodichloromethane	U	U	U	U	U	U	U	U	U	1	50 ST
2-Chloroethyl vinyl ether	U	U	U	U	U	U	U	U	U	1	----
c-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	1	0.4 ST
t-1,3-Dichloropropene	U	U	U	U	U	U	U	U	U	1	0.4 ST
1,1,2-Trichloroethane	U	U	U	U	U	U	U	U	U	1	1 ST
Dibromochloromethane	U	U	U	U	U	U	U	U	U	1	50 ST
Bromoform	U	U	U	U	U	U	U	U	U	1	50 ST
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	U	1	3 ST
1,4-Dichlorobenzene	U	U	U	U	1	U	U	U	U	1	3 ST
1,2-Dichlorobenzene	U	U	U	U	1	U	U	U	U	1	3 ST
1,1,2,2-Tetrachloroethane	U	U	U	U	2	U	U	U	U	1	5 ST
TOTAL VOCs	3	2	15	0	10	2	1	0	0		

QUALIFIERS/ABBREVIATIONS:
U: Compound analyzed for but not detected
B: Indicates potential laboratory contamination
D: Compound Analyzed at Dilution
CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
ug/l = Microgram per liter

NOTES
1) Sample depth in feet below ground surface.

[ ] - Compound detected above Class GA Standard

TABLE 2-1 (Continued)
Franklin Cleaners Site
Summary Of Groundwater Investigation Results
Volatile Organic Compounds

SAMPLE IDENTIFICATION	GP-W 7	GP-W 8	GP-W 9	GP-W 10	GP-W 11	GP-W 12	GP-W 13	GP-W 14	CONTRACT REQUIRED DETECTION LIMIT	NYSDEC CLASS GA GROUNDWATER STANDARD/ GUIDELINE
SAMPLE DEPTH	84'	84'	78'	92'	92'	92'	92'	92'		
DATE OF COLLECTION	09/28/99	09/28/99	09/28/99	09/29/99	09/29/99	01/05/00	01/24/00	01/24/00		
DILUTION FACTOR	1	1	1	1	1	1	3	5		
VOLATILE ORGANICS	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Vinyl Chloride	U	U	U	U	U	U	U	U	1	2 ST
1,1-Dichloroethene	U	U	**10**	U	U	U	U	U	1	5 ST
Methylene Chloride	U	U	U	U	U	2	U	U	1	5 ST
t-1,2-Dichloroethene	U	U	U	U	U	U	U	U	1	5 ST
1,1-Dichloroethane	U	U	U	U	U	U	U	2	1	5 ST
1,1,1-Trichloroethane	U	U	**22**	U	2	3	U	**6**	1	5 ST
Carbon Tetrachloride	U	U	U	U	U	U	U	U	1	5 ST
1,2-Dichloroethane	U	U	U	U	U	U	U	U	1	0.6 ST
Trichloroethene	2	1	1	2	2	2	U	U	1	5 ST
Tetrachloroethene	**210 D**	**430 D**	**34**	**150**	**1,200 D**	**960 D**	U	**26**	1	5 ST
Chlorobenzene	U	U	U	U	U	U	U	U	1	5 ST
c-1,2-Dichloroethene	**6**	2	U	**6**	1	U	U	U	1	5 ST
Chloromethane	U	U	U	U	U	U	U	U	1	----
Bromomethane	U	U	U	U	U	U	U	U	1	5 ST
Chloroethane	U	U	U	U	U	U	U	U	1	5 ST
Trichlorofluoromethane	U	U	U	U	U	U	U	U	1	5 ST
Chloroform	U	U	U	U	U	U	1	U	1	7 ST
1,2-Dichloropropane	U	U	U	U	U	U	U	U	1	1 ST
Bromodichloromethane	U	U	U	U	U	U	U	U	1	50 ST
2-Chloroethyl vinyl ether	U	U	U	U	U	U	U	U	1	----
c-1,3-Dichloropropene	U	U	U	U	U	U	U	U	1	0.4 ST
t-1,3-Dichloropropene	U	U	U	U	U	U	U	U	1	0.4 ST
1,1,2-Trichloroethane	U	U	U	U	U	1	U	U	1	1 ST
Dibromochloromethane	U	U	U	U	U	U	U	U	1	50 ST
Bromoform	U	U	U	U	U	U	U	U	1	50 ST
1,3-Dichlorobenzene	U	U	U	U	U	U	U	U	1	3 ST
1,4-Dichlorobenzene	**4**	2	2	1	2	U	U	U	1	3 ST
1,2-Dichlorobenzene	U	U	U	U	U	U	U	U	1	3 ST
1,1,2,2-Tetrachloroethane	U	U	U	U	U	U	U	U	1	5 ST
TOTAL VOCs	222	435	69	159	1207	968	1	34		

QUALIFIERS/ABBREVIATIONS:
U: Compound analyzed for but not detected
D: Compound Analyzed at Dilution
CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
ug/l= Microgram per liter

NOTES
1) Sample depth in feet below ground surface.

[ ] - Compound detected above Class GA Standard

GP–W4			
CONSTITUENT	DEPTH		
	20'	50'	84'
PCE	ND	ND	5
TCE	ND	ND	ND
1,1–DCE	ND	ND	ND
1,2–DCE	ND	ND	7
TCA	ND	ND	ND

GP–W5			
CONSTITUENT	DEPTH		
	21'	50'	84'
PCE	ND	6	2
TCE	ND	ND	ND
1,1–DCE	ND	ND	ND
1,2–DCE	ND	ND	ND
TCA	ND	ND	ND

GP–W6			
CONSTITUENT	DEPTH		
	21'	50'	84'
PCE	ND	ND	ND
TCE	ND	ND	ND
1,1–DCE	ND	ND	ND
1,2–DCE	ND	ND	ND
TCA	ND	ND	ND

GP–W9	
CONSTITUENT	DEPTH
	78'
PCE	34
TCE	1
1,1–DCE	10
1,2–DCE	ND
TCA	22

GP–W11	
CONSTITUENT	DEPTH
	92'
PCE	1,200D
TCE	2
1,1–DCE	ND
1,2–DCE	1
TCA	2

GP–W10	
CONSTITUENT	DEPTH
	92'
PCE	150
TCE	2
1,1–DCE	ND
1,2–DCE	6
TCA	ND

GP–W7	
CONSTITUENT	DEPTH
	84'
PCE	210D
TCE	2
1,1–DCE	ND
1,2–DCE	6
TCA	ND

GP–W13	
CONSTITUENT	DEPTH
	92'
PCE	ND
TCE	ND
1,1–DCE	ND
1,2–DCE	ND
TCA	ND

GP–W1			
CONSTITUENT	DEPTH		
	20'	50'	84'
PCE	ND	1	ND
TCE	ND	ND	ND
1,1–DCE	ND	ND	ND
1,2–DCE	ND	ND	ND
TCA	ND	1	ND

GP–W14	
CONSTITUENT	DEPTH
	92'
PCE	26
TCE	ND
1,1–DCE	ND
1,2–DCE	ND
TCA	6

GP–W2			
CONSTITUENT	DEPTH		
	21'	50'	84'
PCE	ND	ND	460D
TCE	ND	ND	7
1,1–DCE	ND	ND	4
1,2–DCE	ND	ND	5
TCA	ND	ND	8

GP–W12	
CONSTITUENT	DEPTH
	92'
PCE	960D
TCE	2
1,1–DCE	ND
1,2–DCE	ND
TCA	4

GP–W8	
CONSTITUENT	DEPTH
	84'
PCE	430D
TCE	1
1,1–DCE	ND
1,2–DCE	2
TCA	ND

GP–W3			
CONSTITUENT	DEPTH		
	21'	50'	84'
PCE	2	16	770
TCE	ND	ND	ND
1,1–DCE	ND	ND	ND
1,2–DCE	ND	ND	ND
TCA	ND	1	21

PN 219

PN 217

PN 215

PN 220

PN 213

PN 218

PN 211

PN 216

PN 214

PN 212

SOUTHERN STATE PARKWAY (WESTBOUND)

SOUTHERN STATE PARKWAY (EASTBOUND)

SOUTHERN STATE PARKWAY

HEMPSTEAD AVENUE

MOLLOY COLLEGE

EXISTING LIGHT POLE AND POLE NO. (TYP)

GENERALIZED CONTAMINANT CONCENTRATION CONTOUR FOR PCE (UG/L) FOR DEEP INTERVAL (TYP)

5

100

1,000

LEGEND:

GP–W7 ⊕	GROUNDWATER PROBE LOCATION
J	COMPOUND FOUND AT LEVEL BELOW CONTRACT REQUIRED DETECTION LIMIT. VALUE ESTIMATED.
E	COMPOUND EXCEEDS CALIBRATION RANGE. VALUE ESTIMATED.
D	COMPOUND ANALYZED AT DILUTION.
ND	NOT DETECTED
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
1,1–DCE	1,1–DICHLOROETHENE
1,2–DCE	TOTAL 1,2–DICHLOROETHENE
TCA	1,1,1–TRICHLOROETHANE

0 100' 200'

SCALE: 1"=100'

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SUMMARY OF RESULTS OF GROUNDWATER PLUME DELINEATION SAMPLING

FIGURE 2–2

A hydropunch sampling system was used for the fourth sampling round to reach the desired sample depth. The hydropunch sampling system consists of a drill rig, small diameter augers and a groundwater sampling device. The augers are advanced to the top of the desired sample interval. The hydropunch sampler is then lowered inside the auger string and driven to the desired sampling interval. The sampling device is retracted to expose the hydropunch screen and allow groundwater to enter the sampler. The sample is forced by hydrostatic pressure into the sampler which is equipped with check valves on the top and bottom. The sampling device is retracted to the surface where the sample is collected for analysis.

The fourth round of groundwater sampling was performed on January 24, 2000 by Land, Air, Water Environmental Services, Inc. The program comprised collection of groundwater samples at two locations (GP-W13 and GP-W14). One groundwater sample was collected from each location at 92 feet below ground surface. The results of the hydropunch program are presented in Table 2-1 and illustrated on Figure 2-2. As can be seen from the results, although PCE was not detected in GP-W13, PCE was detected in groundwater at a concentration of 26 ug/l at GP-W14. Therefore, the results of the fourth round of sampling show that the western edge of the plume extends to probe point GP-W14.

In summary, the results of the plume delineation program indicate that the most elevated levels of PCE (i.e., greater than 1,000 ug/l) exist at depths of greater than 80 feet. Based on the results of the program, the groundwater contamination plume is concentrated at a depth of approximately 80 to 95 feet below ground surface, immediately above the clay layer. The RI/FS Report indicates that concentrations of greater than 1,000 ug/l were present approximately 1,200 feet upgradient of the Southern State Parkway at shallower depths (approximately 49 to 87 feet below ground surface) (see Figure 1-2). The results of the plume delineation program also indicate that the plume is slightly farther west (approximately 100 feet) than determined during the remedial investigation. It can be concluded from the plume delineation program that the groundwater contamination plume is centered in the vicinity of GP-W8 and GP-W9 and appears to be approximately 400 feet wide at this location (based on the standard of 5 ug/l for PCE). For the purpose of modeling the extraction well capture zone, a more conservative plume width of 450 feet will be used.

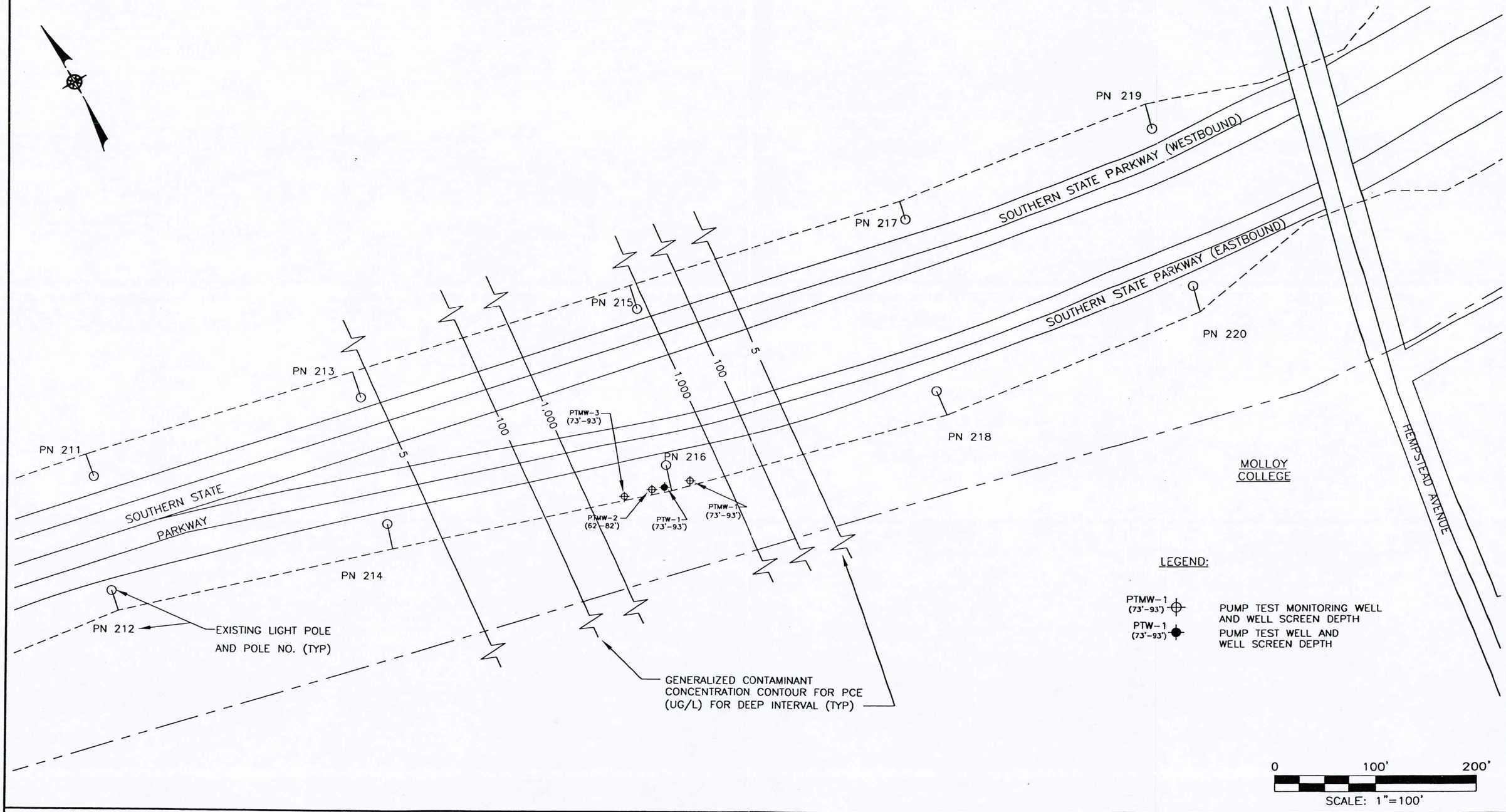
2.3 Pump Test Field Program

Activities performed as part of the pump test included installation of three groundwater monitoring/observation wells, installation of a groundwater extraction well, measurement and recording of pre-test groundwater elevations, a pre-test and pump test, and measurement and recording of post-test groundwater elevations. Descriptions of the field activities, the data collected and an analysis of the pump test results are presented below.

2.3.1 Monitoring Wells

Three monitoring wells (PTMW-1, PTMW-2 and PTMW-3) were installed by Uni-Tech Drilling Company, Inc., using the hollow stem auger and mud rotary techniques. Observation well PTMW-1 was installed on September 14, 1999, using the hollow stem auger technique. The hollow stem auger technique was used to facilitate split spoon sampling of the borehole. Observation wells PTMW-2 and PTMW-3 were installed between October 11 and October 13, 1999, using the mud rotary technique. Mud rotary technique was selected to facilitate installation of the 6" diameter extraction well (see further discussion below). The locations of the monitoring wells were selected based on the planned location for the pump test well (PTW-1) and anticipated drawdown (see Figure 2-3).

The observation wells were positioned at fixed distances from the planned location of the extraction well to gauge the variations in drawdown during the pump test. PTMW-1, located near probe point GP-W3, approximately 27 feet east of PTW-1, was advanced into the Gardiners Clay unit in order to determine the thickness and characteristics of the confining unit. The bore hole was sampled at 5-foot intervals beginning at ground surface to a depth of 50 feet using a 2-foot long 2-inch diameter split spoon. Below 50 feet the boring was sampled continuously at 2-foot intervals to 100 feet below ground surface. PTMW-2, located 12 feet west of PTW-1, was advanced to 92 feet below ground surface and was sampled continuously at 2-foot intervals beginning at 82 feet below surface to confirm the downhole information collected during the drilling of PTMW-1. PTMW-3, located 50 feet west of PTW-1, was advanced to 95 feet below



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LOCATIONS OF PUMP TEST WELL AND MONITORING WELLS

FIGURE 2-3

ground surface. Upon retrieval of each split spoon, the sample was logged in accordance with the Modified Burmeister Soil Classification System. The boring logs are provided in Appendix A. In general, the soils can be classified as fine to coarse sand from grade to 70 feet below ground surface and silty, fine to coarse sand with interbedded sandy-clay lenses to 95 feet, where a prominent clay layer at least 5 feet thick was encountered.

Five split spoon samples were selected from PTMW-1 for grain size analysis to determine the appropriate screen slot size for the pump test well. The samples were selected from the planned depth interval for the pump test well screen (72 to 92 feet below surface). The results of the grain size analyses are provided in Appendix B. A discussion of the results is presented in Section 2.3.2.

The three observation wells were constructed with 2-inch diameter, Schedule 40, threaded flush joint PVC riser pipe and 20-foot long 10-slot, Schedule 40 PVC well screen. PTMW-1 and PTMW-3 were screened from 73 to 93 feet below ground surface and PTMW-2 was screened from 62 to 82 feet below ground surface. Each observation well was installed in approximately a 6.5-inch diameter borehole. Number 1 Grade gravel pack was tremied around the well screen beginning at two feet below the bottom of the well screen to two feet above the top of the well screen. A 2-foot thick bentonite seal was then placed above the sand pack. The remaining annular space was backfilled with a bentonite/cement grout mix prior to cementing a flush mounted monitoring well manhole to complete the installation. The well construction logs are provided in Appendix C. The wells were developed by pumping and surging to remove sediment from the well and to provide hydraulic connection to the surrounding formation on October 14, 1999.

2.3.2 Extraction Well

The extraction well, PTW-1, was installed on October 12, 1999, using the mud rotary technique. The location of the pump test well and screened interval was based on the results of the plume delineation program (see Figure 2-3).

The results of the grain size analyses for the samples collected during drilling of PTMW-1 were provided to Uni-Tech Drilling Company, Inc., and a pumping rate of 150 gpm was specified. Based on the information provided, Uni-Tech recommended a 40-slot screen. As a result, the extraction well was constructed with 6-inch diameter, Schedule 80, threaded flush joint PVC riser pipe and 20-foot long 40-slot, continuous-slot stainless steel well screen installed at a depth of 73 to 93 feet below ground surface. The extraction well was constructed in a 14-inch diameter borehole. Number 2 Grade gravel pack was tremied around the well screen beginning at two feet below the bottom of the well screen to 9 feet above the top of the well screen. The gravel pack was tremied to 9 feet above the well screen to prevent settling and consolidation of the sealing and grouting material into the screen zone. A 2-foot thick bentonite seal was then placed above the sandpack. The remaining annular space was backfilled with a bentonite/cement grout mix prior to cementing a flush mounted monitoring well manhole to complete installation. The well construction log is provided in Appendix C. The well was developed by pumping and surging to remove sediment from the well and to provide hydraulic connection to the surrounding formation on October 14, 1999.

2.3.3 Pre-test Data Logging and Recording

Prior to the start of the pump test, pressure transducers were installed to continuously collect background groundwater elevation data from the newly installed wells, PTMW-1, PTMW-2, PTMW-3, and existing well MW-4D (see Figures 1-2 and 2-3). Groundwater elevations were measured in each well continuously for 8 days at 10-minute intervals. The pressure transducers used were Troll 4,000s manufactured by In-Situ Inc. The Trolls are fully submersible, 1.5-inch diameter stainless steel pressure transducers capable of collecting water elevations and temperature measurements. The Trolls were installed at a depth of 50 feet below ground surface in each well and were pre-programmed using the vendor supplied *Win-Situ*™ software to digitally collect and store data. The data collected prior to the pump test to establish a baseline indicates a non-fluctuating groundwater-table.

Immediately prior to beginning the pump test, the Trolls were programmed via a laptop computer to collected data at 3-second intervals, therefore, capturing both the drawdown and

recovery data. Upon completion of the tests, the Trolls were programmed to collect data at 10-minute intervals for the following 4 days.

2.3.4 Pump Test

A pre-test and three (3) aquifer pump tests were conducted using extraction well PTW-1 and monitoring wells PTMW-1, PTMW-2, PTMW-3 and MW-4D on November 9 through November 11, 1999. Monitoring wells PTMW-1, PTMW-2 and PTMW-3, located around the pump test well at varying distances (27, 12 and 50 feet, respectively) (see Figure 2-3), were used to gauge water table drawdown as a function of distance during the test. MW-4D is located outside the expected zone of influence of the extraction well, and therefore, was used to monitor for background fluctuations in the water table.

A Grundfos pump (Model 135650-3) supplied by NYSDEC was installed in PTW-1 by Uni-Tech Drilling Co. on October 14, 1999, at a depth of 60 feet below ground surface. The pump plate indicated a flow rate of 75 to 189 gallons per minute (gpm) at a discharge head of 137 to 61 feet of water column. Two-inch ID polyethylene tubing extending from the pump to ground surface was installed to convey the pump discharge. Two-inch Schedule 40 PVC was used to connect the well head to the inline check valve, gate valve and flow totalizer and ultimately to the 3-inch discharge hose. Approximately 1,000 feet of hose was required to discharge into a Nassau County sanitary sewer system manhole located on Woodland Drive approximately 70 feet east of the intersection with Hempstead Avenue with County authorization. The inline totalizer was utilized to monitor the flow of groundwater discharged from the extraction well. The gate valve was used to regulate flow rate. A control panel was installed to control operation of the pump. A laptop computer was used to program and monitor the pressure transducers.

The pre-test was completed on November 9, 1999, starting at 14:35 and ending at 16:00. Prior to the start of the pretest, a pressure transducer was installed in the extraction well to collect drawdown data. The pre-test was performed to determine the maximum drawdown and maximum pumping rate of the pump under field conditions and to determine whether the

observation wells were located within the zone of influence of the extraction well. Additionally, the pre-test was completed to establish the reliability of the equipment and ensure proper flow and discharge. During the pre-test, the pump was operated continuously at 92 gpm for two hours producing a drawdown of 34.5 feet in the extraction well. The flow rate produced drawdown in PTMW-1, PTMW-2 and PTMW-3 ranging from 1.8 ft to 3.5 ft, indicating usable data would be collected from the observation wells during the actual pump tests.

The first pump test was started on November 9, 1999, at 20:00. The test was performed at a flow rate of 80 gpm for approximately 8.3 hours prior to drawdown stabilization in all monitoring wells. Upon drawdown stabilization, the pump was shut down on November 10, 1999, at 4:14 and the aquifer was allowed to recover to pre-pumping conditions. The extraction well and all monitoring wells returned to pre-pumping conditions by 10:05 of the same day. Prior to shut down, a discharge sample was collected for analysis of chlorinated volatile organic compounds, dissolved iron and dissolved manganese by Methods 601, 236.1 and 243.2, respectively. The analyses for iron and manganese were performed to provide data needed for design of the treatment system (see Section 4.0). The results were 29.4 ug/l, 54 ug/l and 650 ug/l for dissolved iron, dissolved manganese and tetrachloroethene, respectively.

The second test was started upon full recovery of the extraction well and monitoring wells on November 10, 1999, at 10:05. The second test was performed for approximately 8.7 hours at a flow rate of 65 gpm, ending at 16:48 when drawdown conditions had stabilized. The recovery data was collected until 11:30 on November 11, 1999. An additional final test was run following full recovery for approximately 20 minutes at a constant flow rate of 62 gpm.

Post-test data was collected from November 11 to November 15, 1999. The Trolls were reprogrammed on November 11, 1999, to collect data at 10 minute intervals. The post-test was completed to detect any post-pump test trends or fluctuation in the water table. Over the course of the post-test, no fluctuations or trends were detected.

2.4 Pump Test Results

2.4.1 Methods of Analysis

The data from the pump test was analyzed using the *Aquifer Test for Windows* pumping test and slug test analysis software package furnished by Waterloo Hydrogeologic of Waterloo, Ontario. The software contains routines for estimation of transmissivity, hydraulic conductivity and storativity for confined and unconfined aquifers. *Aquifer Test* allows complete analysis of the pump test data via the Cooper and Jacob distance-drawdown method, time-drawdown method and distance-time-drawdown method. The recovery data for each well was analyzed using the Theis and Jacob recovery method. Appendix D provides the pump test data as well as graphical presentations of the result of each analysis.

The distance-drawdown method utilizes a minimum of three observation wells. The distance from each observation well to the extraction well is plotted versus the drawdown at a specified time during the pump test. A best fit straight line is drawn, yielding a slope that is used to calculate transmissivity. The hydraulic conductivity is then obtained by dividing the transmissivity by the aquifer thickness (72 ft).

The time-drawdown method uses the drawdown and time data obtained from an observation well, the distance from the extraction well and the pumping rate. The time is plotted versus the drawdown on a semi-logarithmic graph. A best fit straight line is drawn, yielding a slope that is used to calculate transmissivity. The hydraulic conductivity is then obtained by dividing the transmissivity by the aquifer thickness (72 ft).

The time-distance-drawdown method uses the drawdown and time data collected from an observation well, the distance from the extraction well and the pumping rate. The drawdown is plotted versus time divided by the distance squared on a semi-logarithmic graph. A best fit straight line is drawn, yielding a slope that is used to calculate transmissivity. The hydraulic conductivity is then obtained by dividing the transmissivity by the aquifer thickness (72 ft).

The recovery data for each well was analyzed using the Theis and Jacob recovery test method. The method uses the recovery data of an observation well, the distance from the extraction well and pumping duration. The drawdown is plotted versus the ratio of total time since pumping began and time since pumping ceased. A best fit straight line is drawn, yielding a slope that is used to calculate transmissivity. The hydraulic conductivity is then obtained by dividing the transmissivity by the aquifer thickness (72 ft).

2.4.2 Analysis of Pump Test 1

The first pump test was started on November 9, 1999, at 20:00. The test was performed at a constant flow rate of 80 gpm. A maximum drawdown of 26.6 feet was measured in PTW-1. Maximum drawdowns measured in PTMW-1, PTMW-2 and PTMW-3 were 1.84, 3.86 and 1.87 feet, respectively, after approximately 8.3 hours of pump operation. A hydraulic conductivity was not calculated for PTMW-2 and a distance-drawdown analysis was not completed due to a malfunction of the transducer in PTMW-2. Data from the start of the test to approximately one hour into the test was lost due to the malfunction. The data collected from the test was analyzed using the Cooper and Jacob distance-time-drawdown and time-drawdown methods. The results reveal hydraulic conductivities of 19 ft/day and 21 ft/day for PTMW-1 and PTMW-3 as summarized in Table 2-2 below. The low hydraulic conductivities calculated for PTMW-1 may be due to incomplete development of the well. Graphical representations of the analyses are presented in Appendix D.

Table 2-2

Pump Test 1
Results of Analysis of
Drawdown Data

Test 1 (80 gpm)	Hydraulic Conductivity (ft/day)		
Cooper and Jacob Method	PTMW-1	PTMW-2	PTMW-3
Distance-Time-Drawdown	19	NA	21
Time-Drawdown	19	NA	20

Upon stabilization of drawdown during Test 1, the pump was turned off and the Trolls collected the recovery data. The data was analyzed using the Theis and Jacob recovery test method. Based on the results of the analysis the hydraulic conductivities are 24 ft/day, 11 ft/day and 27 ft/day, respectively, for PTMW-1, PTMW-2 and PTMW-3. The results are tabulated in Table 2-3 below.

Table 2-3

Pump Test 1
Results of Analysis of Recovery Data

Test 1 (80 gpm)	Hydraulic Conductivity (ft/day)		
Theis and Jacob Method	PTMW-1	PTMW-2	PTMW-3
Recovery Test	24	11	27

2.4.3 Analysis of Pump Test 2

The second test was started upon full recovery of the extraction well and all monitoring wells on November 10, 1999, at 10:05. The test was performed at a constant flow rate of 65 gpm. A maximum drawdown of 20 feet was measured in PTW-1. Maximum drawdown measurements of 1.34, 3.01 and 1.38 feet were recorded in PTMW-1, PTMW-2 and PTMW-3, respectively, after approximately 8.7 hours of pump operation. Analysis of the maximum drawdown data for the three monitoring wells using the Cooper and Jacob distance-drawdown method indicated a hydraulic conductivity of 21 ft/day. The data collected from the test was also analyzed using the Cooper and Jacob distance-time-drawdown and time-drawdown methods. The results reveal hydraulic conductivities of 23 ft/day, 12 ft/day and 25 ft/day for PTMW-1, PTMW-2 and PTMW-3, respectively, as summarized in Table 2-4 below. Graphical representations of the analyses are presented in Appendix D.

Table 2-4

Pump Test 2
Results of Analysis of
Drawdown Data

Test 2 (65 gpm)	Hydraulic Conductivity (ft/day)		
Cooper and Jacob Method	PTMW-1	PTMW-2	PTMW-3
Distance-Time-Drawdown	23	12	25
Time-Drawdown	23	12	25

Upon stabilization of drawdown in each observation well during Test 2, the pump was turned off and the recovery data was collected. The data was analyzed using the Theis and Jacob recovery test method. Based on the results of the analysis the hydraulic conductivities are 23 ft/day, 12 ft/day and 21 ft/day, respectively, for PTMW-1, PTMW-2 and PTMW-3. The results are tabulated in Table 2-5 below.

Table 2-5

Pump Test 2
Results of Analysis of Recovery Data

Test 2 (65 gpm)	Hydraulic Conductivity (ft/day)		
Theis and Jacob Method	PTMW-1	PTMW-2	PTMW-3
Recovery Test	23	12	21

2.4.4 Analysis of Pump Test 3

An additional pump test was completed on November 11, 1999. The test was run for a total of 20 minutes at a constant flow rate of 62 gpm. The test was completed to obtain additional data for the initial drawdown exhibited by the observation and extraction wells. The maximum drawdown in PTW-1 was recorded as 18.9 feet. Maximum drawdowns measured in PTMW-1, PTMW-2 and PTMW-3 were 1.28, 2.8 and 1.33 feet, respectively, after approximately 20 minutes of pump operation. Analysis of the maximum drawdown data for the three monitoring wells using the Cooper and Jacob distance-drawdown method indicated a

hydraulic conductivity of 21 ft/day. The data collected from the test was also analyzed using the Cooper and Jacob distance-time-drawdown and time-drawdown methods. The results indicate hydraulic conductivities of 22 ft/day, 11 to 12 ft/day and 22 ft/day for PTMW-1, PTMW-2 and PTMW-3, respectively, as summarized in Table 2-6 below. Graphical representations of the analyses are presented in Appendix D.

Table 2-6

Pump Test 3
Results of Analysis of
Drawdown Data

Test 3 (62 gpm)	Hydraulic Conductivity (ft/day)		
Cooper and Jacob Method	PTMW-1	PTMW-2	PTMW-3
Distance-Time-Drawdown	21	12	22
Time-Drawdown	22	11	22

In summary, the results of the analyses of the pump test data indicate an aquifer hydraulic conductivity ranging from 11 ft/day to 27 ft/day. The analyses of the drawdown and recovery data collected from PTMW-1 and PTMW-3 exhibit fairly good correlation (results ranged from 19 ft/day to 27 ft/day). These results also correlate well with the results of the Cooper and Jacob distance-drawdown method analyses which utilize data from all monitoring wells concurrently (results were 21 ft/day for both Pump Tests 2 and 3).

The results obtained from the drawdown and recovery data for PTMW-2 do not correlate well with the results obtained for PTMW-1 and PTMW-3. The results obtained from PTMW-2 range from 11 ft/day to 12 ft/day. The difference may be the result of the shallower screen interval of PTMW-2 (62 to 82 feet bgs) as compared to PTMW-1 and PTMW-3 (73 to 93 feet bgs) that reflects the effect of a vertical anisotropy in hydraulic conductivity. The lower hydraulic conductivity in PTMW-2 indicates less permeable soil layers at the shallower depth, which is consistent with downhole observations recorded during well construction and sampling of nearby well PTMW-1. The soil found in the 65 to 85-foot depth interval contained a higher

percentage of finer sand and clay than the soil found at the deeper intervals (i.e., 85 to 95 foot bgs).

In conclusion, the results indicate a hydraulic conductivity for unconsolidated sands and silts at the site ranging from 11 ft/day to 27 ft/day. These rates are consistent with the range reported for silty sand to medium sand by Freeze and Cherry (1979) (3 to 28 ft/day). For the purposed of modeling the required extraction well capture zone, a more conservative hydraulic conductivity (30 ft/day) will be used.

Section 3

3.0 BASIS OF DESIGN

3.1 Introduction

As discussed in Section 1.0, the objective of this Remedial Measure (RM) is to construct an extraction and treatment system to contain and treat the contaminated groundwater plume migrating from the Franklin Cleaners Site. Accordingly, using the plume delineation and pump test results presented in Section 2.0, the capture zone was modeled for multiple pumping well configurations and pumping rates to evaluate potential system configuration options. The objective is to capture the entire width of the plume at the planned location for construction of the extraction system. The plume has been defined as the zone of groundwater exhibiting greater than 5 ug/l of tetrachloroethene contamination (see Figure 2-2). Additionally, in this section site constraints, management of treated water and basic treatment system design data are addressed.

3.2 Capture Zone Modeling

A simplified two-dimensional modeling analysis was performed to evaluate extraction well configurations and groundwater extraction rates. Capture zone estimates were calculated using *WinFlow*™, a 2-dimensional (2-D), steady-state groundwater flow model supplied by Environmental Simulations, Inc. The 2-D model simulates groundwater flow in a horizontal plane using analytical functions developed by Strack (1989). A range of groundwater extraction rates and extraction well locations were evaluated.

The aquifer characteristics input into the model were based on site-specific information obtained during the RI, the groundwater delineation program and the pump test. The input characteristics include the following:

- Hydraulic Conductivity - 30 ft/day
- Storativity - 0.2
- Transmissivity – 2,160 ft^2/day
- Horizontal Gradient - 0.00017 ft/ft

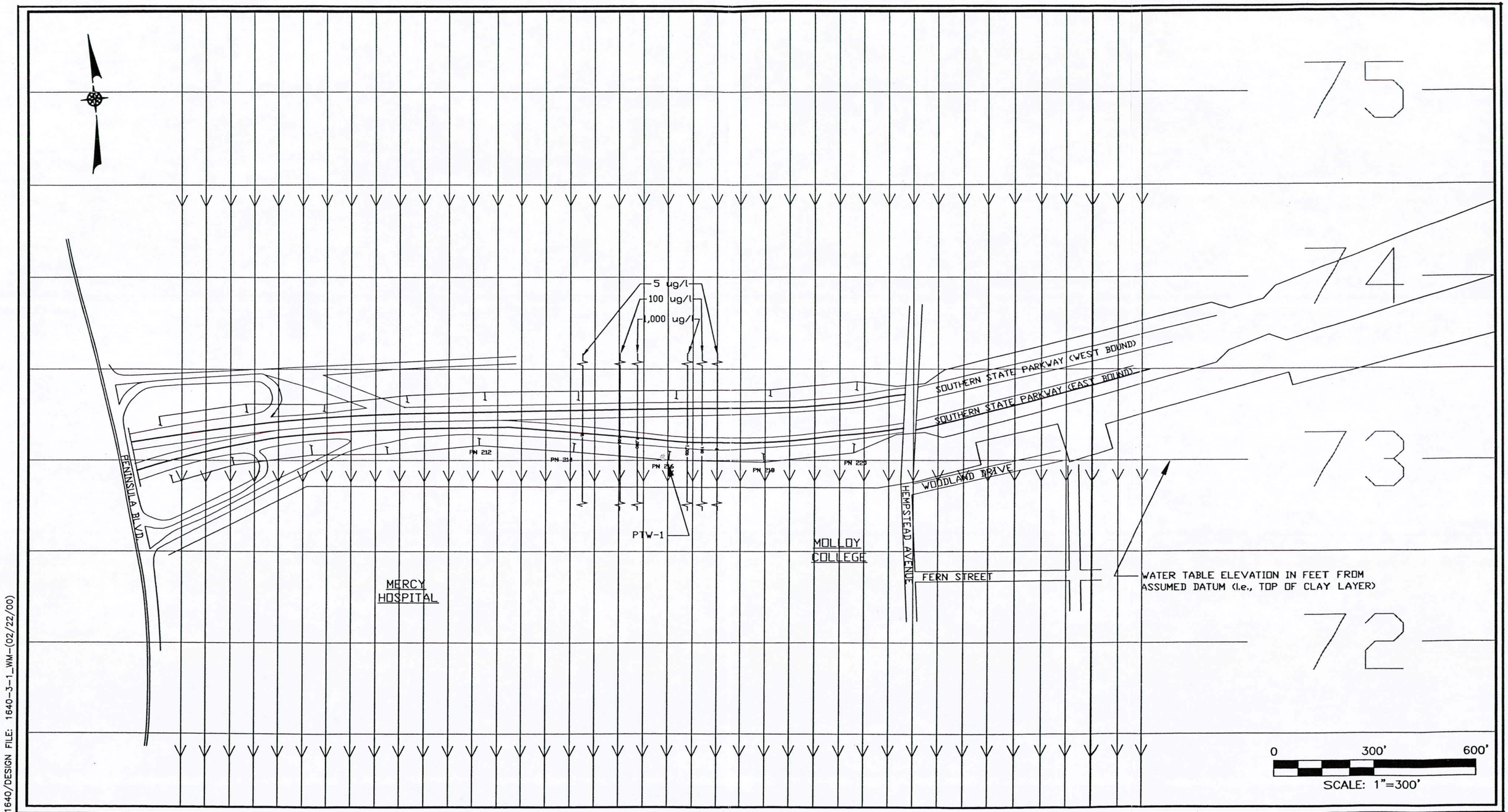
- Porosity-0.2
- Saturated Aquifer Thickness - 72 feet

The targeted area for location of the extraction well(s) is between the boundaries of the Molloy College and Mercy Hospital properties along the shoulder of the east bound Southern State Parkway. The location is downgradient of the Franklin Cleaners Site and upgradient of the Village of Rockville Centre public water supply wells and perpendicular to the flow path of the plume.

One and two well extraction scenarios were evaluated at cumulative extraction rates of 15, 20, 30 and 40 gpm. Existing extraction well PTW-1 was utilized in both the single extraction well and two well scenarios. For the two well scenario, a second extraction point with the same screen diameter as PTW-1 was modeled. The second well, PTW-2 was located approximately 120 feet west of PTW-1. The flow was distributed equally between the two wells (PTW-1 and PTW-2) when modeling the two well scenario. Figure 3-1 illustrates pre-pumping conditions using the aquifer characteristics described above.

The results of the single well capture zone modeling using flow rates of 15, 20, 30 and 40 gpm indicate capture zones of approximately 270, 490, 720 and 1,000 feet in width, respectively, at the point of extraction (see Figures 3-2, 3-3, 3-4 and 3-5). The results of the two well capture zone modeling using cumulative flow rates of 15, 20, 30 and 40 gpm indicate capture zones of approximately 350, 500, 720 and 990 feet in width, respectively (see Figures 3-6, 3-7, 3-8 and 3-9). As discussed above, a minimum plume width of 450 feet is recommended for determining the required capture zone width. Therefore, the results of the modeling indicate that the minimum required cumulative pumping rate for plume containment is 20 gpm. Based on the results of the modeling this conclusion applies to both the single well and two well scenarios.

