NEW YORK STATE SUPERFUND STANDBY CONTRACT

PRELIMINARY SITE ASSESSMENT REPORT

GLEN HEAD GROUNDWATER PLUME SITE
Village of Glen Head, New York
Site No. 1-30-098

VOLUME I – REPORT

Work Assignment No. D002676-45

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation

September 2000

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS
One Blue Hill Plaza
Pearl River, New York 10965

PRELIMINARY SITE ASSESSMENT REPORT

GLEN HEAD GROUNDWATER PLUME SITE
Village of Glen Head, New York

WORK ASSIGNMENT NO. D002676-45

TABLE OF CONTENTS

LIST OF APPENDICES

REFERENCES ARE BOUND SEPARATELY IN VOLUME II.

PRELIMINARY SITE ASSESSMENT REPORT

GLEN HEAD GROUNDWATER PLUME SITE
Village of Glen Head, New York

WORK ASSIGNMENT NO. D002676-45

LIST OF FIGURES

LIST OF TABLES

1.0 NYSDEC SITE INVESTIGATION INFORMATION

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION

SITE INVESTIGATION INFORMATION

1. SITE NAME	2. SITE NUMBER	3. TOWN/CITY/VILLAGE	4. COUNTY
Glen Head Groundwater Plume	130098	Oyster Bay/Village of Glen Head	Nassau

5. REGION	6. CLASSIFICATION			
1		CURRENT	PROPOSED	MODIFY

7. LOCATION OF SITE (Attach U.S.G.S. Topographic Map showing site location) see Figure 1

a. Quadrangle: Sea Cliff, NY

b. Site Latitude 40.833648 Site Longitude 73.627223

c. Tax Map Numbers Tax ID Nos. were available for some of the suspected sources: Glen Head Cleaners (Section 21, Block 228, Lot 17); former Charrell Cleaners (Section 21, Block 228, Lot 12); former Fresh & Clean Dry Cleaners (Section 20, Block 13, Lot 314).

d. Site Street Address: Area encompassing Glen Cove Avenue to the west, the northern end of Railroad Avenue to the north, Railroad Avenue to the east, and Walnut Avenue to the south.

8. BRIEFLY DESCRIBE THE SITE (Attach site plan showing disposal/sampling locations) see Figures 2 through 6; Table 1.

The Glen Head Groundwater Plume site lies in the area located immediately south of the TransTechnology site that has known groundwater contamination and past on-site industrial activities. Previous investigations at the TransTechnology site indicated that on-site groundwater had concentrations of up to 16,000 ug/l of PCE. A PSA was initiated in areas upgradient of the TransTechnology site for the NYSDEC by Lawler, Matusky & Skelly Engineers LLP (LMS) in September - October 1999 in an attempt to determine locations of PCE sources and local groundwater flow conditions. Groundwater samples were collected from four monitoring wells and four hydropunch locations. Elevated concentrations of VOCs, particularly PCE, were detected in all of the initial PSA groundwater samples. After a review of the initial (1999) PSA data, a second phase of investigatory work was conducted in May 2000 to better characterize the site and the potential sources of groundwater contamination. Elevated levels of PCE and VOCs were again detected in the groundwater.

Since PCE contamination was documented at the Glen Head Groundwater Plume site during the PSA (maximum concentration of 18,000 ug/l, see Figure 3)), it is suspected that releases of PCE occurred at the site. This contamination may have contributed to the groundwater contamination that was previously detected at the former TransTechnology site. Possible sources of PCE contamination have been identified during the PSA (i.e., five active/former dry cleaning facilities located in the site area - see Figure 2); however, definite sources of contamination could not be confirmed during the PSA. It is probable that at least one - and possibly more- of the five potential sources noted (and possibly other sources not identified during the PSA) have contributed to the local groundwater contamination. It is possible that improper handling of PCE/PCE waste or poor housekeeping practices that may have historically occurred at the potential source facilities may have resulted in releases of PCE to the subsurface at the Glen Head Groundwater Plume site.

a. Area: 40 acres b. EPA ID Number NA

c. Completed ( )Phase I ( )Phase II (X) PSA ( )RI/FS ( )PA/SI ( )Other

9. HAZARDOUS WASTE DISPOSED (Include EPA Hazardous Waste Numbers)

F002 (spent halogenated solvents) - tetrachloroethene (PCE)

10. ANALYTICAL DATA AVAILABLE

a. ( )Air (X)Groundwater ( )Surface Water ( )Sediment ( )Soil ( )Waste ( )Leachate ( )EPTox ( )TCLP

b. Exceedences in NYS Groundwater Standards or Guidance Values Refer to attached Table 1.

11. CONCLUSION

12. SITE DATA

a. Nearest Surface Water: Distance 1700 ft Direction: NE Classification: N/A (retention basin)

b. Nearest Groundwater: Depth 110 ft Flow Direction: WNW (X)Sole Source ( )Primary ( )Principal