Based on the results of the modeling, a one or two extraction well configuration may be used to contain the groundwater plume. Although one well would result in a savings in construction costs, the two well configuration provides operational flexibility which would not



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CAPTURE ZONE MODEL (PRE-PUMPING CONDITIONS)
K=30 I=0.00167 B=72 FLOW=00 GPM

FIGURE 3-1

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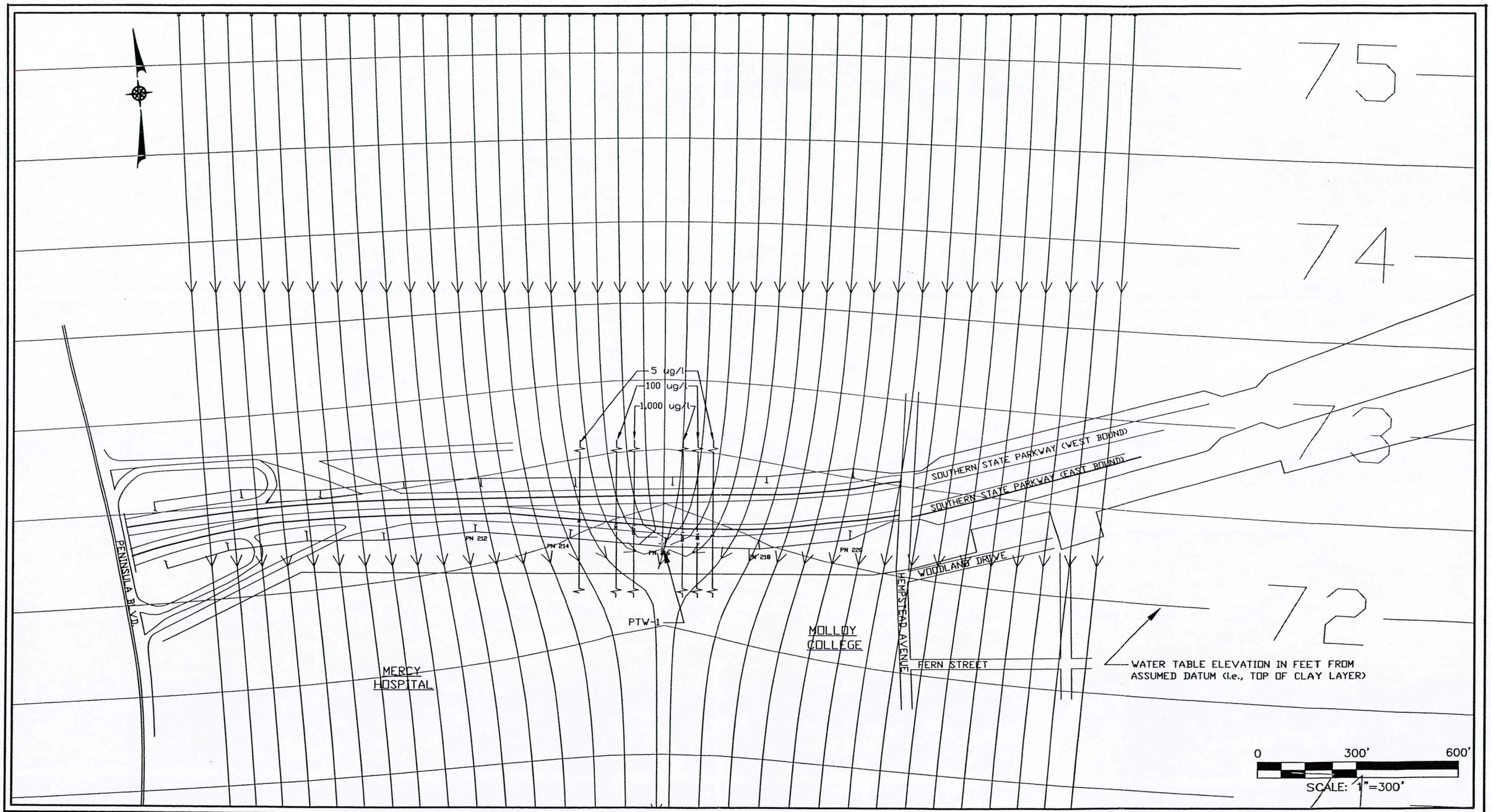

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CAPTURE ZONE MODEL
K=30 FT/DAY I=0.00167 B=72 FT FLOW=15 GPM

FIGURE 3-2

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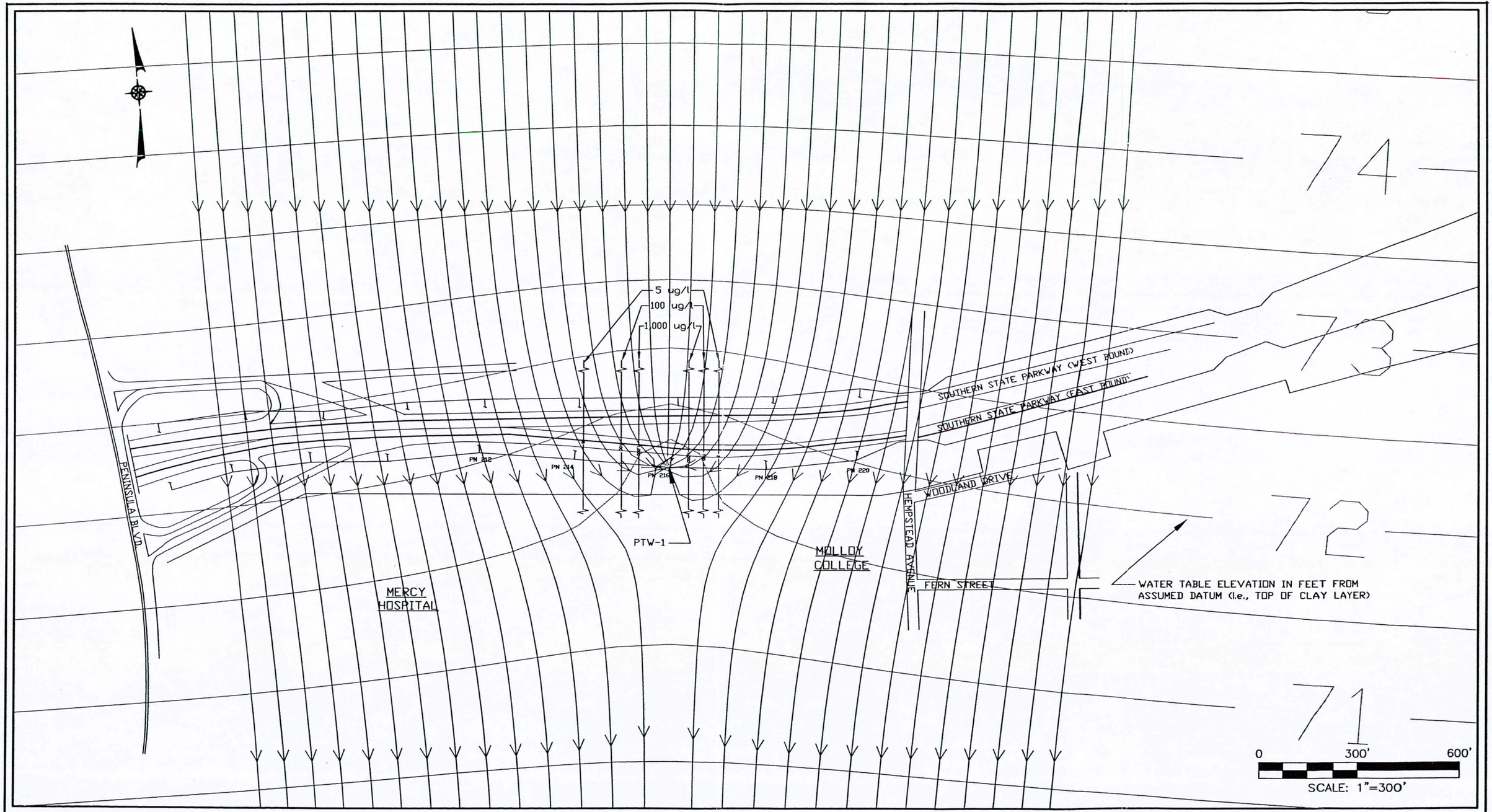

FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

CAPTURE ZONE MODEL
K=30 FT/DAY I=0.00167 B=72 FT FLOW=20 GPM

FIGURE 3-3

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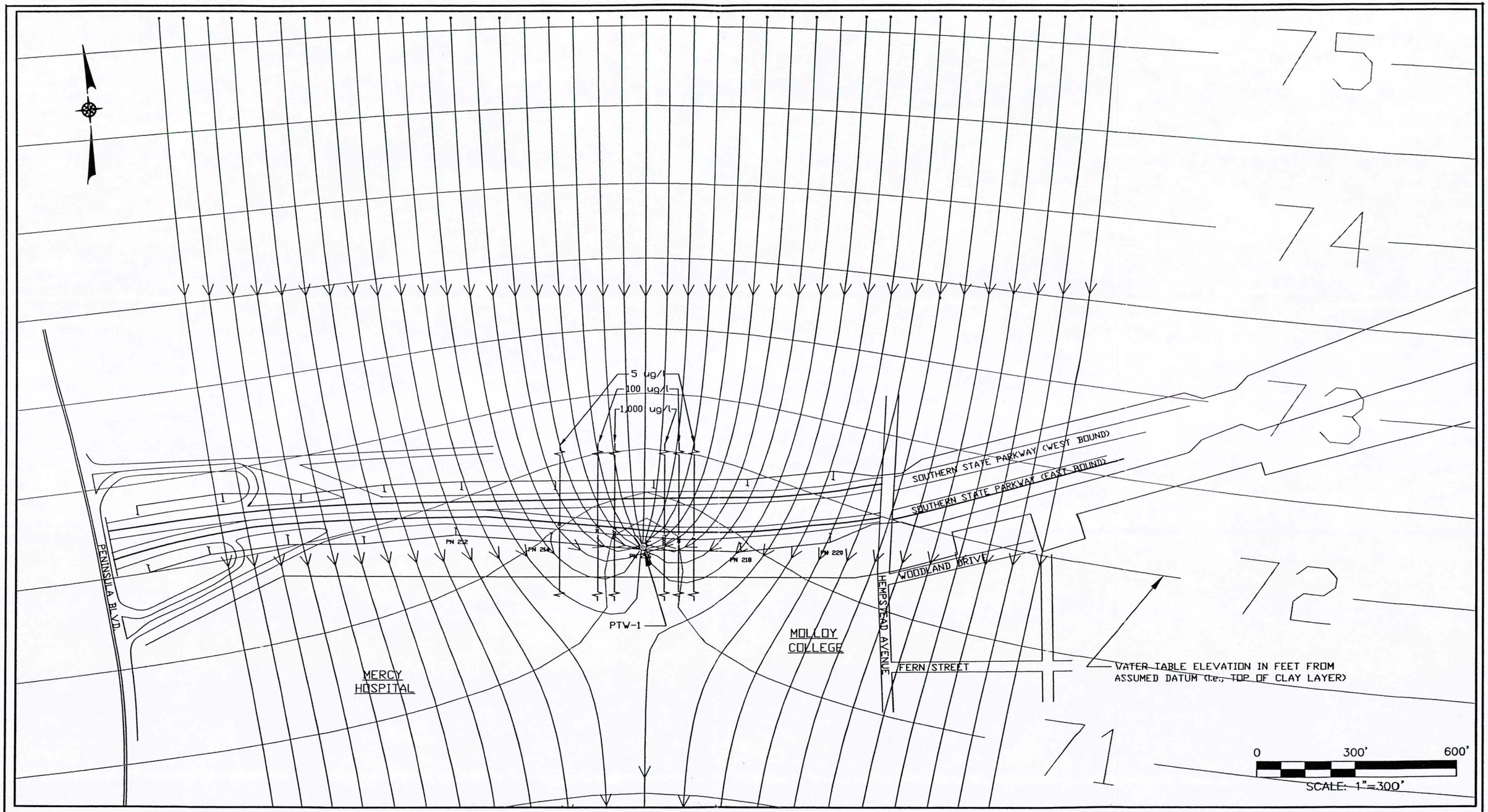

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FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

CAPTURE ZONE MODEL
K=30 FT/DAY I=0.00167 B=72 FT FLOW=30 GPM

FIGURE 3-4

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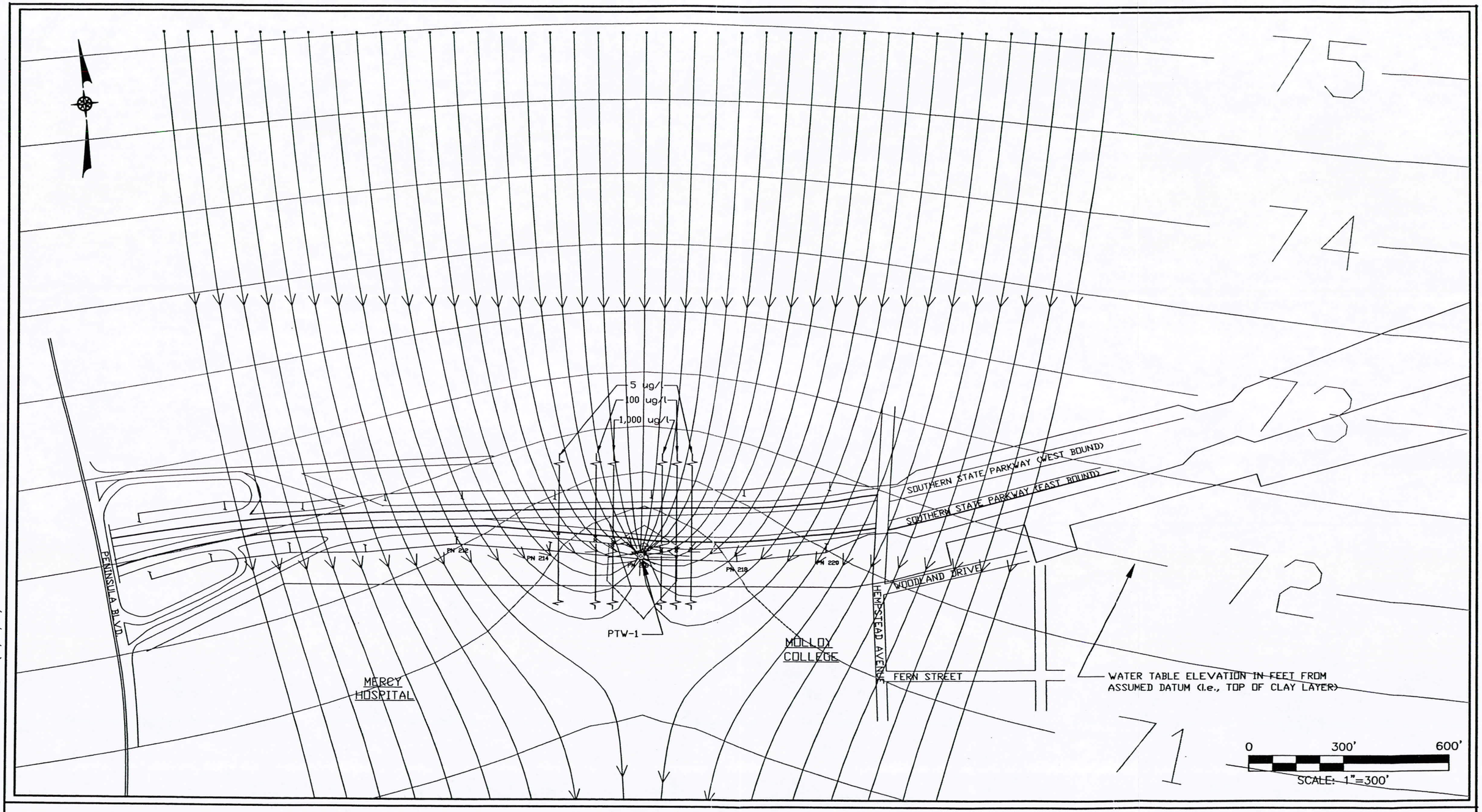

FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

CAPTURE ZONE MODEL
K=30 FT/DAY I=0.00167 B=72 FT FLOW=40 GPM

FIGURE 3-5

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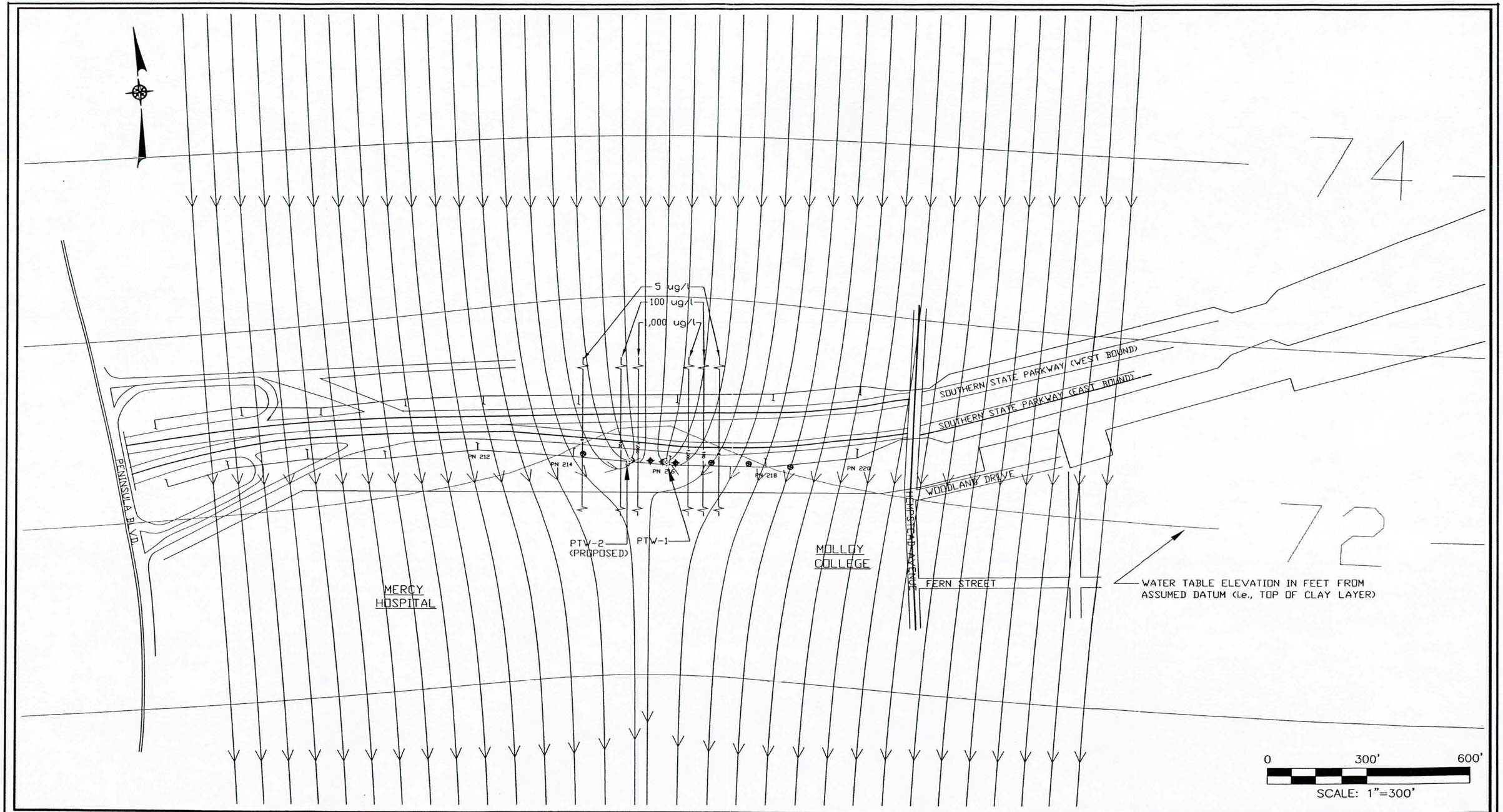

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FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

CAPTURE ZONE MODEL (TWO WELLS)
K=30 FT/DAY I=0.00167 B=72 FT FLOW=7.5 GPM/WELL

FIGURE 3-6

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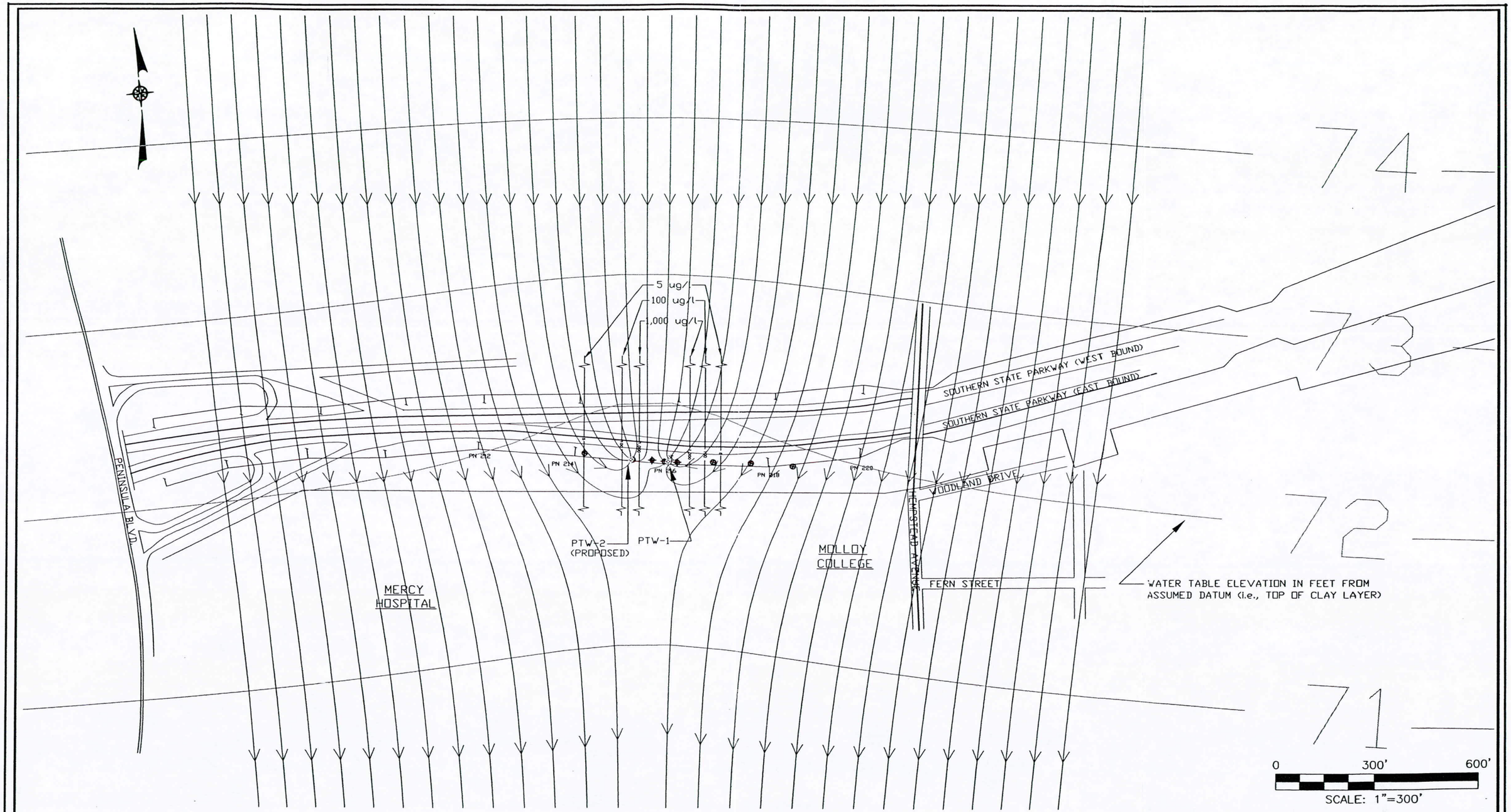

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FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

CAPTURE ZONE MODEL (TWO WELLS)
K=30 FT/DAY I=0.00167 B=72 FT FLOW=10 GPM/WELL

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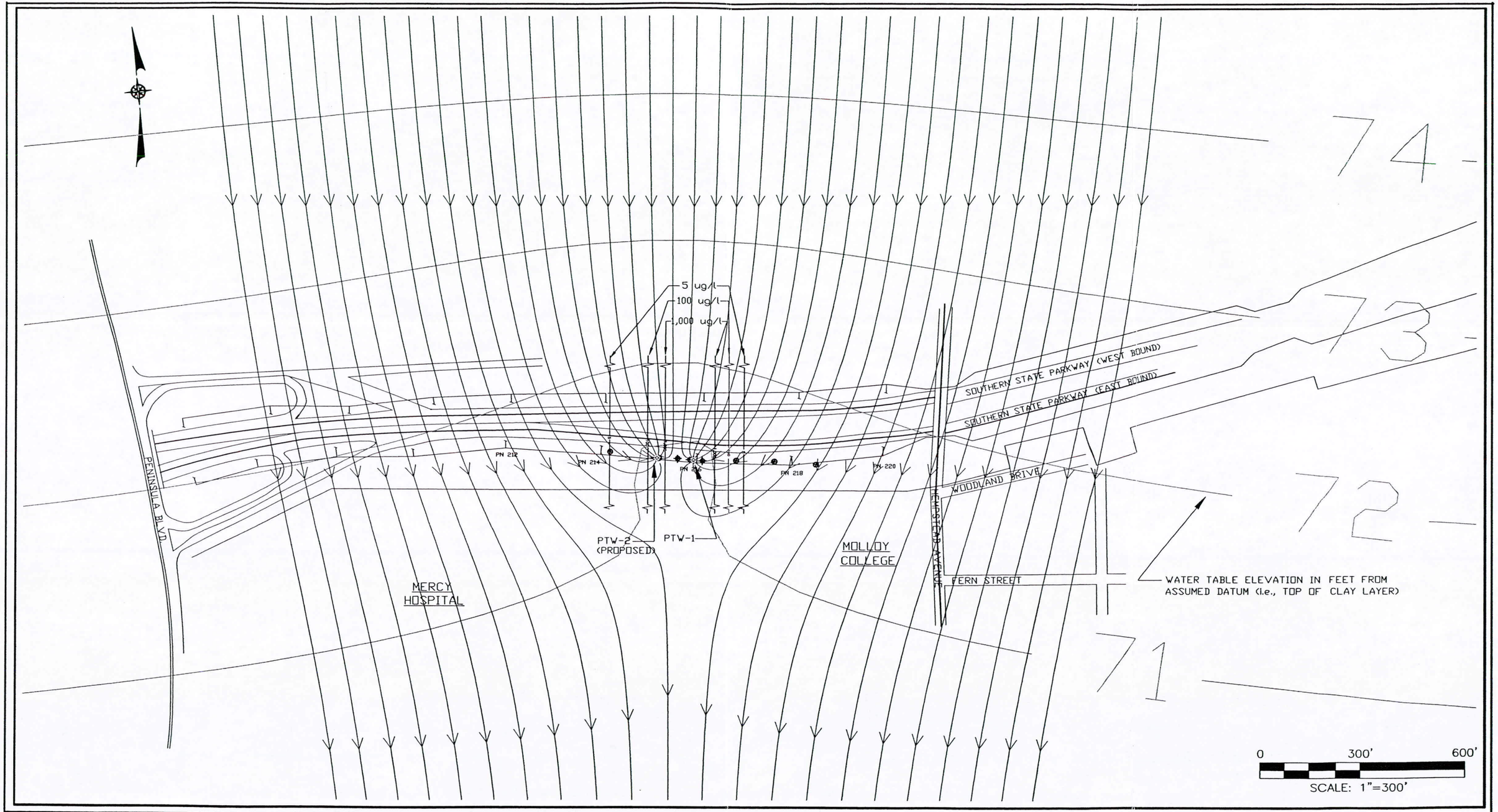
FIGURE 3-7



FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

CAPTURE ZONE MODEL (TWO WELLS)
K=30 FT/DAY I=0.00167 B=72 FT FLOW=15 GPM/WELL

FIGURE 3-8

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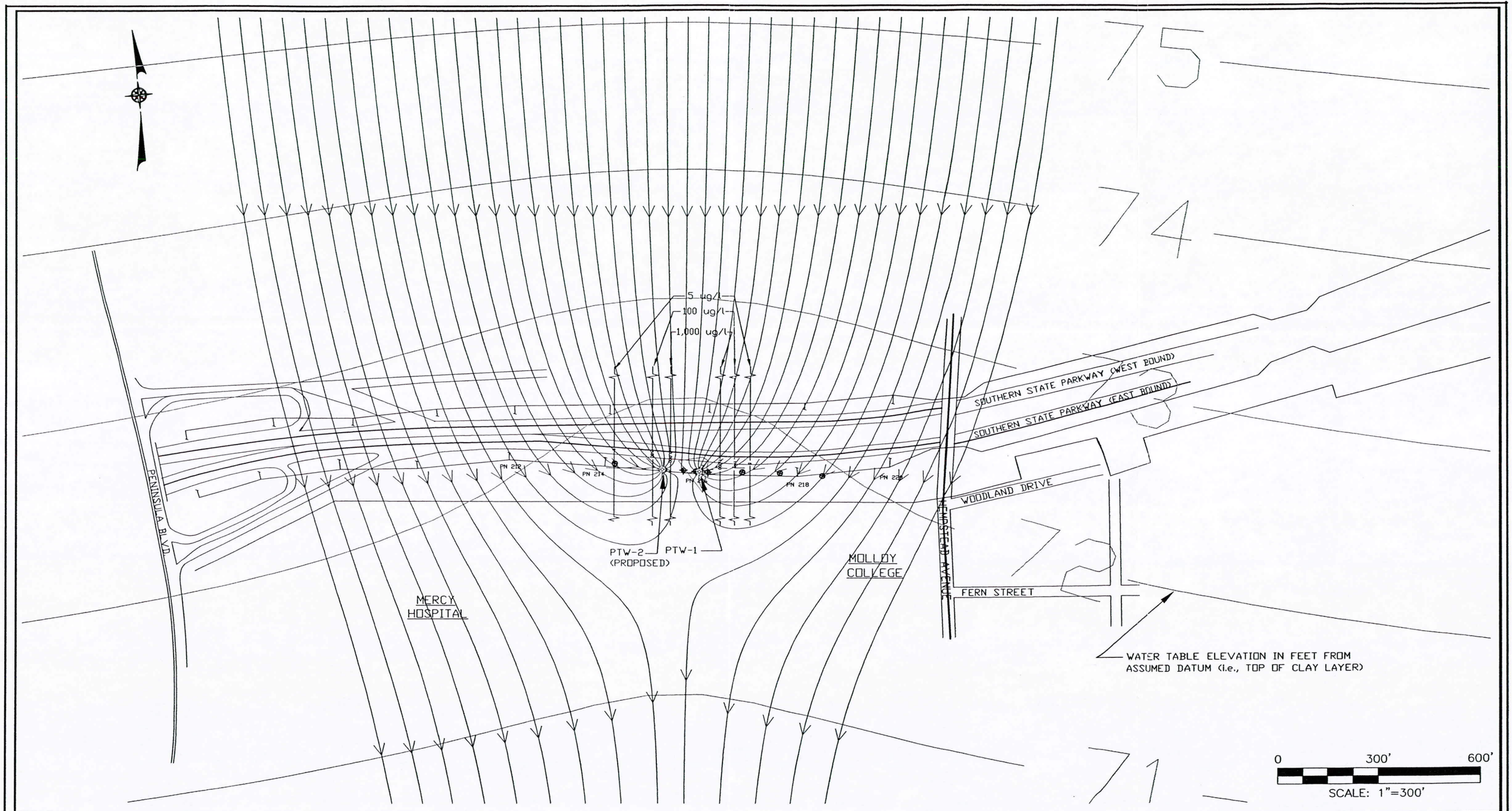

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FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

CAPTURE ZONE MODEL (TWO WELLS)
K=30 FT/DAY I=0.00167 B=72 FT FLOW=20 GPM/WELL

FIGURE 3-9

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be provided by the one well configuration. For example, one well may be taken down for servicing without shutting down the entire system and maintaining containment of the plume. Also, flow rates can be increased or reduced in separate parts of the plume if a change in contaminant concentrations indicate such a change would be beneficial. The additional cost associated with one additional extraction well, including the pump and appurtenances, is estimated to be less than $20,000. Therefore, a two well configuration is recommended.

Since the model is based on a simplification of actual site conditions and uses several assumptions, a factor of safety is recommended to provide a flow rate that captures the full width of the plume. It is recommended that the extraction system be designed for a cumulative flow rate of 70 gpm (i.e., two wells each extracting 35 gpm). The incremental cost increase for the higher flow rate would be minimal and would provide a margin of safety which accounts for potential effects of the heterogeneous nature of the aquifer and the simplifying assumptions of the model as well as providing the capability to extract greater quantities of groundwater, if required, and operate with a single well during servicing (as discussed above). Initially groundwater would be extracted at approximately 20 gpm to minimize unnecessary pumping and treatment of clean groundwater. The extraction rate would then be increased if necessary based on the results of downgradient groundwater monitoring.

3.3 Site Constraints

The treatment system equipment will be housed in a small building within the limits of the wooded area, between the boundaries of Molloy College and Mercy Hospital, south of the east bound Southern State Parkway as shown on Drawing 1 presented in a map pocket at the back of this document. This property is owned by the New York State Office of Parks, Recreation and Historic Preservation (NYSOPR&HP). Presently, plans are to access the property for construction, operations and maintenance via the Molloy College property (see Drawing 1). As a result, agreements will be required with both NYSOPR&HP and Molloy College. Additionally, approval of the plans for clearing and landscaping will be required from NYSOPR&HP.

3.4 Treated Water Discharge

Treated groundwater will be discharged to the existing Nassau County Department of Public Works (NCDPW) storm drain system. The closest storm drain manhole is located on Hempstead Avenue near the intersection with Woodland Drive (see Drawing 1). NCDPW has indicated that the storm drain system in this area could accept the additional flow (see Appendix E). However, the remediation system shall be designed to cease discharge during a large storm event which would result in an exceedence of the storm drain capacity.

In order to discharge treated groundwater to the storm drain system, piping will be installed from the treatment system to the storm drain manhole as shown on Drawing 1. The piping will be installed below grade on property owned by NYSOPR&HP, parallel to the Molloy College property boundary, prior to intersecting Hempstead Avenue.

The storm drain manhole located on Hempstead Avenue is connected to an 18-inch diameter reinforced concrete pipe (RCP). The flow along Hempstead Avenue is south. The 18-inch pipe expands to a 24-inch pipe at the intersection of Beech Street. At the intersection of Bulson Road, the flow heads west until the intersection of North Village Avenue where it connects to a 30-inch pipe and heads south. At the intersection of North Village Avenue and DeMott Avenue the 30-inch pipe expands to a 36-inch pipe. The flow then turns onto Lakeside Drive where the pipe is connected to a 42-inch pipe at the intersection of Lakeview Avenue. Lakeside Drive becomes North Centre Avenue and at the intersection of Maine Avenue the 42-inch pipe connects to a 48-inch pipe. At the intersection of Nassau Avenue and North Centre Avenue the storm drain flows west, until the intersection with Banks Avenue. On Banks Avenue the flow is south until Nassau Avenue, where flow is west along Nassau Avenue. The storm drain system ends at a headwall located on Nassau Avenue just south of Smith Pond, also known as Smith Lake, combines with the overflow from Smith Pond and discharges into the head of Mill River.

Mill River receives the discharge from the storm drain system in this area. Mill River is an existing stream that ultimately discharges into Reynolds Channel. Based on a discussion with

James Beach (NYSDEC, Division of Water) Mill River is classified as a Class SC surface water body. NYSDEC regulations, 6 NYCRR 703 (Surface Water and Groundwater Quality Standards and Groundwater Effluent Limits), establish a guidance value of 1.0 ug/l for tetrachloroethene (PCE) in a Class SC water body.

Approvals to connect to the storm drain system will be required from the NCDPW. In order to install pipe along the Hempstead Avenue right-of-way and across Hempstead Avenue and connect to and use the storm drain system, NCDPW road opening and connection permits are required. Based on discussions with NYSDEC, a State Pollution Discharge Elimination System (SPDES) permit will not be required since this is a New York State Superfund project; however, compliance with the substantive requirements of the SPDES regulations is required.

3.5 Design Data

It was anticipated that the major treatment system unit operations would include groundwater extraction, metals (Fe and Mn) removal, pH adjustment, removal of volatile organic compounds (VOCs) and vapor phase treatment. As a result, the key design data for the system includes anticipated concentrations of PCE, iron (Fe), manganese (Mn) and pH in the extracted groundwater. Table 3-1 summarizes the design data obtained during the groundwater plume delineation program and the pump test.

Iron and manganese were detected in the pump test discharge sample at concentrations of 29.4 ug/l and 54 ug/l, respectively. There are no standards or guidance values listed by the NYSDEC for discharge of iron and manganese to a Class SC water body, however, removal of iron and manganese may be required to avoid problems associated with operation of the air stripping system being considered for the removal of PCE and other volatile organic compounds in the groundwater contaminant plume.

As stated above, the NYSDEC guidance value is 1.0 ug/l for PCE for discharge to a Class SC water body. Most of the Geoprobe and hydropunch samples in the project area exhibited concentrations above this value (1,200 ug/l and 960 ug/l for GP-W11 and GP-W12,

Table 3-1

FRANKLIN CLEANERS SITE
GROUNDWATER EXTRACTION AND TREATMENT
REMEDIAL MEASURE
ENGINEERING REPORT
DESIGN DATA SUMMARY

Concentration (ug/l) in Groundwater Samples

Constituent	Pump Test Discharge Sample PT-GW	Probe Point Sample Location GP-W11	Probe Point Sample Location GP-W12	NYSDEC Class SC Guidance Value
PCE	650	1,200	960	1
Iron (Fe)	29.4	NA	NA	NS
Manganese (Mn)	54	NA	NA	NS
pH	6.2	5.32	6.44	NS

Notes:

1. All constituents analyzed for in laboratory except for pH, which is field measured.

2. See Figure 2-1 for probe locations and Figure 2-3 for well location.

NS - No standard

NA - Not analyzed

respectively). The treatment system will be designed to remove PCE at the maximum concentration of 1,200 ug/l detected to a concentration of 1.0 ug/l.

Section 4

4.0 EXTRACTION AND TREATMENT SYSTEM PROCESS DESIGN

4.1 Introduction

As discussed in Section 3, the extraction system will be designed to remove the contaminated groundwater with two wells and the treatment system will be designed to reduce PCE from an inlet concentration of 1,200 ug/l to a discharge concentration of 1.0 ug/l at a maximum flow rate of 70 gpm. As described in the Remedial Investigation and Feasibility Study (RI/FS) Report and Record of Decision (ROD), air stripping is the treatment technology that has been selected for removal of VOCs from the groundwater. Additionally, as described in the RI/FS Report and ROD, granular activated carbon will be used to treat the exhaust gas from the air stripping process prior to discharge to the atmosphere.

4.2 System Layout

Based on the flow path, plume width and chemical characteristics of the groundwater plume to be contained, the major treatment system equipment required will include two extraction wells, a low profile air stripper, two granular activated carbon (GAC) vessels for air stripper exhaust gas treatment and a lift station to convey the treated discharge to the storm water sewer system. A flow schematic of the treatment system is presented as Figure 4-1. The treatment system will be housed in a split-face concrete block building. Drawing 1 shows the proposed location of the extraction and treatment system, and the general arrangement of equipment is shown on Figure 4-2.

4.3 Pre-Treatment

Based on review of data presented in Section 3 and the results of the groundwater sampling during the remedial investigation, as well as communications with system vendors, pretreatment, including iron and manganese removal and filtration are not required as part of the groundwater treatment process for this project. As shown in Table 3-1, concentrations of iron and manganese detected in the pump test discharge were 29.4 ug/l and 54 ug/l, respectively.

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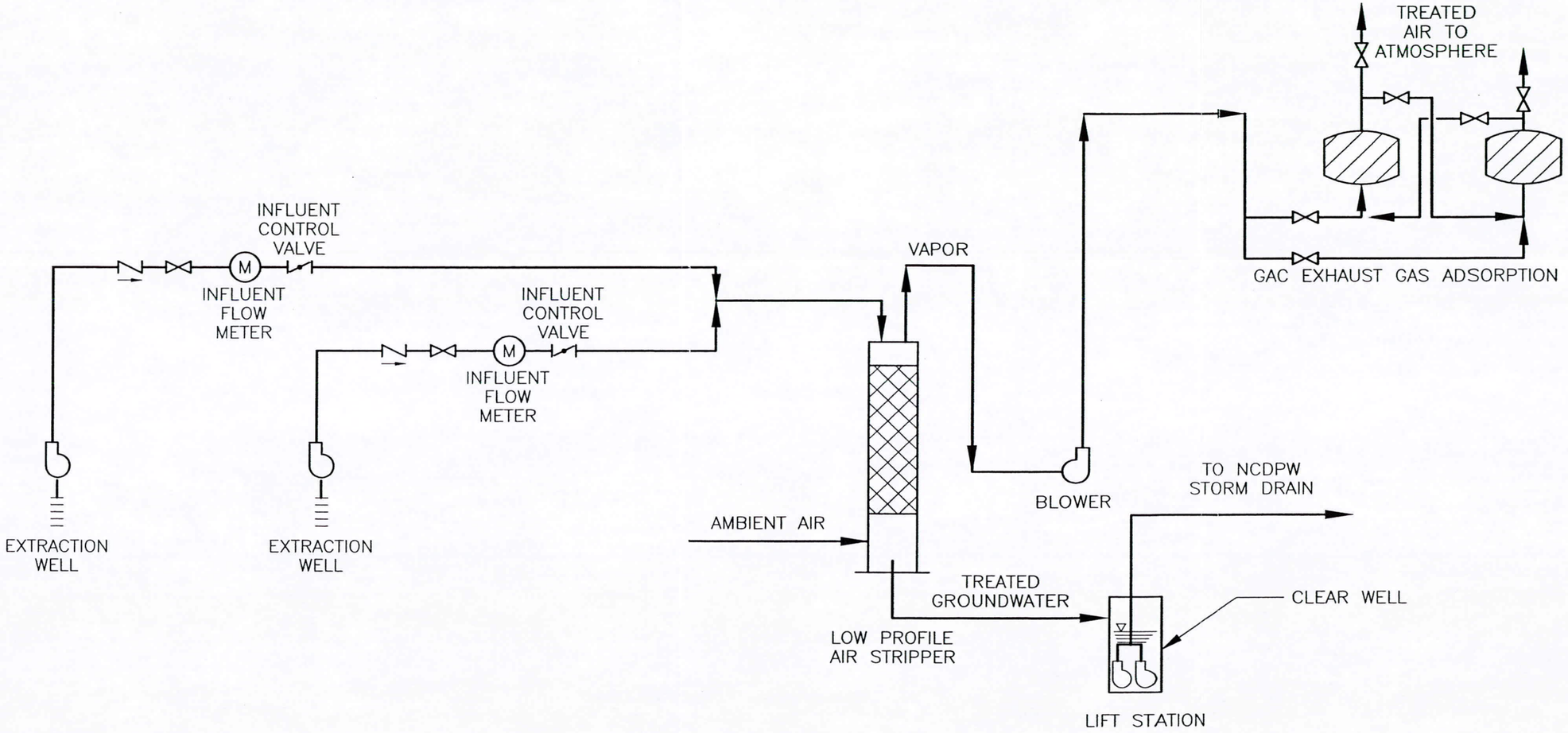

NOT TO SCALE

FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

Dvirka and Bartilucci
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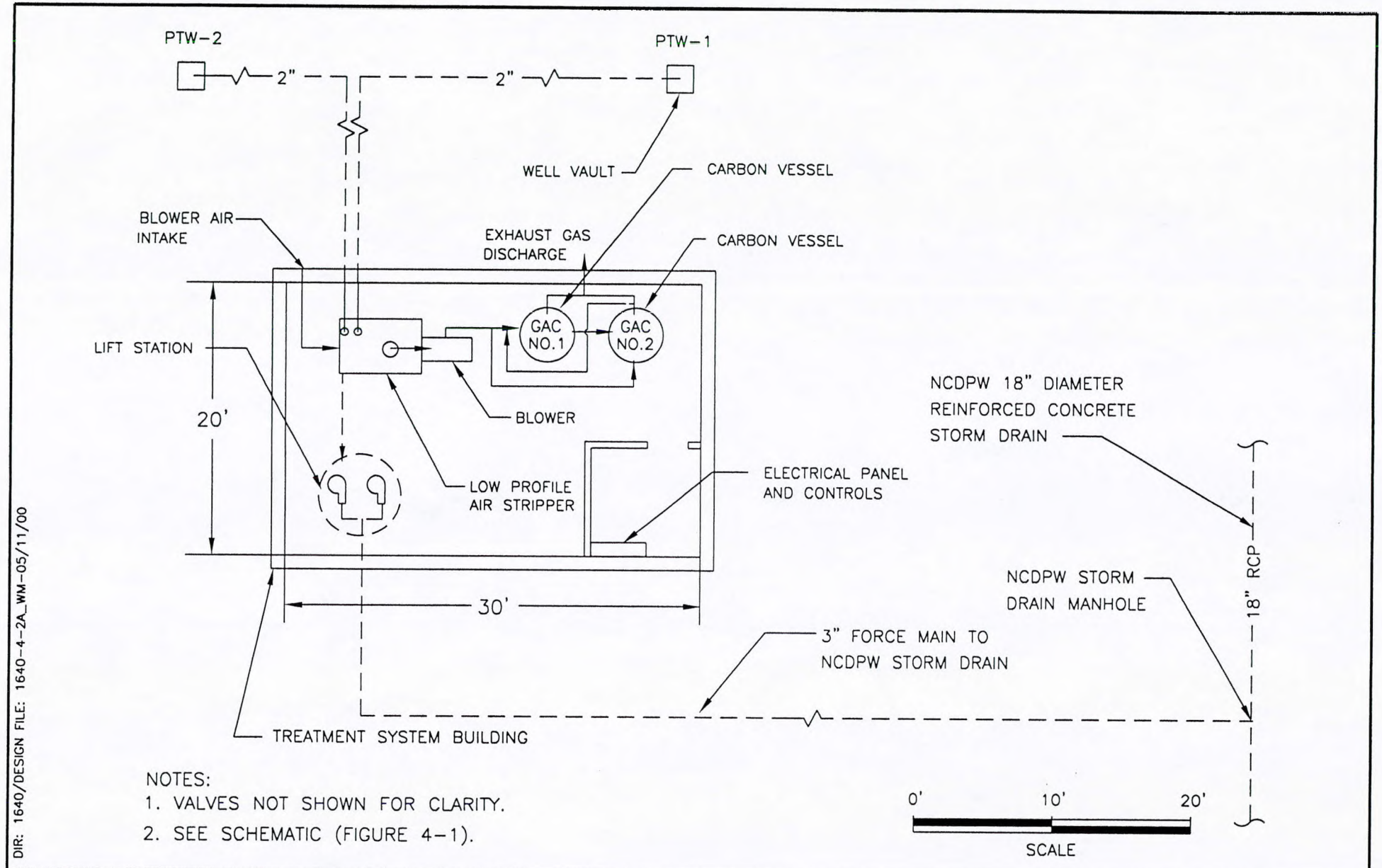
GROUNDWATER EXTRACTION AND TREATMENT SYSTEM SCHEMATIC

FIGURE 4-1



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FRANKLIN CLEANERS SITE
HEMPSTEAD, NEW YORK

TREATMENT SYSTEM EQUIPMENT LAYOUT PLAN

FIGURE 4-2

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Additionally, during completion of the RI, samples collected from MW-4I (screened at a depth of 38 to 53 feet below ground surface) and MW-4D (screened at a depth of 62 to 77 feet below ground surface) located approximately 1,100 feet upgradient of the planned extraction wells (see Figure 1-2), exhibited a maximum manganese concentration of 29.8 ug/l, while iron was not detected in either well. (The instrument detection limit for iron was 9.7 ug/l.) Similar concentrations of these constituents were also detected in groundwater monitoring wells further upgradient which were sampled during the RI. Typically, concentrations of iron and manganese below 1 mg/l indicate that these inorganic constituents will not pose any operations and maintenance concerns for an air stripping system.

4.4 Extraction Wells and Influent Piping

As indicated in Section 3, two extraction wells located on property which is part of the Southern State Parkway, pumping at a total maximum flow rate of 70 gpm, will be used to contain the groundwater plume. In addition to the existing extraction well (PTW-1), a second extraction well, PTW-2, located approximately 120 feet west of PTW-1 will be installed. The location of the extraction wells is shown on Drawing 1.

Based on the preliminary results of the pre-design study plume delineation program, PTW-1 was constructed to draw water from 73 to 93 feet below ground surface. As discussed in Section 2, the plume delineation program indicated that the groundwater contamination is concentrated at a depth of approximately 80 to 95 feet below ground surface, immediately above a confining layer.

4.4.1 Screen Depth and Casing

Extraction well PTW-2 will be constructed with the same diameter and materials as PTW-1 as described in Section 3; however, the length and screen depth interval will differ. Well PTW-2 will be installed to a depth of 95 feet below ground surface. The riser will be 6-inch diameter, Schedule 80, threaded flush joint PVC. A 15-foot long, continuous-slot stainless steel well screen will be installed at a depth of 80 to 95 feet below ground surface. The extraction well

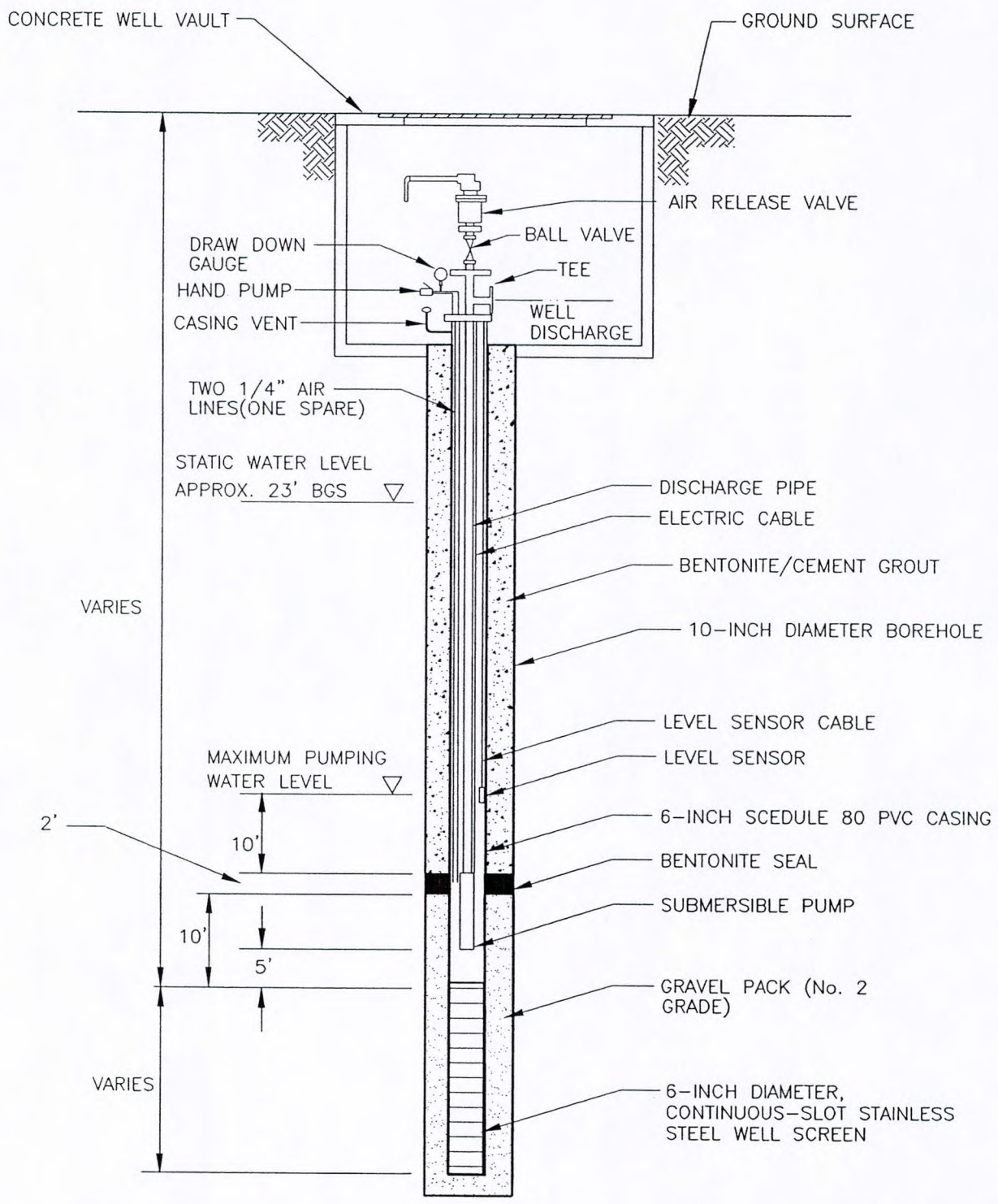
will be installed in a minimum 10-inch diameter borehole. Number 2 Grade gravel pack will be tremied around the well screen beginning at 2 feet below the bottom of the well screen to 10 feet above the top of the well screen. The gravel pack is tremied to 10 feet above the well screen to prevent settling, and consolidation of the sealing and grout material into the screen zone. The remaining annular space will be backfilled with a bentonite/cement grout mix prior to cementing a flush-mounted vault to complete the installation. The well head will be installed in a vault for reasons of safety since the wells will be located approximately 20 feet from the parkway on the shoulder of the roadway. Figure 4-3 illustrates the typical extraction well construction.

4.4.2 Extraction Well Pumps

A submersible well pump will be installed in each extraction well approximately 5 feet above the top of the screen. Four-inch diameter pumps equipped with approximately two horsepower inverter duty rated motors will provide the required flow and discharge head. Each pump will be connected to a variable frequency drive (VFD) controller located in the main control panel. The VFD controllers will provide the capability to operate each pump individually at a flow rate ranging from approximately 5 to 35 gpm. Two-inch diameter PVC pipe will extend from each pump to convey the pump discharge to ground surface.

4.4.3 Influent Piping

The discharge piping from each well will deliver the extracted groundwater to the treatment system. The piping will be 2-inch diameter PVC pipe. The piping will be installed below the frost line to prevent freezing and damage to the piping system. The general layout of the piping is shown on Drawing 1.



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NOT TO SCALE

FRANKLIN CLEANERS SITE
TOWN OF HEMPSTEAD, NEW YORK

GROUNDWATER EXTRACTION WELL DETAIL

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FIGURE 4-3

4.5 Air Stripping System

As previously discussed, the air stripping system will be designed to reduce PCE in the extracted groundwater from an inlet concentration of 1,200 ug/l to 1 ug/l at a maximum flow rate of 70 gpm. As shown in Table 4-1, a discharge concentration of less than 0.5 ug/l PCE is expected to be achievable with a low profile air stripper at 70 gpm. This provides a factor of safety with respect to the surface water discharge limit of 1 ug/l. Based on communications with system vendors, however, any significant increase in groundwater extraction rates would require a larger air stripper in order to achieve the required removal efficiency for PCE. Air stripper performance has also been evaluated with respect to the additional volatile organic compounds detected during the plume delineation program, as summarized in Table 4-1. The influent contaminant concentrations shown in Table 4-1 represent the highest concentration of each contaminant detected during the plume delineation program.

The air stripper specified for this project to meet the liquid phase discharge criteria will be a skid-mounted low-profile air stripper. The estimated dimensions of the air stripper are approximately 8 feet high, 6 feet long and 4 feet wide. The air stripper will be installed inside the treatment system building. Typically, low-profile air stripping systems operate by counter-current flow through horizontally positioned aeration trays. The groundwater flows downward through small (approximately 3/16-inch) holes in the aeration trays, while at the same time clean air is pulled up through the same holes. As a result, VOCs are transferred from the liquid phase to the vapor phase. Tray cleanout and inspection ports will be specified, as well as the capability to easily remove each tray to facilitate more thorough inspections and cleaning.

The low-profile air stripper will include an integral approximately 20 HP blower capable of supplying approximately 600 scfm (air to water ratio of approximately 64 to 1). Ambient air is introduced to the air stripper through the bottom and exits from the top by means of an induced draft. A mist eliminator located on the exhaust port of the air stripper will remove water droplets entrained in the exhaust gas prior to exiting the air stripper. The blower will be sized to provide the discharge pressure required to convey the exhaust gas through the exhaust gas treatment system.

Table 4-1

FRANKLIN CLEANERS SITE
SUMMARY OF EXPECTED AIR STRIPPER PERFORMANCE

Contaminant	Influent Concentration (ppb)	Effluent Concentration[1]		NYSDEC Class SC Surface Water Standard/ Guidance Value (ppb)
		Liquid Phase (ppb)	Vapor Phase (ppmv)	
Tetrachloroethene	1,200	0.23	2.7	1 ST
Trichloroethene	7	<1	0	40 GV
1,1-Dichloroethene	10	<1	0	-[2]
1,1,1-Trichloroethane	10	<1	0	-[2]
1,1,2-Trichloroethane	10	4	0	-[2]
1,2-Dichloroethane	7	3	0	-[2]

[1]Based on modeling performed by North East Environmental Products, Inc. for a Model 2651 shallow tray low profile air stripper.

[2]NYSDEC regulations, 6 NYCRR 703.5 establish no discharge Standard or Guidance Value for this compound.

Abbreviations:

ppb = Parts per billion
ppmv = Parts per million volume
ST = Standard
GV = Guidance Value

Influent to the low-profile air stripper will be pumped from the two extraction wells, to the top of the air stripper. Spray nozzles will break up the water flow into droplets as it enters the stripper and uniformly distribute flow across the surface area of the trays, thereby enhancing mass transfer. The treated effluent will discharge from the bottom of the air stripper to the lift station prior to discharge to the NCDPW storm drain system (see Figure 4-1).

4.6 Exhaust Gas Treatment System

4.6.1 Exhaust Gas Characteristics

The design characteristics of the low-profile air stripper exhaust gas stream are based on the design liquid phase inlet and outlet concentrations of tetrachloroethene of 1,200 ug/l and 1.0 ug/l, respectively, a groundwater flow rate of 70 gpm and an air flow rate of 600 scfm at 50°F and 1 atm. This equates to a mass vapor phase exhaust rate of 0.04 lb/hr of PCE (2.7 ppm). The predicted mass vapor phase exhaust rate for the additional contaminants detected during the plume delineation program, as shown in Table 4-1, are expected to be insignificant.

An estimate of potential air impacts at a PCE exhaust rate of 0.04 lb/hr was calculated using the standard point source method in the NYSDEC Air Guide-1. Based on the calculations, a stack height of approximately 25 to 30 feet would be required for the uncontrolled emission in order to comply with the annual guideline concentration of 1.2 ug/m^3 for PCE. Since this would be inconsistent with the project objective of maintaining a low profile treatment system, granular activated carbon will be used for exhaust gas treatment, as described in the RI/FS Report and ROD. The treated exhaust gas will be discharged at a height of approximately 3 feet above the roof of the treatment system building.

4.6.2 Carbon Adsorption System Design Parameters

The fixed bed granular activated carbon adsorption system will be designed to remove 99 percent of the PCE in the low-profile air stripping system exhaust gas. The system will consist of two granular activated carbon vessels in series, an exhaust discharge stack and

associated piping, valves and controls as shown in the schematic on Figure 4-1. This configuration will result in a flow rate of approximately 600 scfm (at 50°F) to each vessel. The secondary vessel in the series serves as a backup to control emissions when breakthrough of the primary vessel occurs and allows for continuous operation without continuous monitoring.

Each carbon vessel will be charged with approximately 1,000 pounds of activated 4 x 10-mesh carbon. The overall height of each canister will be approximately 5 feet, the dimensions will be approximately 4 feet by 4 feet, and the weight of each loaded vessel will be approximately 1,600 pounds.

Flow will be redirected by valves from the primary vessel to the secondary vessel when breakthrough of the primary vessel occurs and replacement carbon will be added to the "new" secondary vessel. The secondary vessel will discharge to an exhaust stack. Sample ports will be provided on the influent and effluent points on both the primary and secondary vessels to monitor for breakthrough. In addition, pressure gauges will be provided for monitoring pressure drop across each vessel. As discussed above, a mass vapor phase exhaust rate of approximately 0.04 lb/hr of PCE is expected. Based on an estimated PCE to carbon use rate of 1:10 (weight to weight), the carbon use rate is estimated to be approximately 10 pounds per day. Therefore, changeout of the primary vessel (1,000 pounds of carbon) will be required at approximately 100-day intervals.

4.7 Lift Station and Treated Effluent Discharge

4.7.1 Lift Station

The lift station will consist of two discharge pumps (providing 100% redundancy), a clearwell and associated controls. The discharge pumps will be sump pumps, each with a design flow rate of 80 gpm. The clearwell will be sized to accommodate the air stripper volume during a general alarm condition, provide sufficient volume between the discharge pump on/off switches and maintain 1 foot of vertical head above the discharge pumps. As a result, the clearwell will be a pre-cast concrete tank approximately 6 feet in diameter and approximately 8 feet deep.

4.7.2 Treated Effluent Discharge

As discussed in Section 3.4, a force main will be installed to convey the treated water from the lift station to the storm drain manhole located on Hempstead Avenue. The force main will be 3-inch (nominal) diameter PVC pipe buried below the frost line. The general layout of the piping is shown on Drawing 1.

As discussed in Section 3.4, the storm drain system is owned and maintained by the Nassau County Department of Public Works (NCDPW). The NCDPW has indicated that the storm system can accommodate the additional flow (see Appendix E). However, the remediation system will be designed to cease discharge during a large storm event, which would result in an exceedance of the storm drain capacity.

4.8 Electrical

4.8.1 Power Supply Source

Long Island Power Authority (LIPA) electric poles run along the west side of Hempstead Avenue. A 208 volt, 3 phase, 60 hertz service drop will provide the required electrical power. The secondary cable will run below grade from the service drop location to the inside of the treatment system building. Coordination with LIPA to provide this service will be the responsibility of the contractor constructing the treatment system.

4.8.2 Electrical Equipment

A small electrical room will be constructed inside the treatment system building. This electrical room will provide protection for the service meter, voltage breakers, utility panel(s), motor control centers (MCC), and any other control panels and telemetry equipment required to operate the treatment system.

4.9 Control Systems

4.9.1 General Failure Alarms

Most equipment failure alarms will result in a single "general failure" alarm. A general failure alarm will automatically shut down all electrical equipment except the discharge pumps. The main control panel will include an alarm reset and an adjustable delay during plant startup.

4.9.2 Extraction Wells

Each extraction well pump will be equipped with a high-pressure switch on the pump discharge. If the pump discharge pressure exceeds an adjustable preset value, a general failure alarm will be activated. A sensor will also be provided in each well to activate a general failure alarm if the water level drops below a preset value. The pumps will shut down based on a general failure alarm. The influent flow rate will be manually adjusted using the VFD pump controllers. A hand-off-auto switch will be provided for each well pump.

4.9.3 Air Stripper System

The air stripper sump will be equipped with a high-level float switch, which will activate the general failure alarm. The blower will be equipped with a high-pressure switch on the discharge duct and a high-vacuum switch on the suction duct. These switches will activate a general failure alarm above preset values. In the event of a general failure, the blower will be shut off after a delay to provide for treatment of the groundwater in the stripper at the time of general failure. A local hand-off-auto switch will be provided for the blower. A relay at the blower will confirm operation. If the blower is not operating, a general failure alarm will be activated.

4.9.4 Exhaust Gas Treatment System

In the event of plugging in the GAC vessels, a high-pressure condition would result at the blower discharge activating a general failure alarm.

4.9.5 Lift Station

A high-level float switch located in the clearwell will activate the general failure alarm. Low-level float switches will control the discharge pumps. The discharge pumps will be equipped with a high-pressure switch on the discharge pipe that will activate the general failure alarm. A local hand-off-auto control switch will be provided for each pump.

4.9.6 Storm Drain

The high pressure switch on the clearwell discharge pumps will activate the general failure alarm. This will eliminate discharge from the lift station to the storm drain system during a major storm event.

4.9.7 Startup Sequence

The main control panel will start up the air stripper blower first, followed by the two extraction wells. The discharge pumps will start and stop based on the level in the sump and, therefore, will not be controlled by the main control panel.

The main control panel will be equipped with a hand-off-auto switch. In the "hand" mode, all equipment will be operated with the local or hand switches. In the "off" mode, no equipment will operate. In the "auto" mode, the startup sequence will begin. All equipment will continue to operate until a general failure alarm is activated. An adjustable time delay will prevent the general failure alarm from activating at startup.

4.9.8 Telemetry Panel

A telemetry panel will contact the treatment system operator's pager upon a general failure alarm.

4.10 Groundwater Monitoring Well Network

A groundwater monitoring well network, consisting of a total of five wells, will be installed downgradient of the extraction system wells to evaluate the effectiveness of and optimize the operation of the system. Three wells, ASMW-1 through ASMW-3, will be installed south of the treatment system building on property which is part of the Southern State Parkway. ASMW-2 will be located between the two extraction wells and ASMW-1 and ASMW-3 will be located near the estimated western and eastern limits of the plume, respectively. The proposed locations for wells ASMW-1 through ASMW-3 are shown on Drawing 1. Wells ASMW-1 through ASMW-3 will be screened approximately 85 to 95 feet below ground surface.

Groundwater monitoring wells ASMW-4 and ASMW-5 will be installed further downgradient, on Molloy College property. ASMW-4 will be screened above the clay unit, approximately 85 to 95 feet below ground surface, and ASMW-5 will be screened directly below the clay unit, approximately 100 to 110 feet below ground surface.

During construction of wells ASMW-2, ASMW-4 and ASMW-5, soil samples will be collected and analyzed for grain size and permeability to determine the depth, thickness and characteristics of the clay unit and the appropriate well screen depths. A thin-walled tube sampler will be used to collect relatively undisturbed samples of the clay (according to ASTM D1587 or approved equal) for permeability tests. (Only the upper interval of the clay layer will be sampled during construction of ASMW-2.)

Each monitoring well will be constructed in an approximately 8-inch diameter borehole drilled using hollow stem augers. The wells will be constructed of 2-inch diameter threaded,

flush joint Schedule 40 PVC riser and 20-slot screen. The wells will be completed with a concrete flush-mounted surface casing with a steel access cover.

The annulus of the borehole in the area of the screen will be sand-packed to a height of 2 feet above the screened interval with No. 1 Grade clean silica sand. A finer grained No. 00 sand pack material (100 percent passing the No. 30 sieve and less than 2 percent passing the No. 200 sieve), 6 inches in thickness, will be placed on top of the sand pack between the sand and the bentonite seal. A 3-foot seal of bentonite pellets or slurry will be placed immediately above the filter material and 6 inches of No. 00 Grade silica sand pack will be placed above the bentonite seal. The remaining annulus will be grouted to the surface with cement/bentonite grout. The bentonite will be tested and/or warranteed to be free of organic and inorganic contaminants. All material placed in the annulus of the borehole will be installed using a tremie pipe.

Section 5

5.0 PROJECT COST

5.1 Purpose

The purpose of this cost estimate is to provide a budgetary value for funding the construction of the Franklin Cleaners Site Groundwater Extraction and Treatment System. An engineer's cost estimate will be prepared for inclusion in the bid documents after the final design documents (i.e., drawings and specifications) are complete.

5.2 Cost Estimate

This cost estimate presents capital costs based on the conceptual design developed and presented in this report and certain assumptions based on available information at this time. The unit costs are based on manufacturer's estimates, data from recently completed projects and published cost estimating information. A 20 percent estimating contingency has been added due to the limited detailed information available at this time.

Table 5-1 summarizes the cost estimate. As shown, the total estimated capital cost including startup and initial testing is $494,000.

Table 5-1

FRANKLIN CLEANERS SITE
GROUNDWATER EXTRACTION AND TREATMENT SYSTEM
DESIGN REPORT

COST ESTIMATE SUMMARY

Work Item	Estimated Cost
Mob/Demob and Site Clearing	$25,000
Site Work	$50,000
Groundwater Extraction and Monitoring Wells	$38,000
Influent and Effluent Piping	$38,000
Treatment System Equipment, Controls and Instrumentation	$105,000
Building	$70,000
Utilities	$68,000
Initial Startup and Testing	$18,000
Subtotal	$412,000
Estimating Contingency @ 20%	$82,000
GRAND TOTAL	**$494,000**

Appendix A

APPENDIX A

BORING LOGS

DVIRKA AND BARTILUCCI

DRILLING CONTRACTOR
Driller: Butch H / UniTech
Inspector: Wayne Mann
Rig Type: CME-85 Drill Rig
Drilling Method: Auger / Split Spoon
Drive Hammer Weight: ____

DRILLING LOG
PROJECT NAME: Franklin Cleaners
PROJECT #: 1640
Location/Address: Pole 216 southern State Parkway

BORING NUMBER PTMW-1
Sheet 1 of 4
Boring Location: 17.5 Ft East of pole 216

GROUNDWATER OBSERVATIONS

Water Level	23'		
Time			
Date	9/13		
Casing Depth	93'		

Weather: Clear, low 80's
Date/Time Start: 9/13/99 11:00
Date/Time Finish: 9/14/99 18:30

Plot Plan

Sample Depth	Sample Number	SPT	PID/FID Reading	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	COMMENTS
0-2	SS-1		0.0	0-2 Organic material mixed with Medium & To coarse SAND		
Recovery none	Hand dig					
4-6	SS-1		0.0	4-6 Tan Brown Fine to Coarse SAND, little small rounded Gravel. Poorly sorted		
Recovery 8"						
Hammer 2,9,14,12						
9-11			0.0	9-10 Tan Brown Medium to Coarse SAND, little (+) small rounded Gravel		
recovery 12"				10-11 Tan Fine to Medium SAND		
Blows 4,8,11,11						
14-16			0.0	14-16 TanBrown Medium to Coarse SAND, Trace (+) Small rounded Gravel		
recovery 14"						
Blows 5,5,7,7						
19-21			0.0	19-21 Tan/light Brown Fine to Coarse SAND, Trace (-) small/fine rounded Gravel, Medium Dense		
recovery 14"						
Blows 3,7,13,10						
24-26			0.0	24-26 Tan/light Brown medium dense Fine to Coarse SAND, Trace (-) small rounded Gravel Moist	▽	Water Table @ ± 23 ft.
recovery 20"						
Blows 2,5,13,12						
29-31			0.0	29-31 Tan/light Brown mediumdense Fine to Coarse SAND Trace small/fine rounded Gravel Moist		
recovery 20"						
Blows 5,10,14,11						
34-36			0.0	34-36 Tan/light Brown medium Dense fine to coarse SAND Trace (+) small rounded Gravel moist.		
recovery 24"						
Blows 3,8,13,15						
39-41			0.0	39-41 Tan/light Brown medium Dense fine to coarse SAND Trace (+) small rounded Gravel		
recovery 23"						
Blows 5,10,12,11						
44-46			0.0	44-46 Same		
recovery 24"						
Blows 5,7,11,12						

SPT = STANDARD PENETRATION TEST

Soil Stratigraphy Summary

DVIRKA AND BARTILUCCI

DRILLING LOG

BORING NUMBER PTMW-1
Sheet 2 of 4

DRILLING CONTRACTOR
Driller Butch H, Uni Tech
Inspector Wayne Mann
Rig Type CME-85 Drill Rig
Drilling Method Auger/Split spoon
Drive Hammer Weight

PROJECT NAME Franklin Cleaners
PROJECT # 1640
Location/Address Pole 216 Southern State Parkway

Boring Location 175 ft east of Pole 216

GROUNDWATER OBSERVATIONS

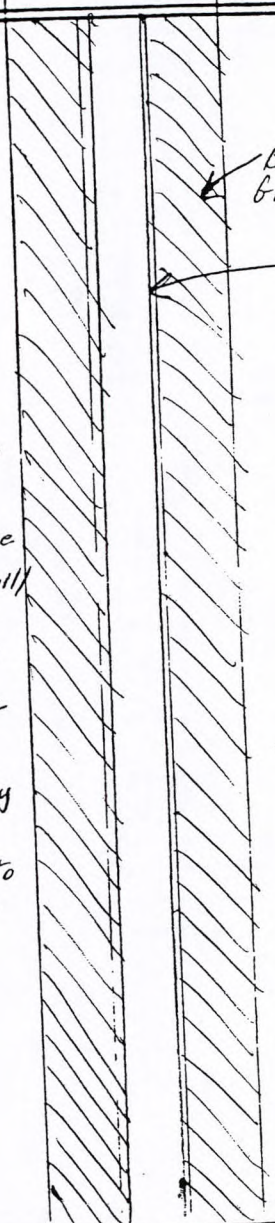
Water Level	23'		
Time			
Date	9/13/99		
Casing Depth	93'		

Weather Clear low 80's
Date/Time Start 9/13/99 11:00
Date/Time Finish 9/14/99 18:30

Plot Plan

Sample Depth	Sample Number	SPT	PID/FID Reading	FIELD IDENTIFICATION OF MATERIAL
49-51			0.0	Tan/Light Brown Dense Medium to Coarse SAND Trace small rounded Gravel
recovery 18"				
Blows 9,20,21,27				
51-53			0.0	Same
recovery 20"				
Blows 17,20,22,27				
53-55				53-55 Same
recovery 24"				
Blows 23,14,14,13				
55-57				55-57 Sample Washed out. Light Brown fine to coarse SAND
recovery 4"				
Blows 14,7,8,9				
57-59				57-59 Tan/Orange Brown medium Dense Fine to Coarse SAND, Trace small/ Fine rounded Gravel. 1" layer of Gray Silty Clay in tip @ 59ft.
recovery 24"				
Blows 11,15,15,17				
59-61				59-61 Tan/Orange Brown medium Dense Fine to Coarse SAND Trace small rounded Gravel 2" thick layer of Gray sandy clay @ 60 ft.
recovery 20"				
Blows 9,8,17,15				
61-63				61-63 Tan/Orange Brown Dense Fine to Coarse SAND Trace small/Fine rounded Gravel.
recovery 21"				
Blows 13,25,31,26				
62-64				62-64 Same
recovery 18"				
Blows 26,17,19,21				
64-66				64-66 Same
recovery 14"				
Blows 4,9,15,17				

WELL SCHEMATIC



COMMENTS

SPT - STANDARD PENETRATION TEST

Soil Stratigraphy Summary

DVIRKA AND BARTILUCCI

DRILLING CONTRACTOR
Driller Butch H / UniTech
Inspector Wayne Mann
Rig Type CME-85 Drill Rig
Drilling Method Auger/Split Spoon
Drive Hammer Weight

DRILLING LOG
PROJECT NAME Franklin Cleaners
PROJECT # 1640
Location/Address Pole 216 Southern State Parkway

BORING NUMBER PTMW-1
Sheet 3 of 4
Boring Location 17.5ft east of Pole 216

GROUNDWATER OBSERVATIONS

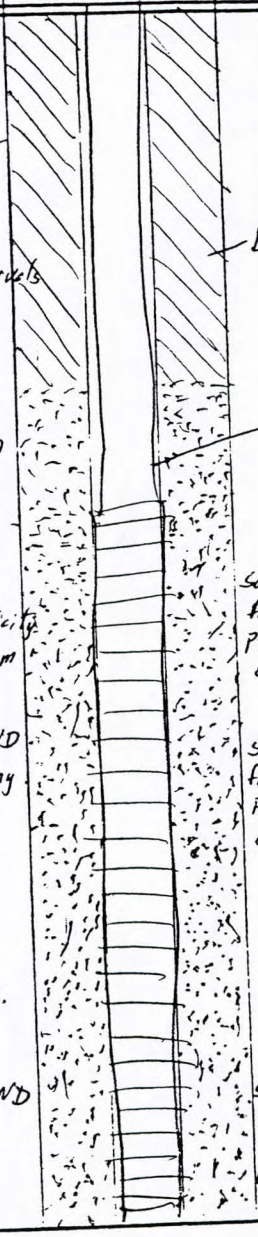
Water Level	23'		
Time			
Date	9/14/99		
Casing Depth	93'		

Weather Clear low 80's
Date/Time Start 9/13/99 11:00
Date/Time Finish 9/14/99 18:30

Plot Plan

Sample Depth	Sample Number	SPT	PID/FID Reading	FIELD IDENTIFICATION OF MATERIAL
66-68			0.0	66-67 Tan Brown dense fine to coarse SAND, Trace(-) Gravel
recovery 18"				67-68 Gray Fine SAND little (+) Silty, Sandy Clay high mica content
Blows 9,14,16,22				
68-70			0.0	68-70 Gray Fine to medium SAND little (+) Silty Sandy Clay. Organic material visible in striation in 2" intervals @ 68+69 ft. High mica content.
recovery 12"				
Blows 7,10,14,18				
70-72			0.0	70-72 Gray Dense Fine to Medium SAND high Mica Content, very fine sand.
recovery 8"				
Blows 21,27,31,28				
72-74			0.0	72-74 Gray Dense Fine to Medium SAND high Mica content. 4" Gray Sandy Clay @ 72 ft.
recovery 16"				
Blows 4,9,13,11				
74-76			0.0	74-76 Top 8" Gray Sandy Clay. Black Striations, high sand content little plasticity. Bottom 6" Gray Dense Fine to Medium SAND, little (+) Silty sand.
recovery 14"				
Blows 5,10,13,12				
76-78			0.0	76-78 Gray Dense Fine to Medium SAND little (-) gray silt. 1" interval Gray Sandy Clay @ 78'
recovery 12" ~~20,10,13,21~~				
Blows 10,10,19,21				
78-80				78-80 Dark Gray Dense Fine to medium SAND little (-) gray silt.
recovery 14"				
Blows 5,9,28,37				
80-82				80-82 Refusal @ 80'11" Gray Dense Fine to Coarse SAND.
recovery 10"				
Blows 29,50/5				
82-84				82-84 Gray Dense Fine to Medium SAND high Mica Content. Black 2" layer @ 84' organic matter.
recovery 14"				
Blows 6,14,26,47				

WELL SCHEMATIC



COMMENTS

Sample collected for grainsize analysis PTMW-1(74-76) 9/14/99 07:50

Sample collected for grain size analysis PTMW-1(76-78) 9/14/99 07:50

Sample collected for grain size analysis PTMW-1(82-84) 9/14/99 09:10

SPT = STANDARD PENETRATION TEST

Soil Stratigraphy Summary

DVIRKA AND BARTILUCCI

DRILLING CONTRACTOR
Driller Butch H / Uni Tech
Inspector Wayne Mann
Rig Type CME-85 Drill Rig
Drilling Method Auger / Splitspoon
Drive Hammer Weight

DRILLING LOG
PROJECT NAME Franklin Cleaners
PROJECT # 1640
Location/Address Pole 216 Southern State Parkway

BORING NUMBER PTMW-1
Sheet 4 of 4
Boring Location 17.5 ft East of pole 216

GROUNDWATER OBSERVATIONS

Water Level	73'		
Time			
Date	9/14/99		
Casing Depth	93'		

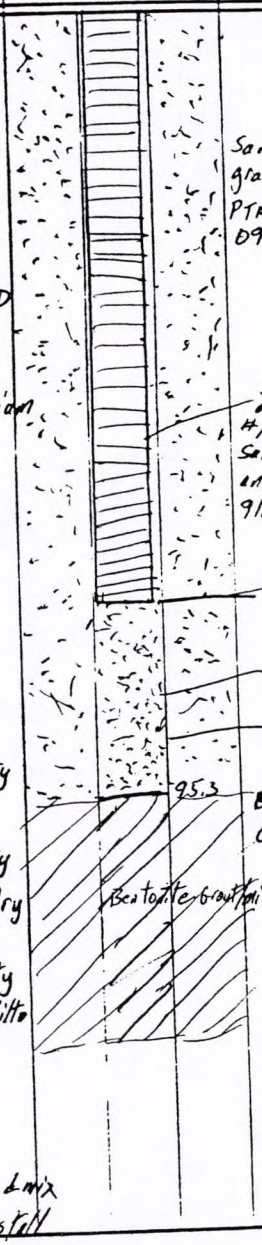
Weather Clear low 80's
Date/Time Start 9/13/99 11:00
Date/Time Finish 9/14/99 18:30

Plot Plan

Sample Depth	Sample Number	SPT	PID/FID Reading	FIELD IDENTIFICATION OF MATERIAL
84-86				84-86 Gray Dense Fine to Medium SAND little (-) silt with + black striations
recovery 13"				
Blows 8,21,31,35				
86-88				86-88 Refusal @ 86'11" Gray Dense Fine to Medium SAND little (-) Silt. Powder like. High Mica content.
recovery 12"				
Blows 25,50/5				
88-90				88-90 Gray Dense Fine to Medium SAND little (-) Silt. High Mica content. high percentage fine SAND.
recovery 16"				
Blow 9,16,31,34				
90-92				90-92 Dark Gray Dense to Fine to Medium SAND little (-) Silt
recovery 22"				
Blows 23,22,25,27				
92-94				92-94 Dark Gray Dense Fine to Medium SAND, little (-) Silt. Bottom 3" brownish tan fine Sand.
recovery 22"				
Blows 11,12,16,10				
94-96				94-95.3ft Brownish Gray Medium Dense fine to medium SAND. followed 1" interval lignite.
recovery				
Blows 8,9,7,12				95.3-96 9" Dark Dense Gray/Black Silty Clay, little moisture
96-98				96-98 Dark Dense Gray/Black Silty Clay. Clay appears competent. dry
recovery 12"				
Blows 18,21,19,12				
98-100				98-100 Dark Gray/Black Dense Silty Clay. no moisture. Gray Sand/Silt striations approx 1/8 inch thick
recovery 24"				
Blows 16,22,32,38				

Boring Terminated.
Clay layer filled w/ Bentonite mix. borehole flushed to remove Bentonite/mud mix 2ft gravel pack above clay then well installed

WELL SCHEMATIC



COMMENTS

Sample collected for grainsize analysis PTMW-1(86-88) 9/14/99 09:30

2" PVC Screen #10 slot Sample collected for grain size analysis PTMW-1(92-92) 9/14/99 10:15

93 ft below Grade

Gravel pack

6" Borehole

Opening into Clay filled with Bentonite water mix.

Soil Stratigraphy Summary

SPT = STANDARD PENETRATION TEST

DVIRKA AND BARTILUCCI

DRILLING LOG

DRILLING CONTRACTOR	
Driller	Joe Tester / Uni Tech
Inspector	Wayne M.
Rig Type	CME-85
Drilling Method	Mud Rotary
Drive Hammer Weight	
PROJECT NAME	Franklin Cleaners
PROJECT #	1640-2
Location/Address	Pole 216 Southern State Parkway
BORING NUMBER	PTMW-2
Sheet	1 of
Boring Location	22 ft west of Pole 216

GROUNDWATER OBSERVATIONS				
Water Level	23'			
Time				
Date				
Casing Depth				

Weather: Clear Cool ≈ 60°F

Date/Time Start: 10/11/99 12:00

Date/Time Finish: 10/11/99 6:10

Plot Plan: ↑N

East bound Southern State Parkway

PTMW-2 PTW-1

Tree line Pole 216

Sample Depth	Sample Type	SPT	PID/FID Reading	FIELD IDENTIFICATION OF MATERIAL
0-2	1		0.0	0-2 Organic material to .5' loose Medium to Coarse SAND to 2ft
recovery none		hand dig		
2-4			0.0	Loose Medium to Coarse SAND tan light brown in color. no odor.
Hand dig				
				Begin collecting spoons @ 82'
82-84	S			Dense Gray, Fine to Medium SAND, Trace (+) Silty Sand no odor no staining
recovery = 16"				
Blows	12, 20, 27, 25			
84-86	S		0.0	Gray fine SAND, little (+) silty Sand, Trace (+) Silty Clay no odor
recovery 18"				
Blows	7, 18, 25, 33			
86-88	S		0.0	Gray fine to Medium SAND little (-) silty SAND. 2" layer dark ~~clay~~ gray clay @ 87.5' no odor
recovery 16"				
Blows	21, 29, 33, 30			
88-90	S		0.0	Gray fine to Medium SAND little (-) Silty SAND. 5" Tannish brown Coarse Gravely SAND @ 89.5
recovery 21"				
Blows	16, 27, 32, 39			
90-92	S		0.0	Gray fine to Medium SAND little (-) Silty SAND 1" layer/lense of dark gray Sandy Clay no odor
recovery 10"				
Blows				End of Boring

S = Split Spoon W = Wash

WELL SCHEMATIC: 2" PVC screen #10; Gravel Pack Hole to 82'

COMMENTS

Soil Stratigraphy Summary

DRILLCON.PM4

Appendix B

APPENDIX B

GRAIN SIZE ANALYSIS RESULTS

Analytical Data Package for Dvirka & Bartilucci

Client Project: Franklin Cleaners/1640-2

SDG# 61787

Mitkem Project ID: 61787

October 14, 1999

SDG Narrative

Mitkem Corporation submits the enclosed data package in response to Dvirka & Bartilucci's Franklin Cleaners project. Under this deliverable, analysis results are presented for five soil samples that were received on September 15, 1999. Analyses were performed per specifications in the chain of custody forms.

The following samples are submitted in this data package:

Client ID	Lab ID	Analysis
PTMW-1(74-76)	61787001	G
PTMW-1(76-78)	61787002	G
PTMW-1(82-84)	61787003	G
PTMW-1(86-88)	61787004	G
PTMW-1(90-92)	61787005	G

G = Grain Size – ASTM D422

The analyses were performed according to ASTM protocols. The analyses were subcontracted to Rhode Island Analytical Laboratories (RIAL) for performance of the requested tests, which are not performed by Mitkem. A copy of the RIAL report is attached.

No unusual observation was made for the analysis.

If you have any questions, please do not hesitate to call me.

Sincerely,

Edward A. Lawler
Laboratory Operations Manager
10/15/99

MITKEM CORPORATION

175 Metro Center Boulevard
Warwick, Rhode Island 02886-1755
(401) 732-3400 • Fax (401) 732-3499
email: mitkem@mitkem.com

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

REPORT TO			INVOICE TO		
COMPANY Dvirka ~~&~~ Bartilucci	PHONE (516) 364-9890		COMPANY Dvirka & Bartilucci	PHONE (516) 364-9390	LAB PROJECT #: 61787
NAME Robbin Petrella	FAX (516) 364-9045		NAME Dave Glass	FAX (516) 364-9045	
ADDRESS 333 Crossways Park Drive			ADDRESS 330 Crossways Park Drive		TURNAROUND TIME: 72 hrs
CITY/ST/ZIP Woodbury NY 11797			CITY/ST/ZIP Woodbury NY 11797		

CLIENT PROJECT NAME:	CLIENT PROJECT #:	CLIENT P.O.#:
Franklin Cleaners	1640-2	1640-2

SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	COMPOSITE	GRAB	WATER	SOIL	OTHER	LAB ID	# OF CONTAINERS	Grain Analysis via ASTM D-422	COMMENTS
~~PTmw-1(74-76)~~										
PTmw-1(76-78)	9/14/99 ~~07:50~~ 07:45		X		X		01	2	X	(2) 8oz jars (glass)
~~PTmw-1(82-84)~~	~~9/14/99 07:50~~		~~X~~		~~X~~					
PTmw-1(76-78)	9/14/99 07:50		X		X		02	2	X	(2) 8oz jars (glass)
PTmw-1(82-84)	9/14/99 9:10		X		X		03	2	X	(2) 8oz. jars (glass)
PTmw-1(86-88)	9/14/99 9:30		X		X		04	2	X	(2) 8 oz. jars (glass)
PTmw-1(90-92)	9/14/99 10:15		X		X		05	2	X	" " " "
	/									" " " "
	/									
	/									
	/									
	/									
	/									

TSF#	RELINQUISHED BY	DATE/TIME	ACCEPTED BY	DATE/TIME	ADDITIONAL REMARKS:	COOLER TEMP:
1	[signature]	9/14/99 17:00	[signature]	9/15/99 09:00		3°
2		/		/		
3		/		/		

WHITE: LABORATORY COPY **YELLOW:** REPORT COPY **PINK:** CLIENT'S COPY

MITKEM CORPORATION

09/15/99 05:26 PM | Page 1 of 1 | Original | Lab Workorder #: **61787**

Lab Workorder **61787** R0

Client: **Dvirka & Bartilucci**
Lab Workorder ID: **Franklin Cleaners/1640-2**
Client Proj ID:
Client PO #: **1640-2**
Project / Profile Name: **Franklin Cleaners**
Date Due: **09/20/99**
Customer Service:
Del Req'd: **ASP B (2 copies)**
Completed?:
Profile Notes: **Voas are unpreserved;7 Day Holding Time**
Project Notes: **SAMPLES SUBBED TO RIAL**

Logged In By:
Reviewed By: RAS

Date Opened: **09/15/99 11:46**
Date Closed: **09/15/99 17:26**

Project Status: **WP**

Lab ID	Client ID	Matrix	Type	Analysis Code	Collected	Received	Due	Notes
61787001	PTMW-1(74-76)	S	SAMPLE	A19-D422Gr DRY WEIGHT	09/14/99 07:50	09/15/99	09/20/99	PTMW17476--SEIVE & HYDROMETER
61787002	PTMW-1(76-78)	S	SAMPLE	A19-D422Gr DRY WEIGHT	09/14/99 07:50	09/15/99	09/20/99	PTMW17678--SEIVE & HYDROMETER
61787003	PTMW-1(82-84)	S	SAMPLE	A19-D422Gr DRY WEIGHT	09/14/99 09:10	09/15/99	09/20/99	PTMW18284--SEIVE & HYDROMETER
61787004	PTMW-1(86-88)	S	SAMPLE	A19-D422Gr DRY WEIGHT	09/14/99 09:30	09/15/99	09/20/99	PTMW18688--SEIVE & HYDROMETER
61787005	PTMW-1(90-92)	S	SAMPLE	A19-D422Gr DRY WEIGHT	09/14/99 10:15	09/15/99	09/20/99	PTMW19092--SEIVE & HYDROMETER

INVOICE AND REPORT GO TO:

Robbin Petrella
Dvirka & Bartilucci
330 Crossways Park Drive
Woodbury, NY, 11797
W : 516-364-9890
F : 516-364-9045

0003

MITKEM CORPORATION
Sample Condition Form

Page__of__

Received By: (NR)	Reviewed By: JJA	Date: 9/15/99	MITKEM Project: 61787
Client Project: FRANKLIN CLEANERS		Client: DURVA & BARTLUCCI	

Condition:

1) Custody Seal(s) (Present/Absent)
(Coolers/Bottles)
(Intact/Broken)

2) Custody Seal Number(s) N/A

3) Chain-of-Custody (Present/Absent)

4) Cooler Temperature 3°
Coolant Condition ICE

5) Airbill(s) (Present/Absent)
Airbill Number(s) FED-EX
811368228135

6) Sample Bottles (Intact)
Broken
Leaking

7) Date Received 9/15/99

8) Time Received 09:00

9) Project Due Date 72 HRS

Sample ID		Preservation (pH)				Comments/Remarks/ Corrective Action*
Lab	Client	HNO_3	H_2SO_4	HCl	NaOH	
01	PTMW-1(74-76)					
02	-1(76-78)					
03	-1(82-84)					
04	-1(86-88)					
05	-1(90-92)					

* See Sample Condition Notification/Corrective Action Form yes (no)

R.I. Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

Mitkem Corporation
Date Received: 9/15/99
Work Order # 9909-08765

Approved by: _____
R.I. Analytical

Sample #: 001
SAMPLE DESCRIPTION: 61787-01 09/14/99 @0750

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	ANALYZED DATE/TIME	ANALYST
SIEVE ANALYSIS	*		%	ASTM	9/20/99 10:00	SB
HYDROMETER	*				10/05/99 16:27	SB

* See Attached for Sieve Analysis

Sample #: 002
SAMPLE DESCRIPTION: 61787-02 09/14/99 @0750

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	ANALYZED DATE/TIME	ANALYST
SIEVE ANALYSIS	*		%	ASTM	9/20/99 10:00	SB
HYDROMETER	*				10/05/99 16:27	SB

* See Attached for Sieve Analysis

Sample #: 003
SAMPLE DESCRIPTION: 61787-03 09/14/99 @0910

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	ANALYZED DATE/TIME	ANALYST
SIEVE ANALYSIS	*		%	ASTM	9/20/99 10:00	SB
HYDROMETER	*				10/05/99 16:27	SB

* See Attached for Sieve Analysis

Sample #: 004
SAMPLE DESCRIPTION: 61787-04 09/14/99 @0930

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	ANALYZED DATE/TIME	ANALYST
SIEVE ANALYSIS	*		%	ASTM	9/20/99 10:00	SB
HYDROMETER	*				10/05/99 16:27	SB

* See Attached for Sieve Analysis

R.I. Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

Mitkem Corporation
Date Received: 9/15/99
Work Order # 9909-08765

Approved by: _____
R.I. Analytical

Sample #: 005
SAMPLE DESCRIPTION: 61787-05 09/14/99 @1015

PARAMETER	SAMPLE RESULTS	DET. LIMIT	UNITS	METHOD	ANALYZED DATE/TIME	ANALYST
SIEVE ANALYSIS	*		%	ASTM	9/20/99 10:00	SB
HYDROMETER	*				10/05/99 16:27	SB

* See Attached for Sieve Analysis

-Sieve Analysis-

Company: Mitkem Corp.
Analysis(s): S.B.
Date: 9/20/99

Sample #: 8765-1
Initial Mass: 122.12

Sieve #	Sieve & Cardboard (g)	Sieve & Cardboard& Sample (g)	Sample (g)	% Retained	% Passing
40	426.65	433.44	6.79	5.59	94.41
60	388.48	422.04	33.56	27.36	66.78
120	458.71	515.72	57.01	46.94	19.84
200	375.95	383.73	7.78	6.41	13.43
270	423.64	431.87	8.23	6.78	6.65
325	423.63	425.44	1.81	1.49	5.16
400	432.78	435.96	3.18	2.62	2.54
PAN	391.64	394.72	3.08	2.54	0.00

Total = 121.44

Sample #: 8765-2
Initial Mass: 219.82

Sieve #	Sieve & Cardboard (g)	Sieve & Cardboard& Sample (g)	Sample (g)	% Retained	% Passing
40	426.72	487.37	60.65	27.67	72.33
60	387.76	490.08	102.32	46.68	25.65
120	458.60	502.10	43.50	19.85	5.80
200	375.85	381.21	5.36	2.45	3.35
270	423.48	424.09	0.61	0.28	3.07
325	423.43	424.70	1.27	0.58	2.49
400	432.55	433.72	1.17	0.53	1.96
PAN	391.50	395.80	4.30	1.96	0.00

Total = 219.18

-Sieve Analysis-

Company: Mitkem Corp.
Analysis(s): S.B.
Date: 9/20/99

Sample #: 8765-3
Initial Mass: 179.84

Sieve #	Sieve & Cardboard (g)	Sieve & Cardboard& Sample (g)	Sample (g)	% Retained	% Passing
40	426.69	453.11	26.42	14.96	85.04
60	387.76	496.25	108.49	61.44	23.60
120	458.5	486.15	27.65	15.66	7.94
200	375.77	380.88	5.11	2.89	5.05
270	423.38	424.46	1.08	0.61	4.44
325	423.48	424.74	1.26	0.71	3.73
400	432.78	434.02	1.24	0.70	3.03
PAN	391.58	396.93	5.35	3.03	0.00

Total = 176.60

Sample #: 8765-4
Initial Mass: 202.33

Sieve #	Sieve & Cardboard (g)	Sieve & Cardboard& Sample (g)	Sample (g)	% Retained	% Passing
40	426.84	428.67	1.83	0.91	99.09
60	387.76	520.09	132.33	65.59	33.50
120	458.46	500.81	42.35	20.99	12.51
200	375.72	384.65	8.93	4.43	8.08
270	423.52	428.25	4.73	2.34	5.74
325	423.53	424.90	1.37	0.68	5.06
400	432.56	435.45	2.89	1.43	3.63
PAN	391.51	398.83	7.32	3.63	0.00

Total = 201.75

-Sieve Analysis-

Company: Mitkem Corp.
Analysis(s): S.B.
Date: 9/20/99

Sample #: 8765-5
Initial Mass: 251.97

Sieve #	Sieve & Cardboard (g)	Sieve & Cardboard& Sample (g)	Sample (g)	% Retained	% Passing
40	426.59	441.94	15.35	6.13	93.87
60	387.90	545.35	157.45	62.90	30.97
120	458.45	506.62	48.17	19.24	11.73
200	375.81	387.43	11.62	4.64	7.09
270	423.45	429.60	6.15	2.46	4.63
325	423.46	423.56	0.10	0.04	4.59
400	432.64	435.42	2.78	1.11	3.48
PAN	391.50	400.20	8.7	3.48	0.00

Total = 250.32

MITKEM CORPORATION
175 Metro Center Boulevard
Warwick, Rhode Island 02886-1755
(401) 732-3400 • Fax (401) 732-3499
email: mitkem@mitkem.com

CHAIN-OF-CUSTODY RECORD

Page ____ of ____

REPORT TO			INVOICE TO		
COMPANY		PHONE	COMPANY	PHONE	LAB PROJECT #: 8765
NAME Data Reporting		FAX	NAME Len Ranalli	FAX	
ADDRESS			ADDRESS		TURNAROUND TIME: 72 h.s. Due 9-20
CITY/ST/ZIP			CITY/ST/ZIP		

CLIENT PROJECT NAME:	CLIENT PROJECT #: 61787	CLIENT P.O.#: 9961787A

SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	COMPOSITE	GRAB	WATER	SOIL	OTHER	LAB ID	# OF CONTAINERS	Grain Analysis ASTM D-422	REQUESTED ANALYSES	COMMENTS
61787-01	9/14/99 07:50				X			2	X		
-02	07:50				X			2	X		
-03	9:10				X			2	X		
-04	9:30				X			2	X		
-05	10:15				X			2	X		
	/										
	/										
	/										
	/										
	/										
	/										
	/										

TSF#	RELINQUISHED BY	DATE/TIME	ACCEPTED BY	DATE/TIME	ADDITIONAL REMARKS:	COOLER TEMP:
1	Jennifer Healey	9/15/99 13:30	D Gudi	9/15/99 1335	Short TAT	
		/		/		
		/		/		

WHITE: LABORATORY COPY YELLOW: REPORT COPY PINK: CLIENT'S COPY

Mitkem Corporation
Attn: Data Reporting
175 Metro Center Blvd.
Warwick, RI 02886-1755

Date Received: 9/15/99
Date Reported: 10/06/99
P.O.#: 9961787A
Work Order #: 9909-08765

PARTICLE SIZE

ASTM METHOD D422 **RIAL SAMPLE ID 8765-1**

MITKEM SAMPLE ID#61787-1

Gravel	**0.00%**
Course Sand	**0.00%**
Medium Sand	**5.59%**
Fine Sand	**80.98%**
Silt size, 0.074 to 0.005 mm	**10.63%**
Clay size, smaller than 0.005 mm	**2.80%**
Colloids, smaller than 0.001 mm	**0.00%**

PARTICLE SIZE

ASTM METHOD D422 RIAL SAMPLE ID 8765-2

MTKEM SAMPLE ID#61787-2

Gravel	0.00%
Course Sand	0.00%
Medium Sand	27.67%
Fine Sand	68.98%
Silt size, 0.074 to 0.005 mm	2.93%
Clay size, smaller than 0.005 mm	0.42%
Colloids, smaller than 0.001 mm	0.00%

PARTICLE SIZE

ASTM METHOD D422

RIAL SAMPLE ID 8765-3

MITKEM SAMPLE ID#61787-3

Gravel	0.00%
Course Sand	0.00%
Medium Sand	14.96%
Fine Sand	79.99%
Silt size, 0.074 to 0.005 mm	4.43%
Clay size, smaller than 0.005 mm	0.62%
Colloids, smaller than 0.001 mm	0.00%

PARTICLE SIZE

ASTM METHOD D422 RIAL SAMPLE ID 8765-4

MITKEM SAMPLE ID#61787-4

Gravel	0.00%
Course Sand	0.00%
Medium Sand	0.91%
Fine Sand	91.01%
Silt size, 0.074 to 0.005 mm	7.22%
Clay size, smaller than 0.005 mm	0.86%
Colloids, smaller than 0.001 mm	0.00%

PARTICLE SIZE

ASTM METHOD D422 RIAL SAMPLE ID 8765-5

MITKEM SAMPLE ID#61787-5

Gravel	0.00%
Course Sand	0.00%
Medium Sand	6.13%
Fine Sand	86.78%
Silt size, 0.074 to 0.005 mm	6.29%
Clay size, smaller than 0.005 mm	0.80%
Colloids, smaller than 0.001 mm	0.00%

R.I. Analytical
Specialists in Environmental Services

CERTIFICATE OF ANALYSIS

Mitkem Corporation
Attn: Data Reporting
175 Metro Center Blvd.
Warwick, RI 02886-1755

Date Received: 9/15/99
Date Reported: 10/06/99
P.O. #: 9961787A
Work Order #: 9909-08765

DESCRIPTION: PROJECT #61787 (FIVE SOIL SAMPLES)

Subject sample(s) has/have been analyzed by our laboratory with the attached results.

Reference: All parameters were analyzed by U.S. EPA approved methodologies. The specific methodologies are listed in the methods column of the Certificate Of Analysis.

If you have any questions regarding this work, or if we may be of further assistance, please contact us.

Approved by:

James E. Mich
Vice President

Michael J. Hobin
Quality Control Coordinator

enc: Chain of Custody

41 Illinois Avenue, Warwick, RI 02888
Tel: (401) 737-8500 Fax: (401) 738-1970

950 Boylston Street, Unit 102, Newton Highlands, MA 02461
Tel: (617) 965-5133 Fax: (617) 965-5624

Last Page of Data Report

Appendix C

APPENDIX C

WELL CONSTRUCTION LOGS

Dvirka and Bartilucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

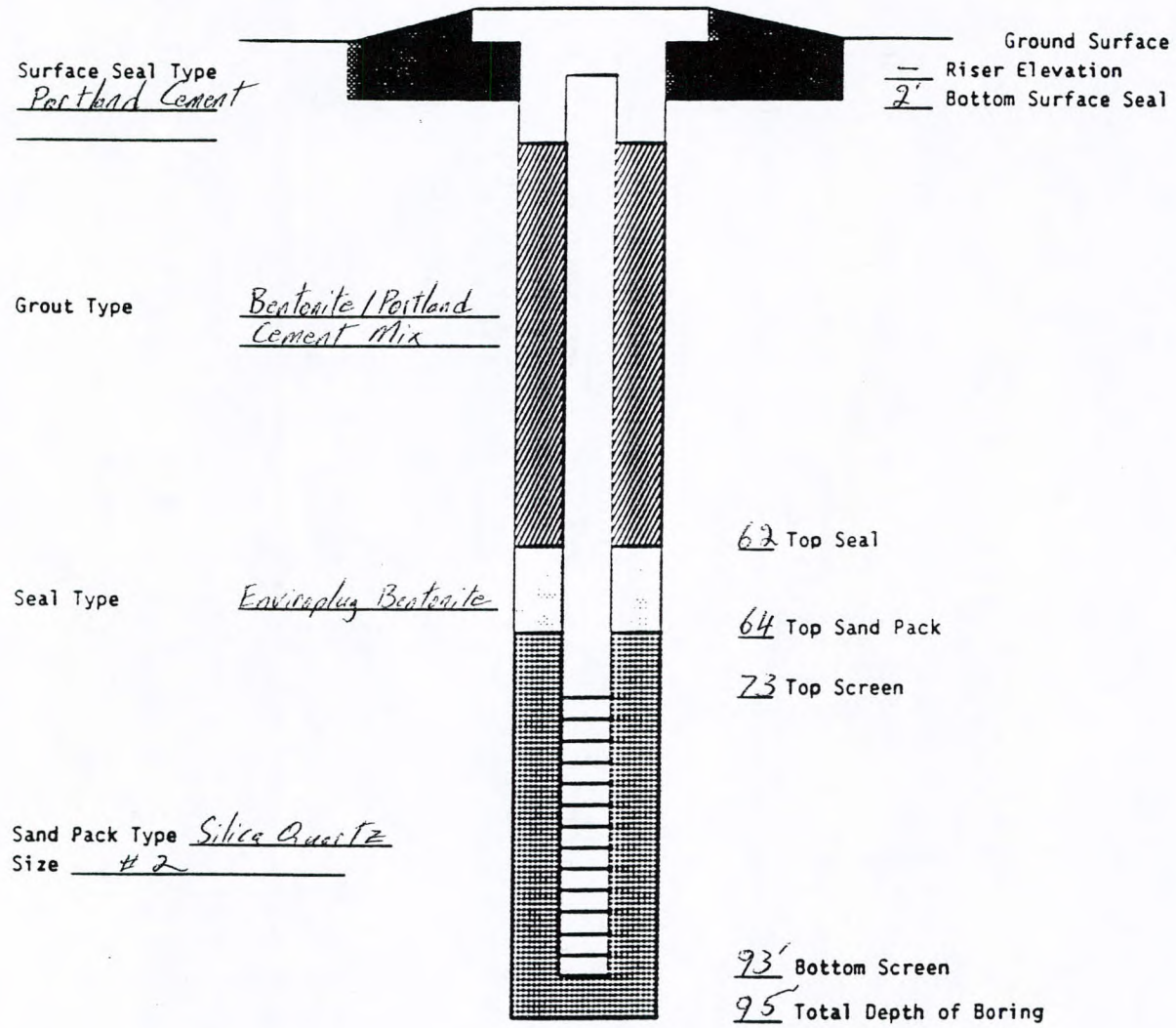
SITE Franklin Cleaners JOB NO. _____ WELL NO. PTW-1

TOTAL DEPTH 95' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) _____ DATE INSTALLED 10/12/99

RISER DIA 6" MATERIAL PVC, Schedule 80 LENGTH 73'
SCREEN DIA 6" MATERIAL Stainless steel LENGTH 20' SLOT SIZE _____

SCHEMATIC



Dvirka and Bertlucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

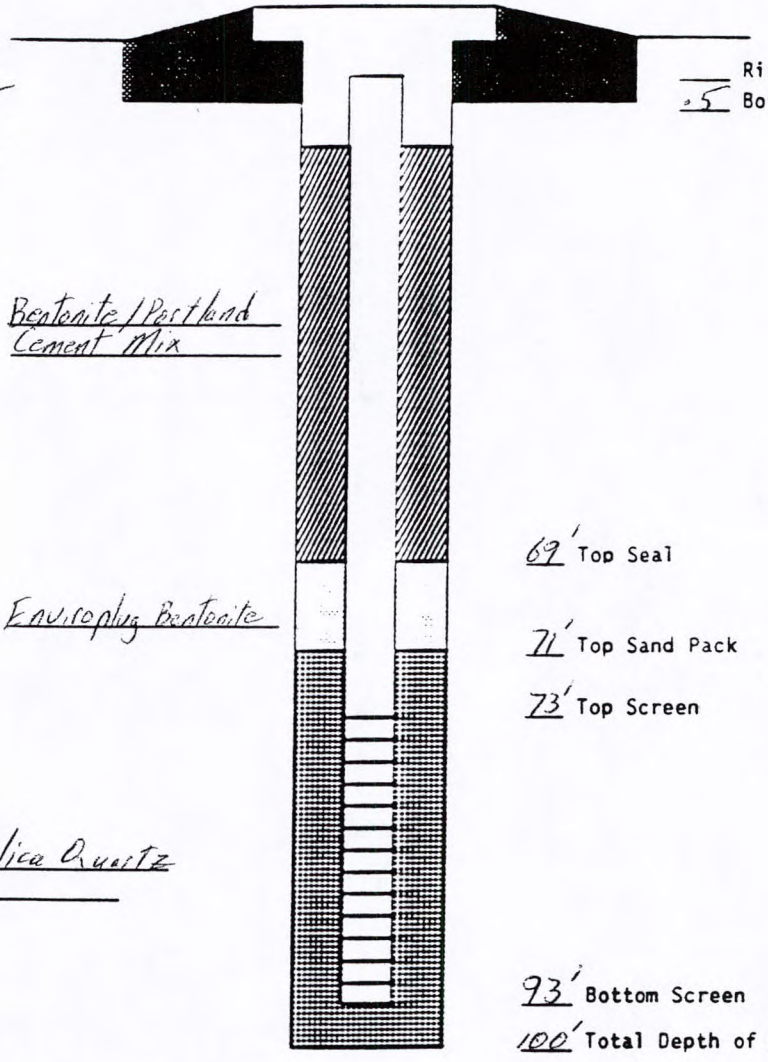
SITE Franklin Cleaners JOB NO. 1640 WELL NO. PTMW-1

TOTAL DEPTH 100' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) ~23' DATE INSTALLED 9/14/99

RISER DIA 2" MATERIAL PVC Schedule 40 LENGTH 73'
SCREEN DIA 2" MATERIAL PVC Schedule 40 LENGTH 20' SLOT SIZE #10

SCHEMATIC



Surface Seal Type Portland Cement

Grout Type Bentonite/Portland Cement Mix

Seal Type Enviroplug Bentonite

Sand Pack Type Silica Quartz
Size #1

Ground Surface
Riser Elevation
.5 Bottom Surface Seal

69' Top Seal

71' Top Sand Pack

73' Top Screen

93' Bottom Screen

100' Total Depth of Boring

Dvirka and Bartlucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

SITE Franklin Cleaners JOB NO. 1640 WELL NO. PTMW-2

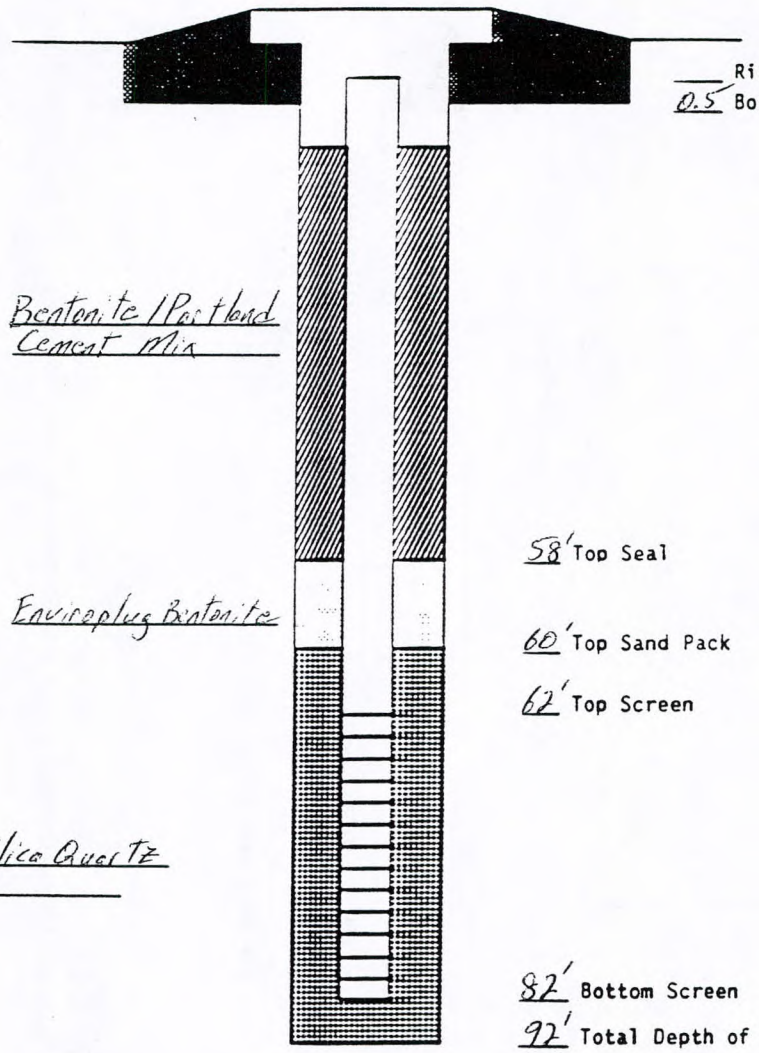
TOTAL DEPTH 92' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) ~23' DATE INSTALLED 10/11/99

RISER DIA 2" MATERIAL PVC Schedule 40 LENGTH 63

SCREEN DIA 2" MATERIAL PVC, Schedule 40 LENGTH 20 SLOT SIZE 10

SCHEMATIC



Surface Seal Type _____

Grout Type Bentonite/Portland Cement Mix

Seal Type Enviroplug Bentonite

Sand Pack Type Silica Quartz
Size #1

Ground Surface
Riser Elevation
0.5' Bottom Surface Seal

58' Top Seal

60' Top Sand Pack

62' Top Screen

82' Bottom Screen

92' Total Depth of Boring

Dvirka and Bartlucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

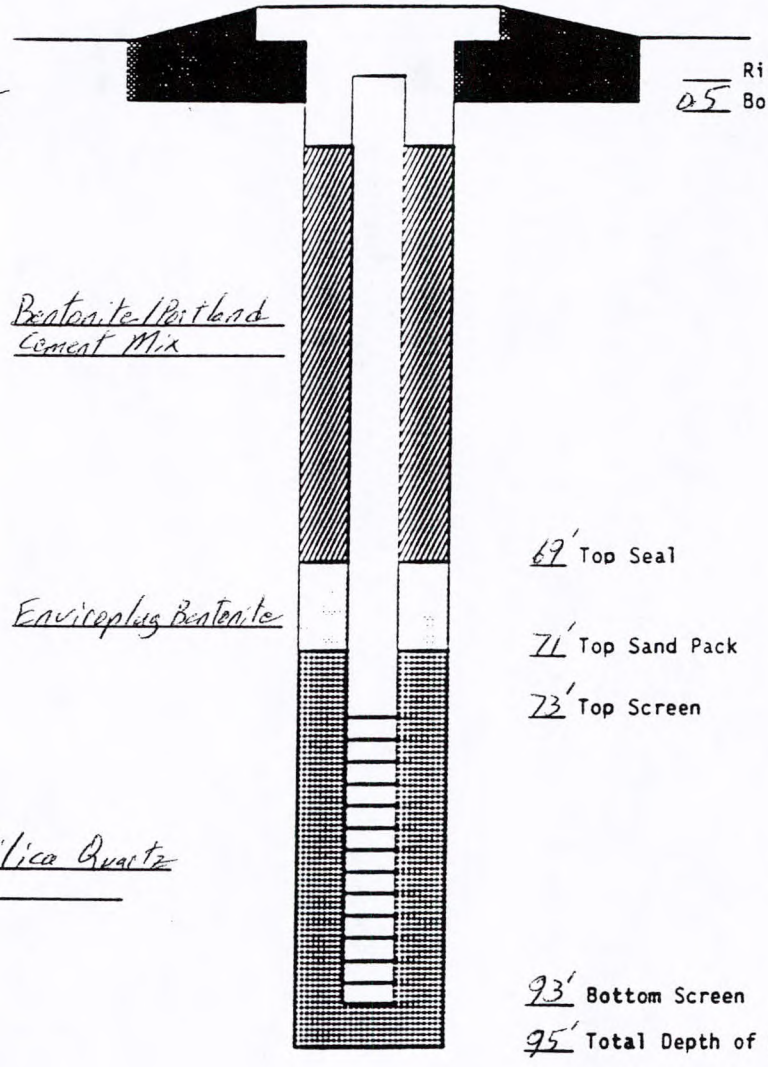
SITE Franklin Cleaners JOB NO. 1640 WELL NO. PTMW-3

TOTAL DEPTH 75' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) _____ DATE INSTALLED 10/13/99

RISER DIA 2" MATERIAL PVC Schedule 40 LENGTH 73'
SCREEN DIA 2" MATERIAL PVC Schedule 40 LENGTH 20' SLOT SIZE 10

SCHEMATIC



Surface Seal Type Portland Cement

Grout Type Bentonite/Portland Cement Mix

Seal Type Enviroplug Bentonite

Sand Pack Type Silica Quartz
Size #1

Ground Surface
Riser Elevation
05 Bottom Surface Seal

69' Top Seal

71' Top Sand Pack

73' Top Screen

93' Bottom Screen

95' Total Depth of Boring

Appendix D

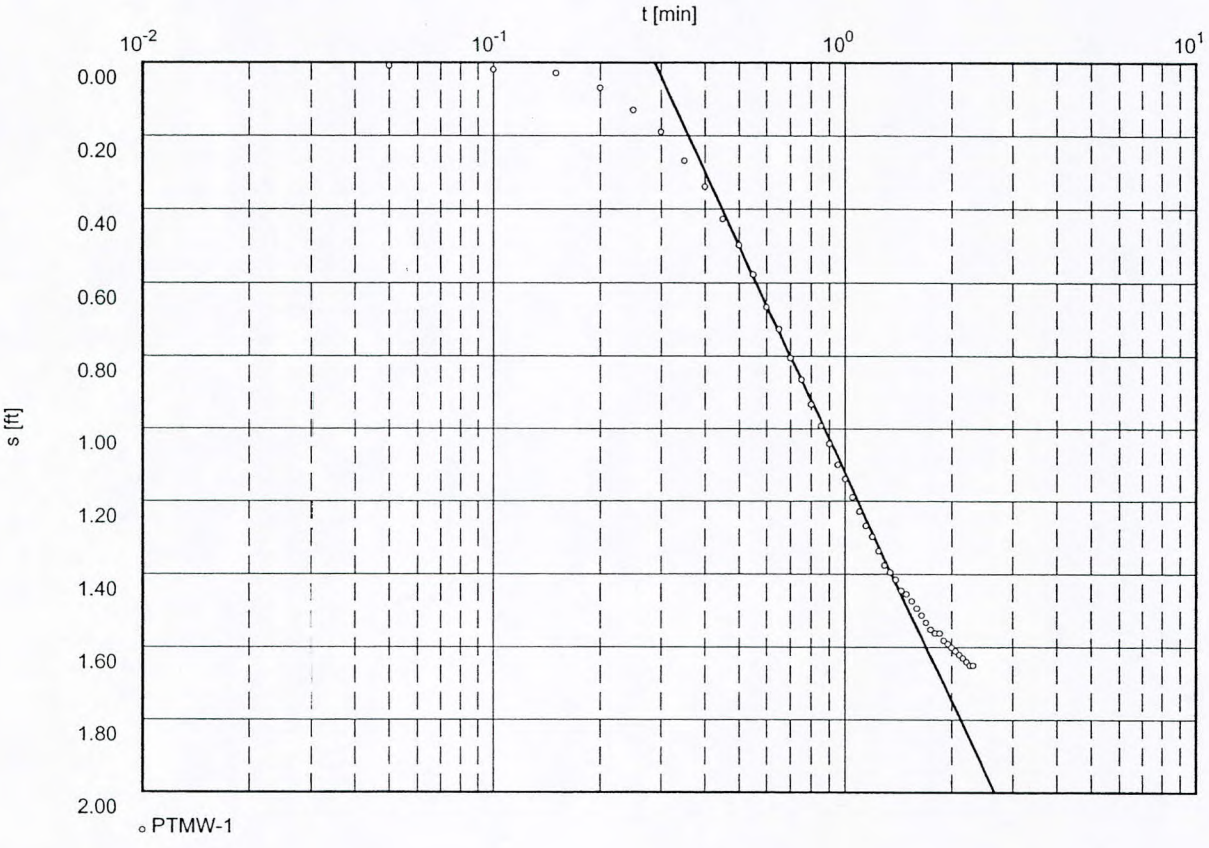
APPENDIX D

PUMP TEST DATA

PUMP TEST 1

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 04.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-1	
Discharge 80.00 U.S.gal/min	



Transmissivity [ft²/min]: 9.43×10^{-1}

Hydraulic conductivity [ft/min]: 1.31×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 04.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

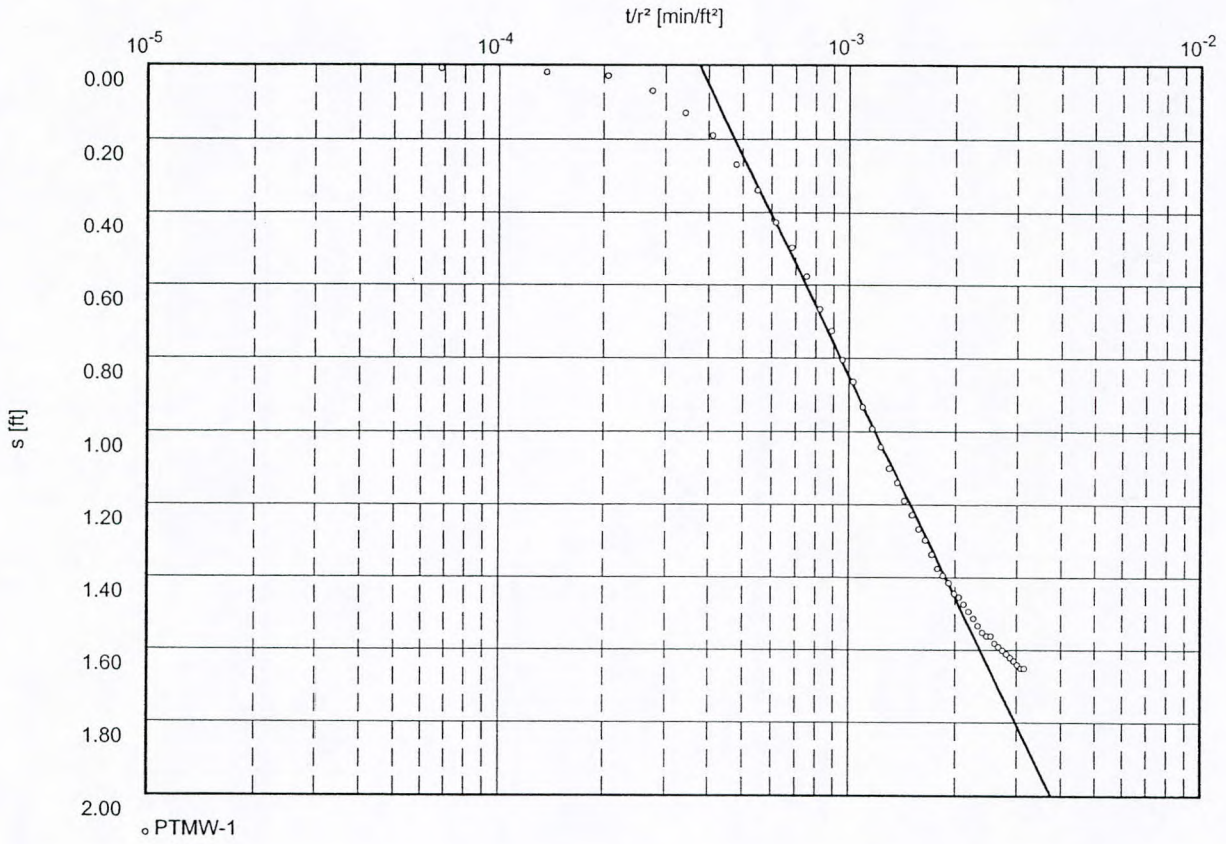
Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-1	PTMW-1
Discharge 80.00 U.S.gal/min	Distance from the pumping well 27.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.01	0.01	0.01
3	0.10	0.02	0.02	0.02
4	0.15	0.03	0.03	0.03
5	0.20	0.07	0.07	0.07
6	0.25	0.13	0.13	0.13
7	0.30	0.19	0.19	0.19
8	0.35	0.27	0.27	0.27
9	0.40	0.34	0.34	0.34
10	0.45	0.43	0.43	0.43
11	0.50	0.50	0.50	0.50
12	0.55	0.58	0.58	0.58
13	0.60	0.67	0.67	0.67
14	0.65	0.73	0.73	0.73
15	0.70	0.81	0.81	0.81
16	0.75	0.87	0.87	0.86
17	0.80	0.94	0.94	0.93
18	0.85	1.00	1.00	0.99
19	0.90	1.05	1.05	1.04
20	0.95	1.11	1.11	1.10
21	1.00	1.15	1.15	1.14
22	1.05	1.20	1.20	1.19
23	1.10	1.24	1.24	1.23
24	1.15	1.28	1.28	1.27
25	1.20	1.31	1.31	1.30
26	1.25	1.35	1.35	1.34
27	1.30	1.39	1.39	1.38
28	1.35	1.41	1.41	1.40
29	1.40	1.43	1.43	1.42
30	1.45	1.46	1.46	1.45
31	1.50	1.47	1.47	1.45
32	1.55	1.49	1.49	1.47
33	1.60	1.51	1.51	1.49
34	1.65	1.53	1.53	1.51
35	1.70	1.55	1.55	1.53
36	1.75	1.57	1.57	1.55
37	1.80	1.58	1.58	1.56
38	1.85	1.58	1.58	1.56
39	1.90	1.60	1.60	1.58
40	1.95	1.61	1.61	1.59
41	2.00	1.62	1.62	1.60
42	2.05	1.63	1.63	1.61
43	2.10	1.64	1.64	1.62
44	2.15	1.65	1.65	1.63
45	2.20	1.66	1.66	1.64
46	2.25	1.67	1.67	1.65
47	2.30	1.67	1.67	1.65

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 04.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-1	
Discharge 80.00 U.S.gal/min	



Transmissivity [ft²/min]: 9.75×10^{-1}

Hydraulic conductivity [ft/min]: 1.35×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 04.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

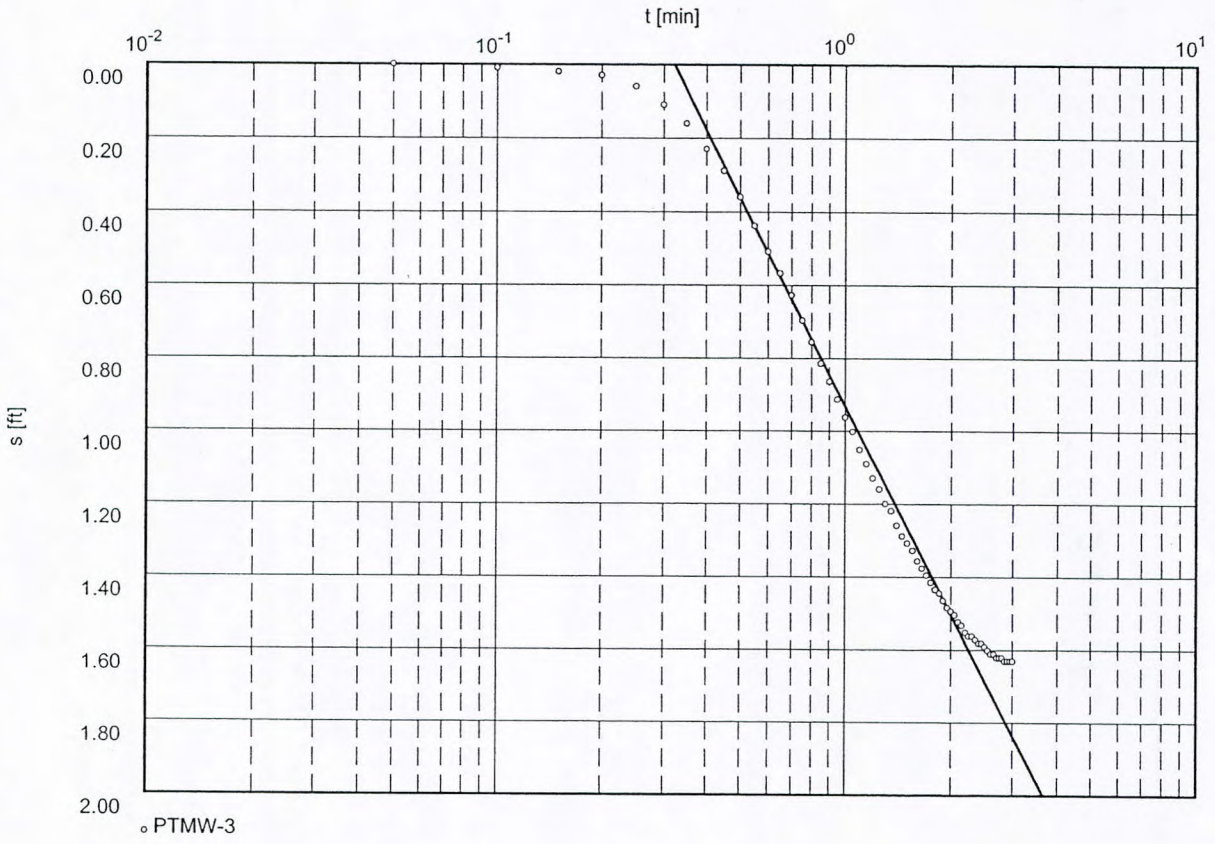
Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-1	PTMW-1
Discharge 80.00 U.S.gal/min	Distance from the pumping well 27.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.01	0.01	0.01
3	0.10	0.02	0.02	0.02
4	0.15	0.03	0.03	0.03
5	0.20	0.07	0.07	0.07
6	0.25	0.13	0.13	0.13
7	0.30	0.19	0.19	0.19
8	0.35	0.27	0.27	0.27
9	0.40	0.34	0.34	0.34
10	0.45	0.43	0.43	0.43
11	0.50	0.50	0.50	0.50
12	0.55	0.58	0.58	0.58
13	0.60	0.67	0.67	0.67
14	0.65	0.73	0.73	0.73
15	0.70	0.81	0.81	0.81
16	0.75	0.87	0.87	0.86
17	0.80	0.94	0.94	0.93
18	0.85	1.00	1.00	0.99
19	0.90	1.05	1.05	1.04
20	0.95	1.11	1.11	1.10
21	1.00	1.15	1.15	1.14
22	1.05	1.20	1.20	1.19
23	1.10	1.24	1.24	1.23
24	1.15	1.28	1.28	1.27
25	1.20	1.31	1.31	1.30
26	1.25	1.35	1.35	1.34
27	1.30	1.39	1.39	1.38
28	1.35	1.41	1.41	1.40
29	1.40	1.43	1.43	1.42
30	1.45	1.46	1.46	1.45
31	1.50	1.47	1.47	1.45
32	1.55	1.49	1.49	1.47
33	1.60	1.51	1.51	1.49
34	1.65	1.53	1.53	1.51
35	1.70	1.55	1.55	1.53
36	1.75	1.57	1.57	1.55
37	1.80	1.58	1.58	1.56
38	1.85	1.58	1.58	1.56
39	1.90	1.60	1.60	1.58
40	1.95	1.61	1.61	1.59
41	2.00	1.62	1.62	1.60
42	2.05	1.63	1.63	1.61
43	2.10	1.64	1.64	1.62
44	2.15	1.65	1.65	1.63
45	2.20	1.66	1.66	1.64
46	2.25	1.67	1.67	1.65
47	2.30	1.67	1.67	1.65

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 04.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-3	
Discharge 80.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.03×10^{0}

Hydraulic conductivity [ft/min]: 1.43×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 04.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-3	PTMW-3
Discharge 80.00 U.S.gal/min	Distance from the pumping well 50.00 ft
Static water level: 0.00 ft below datum	

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.00	0.00	0.00
3	0.10	0.01	0.01	0.01
4	0.15	0.02	0.02	0.02
5	0.20	0.03	0.03	0.03
6	0.25	0.06	0.06	0.06
7	0.30	0.11	0.11	0.11
8	0.35	0.16	0.16	0.16
9	0.40	0.23	0.23	0.23
10	0.45	0.29	0.29	0.29
11	0.50	0.36	0.36	0.36
12	0.55	0.44	0.44	0.44
13	0.60	0.51	0.51	0.51
14	0.65	0.57	0.57	0.57
15	0.70	0.63	0.63	0.63
16	0.75	0.70	0.70	0.70
17	0.80	0.76	0.76	0.76
18	0.85	0.82	0.82	0.82
19	0.90	0.87	0.87	0.86
20	0.95	0.92	0.92	0.91
21	1.00	0.97	0.97	0.96
22	1.05	1.01	1.01	1.00
23	1.10	1.06	1.06	1.05
24	1.15	1.10	1.10	1.09
25	1.20	1.14	1.14	1.13
26	1.25	1.17	1.17	1.16
27	1.30	1.21	1.21	1.20
28	1.35	1.23	1.23	1.22
29	1.40	1.27	1.27	1.26
30	1.45	1.30	1.30	1.29
31	1.50	1.32	1.32	1.31
32	1.55	1.34	1.34	1.33
33	1.60	1.37	1.37	1.36
34	1.65	1.39	1.39	1.38
35	1.70	1.41	1.41	1.40
36	1.75	1.43	1.43	1.42
37	1.80	1.45	1.45	1.44
38	1.85	1.46	1.46	1.45
39	1.90	1.48	1.48	1.46
40	1.95	1.50	1.50	1.48
41	2.00	1.51	1.51	1.49
42	2.05	1.52	1.52	1.50
43	2.10	1.54	1.54	1.52
44	2.15	1.55	1.55	1.53
45	2.20	1.57	1.57	1.55
46	2.25	1.58	1.58	1.56
47	2.30	1.58	1.58	1.56
48	2.35	1.59	1.59	1.57
49	2.40	1.60	1.60	1.58
50	2.45	1.60	1.60	1.58

Dvirka and Bartilucci
330 Crossways Park Drive
Woodbury N.Y. 11797
ph.(516)364-9890

Pumping test analysis
Time-Drawdown-method after
COOPER & JACOB
Unconfined aquifer

Date: 04.01.2000 | Page 3

Project: FRANKLIN CLEANERS

Evaluated by: WM

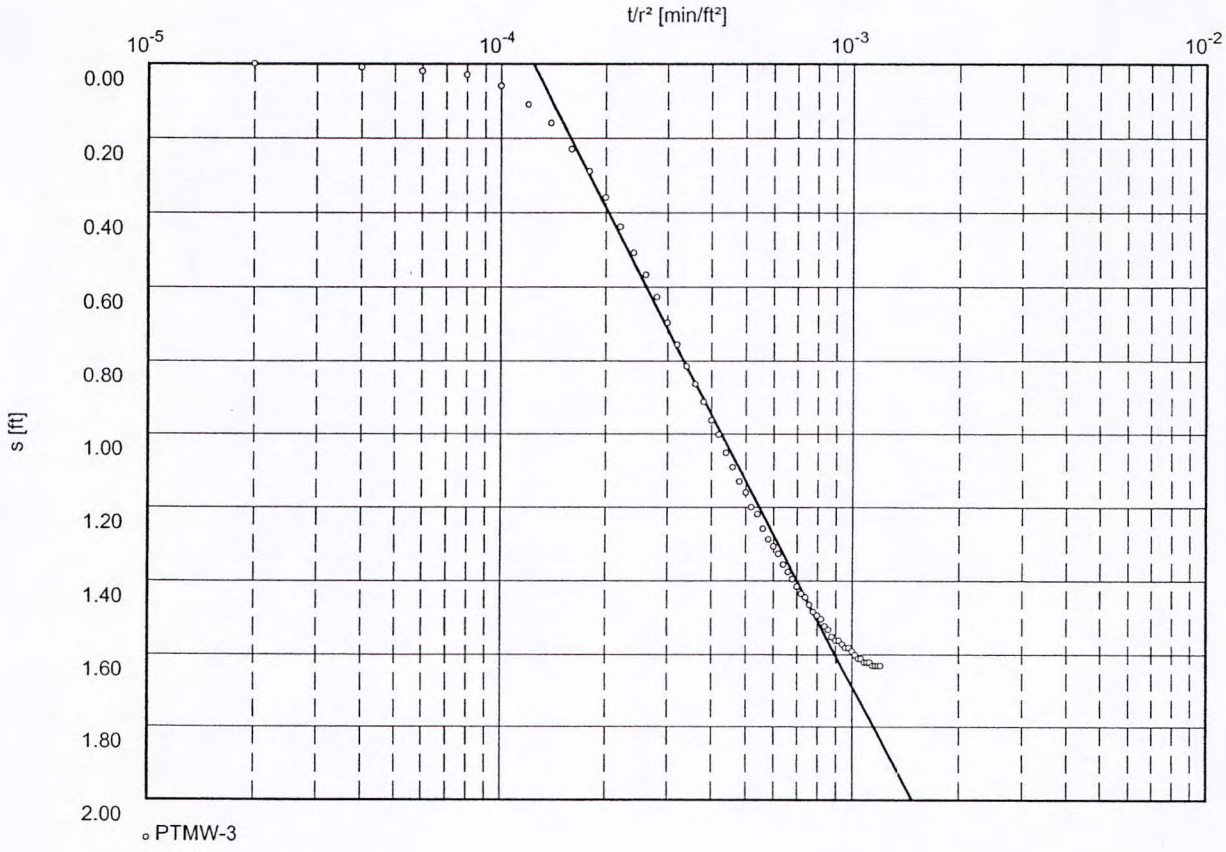
Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-3	PTMW-3
Discharge 80.00 U.S.gal/min	Distance from the pumping well 50.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	2.50	1.61	1.61	1.59
52	2.55	1.62	1.62	1.60
53	2.60	1.63	1.63	1.61
54	2.65	1.63	1.63	1.61
55	2.70	1.64	1.64	1.62
56	2.75	1.64	1.64	1.62
57	2.80	1.64	1.64	1.62
58	2.85	1.65	1.65	1.63
59	2.90	1.65	1.65	1.63
60	2.95	1.65	1.65	1.63
61	3.00	1.65	1.65	1.63

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 04.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-3	
Discharge 80.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.04×10^{0}

Hydraulic conductivity [ft/min]: 1.45×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 04.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-3	PTMW-3
Discharge 80.00 U.S.gal/min	Distance from the pumping well 50.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.00	0.00	0.00
3	0.10	0.01	0.01	0.01
4	0.15	0.02	0.02	0.02
5	0.20	0.03	0.03	0.03
6	0.25	0.06	0.06	0.06
7	0.30	0.11	0.11	0.11
8	0.35	0.16	0.16	0.16
9	0.40	0.23	0.23	0.23
10	0.45	0.29	0.29	0.29
11	0.50	0.36	0.36	0.36
12	0.55	0.44	0.44	0.44
13	0.60	0.51	0.51	0.51
14	0.65	0.57	0.57	0.57
15	0.70	0.63	0.63	0.63
16	0.75	0.70	0.70	0.70
17	0.80	0.76	0.76	0.76
18	0.85	0.82	0.82	0.82
19	0.90	0.87	0.87	0.86
20	0.95	0.92	0.92	0.91
21	1.00	0.97	0.97	0.96
22	1.05	1.01	1.01	1.00
23	1.10	1.06	1.06	1.05
24	1.15	1.10	1.10	1.09
25	1.20	1.14	1.14	1.13
26	1.25	1.17	1.17	1.16
27	1.30	1.21	1.21	1.20
28	1.35	1.23	1.23	1.22
29	1.40	1.27	1.27	1.26
30	1.45	1.30	1.30	1.29
31	1.50	1.32	1.32	1.31
32	1.55	1.34	1.34	1.33
33	1.60	1.37	1.37	1.36
34	1.65	1.39	1.39	1.38
35	1.70	1.41	1.41	1.40
36	1.75	1.43	1.43	1.42
37	1.80	1.45	1.45	1.44
38	1.85	1.46	1.46	1.45
39	1.90	1.48	1.48	1.46
40	1.95	1.50	1.50	1.48
41	2.00	1.51	1.51	1.49
42	2.05	1.52	1.52	1.50
43	2.10	1.54	1.54	1.52
44	2.15	1.55	1.55	1.53
45	2.20	1.57	1.57	1.55
46	2.25	1.58	1.58	1.56
47	2.30	1.58	1.58	1.56
48	2.35	1.59	1.59	1.57
49	2.40	1.60	1.60	1.58
50	2.45	1.60	1.60	1.58

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 04.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

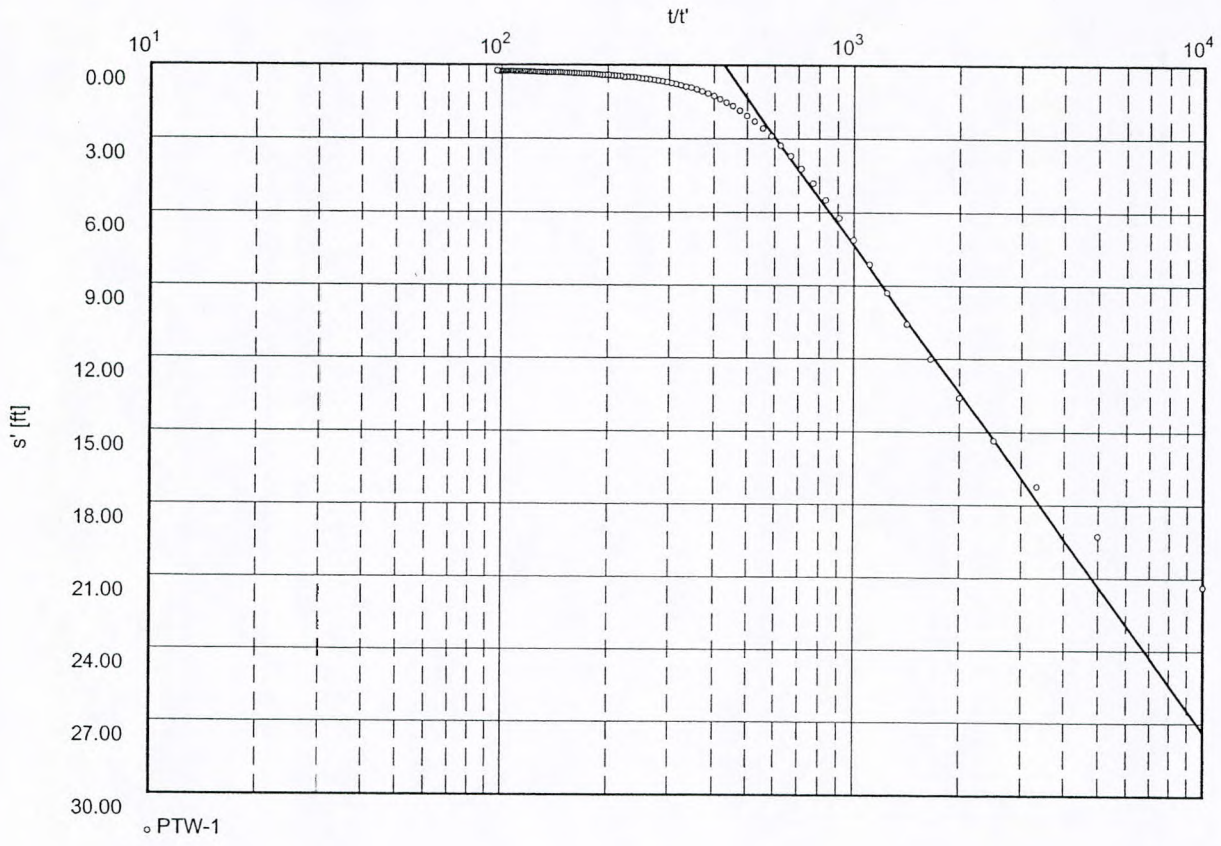
Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-3	PTMW-3
Discharge 80.00 U.S.gal/min	Distance from the pumping well 50.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	2.50	1.61	1.61	1.59
52	2.55	1.62	1.62	1.60
53	2.60	1.63	1.63	1.61
54	2.65	1.63	1.63	1.61
55	2.70	1.64	1.64	1.62
56	2.75	1.64	1.64	1.62
57	2.80	1.64	1.64	1.62
58	2.85	1.65	1.65	1.63
59	2.90	1.65	1.65	1.63
60	2.95	1.65	1.65	1.63
61	3.00	1.65	1.65	1.63

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 21.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99 - 11/10/99
PTW-1	
Discharge 80.00 U.S.gal/min	
	Pumping test duration: 499.80 min



Transmissivity [ft²/min]: 9.78×10^{-2}

Hydraulic conductivity [ft/min]: 1.35×10^{-3}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 21.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99 - 11/10/99
PTW-1	PTW-1
Discharge 80.00 U.S.gal/min	
Static water level: 0.00 ft below datum	Pumping test duration: 499.80 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
1	0.05	26.10	26.10	21.37
2	0.10	22.92	22.92	19.27
3	0.15	20.04	20.04	17.25
4	0.20	17.48	17.48	15.36
5	0.25	15.22	15.22	13.61
6	0.30	13.24	13.24	12.02
7	0.35	11.50	11.50	10.58
8	0.40	9.99	9.99	9.30
9	0.45	8.67	8.67	8.15
10	0.50	7.55	7.55	7.15
11	0.55	6.53	6.53	6.23
12	0.60	5.72	5.72	5.49
13	0.65	4.99	4.99	4.82
14	0.70	4.36	4.36	4.23
15	0.75	3.81	3.81	3.71
16	0.80	3.36	3.36	3.28
17	0.85	2.97	2.97	2.91
18	0.90	2.64	2.64	2.59
19	0.95	2.34	2.34	2.30
20	1.00	2.10	2.10	2.07
21	1.05	1.89	1.89	1.87
22	1.10	1.70	1.70	1.68
23	1.15	1.55	1.55	1.53
24	1.20	1.41	1.41	1.40
25	1.25	1.29	1.29	1.28
26	1.30	1.18	1.18	1.17
27	1.35	1.10	1.10	1.09
28	1.40	1.02	1.02	1.01
29	1.45	0.95	0.95	0.94
30	1.50	0.90	0.90	0.89
31	1.55	0.84	0.84	0.84
32	1.60	0.79	0.79	0.79
33	1.65	0.75	0.75	0.75
34	1.70	0.72	0.72	0.72
35	1.75	0.68	0.68	0.68
36	1.80	0.65	0.65	0.65
37	1.85	0.63	0.63	0.63
38	1.90	0.60	0.60	0.60
39	1.95	0.58	0.58	0.58
40	2.00	0.56	0.56	0.56
41	2.05	0.54	0.54	0.54
42	2.10	0.52	0.52	0.52
43	2.15	0.51	0.51	0.51
44	2.20	0.50	0.50	0.50
45	2.25	0.51	0.51	0.51
46	2.30	0.47	0.47	0.47
47	2.35	0.46	0.46	0.46
48	2.40	0.45	0.45	0.45
49	2.45	0.45	0.45	0.45
50	2.50	0.43	0.43	0.43

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 21.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99 - 11/10/99
PTW-1	PTW-1
Discharge 80.00 U.S.gal/min	
Static water level: 0.00 ft below datum	Pumping test duration: 499.80 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
51	2.55	0.42	0.42	0.42
52	2.60	0.42	0.42	0.42
53	2.65	0.41	0.41	0.41
54	2.70	0.40	0.40	0.40
55	2.75	0.39	0.39	0.39
56	2.80	0.39	0.39	0.39
57	2.85	0.38	0.38	0.38
58	2.90	0.38	0.38	0.38
59	2.95	0.38	0.38	0.38
60	3.00	0.37	0.37	0.37
61	3.05	0.36	0.36	0.36
62	3.10	0.36	0.36	0.36
63	3.15	0.35	0.35	0.35
64	3.20	0.35	0.35	0.35
65	3.25	0.34	0.34	0.34
66	3.30	0.34	0.34	0.34
67	3.35	0.34	0.34	0.34
68	3.40	0.33	0.33	0.33
69	3.45	0.33	0.33	0.33
70	3.50	0.32	0.32	0.32
71	3.55	0.32	0.32	0.32
72	3.60	0.32	0.32	0.32
73	3.65	0.32	0.32	0.32
74	3.70	0.32	0.32	0.32
75	3.75	0.32	0.32	0.32
76	3.80	0.31	0.31	0.31
77	3.85	0.31	0.31	0.31
78	3.90	0.31	0.31	0.31
79	3.95	0.31	0.31	0.31
80	4.00	0.31	0.31	0.31
81	4.05	0.30	0.30	0.30
82	4.10	0.30	0.30	0.30
83	4.15	0.29	0.29	0.29
84	4.20	0.30	0.30	0.30
85	4.25	0.29	0.29	0.29
86	4.30	0.29	0.29	0.29
87	4.35	0.29	0.29	0.29
88	4.40	0.29	0.29	0.29
89	4.45	0.29	0.29	0.29
90	4.50	0.28	0.28	0.28
91	4.55	0.28	0.28	0.28
92	4.60	0.29	0.29	0.29
93	4.65	0.28	0.28	0.28
94	4.70	0.28	0.28	0.28
95	4.75	0.28	0.28	0.28
96	4.80	0.28	0.28	0.28
97	4.85	0.27	0.27	0.27
98	4.90	0.27	0.27	0.27
99	4.95	0.27	0.27	0.27
100	5.00	0.27	0.27	0.27

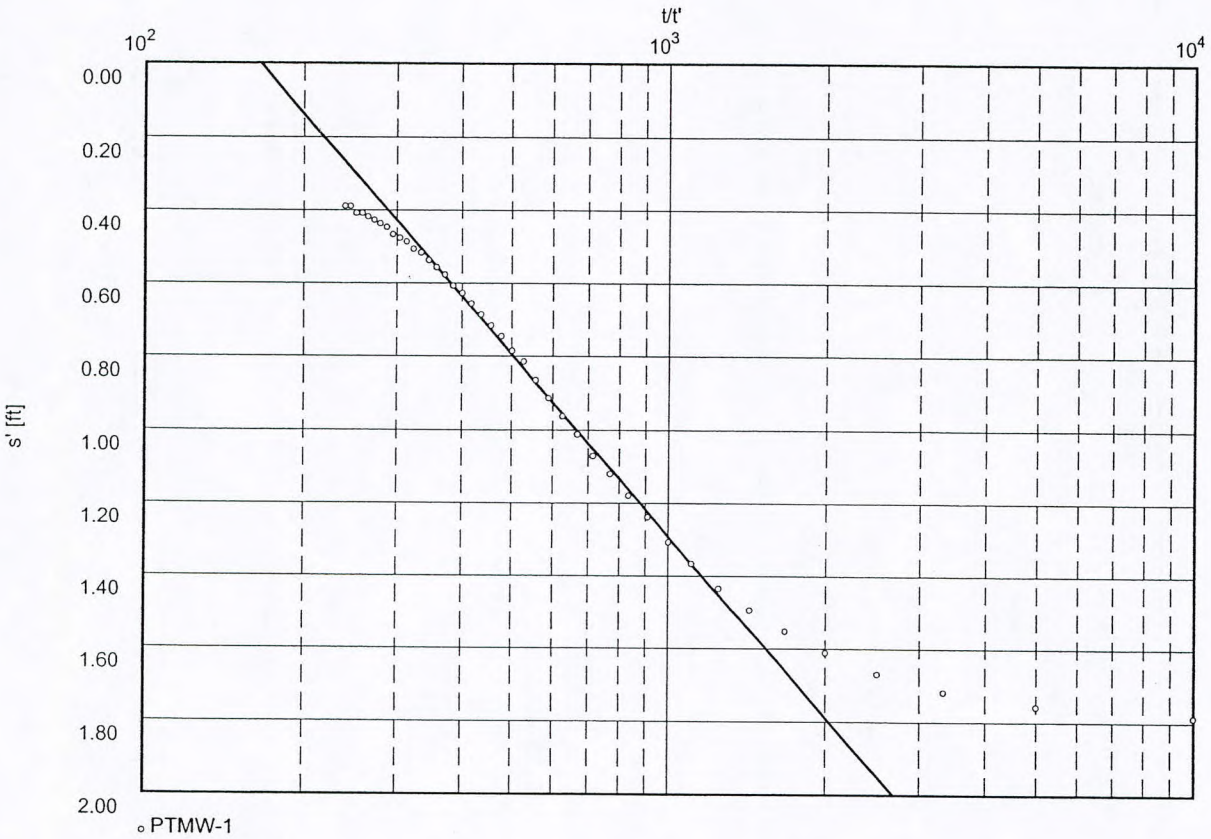
Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 21.01.2000	Page 4
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99 - 11/10/99
PTW-1	PTW-1
Discharge 80.00 U.S.gal/min	
Static water level: 0.00 ft below datum	Pumping test duration: 499.80 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
101	5.05	0.27	0.27	0.27
102	5.10	0.27	0.27	0.27
103	5.15	0.27	0.27	0.27
104	5.20	0.26	0.26	0.26

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 04.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-1	
Discharge 80.00 U.S.gal/min	
	Pumping test duration: 499.90 min



Transmissivity [ft²/min]: 1.18×10^{0}

Hydraulic conductivity [ft/min]: 1.64×10^{-2}

Aquifer thickness [ft]: 72.00

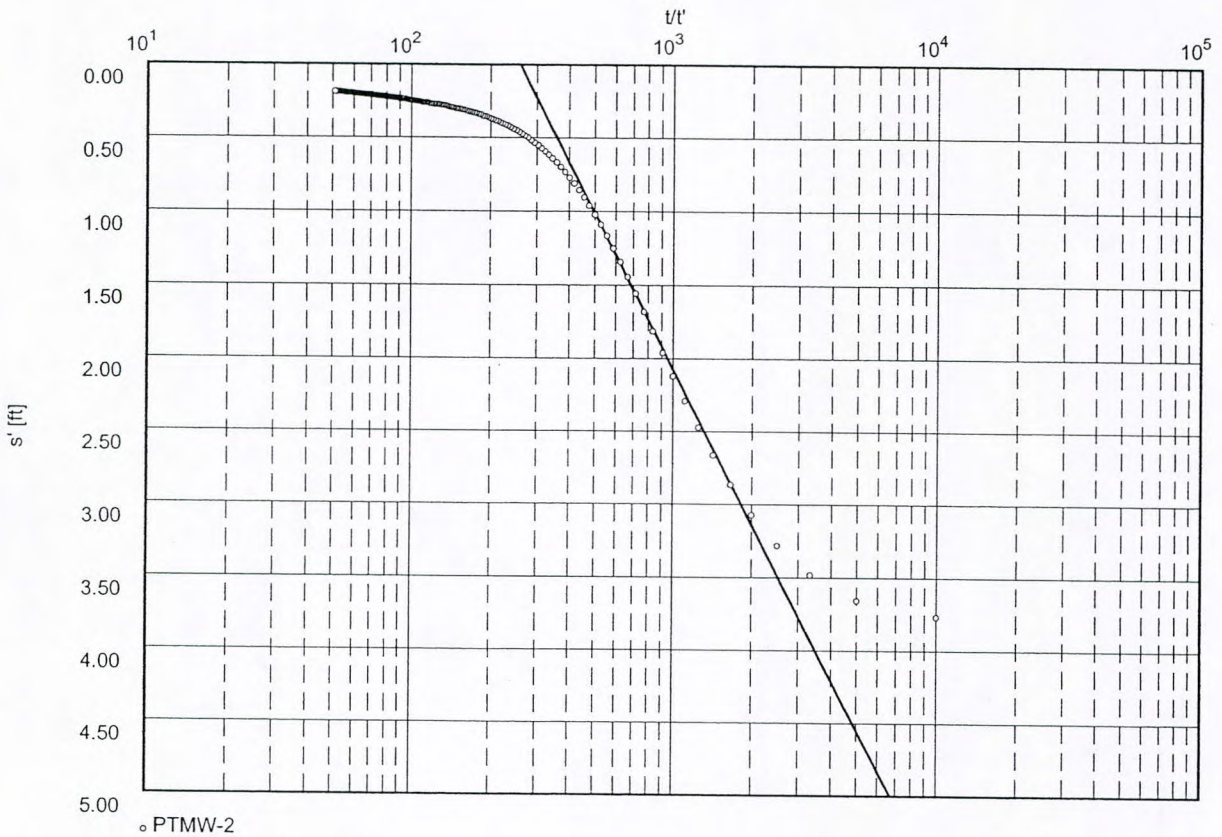
Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 04.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-1	PTMW-1
Discharge 80.00 U.S.gal/min	Distance from the pumping well 27.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 499.90 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
1	0.05	1.81	1.81	1.79
2	0.10	1.78	1.78	1.76
3	0.15	1.74	1.74	1.72
4	0.20	1.69	1.69	1.67
5	0.25	1.63	1.63	1.61
6	0.30	1.57	1.57	1.55
7	0.35	1.51	1.51	1.49
8	0.40	1.45	1.45	1.44
9	0.45	1.38	1.38	1.37
10	0.50	1.32	1.32	1.31
11	0.55	1.25	1.25	1.24
12	0.60	1.19	1.19	1.18
13	0.65	1.13	1.13	1.12
14	0.70	1.08	1.08	1.07
15	0.75	1.02	1.02	1.01
16	0.80	0.97	0.97	0.96
17	0.85	0.92	0.92	0.91
18	0.90	0.87	0.87	0.86
19	0.95	0.82	0.82	0.82
20	1.00	0.79	0.79	0.79
21	1.05	0.75	0.75	0.75
22	1.10	0.72	0.72	0.72
23	1.15	0.69	0.69	0.69
24	1.20	0.66	0.66	0.66
25	1.25	0.63	0.63	0.63
26	1.30	0.61	0.61	0.61
27	1.35	0.58	0.58	0.58
28	1.40	0.56	0.56	0.56
29	1.45	0.54	0.54	0.54
30	1.50	0.52	0.52	0.52
31	1.55	0.51	0.51	0.51
32	1.60	0.49	0.49	0.49
33	1.65	0.48	0.48	0.48
34	1.70	0.47	0.47	0.47
35	1.75	0.45	0.45	0.45
36	1.80	0.44	0.44	0.44
37	1.85	0.43	0.43	0.43
38	1.90	0.42	0.42	0.42
39	1.95	0.41	0.41	0.41
40	2.00	0.41	0.41	0.41
41	2.05	0.39	0.39	0.39
42	2.10	0.39	0.39	0.39

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 13.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-2	
Discharge 80.00 U.S.gal/min	
	Pumping test duration: 500.00 min



Transmissivity [ft²/min]: 5.52×10^{-1}

Hydraulic conductivity [ft/min]: 7.68×10^{-3}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 13.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-2	PTMW-2
Discharge 80.00 U.S.gal/min	Distance from the pumping well 12.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
2	0.05	3.87	3.87	3.77
3	0.10	3.76	3.76	3.66
4	0.15	3.57	3.57	3.48
5	0.20	3.36	3.36	3.28
6	0.25	3.14	3.14	3.07
7	0.30	2.93	2.93	2.87
8	0.35	2.72	2.72	2.67
9	0.40	2.52	2.52	2.47
10	0.45	2.33	2.33	2.29
11	0.50	2.15	2.15	2.12
12	0.55	1.99	1.99	1.96
13	0.60	1.84	1.84	1.82
14	0.65	1.70	1.70	1.68
15	0.70	1.58	1.58	1.56
16	0.75	1.46	1.46	1.45
17	0.80	1.36	1.36	1.34
18	0.85	1.26	1.26	1.25
19	0.90	1.18	1.18	1.17
20	0.95	1.10	1.10	1.09
21	1.00	1.03	1.03	1.02
22	1.05	0.97	0.97	0.96
23	1.10	0.91	0.91	0.91
24	1.15	0.86	0.86	0.86
25	1.20	0.81	0.81	0.81
26	1.25	0.77	0.77	0.77
27	1.30	0.74	0.74	0.73
28	1.35	0.70	0.70	0.70
29	1.40	0.67	0.67	0.67
30	1.45	0.65	0.65	0.64
31	1.50	0.62	0.62	0.62
32	1.55	0.60	0.60	0.59
33	1.60	0.57	0.57	0.57
34	1.65	0.56	0.56	0.55
35	1.70	0.54	0.54	0.54
36	1.75	0.52	0.52	0.52
37	1.80	0.50	0.50	0.50
38	1.85	0.49	0.49	0.49
39	1.90	0.48	0.48	0.47
40	1.95	0.47	0.47	0.46
41	2.00	0.45	0.45	0.45
42	2.05	0.44	0.44	0.44
43	2.10	0.43	0.43	0.43
44	2.15	0.42	0.42	0.42
45	2.20	0.41	0.41	0.41
46	2.25	0.41	0.41	0.40
47	2.30	0.40	0.40	0.40
48	2.35	0.39	0.39	0.39
49	2.40	0.38	0.38	0.38
50	2.45	0.38	0.38	0.38

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 13.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-2	PTMW-2
Discharge 80.00 U.S.gal/min	Distance from the pumping well 12.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
51	2.50	0.37	0.37	0.37
52	2.55	0.36	0.36	0.36
53	2.60	0.36	0.36	0.36
54	2.65	0.36	0.36	0.36
55	2.70	0.35	0.35	0.35
56	2.75	0.34	0.34	0.34
57	2.80	0.34	0.34	0.34
58	2.85	0.34	0.34	0.33
59	2.90	0.33	0.33	0.33
60	2.95	0.33	0.33	0.33
61	3.00	0.32	0.32	0.32
62	3.05	0.32	0.32	0.32
63	3.10	0.32	0.32	0.32
64	3.15	0.31	0.31	0.31
65	3.20	0.31	0.31	0.31
66	3.25	0.31	0.31	0.31
67	3.30	0.30	0.30	0.30
68	3.35	0.30	0.30	0.30
69	3.40	0.30	0.30	0.30
70	3.45	0.30	0.30	0.30
71	3.50	0.30	0.30	0.30
72	3.55	0.29	0.29	0.29
73	3.60	0.29	0.29	0.29
74	3.65	0.29	0.29	0.29
75	3.70	0.29	0.29	0.29
76	3.75	0.28	0.28	0.28
77	3.80	0.28	0.28	0.28
78	3.85	0.28	0.28	0.28
79	3.90	0.28	0.28	0.28
80	3.95	0.28	0.28	0.27
81	4.00	0.28	0.28	0.27
82	4.05	0.28	0.28	0.27
83	4.10	0.28	0.28	0.27
84	4.15	0.27	0.27	0.27
85	4.20	0.27	0.27	0.27
86	4.25	0.27	0.27	0.27
87	4.30	0.27	0.27	0.27
88	4.35	0.26	0.26	0.26
89	4.40	0.26	0.26	0.26
90	4.45	0.26	0.26	0.26
91	4.50	0.26	0.26	0.26
92	4.55	0.26	0.26	0.26
93	4.60	0.26	0.26	0.26
94	4.65	0.26	0.26	0.26
95	4.70	0.26	0.26	0.26
96	4.75	0.26	0.26	0.26
97	4.80	0.26	0.26	0.25
98	4.85	0.25	0.25	0.25
99	4.90	0.25	0.25	0.25
100	4.95	0.25	0.25	0.25

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 13.01.2000	Page 4
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-2	PTMW-2
Discharge 80.00 U.S.gal/min	Distance from the pumping well 12.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
101	5.00	0.25	0.25	0.25
102	5.05	0.25	0.25	0.25
103	5.10	0.25	0.25	0.25
104	5.15	0.25	0.25	0.25
105	5.20	0.24	0.24	0.24
106	5.25	0.24	0.24	0.24
107	5.30	0.24	0.24	0.24
108	5.35	0.24	0.24	0.24
109	5.40	0.24	0.24	0.24
110	5.45	0.24	0.24	0.24
111	5.50	0.24	0.24	0.24
112	5.55	0.24	0.24	0.24
113	5.60	0.24	0.24	0.24
114	5.65	0.23	0.23	0.23
115	5.70	0.23	0.23	0.23
116	5.75	0.23	0.23	0.23
117	5.80	0.23	0.23	0.23
118	5.85	0.23	0.23	0.23
119	5.90	0.23	0.23	0.23
120	5.95	0.23	0.23	0.23
121	6.00	0.23	0.23	0.23
122	6.05	0.23	0.23	0.23
123	6.10	0.23	0.23	0.23
124	6.15	0.23	0.23	0.23
125	6.20	0.22	0.22	0.22
126	6.25	0.22	0.22	0.22
127	6.30	0.22	0.22	0.22
128	6.35	0.22	0.22	0.22
129	6.40	0.22	0.22	0.22
130	6.45	0.22	0.22	0.22
131	6.50	0.22	0.22	0.22
132	6.55	0.22	0.22	0.22
133	6.60	0.22	0.22	0.22
134	6.65	0.22	0.22	0.22
135	6.70	0.22	0.22	0.22
136	6.75	0.22	0.22	0.22
137	6.80	0.22	0.22	0.22
138	6.85	0.22	0.22	0.22
139	6.90	0.22	0.22	0.22
140	6.95	0.21	0.21	0.21
141	7.00	0.21	0.21	0.21
142	7.05	0.21	0.21	0.21
143	7.10	0.21	0.21	0.21
144	7.15	0.21	0.21	0.21
145	7.20	0.21	0.21	0.21
146	7.25	0.21	0.21	0.21
147	7.30	0.21	0.21	0.21
148	7.35	0.21	0.21	0.21
149	7.40	0.21	0.21	0.21
150	7.45	0.21	0.21	0.21

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 13.01.2000	Page 5
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-2	PTMW-2
Discharge 80.00 U.S.gal/min	Distance from the pumping well 12.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
151	7.50	0.21	0.21	0.21
152	7.55	0.21	0.21	0.21
153	7.60	0.21	0.21	0.21
154	7.65	0.21	0.21	0.21
155	7.70	0.21	0.21	0.21
156	7.75	0.21	0.21	0.21
157	7.80	0.21	0.21	0.21
158	7.85	0.21	0.21	0.21
159	7.90	0.21	0.21	0.21
160	7.95	0.21	0.21	0.21
161	8.00	0.21	0.21	0.21
162	8.05	0.20	0.20	0.20
163	8.10	0.20	0.20	0.20
164	8.15	0.20	0.20	0.20
165	8.20	0.20	0.20	0.20
166	8.25	0.20	0.20	0.20
167	8.30	0.20	0.20	0.20
168	8.35	0.20	0.20	0.20
169	8.40	0.20	0.20	0.20
170	8.45	0.20	0.20	0.20
171	8.50	0.20	0.20	0.20
172	8.55	0.20	0.20	0.20
173	8.60	0.20	0.20	0.20
174	8.65	0.20	0.20	0.20
175	8.70	0.20	0.20	0.20
176	8.75	0.20	0.20	0.20
177	8.80	0.20	0.20	0.20
178	8.85	0.20	0.20	0.20
179	8.90	0.20	0.20	0.20
180	8.95	0.20	0.20	0.20
181	9.00	0.20	0.20	0.20
182	9.05	0.20	0.20	0.20
183	9.10	0.20	0.20	0.20
184	9.15	0.19	0.19	0.19
185	9.20	0.20	0.20	0.20
186	9.25	0.20	0.20	0.20
187	9.30	0.19	0.19	0.19
188	9.35	0.19	0.19	0.19
189	9.40	0.19	0.19	0.19
190	9.45	0.19	0.19	0.19
191	9.50	0.19	0.19	0.19
192	9.55	0.19	0.19	0.19
193	9.60	0.19	0.19	0.19
194	9.65	0.19	0.19	0.19
195	9.70	0.19	0.19	0.19
196	9.75	0.19	0.19	0.19
197	9.80	0.19	0.19	0.19
198	9.85	0.19	0.19	0.19
199	9.90	0.19	0.19	0.19
200	9.95	0.19	0.19	0.19

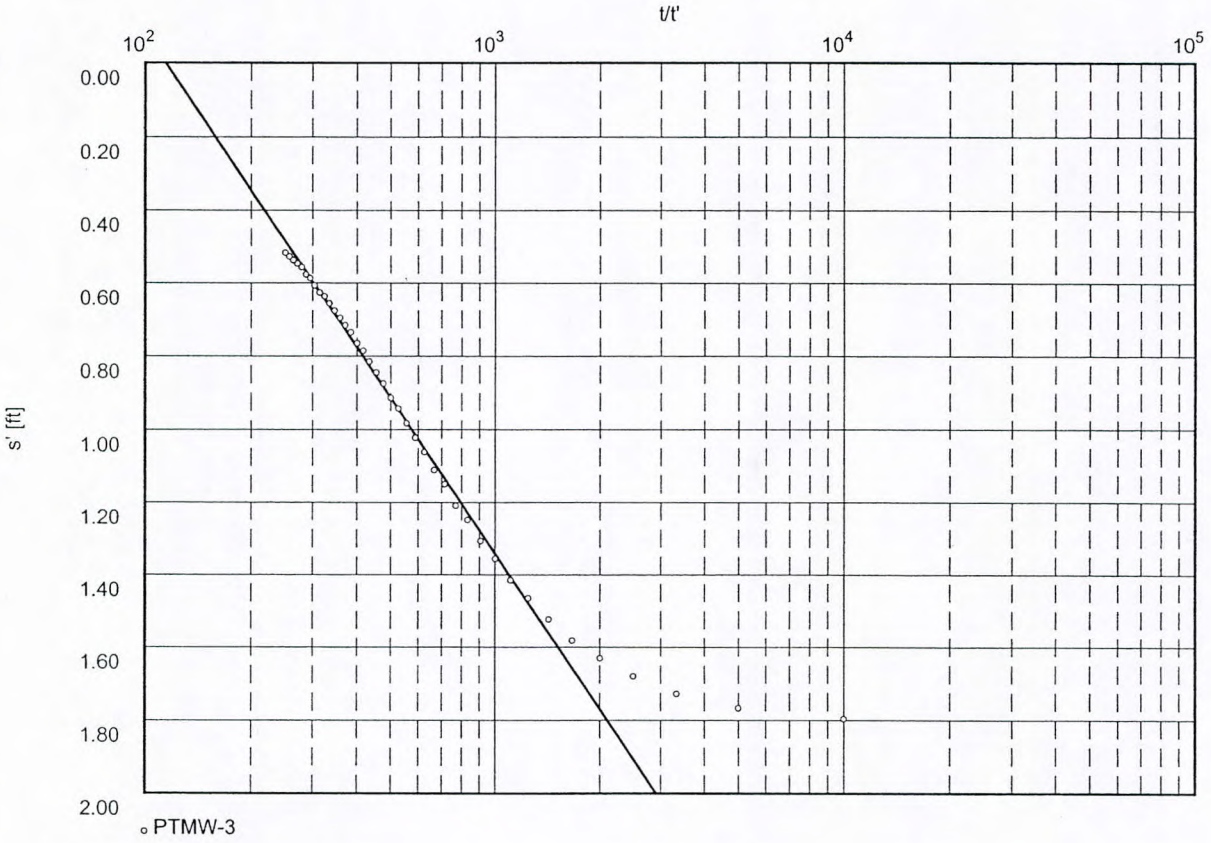
Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 13.01.2000	Page 6
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-2	PTMW-2
Discharge 80.00 U.S.gal/min	Distance from the pumping well 12.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
201	10.00	0.19	0.19	0.19

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 10.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-3	
Discharge 80.00 U.S.gal/min	
	Pumping test duration: 500.00 min



Transmissivity [ft²/min]: 1.37×10^{0}

Hydraulic conductivity [ft/min]: 1.90×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 10.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

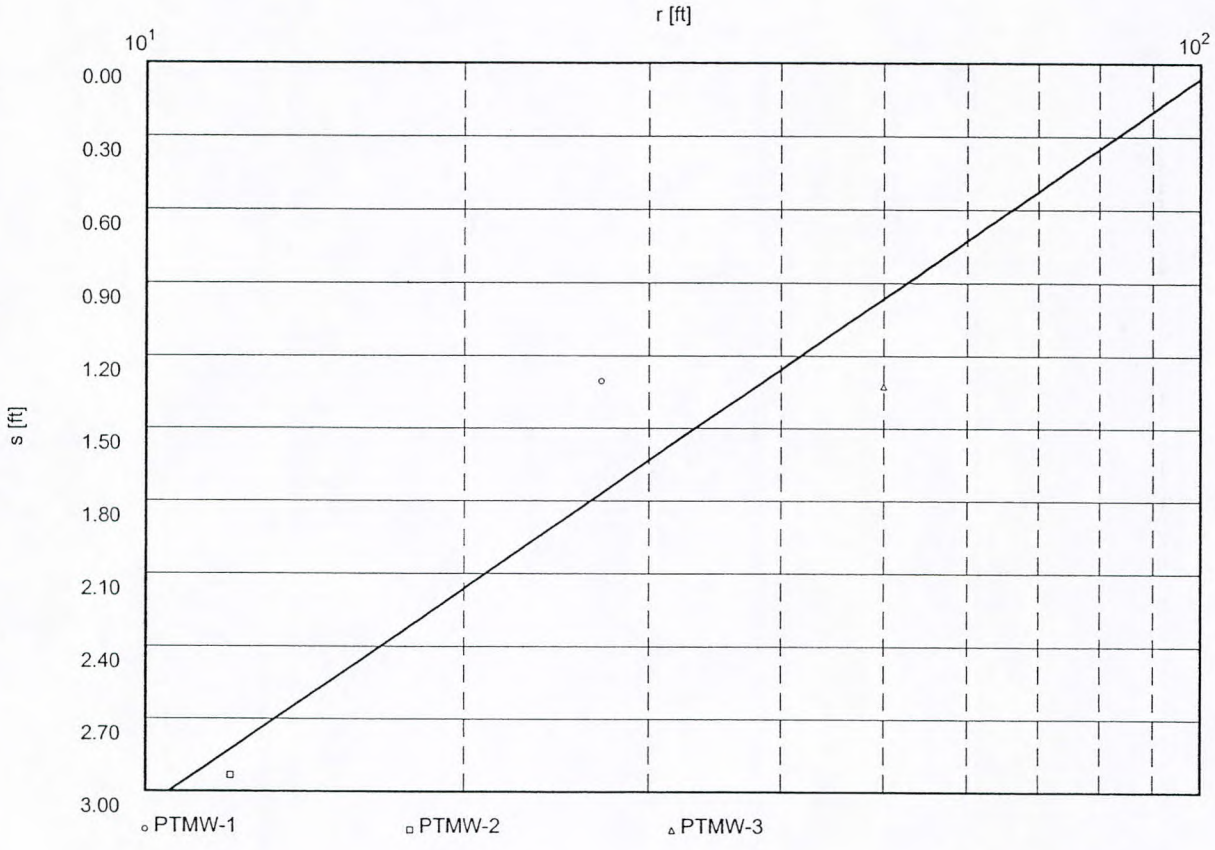
Pumping Test No. 1	Test conducted on: 11/09/99
PTMW-3	PTMW-3
Discharge 80.00 U.S.gal/min	Distance from the pumping well 50.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
1	0.05	1.82	1.82	1.80
2	0.10	1.79	1.79	1.77
3	0.15	1.75	1.75	1.73
4	0.20	1.70	1.70	1.68
5	0.25	1.65	1.65	1.63
6	0.30	1.60	1.60	1.58
7	0.35	1.54	1.54	1.52
8	0.40	1.48	1.48	1.46
9	0.45	1.43	1.43	1.42
10	0.50	1.37	1.37	1.36
11	0.55	1.32	1.32	1.31
12	0.60	1.26	1.26	1.25
13	0.65	1.22	1.22	1.21
14	0.70	1.16	1.16	1.15
15	0.75	1.12	1.12	1.11
16	0.80	1.07	1.07	1.06
17	0.85	1.03	1.03	1.02
18	0.90	0.99	0.99	0.98
19	0.95	0.95	0.95	0.94
20	1.00	0.92	0.92	0.91
21	1.05	0.88	0.88	0.87
22	1.10	0.85	0.85	0.84
23	1.15	0.82	0.82	0.82
24	1.20	0.79	0.79	0.79
25	1.25	0.77	0.77	0.77
26	1.30	0.74	0.74	0.74
27	1.35	0.72	0.72	0.72
28	1.40	0.70	0.70	0.70
29	1.45	0.68	0.68	0.68
30	1.50	0.66	0.66	0.66
31	1.55	0.64	0.64	0.64
32	1.60	0.63	0.63	0.63
33	1.65	0.61	0.61	0.61
34	1.70	0.59	0.59	0.59
35	1.75	0.58	0.58	0.58
36	1.80	0.56	0.56	0.56
37	1.85	0.55	0.55	0.55
38	1.90	0.54	0.54	0.54
39	1.95	0.53	0.53	0.53
40	2.00	0.52	0.52	0.52

PUMP TEST 2

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
ALL WELLS	
Discharge 65.00 U.S.gal/min	Analysis at time (t) 10.00 min



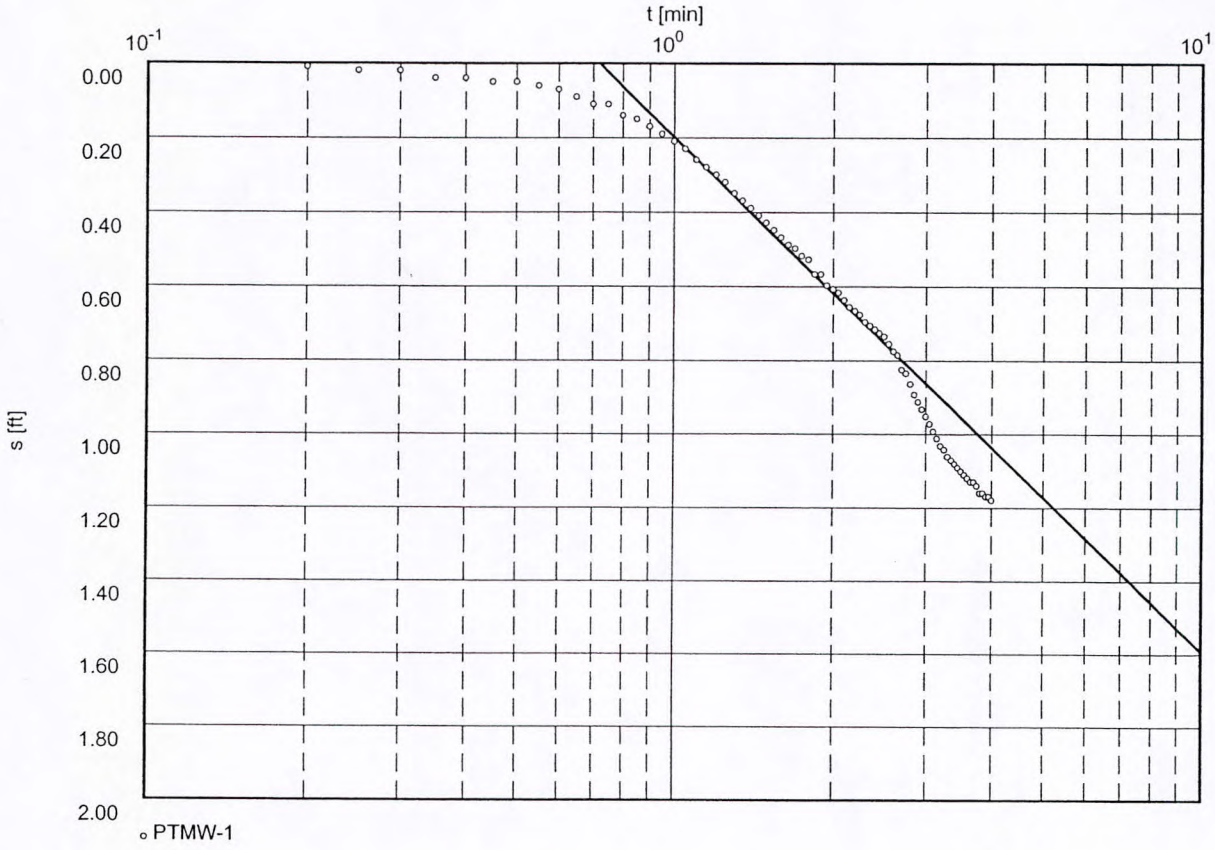
Transmissivity [ft²/min]: 1.05×10^{0}

Hydraulic conductivity [ft/min]: 1.46×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-1	
Discharge 65.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.14×10^{0}

Hydraulic conductivity [ft/min]: 1.58×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-1	PTMW-1
Discharge 65.00 U.S.gal/min	Distance from the pumping well 27.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
1	0.20	0.01	0.01	0.01
2	0.25	0.02	0.02	0.02
3	0.30	0.02	0.02	0.02
4	0.35	0.04	0.04	0.04
5	0.40	0.04	0.04	0.04
6	0.45	0.05	0.05	0.05
7	0.50	0.05	0.05	0.05
8	0.55	0.06	0.06	0.06
9	0.60	0.07	0.07	0.07
10	0.65	0.09	0.09	0.09
11	0.70	0.11	0.11	0.11
12	0.75	0.11	0.11	0.11
13	0.80	0.14	0.14	0.14
14	0.85	0.15	0.15	0.15
15	0.90	0.17	0.17	0.17
16	0.95	0.19	0.19	0.19
17	1.00	0.21	0.21	0.21
18	1.05	0.23	0.23	0.23
19	1.10	0.26	0.26	0.26
20	1.15	0.28	0.28	0.28
21	1.20	0.30	0.30	0.30
22	1.25	0.32	0.32	0.32
23	1.30	0.35	0.35	0.35
24	1.35	0.37	0.37	0.37
25	1.40	0.39	0.39	0.39
26	1.45	0.41	0.41	0.41
27	1.50	0.43	0.43	0.43
28	1.55	0.45	0.45	0.45
29	1.60	0.47	0.47	0.47
30	1.65	0.49	0.49	0.49
31	1.70	0.50	0.50	0.50
32	1.75	0.52	0.52	0.52
33	1.80	0.53	0.53	0.53
34	1.85	0.57	0.57	0.57
35	1.90	0.57	0.57	0.57
36	1.95	0.60	0.60	0.60
37	2.00	0.61	0.61	0.61
38	2.05	0.62	0.62	0.62
39	2.10	0.64	0.64	0.64
40	2.15	0.66	0.66	0.66
41	2.20	0.67	0.67	0.67
42	2.25	0.68	0.68	0.68
43	2.30	0.70	0.70	0.70
44	2.35	0.71	0.71	0.71
45	2.40	0.72	0.72	0.72
46	2.45	0.73	0.73	0.73
47	2.50	0.74	0.74	0.74
48	2.55	0.76	0.76	0.76
49	2.60	0.78	0.78	0.78
50	2.65	0.79	0.79	0.79

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

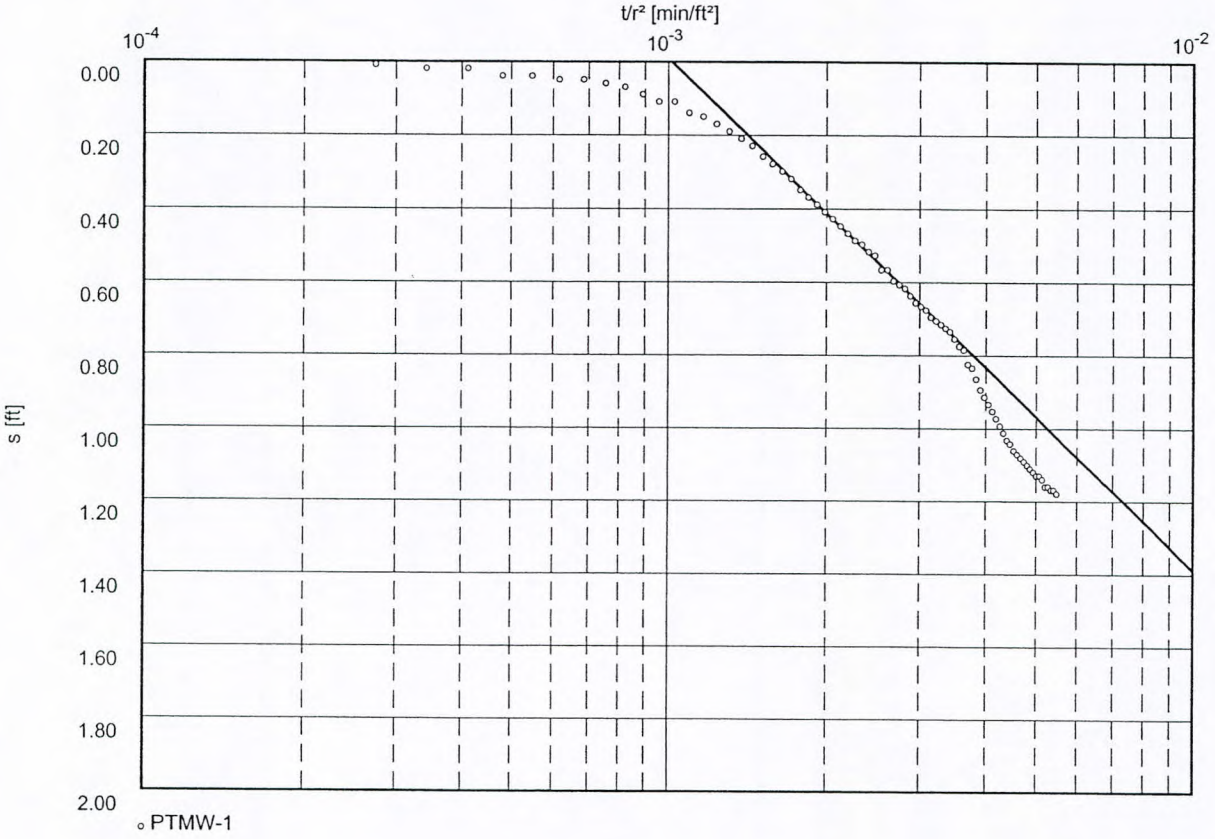
Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-1	PTMW-1
Discharge 65.00 U.S.gal/min	Distance from the pumping well 27.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	2.70	0.83	0.83	0.83
52	2.75	0.84	0.84	0.84
53	2.80	0.87	0.87	0.86
54	2.85	0.90	0.90	0.89
55	2.90	0.92	0.92	0.91
56	2.95	0.94	0.94	0.93
57	3.00	0.96	0.96	0.95
58	3.05	0.98	0.98	0.97
59	3.10	1.00	1.00	0.99
60	3.15	1.02	1.02	1.01
61	3.20	1.04	1.04	1.03
62	3.25	1.05	1.05	1.04
63	3.30	1.07	1.07	1.06
64	3.35	1.08	1.08	1.07
65	3.40	1.09	1.09	1.08
66	3.45	1.10	1.10	1.09
67	3.50	1.11	1.11	1.10
68	3.55	1.12	1.12	1.11
69	3.60	1.13	1.13	1.12
70	3.65	1.14	1.14	1.13
71	3.70	1.14	1.14	1.13
72	3.75	1.15	1.15	1.14
73	3.80	1.17	1.17	1.16
74	3.85	1.17	1.17	1.16
75	3.90	1.18	1.18	1.17
76	3.95	1.18	1.18	1.17
77	4.00	1.19	1.19	1.18

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-1	
Discharge 65.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.13×10^{0}

Hydraulic conductivity [ft/min]: 1.57×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-1	PTMW-1
Discharge 65.00 U.S.gal/min	Distance from the pumping well 27.00 ft
Static water level: 0.00 ft below datum	

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
1	0.20	0.01	0.01	0.01
2	0.25	0.02	0.02	0.02
3	0.30	0.02	0.02	0.02
4	0.35	0.04	0.04	0.04
5	0.40	0.04	0.04	0.04
6	0.45	0.05	0.05	0.05
7	0.50	0.05	0.05	0.05
8	0.55	0.06	0.06	0.06
9	0.60	0.07	0.07	0.07
10	0.65	0.09	0.09	0.09
11	0.70	0.11	0.11	0.11
12	0.75	0.11	0.11	0.11
13	0.80	0.14	0.14	0.14
14	0.85	0.15	0.15	0.15
15	0.90	0.17	0.17	0.17
16	0.95	0.19	0.19	0.19
17	1.00	0.21	0.21	0.21
18	1.05	0.23	0.23	0.23
19	1.10	0.26	0.26	0.26
20	1.15	0.28	0.28	0.28
21	1.20	0.30	0.30	0.30
22	1.25	0.32	0.32	0.32
23	1.30	0.35	0.35	0.35
24	1.35	0.37	0.37	0.37
25	1.40	0.39	0.39	0.39
26	1.45	0.41	0.41	0.41
27	1.50	0.43	0.43	0.43
28	1.55	0.45	0.45	0.45
29	1.60	0.47	0.47	0.47
30	1.65	0.49	0.49	0.49
31	1.70	0.50	0.50	0.50
32	1.75	0.52	0.52	0.52
33	1.80	0.53	0.53	0.53
34	1.85	0.57	0.57	0.57
35	1.90	0.57	0.57	0.57
36	1.95	0.60	0.60	0.60
37	2.00	0.61	0.61	0.61
38	2.05	0.62	0.62	0.62
39	2.10	0.64	0.64	0.64
40	2.15	0.66	0.66	0.66
41	2.20	0.67	0.67	0.67
42	2.25	0.68	0.68	0.68
43	2.30	0.70	0.70	0.70
44	2.35	0.71	0.71	0.71
45	2.40	0.72	0.72	0.72
46	2.45	0.73	0.73	0.73
47	2.50	0.74	0.74	0.74
48	2.55	0.76	0.76	0.76
49	2.60	0.78	0.78	0.78
50	2.65	0.79	0.79	0.79

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

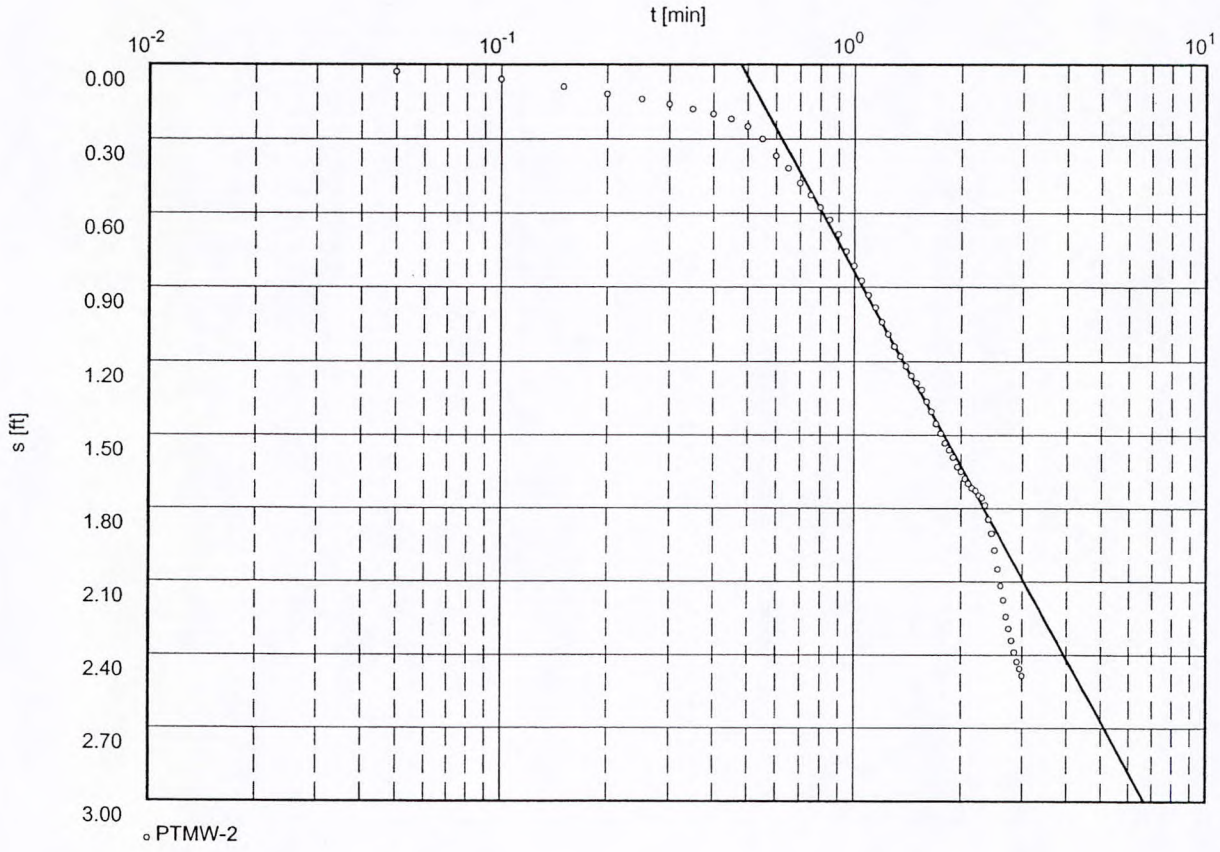
Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-1	PTMW-1
Discharge 65.00 U.S.gal/min	Distance from the pumping well 27.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	2.70	0.83	0.83	0.83
52	2.75	0.84	0.84	0.84
53	2.80	0.87	0.87	0.86
54	2.85	0.90	0.90	0.89
55	2.90	0.92	0.92	0.91
56	2.95	0.94	0.94	0.93
57	3.00	0.96	0.96	0.95
58	3.05	0.98	0.98	0.97
59	3.10	1.00	1.00	0.99
60	3.15	1.02	1.02	1.01
61	3.20	1.04	1.04	1.03
62	3.25	1.05	1.05	1.04
63	3.30	1.07	1.07	1.06
64	3.35	1.08	1.08	1.07
65	3.40	1.09	1.09	1.08
66	3.45	1.10	1.10	1.09
67	3.50	1.11	1.11	1.10
68	3.55	1.12	1.12	1.11
69	3.60	1.13	1.13	1.12
70	3.65	1.14	1.14	1.13
71	3.70	1.14	1.14	1.13
72	3.75	1.15	1.15	1.14
73	3.80	1.17	1.17	1.16
74	3.85	1.17	1.17	1.16
75	3.90	1.18	1.18	1.17
76	3.95	1.18	1.18	1.17
77	4.00	1.19	1.19	1.18

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-2	
Discharge 65.00 U.S.gal/min	



Transmissivity [ft²/min]: 6.06×10^{-1}

Hydraulic conductivity [ft/min]: 8.42×10^{-3}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-2	PTMW-2
Discharge 65.00 U.S.gal/min	Distance from the pumping well 12.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.03	0.03	0.03
3	0.10	0.06	0.06	0.06
4	0.15	0.09	0.09	0.09
5	0.20	0.12	0.12	0.12
6	0.25	0.14	0.14	0.14
7	0.30	0.16	0.16	0.16
8	0.35	0.18	0.18	0.18
9	0.40	0.20	0.20	0.20
10	0.45	0.22	0.22	0.22
11	0.50	0.25	0.25	0.25
12	0.55	0.30	0.30	0.30
13	0.60	0.37	0.37	0.37
14	0.65	0.42	0.42	0.42
15	0.70	0.48	0.48	0.48
16	0.75	0.53	0.53	0.53
17	0.80	0.58	0.58	0.58
18	0.85	0.63	0.63	0.63
19	0.90	0.69	0.69	0.69
20	0.95	0.76	0.76	0.76
21	1.00	0.82	0.82	0.82
22	1.05	0.88	0.88	0.87
23	1.10	0.94	0.94	0.93
24	1.15	0.99	0.99	0.98
25	1.20	1.05	1.05	1.04
26	1.25	1.10	1.10	1.09
27	1.30	1.15	1.15	1.14
28	1.35	1.19	1.19	1.18
29	1.40	1.23	1.23	1.22
30	1.45	1.27	1.27	1.26
31	1.50	1.30	1.30	1.29
32	1.55	1.33	1.33	1.32
33	1.60	1.38	1.38	1.37
34	1.65	1.42	1.42	1.41
35	1.70	1.47	1.47	1.45
36	1.75	1.51	1.51	1.49
37	1.80	1.55	1.55	1.53
38	1.85	1.58	1.58	1.56
39	1.90	1.61	1.61	1.59
40	1.95	1.65	1.65	1.63
41	2.00	1.67	1.67	1.65
42	2.05	1.70	1.70	1.68
43	2.10	1.72	1.72	1.70
44	2.15	1.74	1.74	1.72
45	2.20	1.75	1.75	1.73
46	2.25	1.77	1.77	1.75
47	2.30	1.78	1.78	1.76
48	2.35	1.81	1.81	1.79
49	2.40	1.87	1.87	1.85
50	2.45	1.93	1.93	1.90

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

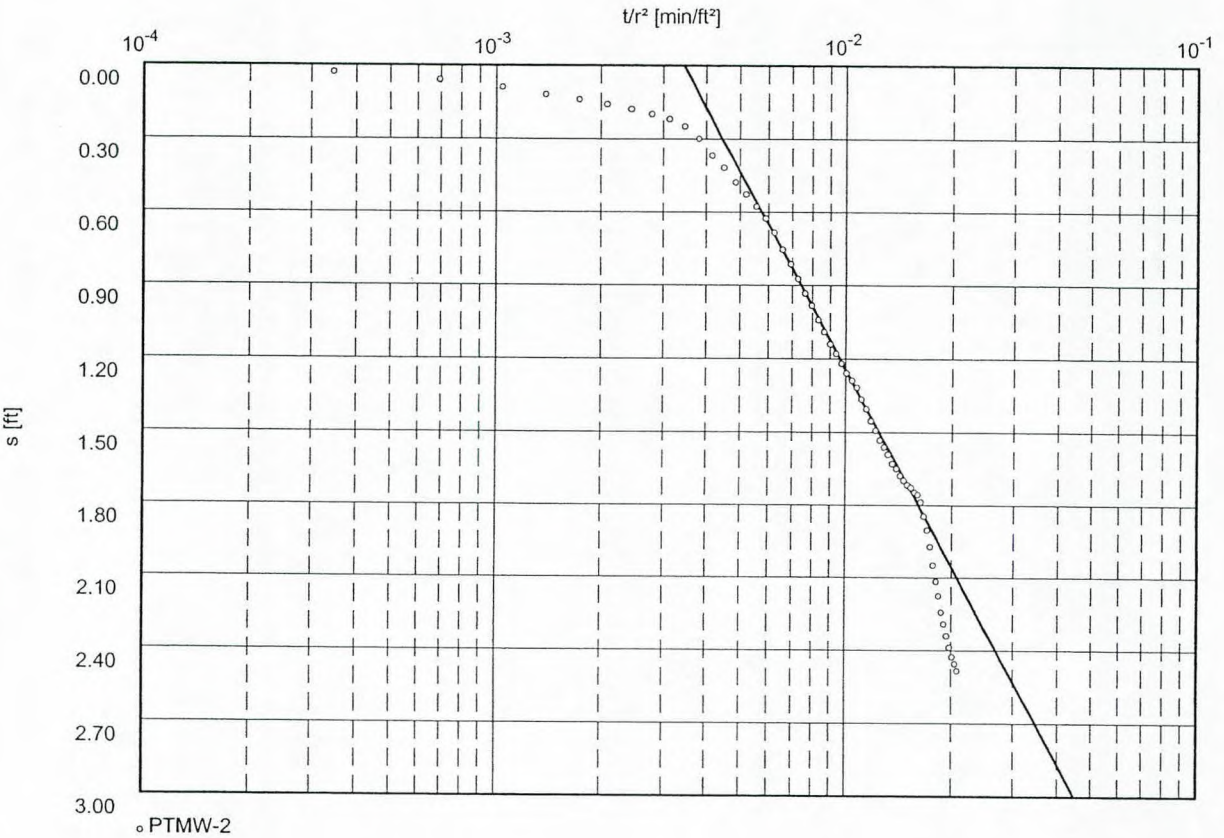
Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-2	PTMW-2
Discharge 65.00 U.S.gal/min	Distance from the pumping well 12.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	2.50	2.00	2.00	1.97
52	2.55	2.08	2.08	2.05
53	2.60	2.15	2.15	2.12
54	2.65	2.21	2.21	2.18
55	2.70	2.28	2.28	2.24
56	2.75	2.33	2.33	2.29
57	2.80	2.38	2.38	2.34
58	2.85	2.43	2.43	2.39
59	2.90	2.47	2.47	2.43
60	2.95	2.50	2.50	2.46
61	3.00	2.53	2.53	2.49

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-2	
Discharge 65.00 U.S.gal/min	



Transmissivity [ft²/min]: 5.90×10^{-1}

Hydraulic conductivity [ft/min]: 8.19×10^{-3}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-2	PTMW-2
Discharge 65.00 U.S.gal/min	Distance from the pumping well 12.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.03	0.03	0.03
3	0.10	0.06	0.06	0.06
4	0.15	0.09	0.09	0.09
5	0.20	0.12	0.12	0.12
6	0.25	0.14	0.14	0.14
7	0.30	0.16	0.16	0.16
8	0.35	0.18	0.18	0.18
9	0.40	0.20	0.20	0.20
10	0.45	0.22	0.22	0.22
11	0.50	0.25	0.25	0.25
12	0.55	0.30	0.30	0.30
13	0.60	0.37	0.37	0.37
14	0.65	0.42	0.42	0.42
15	0.70	0.48	0.48	0.48
16	0.75	0.53	0.53	0.53
17	0.80	0.58	0.58	0.58
18	0.85	0.63	0.63	0.63
19	0.90	0.69	0.69	0.69
20	0.95	0.76	0.76	0.76
21	1.00	0.82	0.82	0.82
22	1.05	0.88	0.88	0.87
23	1.10	0.94	0.94	0.93
24	1.15	0.99	0.99	0.98
25	1.20	1.05	1.05	1.04
26	1.25	1.10	1.10	1.09
27	1.30	1.15	1.15	1.14
28	1.35	1.19	1.19	1.18
29	1.40	1.23	1.23	1.22
30	1.45	1.27	1.27	1.26
31	1.50	1.30	1.30	1.29
32	1.55	1.33	1.33	1.32
33	1.60	1.38	1.38	1.37
34	1.65	1.42	1.42	1.41
35	1.70	1.47	1.47	1.45
36	1.75	1.51	1.51	1.49
37	1.80	1.55	1.55	1.53
38	1.85	1.58	1.58	1.56
39	1.90	1.61	1.61	1.59
40	1.95	1.65	1.65	1.63
41	2.00	1.67	1.67	1.65
42	2.05	1.70	1.70	1.68
43	2.10	1.72	1.72	1.70
44	2.15	1.74	1.74	1.72
45	2.20	1.75	1.75	1.73
46	2.25	1.77	1.77	1.75
47	2.30	1.78	1.78	1.76
48	2.35	1.81	1.81	1.79
49	2.40	1.87	1.87	1.85
50	2.45	1.93	1.93	1.90

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

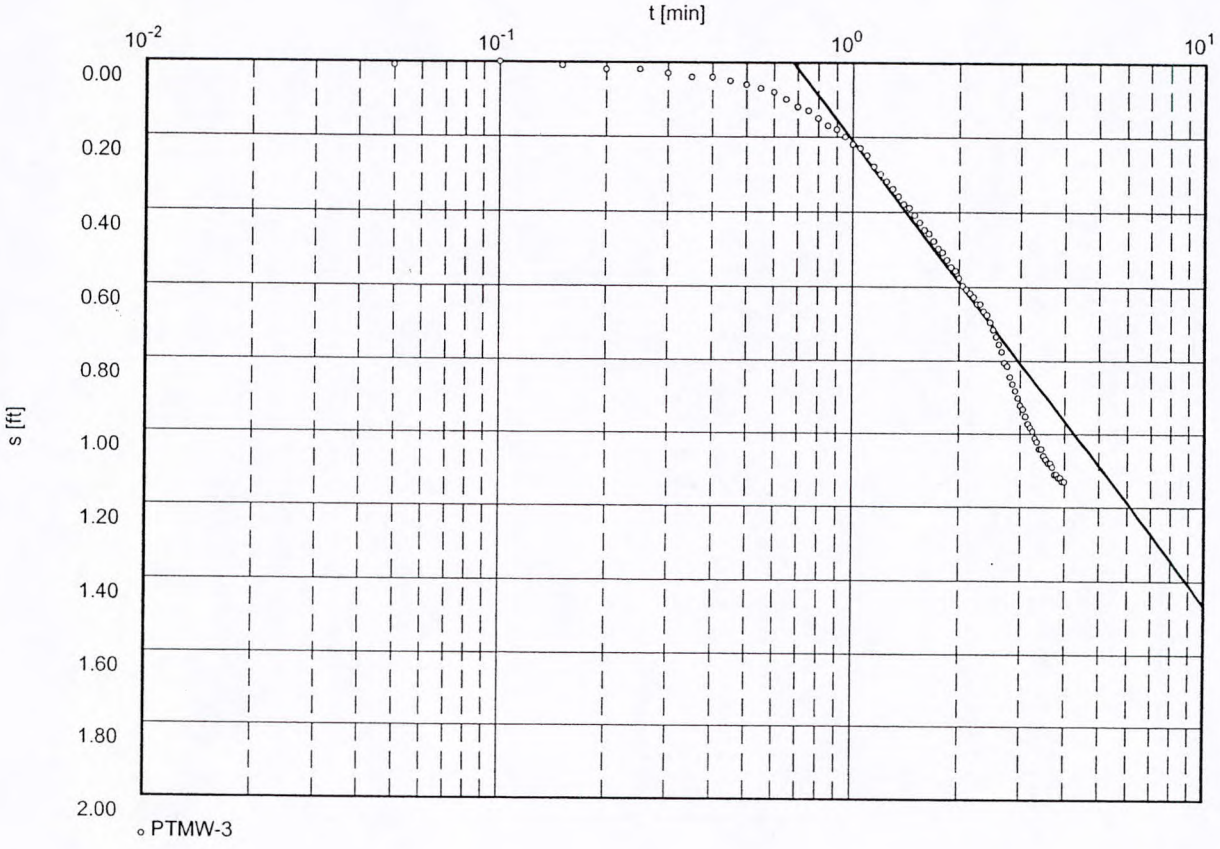
Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-2	PTMW-2
Discharge 65.00 U.S.gal/min	Distance from the pumping well 12.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	2.50	2.00	2.00	1.97
52	2.55	2.08	2.08	2.05
53	2.60	2.15	2.15	2.12
54	2.65	2.21	2.21	2.18
55	2.70	2.28	2.28	2.24
56	2.75	2.33	2.33	2.29
57	2.80	2.38	2.38	2.34
58	2.85	2.43	2.43	2.39
59	2.90	2.47	2.47	2.43
60	2.95	2.50	2.50	2.46
61	3.00	2.53	2.53	2.49

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-3	
Discharge 65.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.26×10^{0}

Hydraulic conductivity [ft/min]: 1.76×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-3	PTMW-3
Discharge 65.00 U.S.gal/min	Distance from the pumping well 50.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.01	0.01	0.01
3	0.10	0.00	0.00	0.00
4	0.15	0.01	0.01	0.01
5	0.20	0.02	0.02	0.02
6	0.25	0.02	0.02	0.02
7	0.30	0.03	0.03	0.03
8	0.35	0.04	0.04	0.04
9	0.40	0.04	0.04	0.04
10	0.45	0.05	0.05	0.05
11	0.50	0.06	0.06	0.06
12	0.55	0.07	0.07	0.07
13	0.60	0.08	0.08	0.08
14	0.65	0.10	0.10	0.10
15	0.70	0.12	0.12	0.12
16	0.75	0.13	0.13	0.13
17	0.80	0.15	0.15	0.15
18	0.85	0.17	0.17	0.17
19	0.90	0.18	0.18	0.18
20	0.95	0.20	0.20	0.20
21	1.00	0.22	0.22	0.22
22	1.05	0.23	0.23	0.23
23	1.10	0.25	0.25	0.25
24	1.15	0.28	0.28	0.28
25	1.20	0.30	0.30	0.30
26	1.25	0.32	0.32	0.32
27	1.30	0.34	0.34	0.34
28	1.35	0.36	0.36	0.36
29	1.40	0.38	0.38	0.38
30	1.45	0.39	0.39	0.39
31	1.50	0.41	0.41	0.41
32	1.55	0.43	0.43	0.43
33	1.60	0.45	0.45	0.45
34	1.65	0.46	0.46	0.46
35	1.70	0.48	0.48	0.48
36	1.75	0.50	0.50	0.50
37	1.80	0.51	0.51	0.51
38	1.85	0.53	0.53	0.53
39	1.90	0.55	0.55	0.55
40	1.95	0.56	0.56	0.56
41	2.00	0.58	0.58	0.58
42	2.05	0.60	0.60	0.60
43	2.10	0.61	0.61	0.61
44	2.15	0.62	0.62	0.62
45	2.20	0.63	0.63	0.63
46	2.25	0.65	0.65	0.65
47	2.30	0.65	0.65	0.65
48	2.35	0.67	0.67	0.67
49	2.40	0.68	0.68	0.68
50	2.45	0.70	0.70	0.70

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

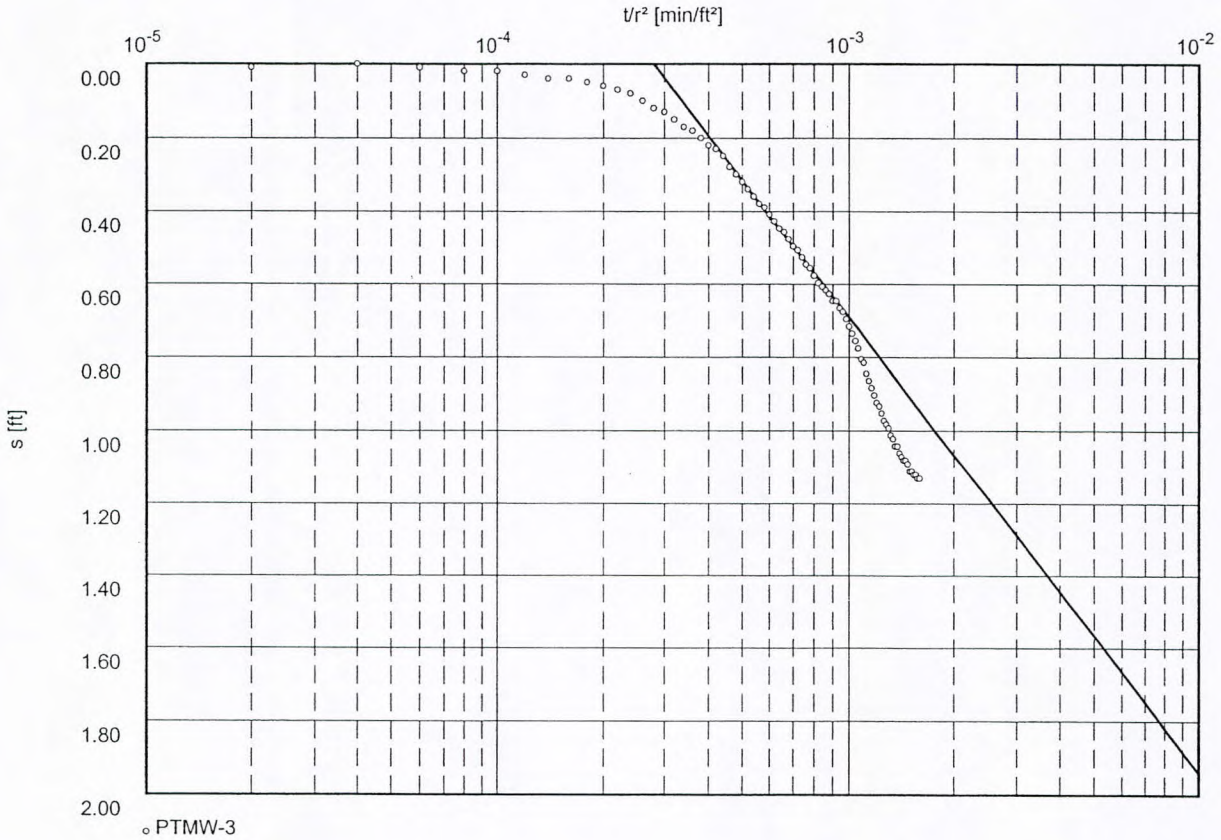
Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-3	PTMW-3
Discharge 65.00 U.S.gal/min	Distance from the pumping well 50.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	2.50	0.72	0.72	0.72
52	2.55	0.74	0.74	0.74
53	2.60	0.76	0.76	0.76
54	2.65	0.78	0.78	0.78
55	2.70	0.81	0.81	0.81
56	2.75	0.82	0.82	0.82
57	2.80	0.85	0.85	0.84
58	2.85	0.87	0.87	0.86
59	2.90	0.89	0.89	0.88
60	2.95	0.91	0.91	0.90
61	3.00	0.93	0.93	0.92
62	3.05	0.94	0.94	0.93
63	3.10	0.96	0.96	0.95
64	3.15	0.98	0.98	0.97
65	3.20	0.99	0.99	0.98
66	3.25	1.00	1.00	0.99
67	3.30	1.02	1.02	1.01
68	3.35	1.03	1.03	1.02
69	3.40	1.05	1.05	1.04
70	3.45	1.05	1.05	1.04
71	3.50	1.07	1.07	1.06
72	3.55	1.08	1.08	1.07
73	3.60	1.09	1.09	1.08
74	3.65	1.09	1.09	1.08
75	3.70	1.10	1.10	1.09
76	3.75	1.12	1.12	1.11
77	3.80	1.12	1.12	1.11
78	3.85	1.13	1.13	1.12
79	3.90	1.13	1.13	1.12
80	3.95	1.14	1.14	1.13
81	4.00	1.14	1.14	1.13

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-3	
Discharge 65.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.27×10^{0}

Hydraulic conductivity [ft/min]: 1.76×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-3	PTMW-3
Discharge 65.00 U.S.gal/min	Distance from the pumping well 50.00 ft
Static water level: 0.00 ft below datum	

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.01	0.01	0.01
3	0.10	0.00	0.00	0.00
4	0.15	0.01	0.01	0.01
5	0.20	0.02	0.02	0.02
6	0.25	0.02	0.02	0.02
7	0.30	0.03	0.03	0.03
8	0.35	0.04	0.04	0.04
9	0.40	0.04	0.04	0.04
10	0.45	0.05	0.05	0.05
11	0.50	0.06	0.06	0.06
12	0.55	0.07	0.07	0.07
13	0.60	0.08	0.08	0.08
14	0.65	0.10	0.10	0.10
15	0.70	0.12	0.12	0.12
16	0.75	0.13	0.13	0.13
17	0.80	0.15	0.15	0.15
18	0.85	0.17	0.17	0.17
19	0.90	0.18	0.18	0.18
20	0.95	0.20	0.20	0.20
21	1.00	0.22	0.22	0.22
22	1.05	0.23	0.23	0.23
23	1.10	0.25	0.25	0.25
24	1.15	0.28	0.28	0.28
25	1.20	0.30	0.30	0.30
26	1.25	0.32	0.32	0.32
27	1.30	0.34	0.34	0.34
28	1.35	0.36	0.36	0.36
29	1.40	0.38	0.38	0.38
30	1.45	0.39	0.39	0.39
31	1.50	0.41	0.41	0.41
32	1.55	0.43	0.43	0.43
33	1.60	0.45	0.45	0.45
34	1.65	0.46	0.46	0.46
35	1.70	0.48	0.48	0.48
36	1.75	0.50	0.50	0.50
37	1.80	0.51	0.51	0.51
38	1.85	0.53	0.53	0.53
39	1.90	0.55	0.55	0.55
40	1.95	0.56	0.56	0.56
41	2.00	0.58	0.58	0.58
42	2.05	0.60	0.60	0.60
43	2.10	0.61	0.61	0.61
44	2.15	0.62	0.62	0.62
45	2.20	0.63	0.63	0.63
46	2.25	0.65	0.65	0.65
47	2.30	0.65	0.65	0.65
48	2.35	0.67	0.67	0.67
49	2.40	0.68	0.68	0.68
50	2.45	0.70	0.70	0.70

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 06.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

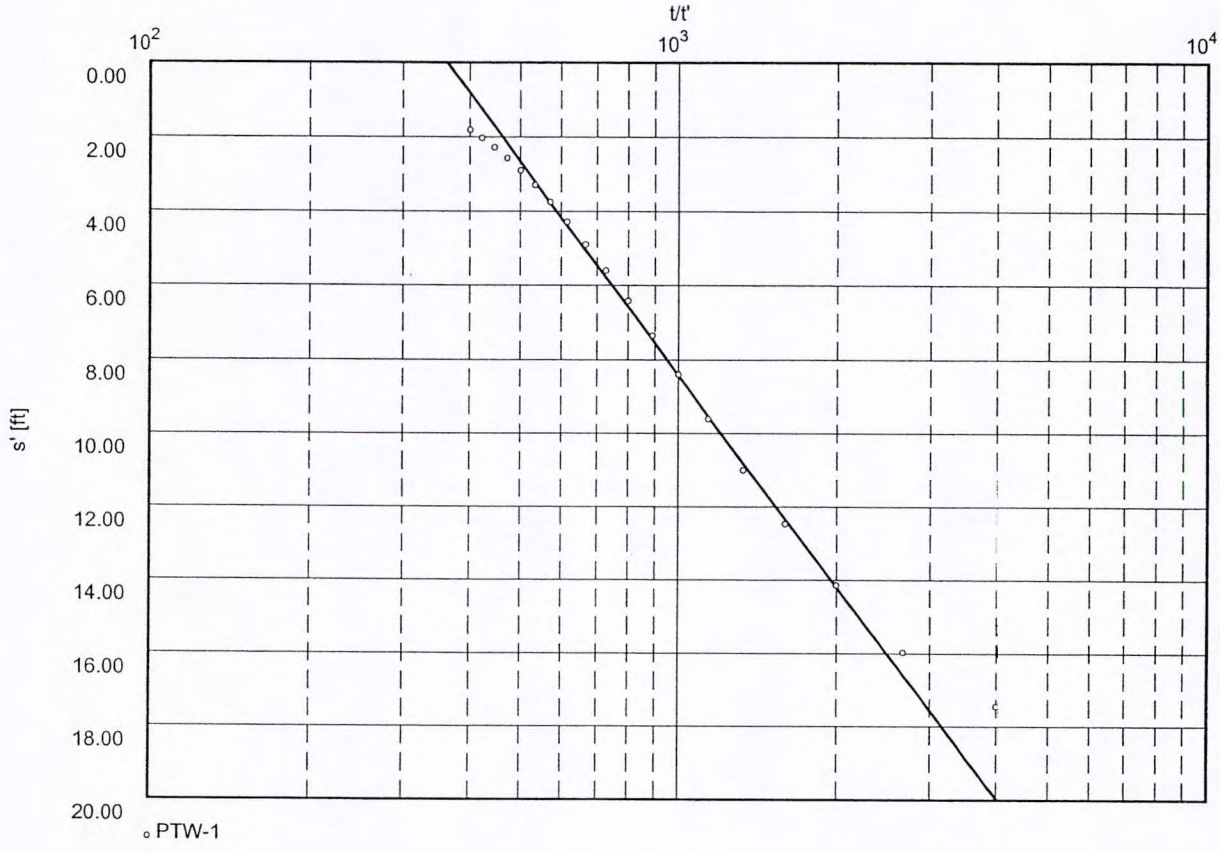
Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-3	PTMW-3
Discharge 65.00 U.S.gal/min	Distance from the pumping well 50.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
51	2.50	0.72	0.72	0.72
52	2.55	0.74	0.74	0.74
53	2.60	0.76	0.76	0.76
54	2.65	0.78	0.78	0.78
55	2.70	0.81	0.81	0.81
56	2.75	0.82	0.82	0.82
57	2.80	0.85	0.85	0.84
58	2.85	0.87	0.87	0.86
59	2.90	0.89	0.89	0.88
60	2.95	0.91	0.91	0.90
61	3.00	0.93	0.93	0.92
62	3.05	0.94	0.94	0.93
63	3.10	0.96	0.96	0.95
64	3.15	0.98	0.98	0.97
65	3.20	0.99	0.99	0.98
66	3.25	1.00	1.00	0.99
67	3.30	1.02	1.02	1.01
68	3.35	1.03	1.03	1.02
69	3.40	1.05	1.05	1.04
70	3.45	1.05	1.05	1.04
71	3.50	1.07	1.07	1.06
72	3.55	1.08	1.08	1.07
73	3.60	1.09	1.09	1.08
74	3.65	1.09	1.09	1.08
75	3.70	1.10	1.10	1.09
76	3.75	1.12	1.12	1.11
77	3.80	1.12	1.12	1.11
78	3.85	1.13	1.13	1.12
79	3.90	1.13	1.13	1.12
80	3.95	1.14	1.14	1.13
81	4.00	1.14	1.14	1.13

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTW-1	
Discharge 65.00 U.S.gal/min	
	Pumping test duration: 400.00 min



Transmissivity [ft²/min]: 8.29×10^{-2}

Hydraulic conductivity [ft/min]: 1.15×10^{-3}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 06.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTW-1	PTW-1
Discharge 65.00 U.S.gal/min	

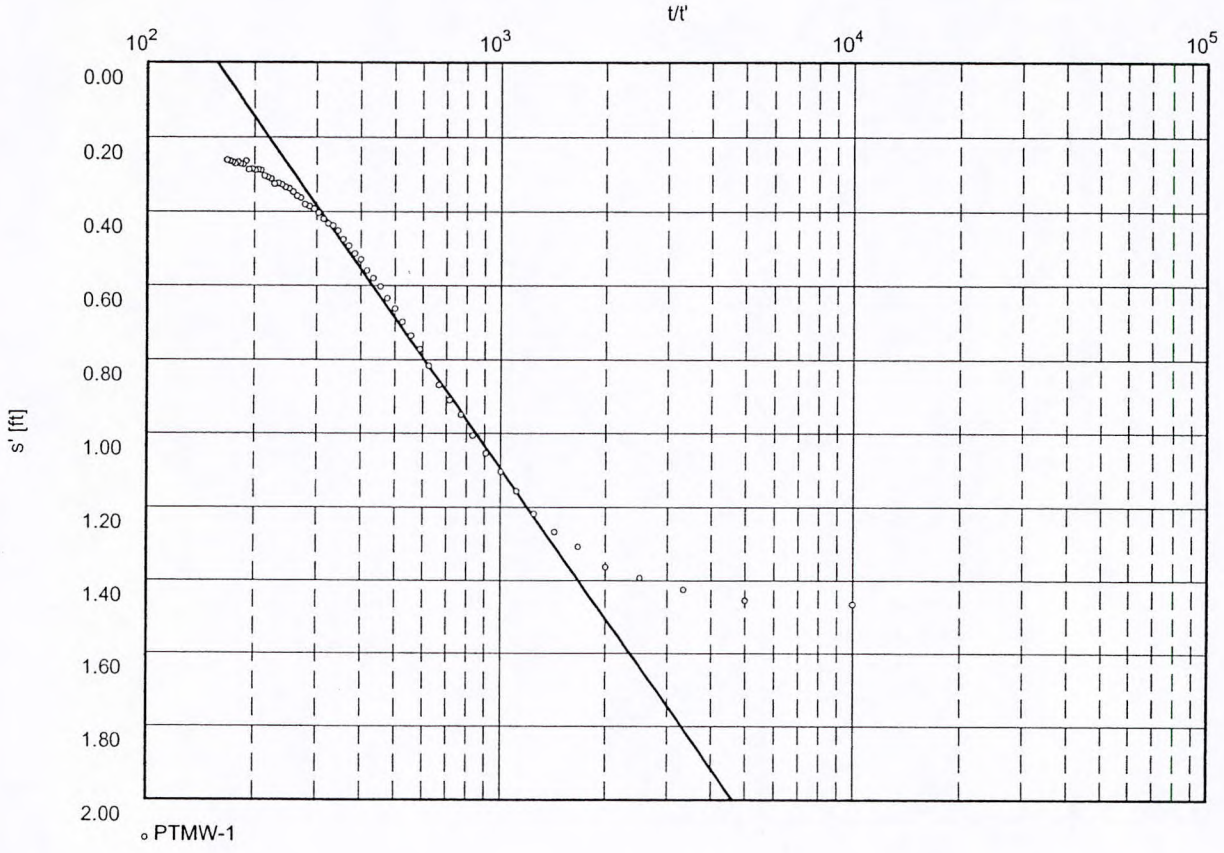
Static water level: 0.00 ft below datum

Pumping test duration: 400.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
1	0.10	20.33	20.33	17.46
2	0.15	18.30	18.30	15.97
3	0.20	15.91	15.91	14.15
4	0.25	13.80	13.80	12.48
5	0.30	12.01	12.01	11.01
6	0.35	10.36	10.36	9.61
7	0.40	8.97	8.97	8.41
8	0.45	7.78	7.78	7.36
9	0.50	6.74	6.74	6.42
10	0.55	5.85	5.85	5.61
11	0.60	5.09	5.09	4.91
12	0.65	4.43	4.43	4.29
13	0.70	3.86	3.86	3.76
14	0.75	3.38	3.38	3.30
15	0.80	2.97	2.97	2.91
16	0.85	2.62	2.62	2.57
17	0.90	2.32	2.32	2.28
18	0.95	2.06	2.06	2.03
19	1.00	1.84	1.84	1.82

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-1	
Discharge 65.00 U.S.gal/min	
	Pumping test duration: 500.00 min



Transmissivity [ft²/min]: 1.16×10^{0}

Hydraulic conductivity [ft/min]: 1.62×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 06.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-1	PTMW-1
Discharge 65.00 U.S.gal/min	Distance from the pumping well 27.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
2	0.05	1.48	1.48	1.46
3	0.10	1.47	1.47	1.45
4	0.15	1.44	1.44	1.42
5	0.20	1.41	1.41	1.39
6	0.25	1.38	1.38	1.36
7	0.30	1.32	1.32	1.31
8	0.35	1.28	1.28	1.27
9	0.40	1.23	1.23	1.22
10	0.45	1.17	1.17	1.16
11	0.50	1.11	1.11	1.11
12	0.55	1.06	1.06	1.06
13	0.60	1.01	1.01	1.01
14	0.65	0.96	0.96	0.95
15	0.70	0.92	0.92	0.91
16	0.75	0.88	0.88	0.87
17	0.80	0.82	0.82	0.82
18	0.85	0.78	0.78	0.77
19	0.90	0.74	0.74	0.74
20	0.95	0.70	0.70	0.70
21	1.00	0.67	0.67	0.66
22	1.05	0.64	0.64	0.64
23	1.10	0.61	0.61	0.60
24	1.15	0.58	0.58	0.58
25	1.20	0.56	0.56	0.56
26	1.25	0.53	0.53	0.53
27	1.30	0.52	0.52	0.51
28	1.35	0.49	0.49	0.49
29	1.40	0.48	0.48	0.48
30	1.45	0.45	0.45	0.45
31	1.50	0.44	0.44	0.44
32	1.55	0.43	0.43	0.43
33	1.60	0.42	0.42	0.42
34	1.65	0.41	0.41	0.40
35	1.70	0.39	0.39	0.39
36	1.75	0.39	0.39	0.39
37	1.80	0.38	0.38	0.38
38	1.85	0.36	0.36	0.36
39	1.90	0.36	0.36	0.36
40	1.95	0.35	0.35	0.35
41	2.00	0.34	0.34	0.34
42	2.05	0.34	0.34	0.34
43	2.10	0.33	0.33	0.33
44	2.15	0.32	0.32	0.32
45	2.20	0.33	0.33	0.33
46	2.25	0.31	0.31	0.31
47	2.30	0.31	0.31	0.31
48	2.35	0.31	0.31	0.31
49	2.40	0.29	0.29	0.29
50	2.45	0.29	0.29	0.29

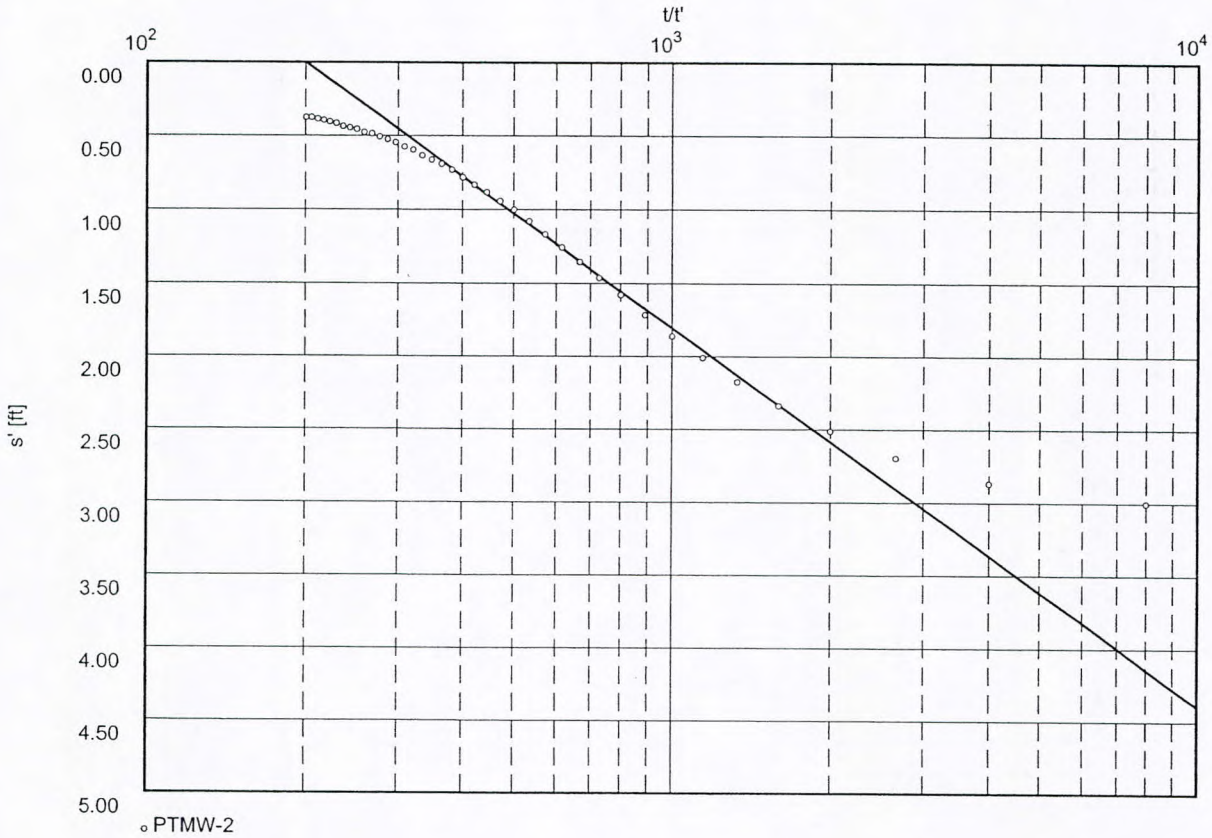
Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 06.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-1	PTMW-1
Discharge 65.00 U.S.gal/min	Distance from the pumping well 27.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
51	2.50	0.29	0.29	0.29
52	2.55	0.29	0.29	0.29
53	2.60	0.29	0.29	0.29
54	2.65	0.26	0.26	0.26
55	2.70	0.27	0.27	0.27
56	2.75	0.27	0.27	0.27
57	2.80	0.27	0.27	0.27
58	2.85	0.27	0.27	0.27
59	2.90	0.27	0.27	0.27
60	2.95	0.26	0.26	0.26
61	3.00	0.26	0.26	0.26

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 06.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-2	
Discharge 65.00 U.S.gal/min	
	Pumping test duration: 400.00 min



Transmissivity [ft²/min]: 6.14×10^{-1}

Hydraulic conductivity [ft/min]: 8.53×10^{-3}

Aquifer thickness [ft]: 72.00

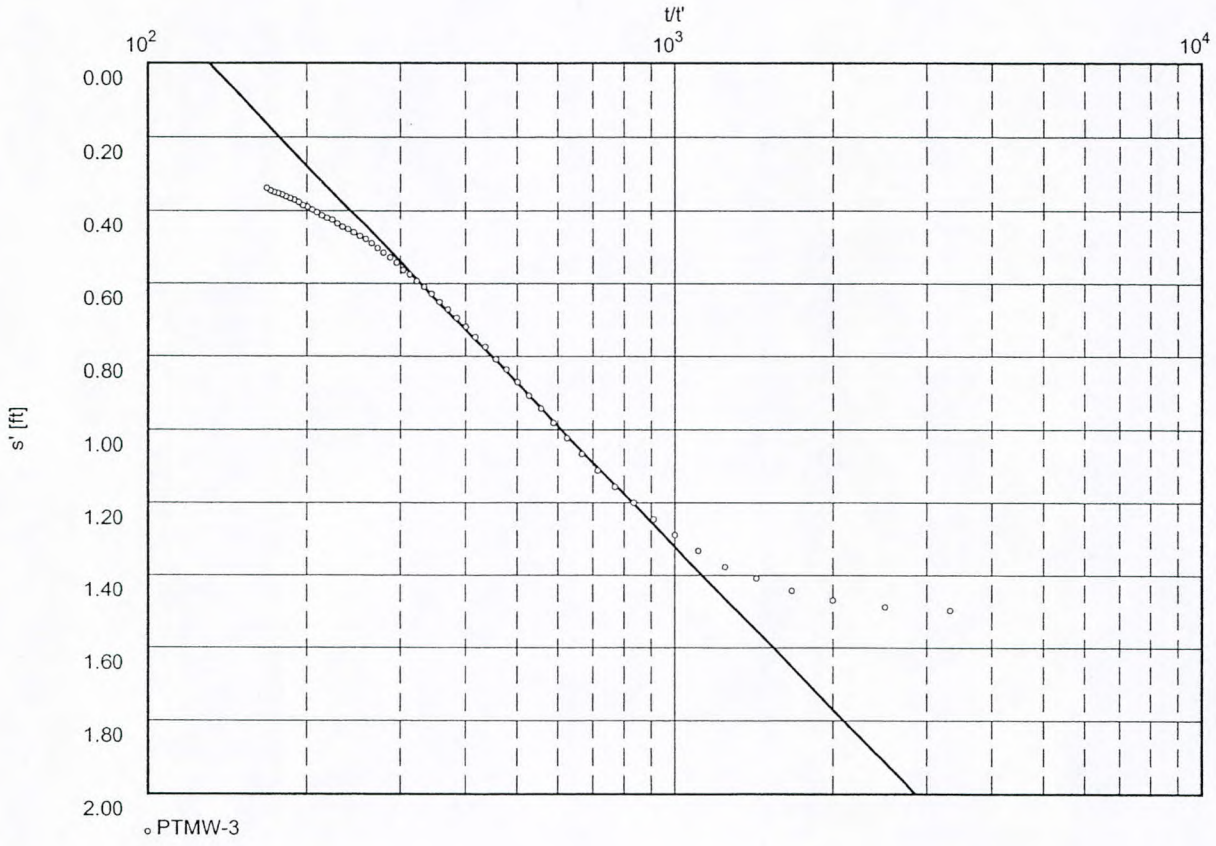
Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 06.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-2	PTMW-2
Discharge 65.00 U.S.gal/min	Distance from the pumping well 12.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 400.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
2	0.05	3.07	3.07	3.00
3	0.10	2.93	2.93	2.87
4	0.15	2.75	2.75	2.70
5	0.20	2.56	2.56	2.51
6	0.25	2.38	2.38	2.34
7	0.30	2.21	2.21	2.18
8	0.35	2.04	2.04	2.01
9	0.40	1.89	1.89	1.87
10	0.45	1.74	1.74	1.72
11	0.50	1.60	1.60	1.58
12	0.55	1.48	1.48	1.46
13	0.60	1.37	1.37	1.36
14	0.65	1.27	1.27	1.26
15	0.70	1.18	1.18	1.17
16	0.75	1.09	1.09	1.08
17	0.80	1.01	1.01	1.00
18	0.85	0.95	0.95	0.94
19	0.90	0.89	0.89	0.88
20	0.95	0.84	0.84	0.84
21	1.00	0.79	0.79	0.79
22	1.05	0.74	0.74	0.74
23	1.10	0.70	0.70	0.70
24	1.15	0.67	0.67	0.67
25	1.20	0.64	0.64	0.64
26	1.25	0.60	0.60	0.60
27	1.30	0.58	0.58	0.58
28	1.35	0.55	0.55	0.55
29	1.40	0.53	0.53	0.53
30	1.45	0.51	0.51	0.51
31	1.50	0.49	0.49	0.49
32	1.55	0.48	0.48	0.48
33	1.60	0.46	0.46	0.46
34	1.65	0.45	0.45	0.45
35	1.70	0.44	0.44	0.44
36	1.75	0.42	0.42	0.42
37	1.80	0.41	0.41	0.41
38	1.85	0.40	0.40	0.40
39	1.90	0.39	0.39	0.39
40	1.95	0.38	0.38	0.38
41	2.00	0.38	0.38	0.38

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 13.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-3	
Discharge 65.00 U.S.gal/min	
	Pumping test duration: 500.00 min



Transmissivity [ft²/min]: 1.06×10^{0}

Hydraulic conductivity [ft/min]: 1.48×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 13.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-3	PTMW-3
Discharge 65.00 U.S.gal/min	Distance from the pumping well 50.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
2	0.15	1.51	1.51	1.50
3	0.20	1.50	1.50	1.49
4	0.25	1.49	1.49	1.47
5	0.30	1.46	1.46	1.44
6	0.35	1.42	1.42	1.41
7	0.40	1.39	1.39	1.38
8	0.45	1.34	1.34	1.33
9	0.50	1.30	1.30	1.29
10	0.55	1.26	1.26	1.25
11	0.60	1.21	1.21	1.20
12	0.65	1.17	1.17	1.16
13	0.70	1.12	1.12	1.11
14	0.75	1.08	1.08	1.07
15	0.80	1.03	1.03	1.02
16	0.85	0.99	0.99	0.98
17	0.90	0.95	0.95	0.94
18	0.95	0.91	0.91	0.91
19	1.00	0.88	0.88	0.87
20	1.05	0.84	0.84	0.84
21	1.10	0.81	0.81	0.81
22	1.15	0.78	0.78	0.77
23	1.20	0.75	0.75	0.75
24	1.25	0.72	0.72	0.72
25	1.30	0.70	0.70	0.70
26	1.35	0.68	0.68	0.67
27	1.40	0.65	0.65	0.65
28	1.45	0.63	0.63	0.63
29	1.50	0.61	0.61	0.61
30	1.55	0.60	0.60	0.59
31	1.60	0.58	0.58	0.58
32	1.65	0.57	0.57	0.56
33	1.70	0.55	0.55	0.54
34	1.75	0.53	0.53	0.53
35	1.80	0.52	0.52	0.52
36	1.85	0.51	0.51	0.51
37	1.90	0.49	0.49	0.49
38	1.95	0.48	0.48	0.48
39	2.00	0.47	0.47	0.47
40	2.05	0.46	0.46	0.46
41	2.10	0.45	0.45	0.45
42	2.15	0.45	0.45	0.45
43	2.20	0.44	0.44	0.44
44	2.25	0.43	0.43	0.43
45	2.30	0.42	0.42	0.42
46	2.35	0.41	0.41	0.41
47	2.40	0.41	0.41	0.40
48	2.45	0.40	0.40	0.40
49	2.50	0.39	0.39	0.39
50	2.55	0.39	0.39	0.39

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Recovery method after THEIS & JACOB Unconfined aquifer	Date: 13.01.2000	Page 3
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

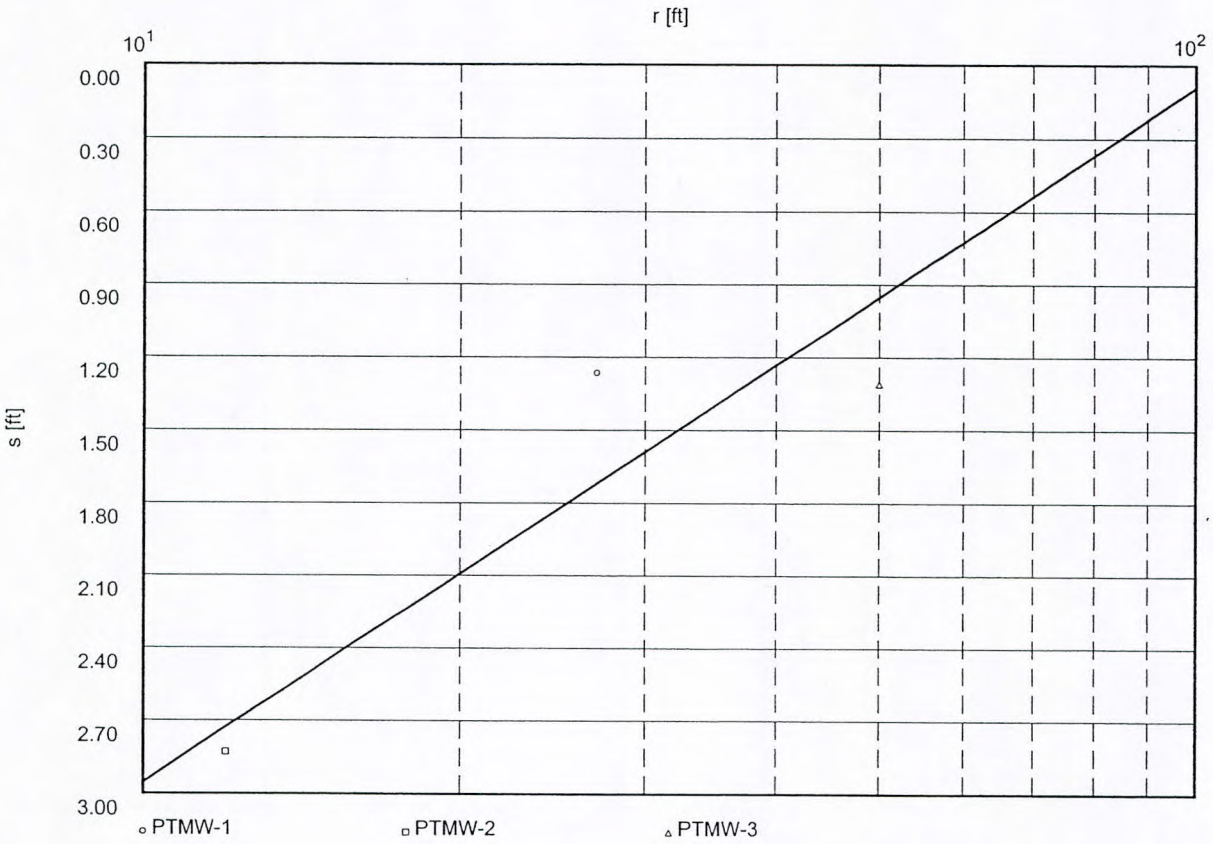
Pumping Test No. 2	Test conducted on: 11/10/99
PTMW-3	PTMW-3
Discharge 65.00 U.S.gal/min	Distance from the pumping well 50.00 ft
Static water level: 0.00 ft below datum	Pumping test duration: 500.00 min

	Time from end of pumping [min]	Water level [ft]	Residual drawdown [ft]	Corrected drawdown [ft]
51	2.60	0.38	0.38	0.38
52	2.65	0.37	0.37	0.37
53	2.70	0.37	0.37	0.37
54	2.75	0.36	0.36	0.36
55	2.80	0.36	0.36	0.36
56	2.85	0.35	0.35	0.35
57	2.90	0.35	0.35	0.35
58	2.95	0.35	0.35	0.35
59	3.00	0.34	0.34	0.34

PUMP TEST 3

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 3	Test conducted on: 11/11/99
ALL OBSERVATION WELLS	
Discharge 62.00 U.S.gal/min	Analysis at time (t) 18.00 min



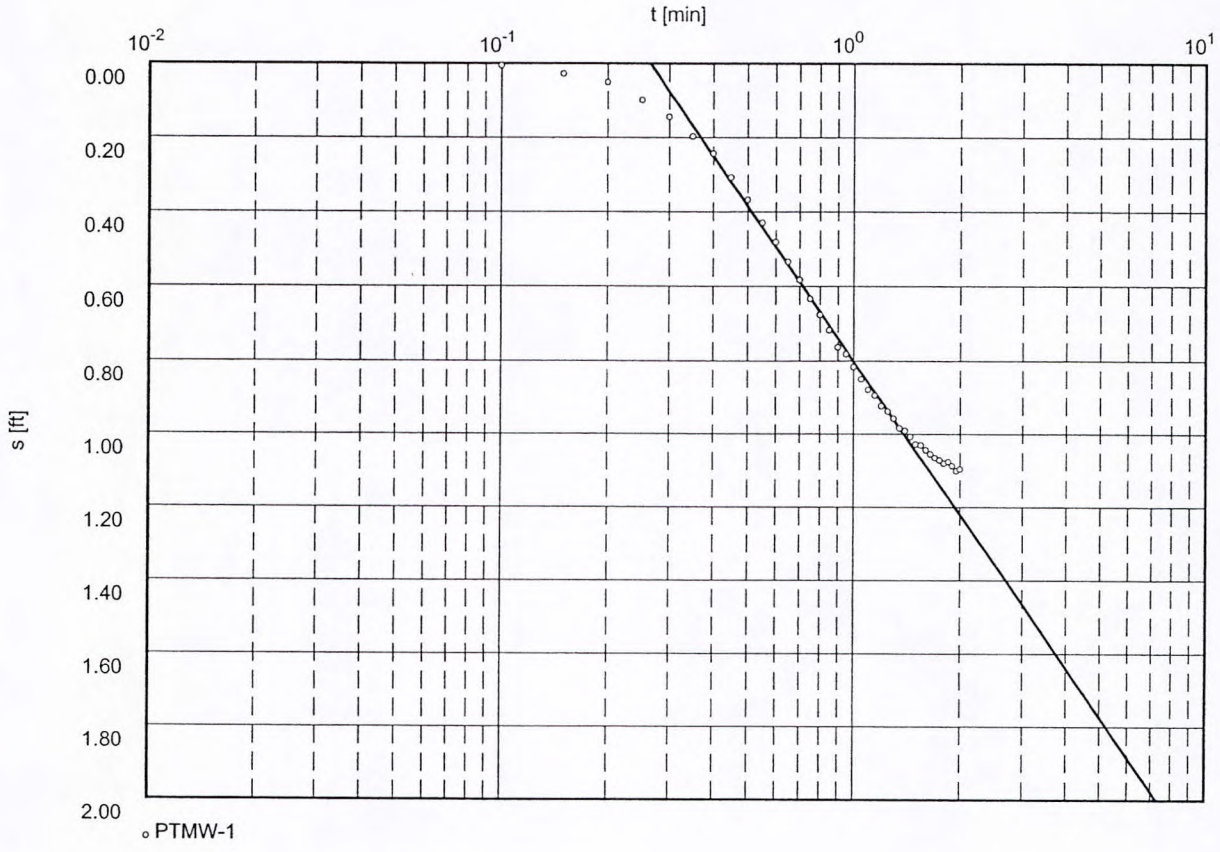
Transmissivity [ft²/min]: 1.05×10^{0}

Hydraulic conductivity [ft/min]: 1.47×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-1	
Discharge 62.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.09×10^{0}

Hydraulic conductivity [ft/min]: 1.51×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

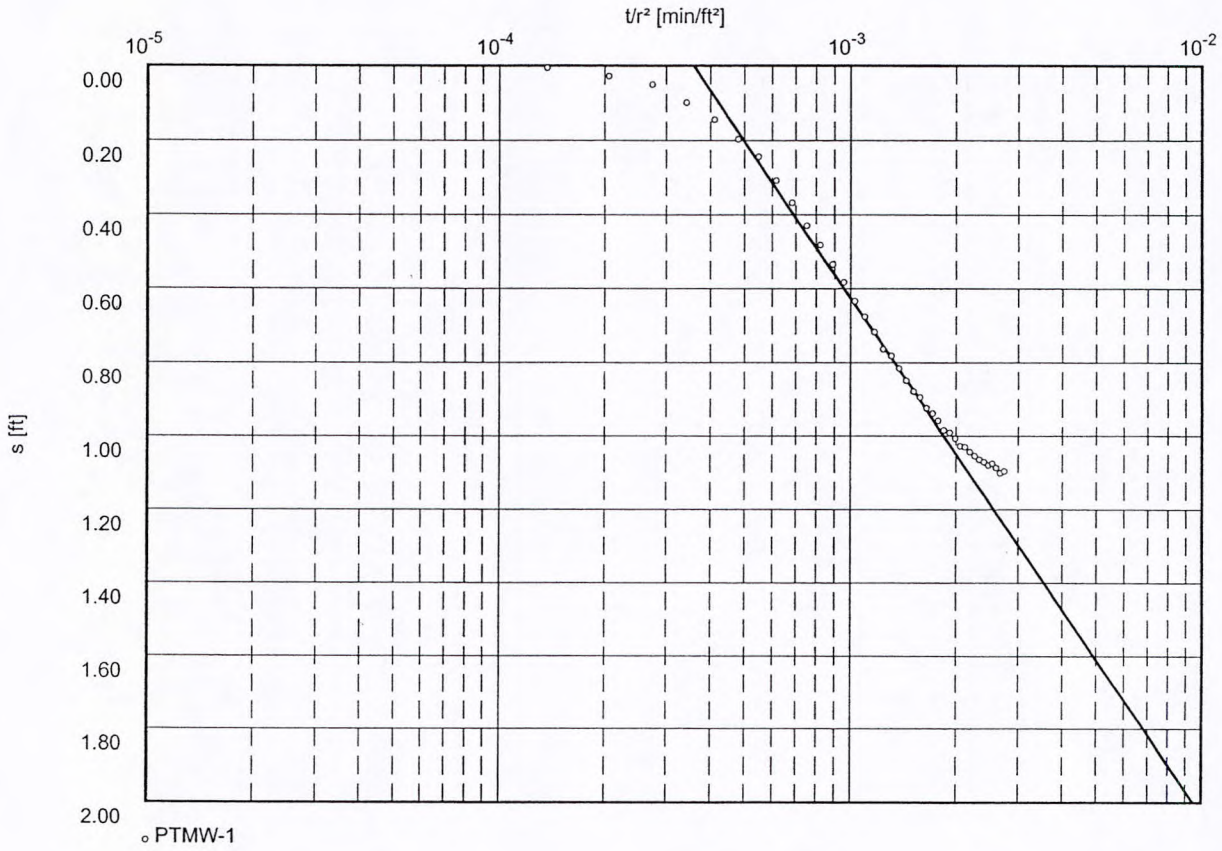
Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-1	PTMW-1
Discharge 62.00 U.S.gal/min	Distance from the pumping well 27.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	-0.01	-0.01	-0.01
3	0.10	0.01	0.01	0.01
4	0.15	0.03	0.03	0.03
5	0.20	0.05	0.05	0.05
6	0.25	0.10	0.10	0.10
7	0.30	0.14	0.14	0.14
8	0.35	0.20	0.20	0.20
9	0.40	0.24	0.24	0.24
10	0.45	0.31	0.31	0.31
11	0.50	0.37	0.37	0.37
12	0.55	0.43	0.43	0.43
13	0.60	0.48	0.48	0.48
14	0.65	0.54	0.54	0.53
15	0.70	0.59	0.59	0.58
16	0.75	0.64	0.64	0.63
17	0.80	0.68	0.68	0.68
18	0.85	0.72	0.72	0.72
19	0.90	0.77	0.77	0.76
20	0.95	0.79	0.79	0.78
21	1.00	0.82	0.82	0.82
22	1.05	0.86	0.86	0.85
23	1.10	0.89	0.89	0.88
24	1.15	0.90	0.90	0.90
25	1.20	0.93	0.93	0.93
26	1.25	0.95	0.95	0.94
27	1.30	0.97	0.97	0.96
28	1.35	0.99	0.99	0.99
29	1.40	1.00	1.00	0.99
30	1.45	1.01	1.01	1.01
31	1.50	1.04	1.04	1.03
32	1.55	1.04	1.04	1.03
33	1.60	1.05	1.05	1.04
34	1.65	1.06	1.06	1.06
35	1.70	1.07	1.07	1.07
36	1.75	1.08	1.08	1.07
37	1.80	1.09	1.09	1.08
38	1.85	1.08	1.08	1.08
39	1.90	1.10	1.10	1.09
40	1.95	1.11	1.11	1.10
41	2.00	1.10	1.10	1.10

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-1	
Discharge 62.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.07×10^{0}

Hydraulic conductivity [ft/min]: 1.49×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

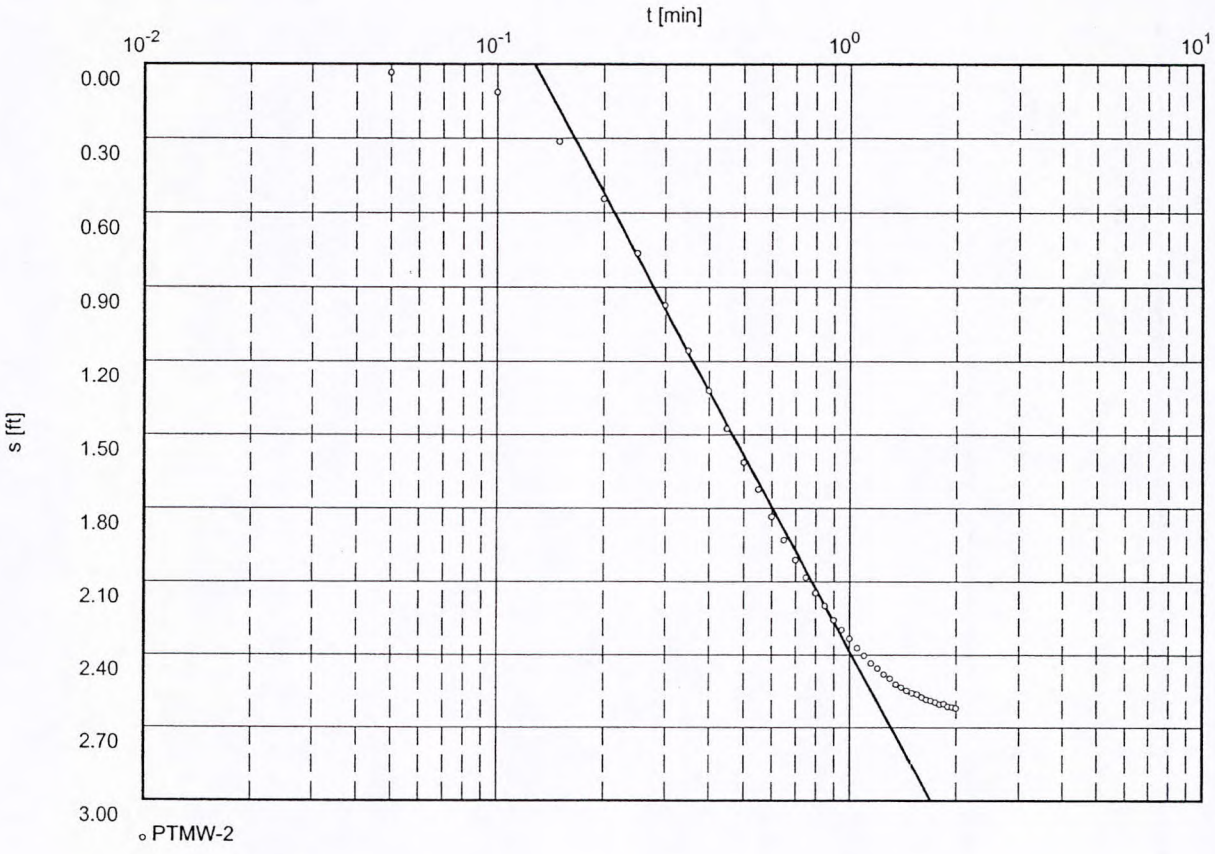
Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-1	PTMW-1
Discharge 62.00 U.S.gal/min	Distance from the pumping well 27.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	-0.01	-0.01	-0.01
3	0.10	0.01	0.01	0.01
4	0.15	0.03	0.03	0.03
5	0.20	0.05	0.05	0.05
6	0.25	0.10	0.10	0.10
7	0.30	0.14	0.14	0.14
8	0.35	0.20	0.20	0.20
9	0.40	0.24	0.24	0.24
10	0.45	0.31	0.31	0.31
11	0.50	0.37	0.37	0.37
12	0.55	0.43	0.43	0.43
13	0.60	0.48	0.48	0.48
14	0.65	0.54	0.54	0.53
15	0.70	0.59	0.59	0.58
16	0.75	0.64	0.64	0.63
17	0.80	0.68	0.68	0.68
18	0.85	0.72	0.72	0.72
19	0.90	0.77	0.77	0.76
20	0.95	0.79	0.79	0.78
21	1.00	0.82	0.82	0.82
22	1.05	0.86	0.86	0.85
23	1.10	0.89	0.89	0.88
24	1.15	0.90	0.90	0.90
25	1.20	0.93	0.93	0.93
26	1.25	0.95	0.95	0.94
27	1.30	0.97	0.97	0.96
28	1.35	0.99	0.99	0.99
29	1.40	1.00	1.00	0.99
30	1.45	1.01	1.01	1.01
31	1.50	1.04	1.04	1.03
32	1.55	1.04	1.04	1.03
33	1.60	1.05	1.05	1.04
34	1.65	1.06	1.06	1.06
35	1.70	1.07	1.07	1.07
36	1.75	1.08	1.08	1.07
37	1.80	1.09	1.09	1.08
38	1.85	1.08	1.08	1.08
39	1.90	1.10	1.10	1.09
40	1.95	1.11	1.11	1.10
41	2.00	1.10	1.10	1.10

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-2	
Discharge 62.00 U.S.gal/min	



Transmissivity [ft²/min]: 5.67×10^{-1}

Hydraulic conductivity [ft/min]: 7.88×10^{-3}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

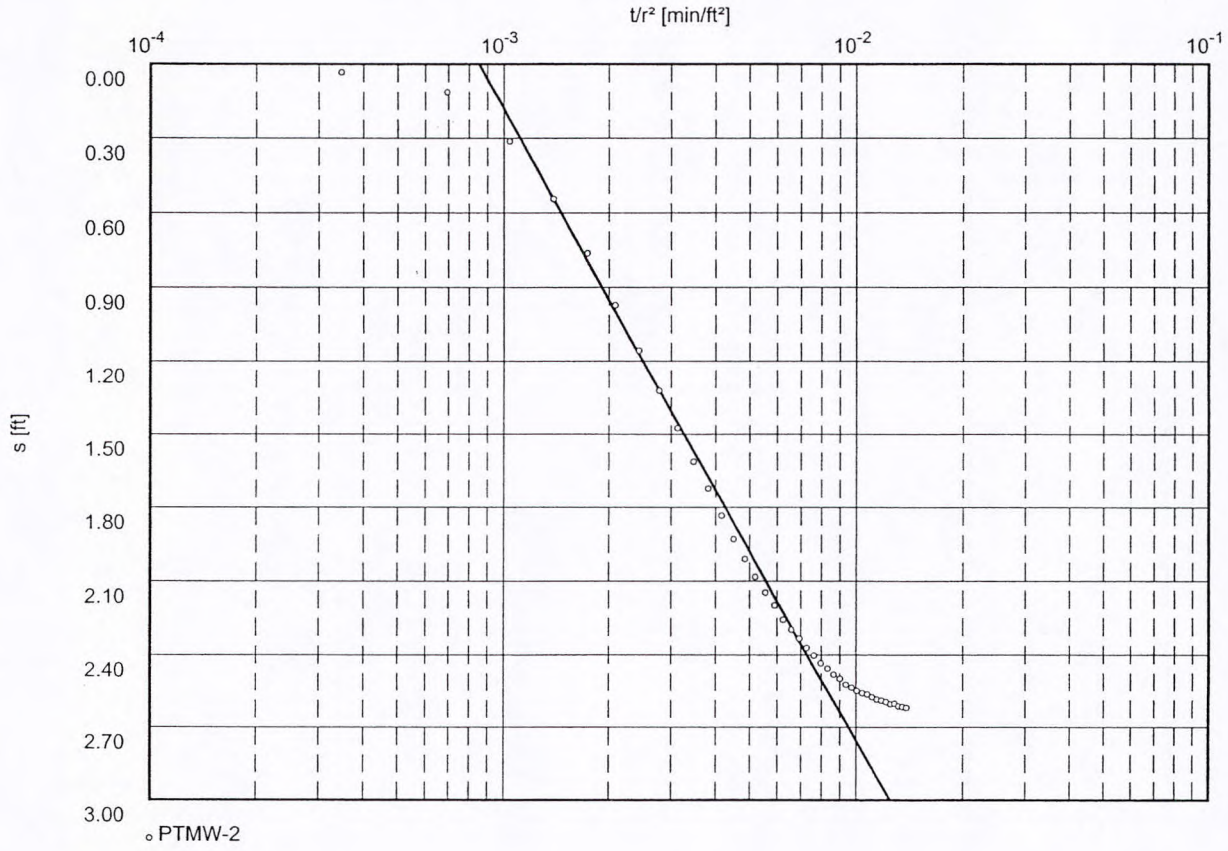
Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-2	PTMW-2
Discharge 62.00 U.S.gal/min	Distance from the pumping well 12.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.04	0.04	0.03
3	0.10	0.12	0.12	0.11
4	0.15	0.31	0.31	0.31
5	0.20	0.55	0.55	0.54
6	0.25	0.77	0.77	0.76
7	0.30	0.98	0.98	0.97
8	0.35	1.17	1.17	1.16
9	0.40	1.34	1.34	1.32
10	0.45	1.49	1.49	1.48
11	0.50	1.63	1.63	1.61
12	0.55	1.75	1.75	1.72
13	0.60	1.86	1.86	1.84
14	0.65	1.96	1.96	1.93
15	0.70	2.04	2.04	2.01
16	0.75	2.12	2.12	2.08
17	0.80	2.18	2.18	2.15
18	0.85	2.24	2.24	2.20
19	0.90	2.29	2.29	2.26
20	0.95	2.34	2.34	2.30
21	1.00	2.37	2.37	2.33
22	1.05	2.41	2.41	2.37
23	1.10	2.44	2.44	2.40
24	1.15	2.48	2.48	2.43
25	1.20	2.50	2.50	2.46
26	1.25	2.53	2.53	2.48
27	1.30	2.54	2.54	2.50
28	1.35	2.57	2.57	2.52
29	1.40	2.58	2.58	2.54
30	1.45	2.60	2.60	2.55
31	1.50	2.61	2.61	2.56
32	1.55	2.61	2.61	2.57
33	1.60	2.63	2.63	2.58
34	1.65	2.63	2.63	2.59
35	1.70	2.64	2.64	2.59
36	1.75	2.65	2.65	2.60
37	1.80	2.65	2.65	2.61
38	1.85	2.65	2.65	2.60
39	1.90	2.66	2.66	2.61
40	1.95	2.67	2.67	2.62
41	2.00	2.67	2.67	2.62

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-2	
Discharge 62.00 U.S.gal/min	



Transmissivity [ft²/min]: 5.88×10^{-1}

Hydraulic conductivity [ft/min]: 8.18×10^{-3}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

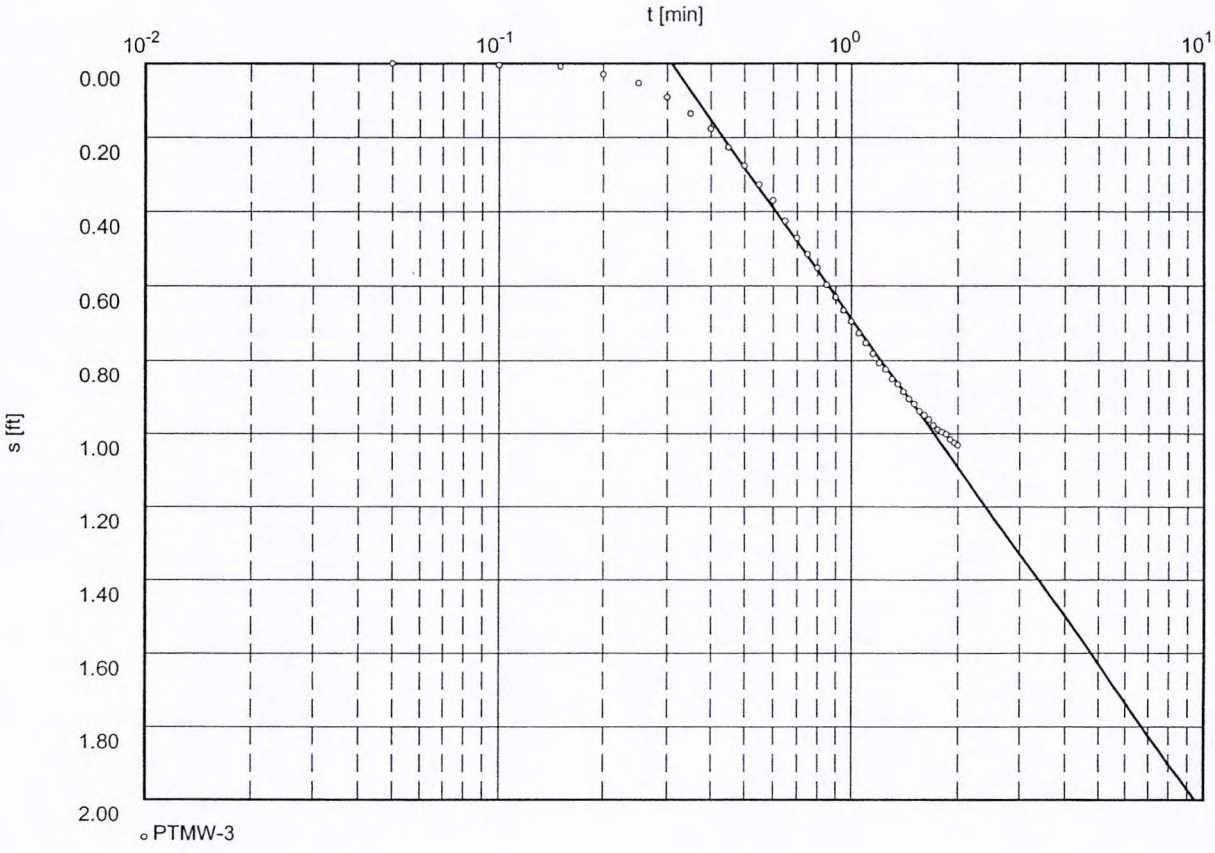
Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-2	PTMW-2
Discharge 62.00 U.S.gal/min	Distance from the pumping well 12.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.04	0.04	0.03
3	0.10	0.12	0.12	0.11
4	0.15	0.31	0.31	0.31
5	0.20	0.55	0.55	0.54
6	0.25	0.77	0.77	0.76
7	0.30	0.98	0.98	0.97
8	0.35	1.17	1.17	1.16
9	0.40	1.34	1.34	1.32
10	0.45	1.49	1.49	1.48
11	0.50	1.63	1.63	1.61
12	0.55	1.75	1.75	1.72
13	0.60	1.86	1.86	1.84
14	0.65	1.96	1.96	1.93
15	0.70	2.04	2.04	2.01
16	0.75	2.12	2.12	2.08
17	0.80	2.18	2.18	2.15
18	0.85	2.24	2.24	2.20
19	0.90	2.29	2.29	2.26
20	0.95	2.34	2.34	2.30
21	1.00	2.37	2.37	2.33
22	1.05	2.41	2.41	2.37
23	1.10	2.44	2.44	2.40
24	1.15	2.48	2.48	2.43
25	1.20	2.50	2.50	2.46
26	1.25	2.53	2.53	2.48
27	1.30	2.54	2.54	2.50
28	1.35	2.57	2.57	2.52
29	1.40	2.58	2.58	2.54
30	1.45	2.60	2.60	2.55
31	1.50	2.61	2.61	2.56
32	1.55	2.61	2.61	2.57
33	1.60	2.63	2.63	2.58
34	1.65	2.63	2.63	2.59
35	1.70	2.64	2.64	2.59
36	1.75	2.65	2.65	2.60
37	1.80	2.65	2.65	2.61
38	1.85	2.65	2.65	2.60
39	1.90	2.66	2.66	2.61
40	1.95	2.67	2.67	2.62
41	2.00	2.67	2.67	2.62

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-3	
Discharge 62.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.12×10^{0}

Hydraulic conductivity [ft/min]: 1.56×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

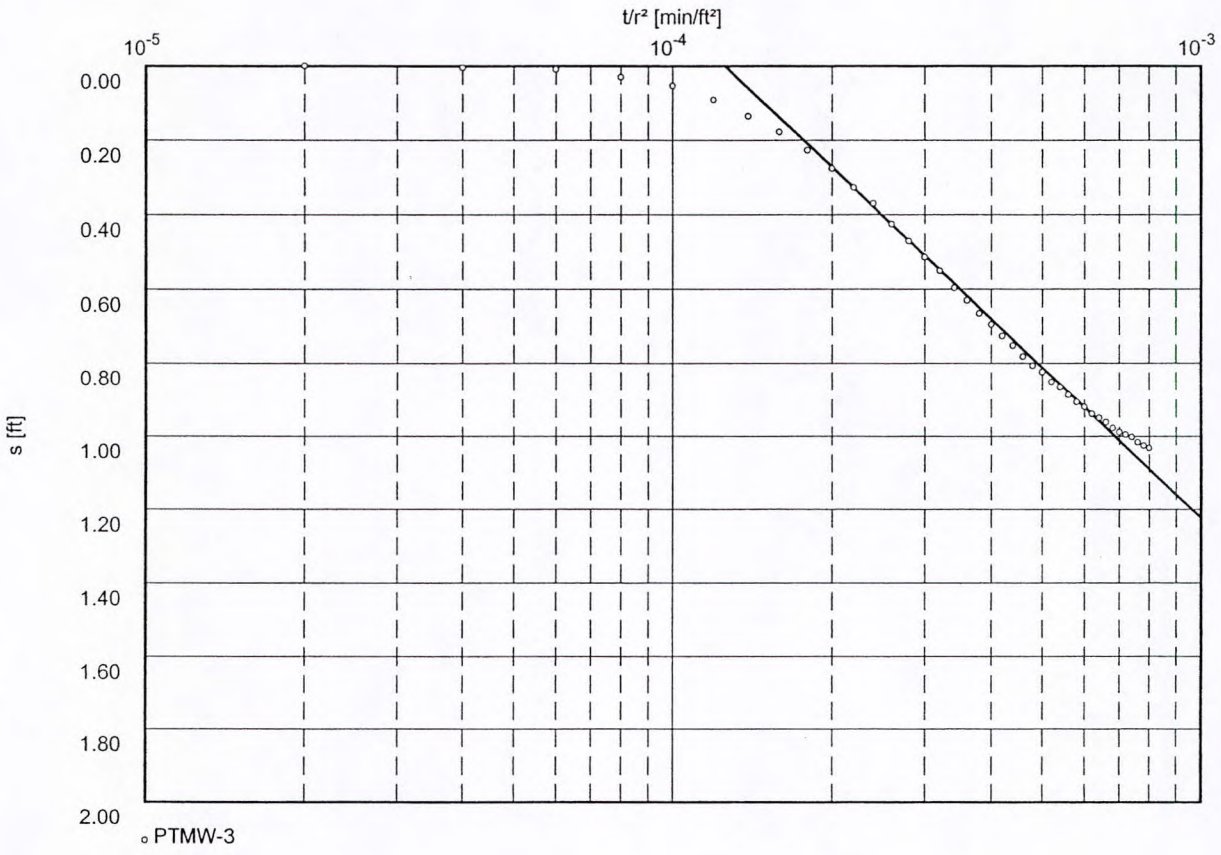
Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-3	PTMW-3
Discharge 62.00 U.S.gal/min	Distance from the pumping well 50.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.00	0.00	0.00
3	0.10	0.01	0.01	0.00
4	0.15	0.01	0.01	0.01
5	0.20	0.03	0.03	0.03
6	0.25	0.05	0.05	0.05
7	0.30	0.09	0.09	0.09
8	0.35	0.14	0.14	0.14
9	0.40	0.18	0.18	0.18
10	0.45	0.23	0.23	0.23
11	0.50	0.28	0.28	0.28
12	0.55	0.33	0.33	0.33
13	0.60	0.37	0.37	0.37
14	0.65	0.43	0.43	0.43
15	0.70	0.47	0.47	0.47
16	0.75	0.52	0.52	0.52
17	0.80	0.55	0.55	0.55
18	0.85	0.60	0.60	0.60
19	0.90	0.63	0.63	0.63
20	0.95	0.67	0.67	0.67
21	1.00	0.70	0.70	0.70
22	1.05	0.73	0.73	0.73
23	1.10	0.76	0.76	0.75
24	1.15	0.79	0.79	0.78
25	1.20	0.81	0.81	0.81
26	1.25	0.83	0.83	0.83
27	1.30	0.86	0.86	0.85
28	1.35	0.87	0.87	0.87
29	1.40	0.89	0.89	0.89
30	1.45	0.91	0.91	0.91
31	1.50	0.93	0.93	0.92
32	1.55	0.95	0.95	0.94
33	1.60	0.96	0.96	0.95
34	1.65	0.97	0.97	0.96
35	1.70	0.98	0.98	0.98
36	1.75	1.00	1.00	0.99
37	1.80	1.00	1.00	1.00
38	1.85	1.01	1.01	1.00
39	1.90	1.02	1.02	1.02
40	1.95	1.03	1.03	1.03
41	2.00	1.04	1.04	1.03

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 1
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-3	
Discharge 62.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.11×10^{0}

Hydraulic conductivity [ft/min]: 1.54×10^{-2}

Aquifer thickness [ft]: 72.00

Dvirka and Bartilucci 330 Crossways Park Drive Woodbury N.Y. 11797 ph.(516)364-9890	Pumping test analysis Distance-Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 07.01.2000	Page 2
		Project: FRANKLIN CLEANERS	
		Evaluated by: WM	

Pumping Test No. 3	Test conducted on: 11/11/99
PTMW-3	PTMW-3
Discharge 62.00 U.S.gal/min	Distance from the pumping well 50.00 ft

Static water level: 0.00 ft below datum

	Pumping test duration [min]	Water level [ft]	Drawdown [ft]	Corrected drawdown [ft]
2	0.05	0.00	0.00	0.00
3	0.10	0.01	0.01	0.00
4	0.15	0.01	0.01	0.01
5	0.20	0.03	0.03	0.03
6	0.25	0.05	0.05	0.05
7	0.30	0.09	0.09	0.09
8	0.35	0.14	0.14	0.14
9	0.40	0.18	0.18	0.18
10	0.45	0.23	0.23	0.23
11	0.50	0.28	0.28	0.28
12	0.55	0.33	0.33	0.33
13	0.60	0.37	0.37	0.37
14	0.65	0.43	0.43	0.43
15	0.70	0.47	0.47	0.47
16	0.75	0.52	0.52	0.52
17	0.80	0.55	0.55	0.55
18	0.85	0.60	0.60	0.60
19	0.90	0.63	0.63	0.63
20	0.95	0.67	0.67	0.67
21	1.00	0.70	0.70	0.70
22	1.05	0.73	0.73	0.73
23	1.10	0.76	0.76	0.75
24	1.15	0.79	0.79	0.78
25	1.20	0.81	0.81	0.81
26	1.25	0.83	0.83	0.83
27	1.30	0.86	0.86	0.85
28	1.35	0.87	0.87	0.87
29	1.40	0.89	0.89	0.89
30	1.45	0.91	0.91	0.91
31	1.50	0.93	0.93	0.92
32	1.55	0.95	0.95	0.94
33	1.60	0.96	0.96	0.95
34	1.65	0.97	0.97	0.96
35	1.70	0.98	0.98	0.98
36	1.75	1.00	1.00	0.99
37	1.80	1.00	1.00	1.00
38	1.85	1.01	1.01	1.00
39	1.90	1.02	1.02	1.02
40	1.95	1.03	1.03	1.03
41	2.00	1.04	1.04	1.03

Appendix E

APPENDIX E

CORRESPONDENCE FROM
NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS
CONCERNING CONNECTION TO
STORM WATER DRAINAGE MANHOLE

Dvirka and Bartilucci
CONSULTING ENGINEERS

330 Crossways Park Drive, Woodbury, New York, 11797-2015
516-364-9890 ▪ 718-460-3634 ▪ Fax: 516-364-9045
e-mail: db-eng@worldnet.att.net

February 28, 2000

Mr. John Waltz, P.E., Commissioner
Nassau County Department of Public Works
1550 Franklin Avenue
Mineola, NY 11501

Re: Franklin Cleaners Site
Remedial Measure
D&B No. 1640-2

Dear Commissioner Waltz:

Dvirka and Bartilucci Consulting Engineers (D&B) has been retained by the New York State Department of Environmental Conservation (NYSDEC) to design a groundwater extraction and treatment system to contain contamination from the above-referenced site. The treatment system will include air stripping for removal of volatile organic compounds (VOCs). We are requesting approval to discharge the treated effluent to the existing 18-inch diameter storm sewer located in Hempstead Avenue and to install piping below grade within the right-of-way and under Hempstead Avenue connecting to the storm sewer manhole located near the intersection of Woodland Drive.

Preliminary discussions with your staff have indicated that the existing storm drain may be surcharged during substantial storm events. In this case we will propose to include a float switch in the existing storm sewer which will shut down our well pumps before the storm drain is surcharged.

The proposed flow rate is 70 gpm, based on the current conceptual design. The influent water will be pumped from two extraction wells located along the Southern State Parkway to the treatment system. The treated water will then be discharged to the storm drain. The attached figure shows the general layout described above.

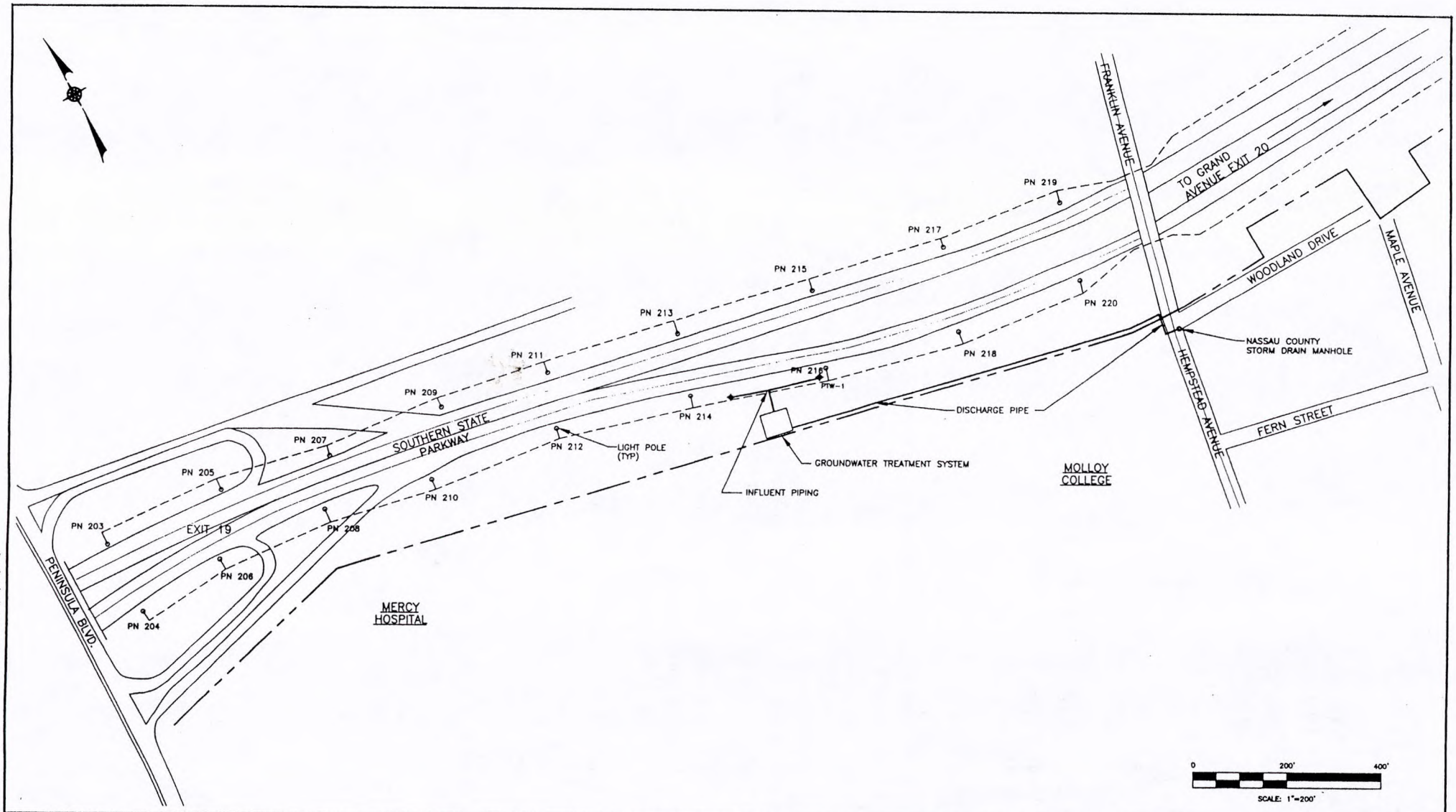
If you have any questions or require additional information, please do not hesitate to contact me at (516) 364-9890.

Very truly yours,

David S. Glass, P.E.
Associate

DSG/kd
cc: D. Camp (NYSDEC)
T. Maher (D&B)
W. Mann (D&B)
♦1640/DSG00LTR-03.DOC(R03)

Ray Dabrowski 473-204-3842



DIR: 1640/DESIGN FILE: 1640-NCDPW_WM-(02/11/00)

FRANKLIN CLEANERS
HEMPSTEAD, NEW YORK

TREATMENT SYSTEM DISCHARGE LAYOUT

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

NOTE: Reduced from scale shown for transmittal.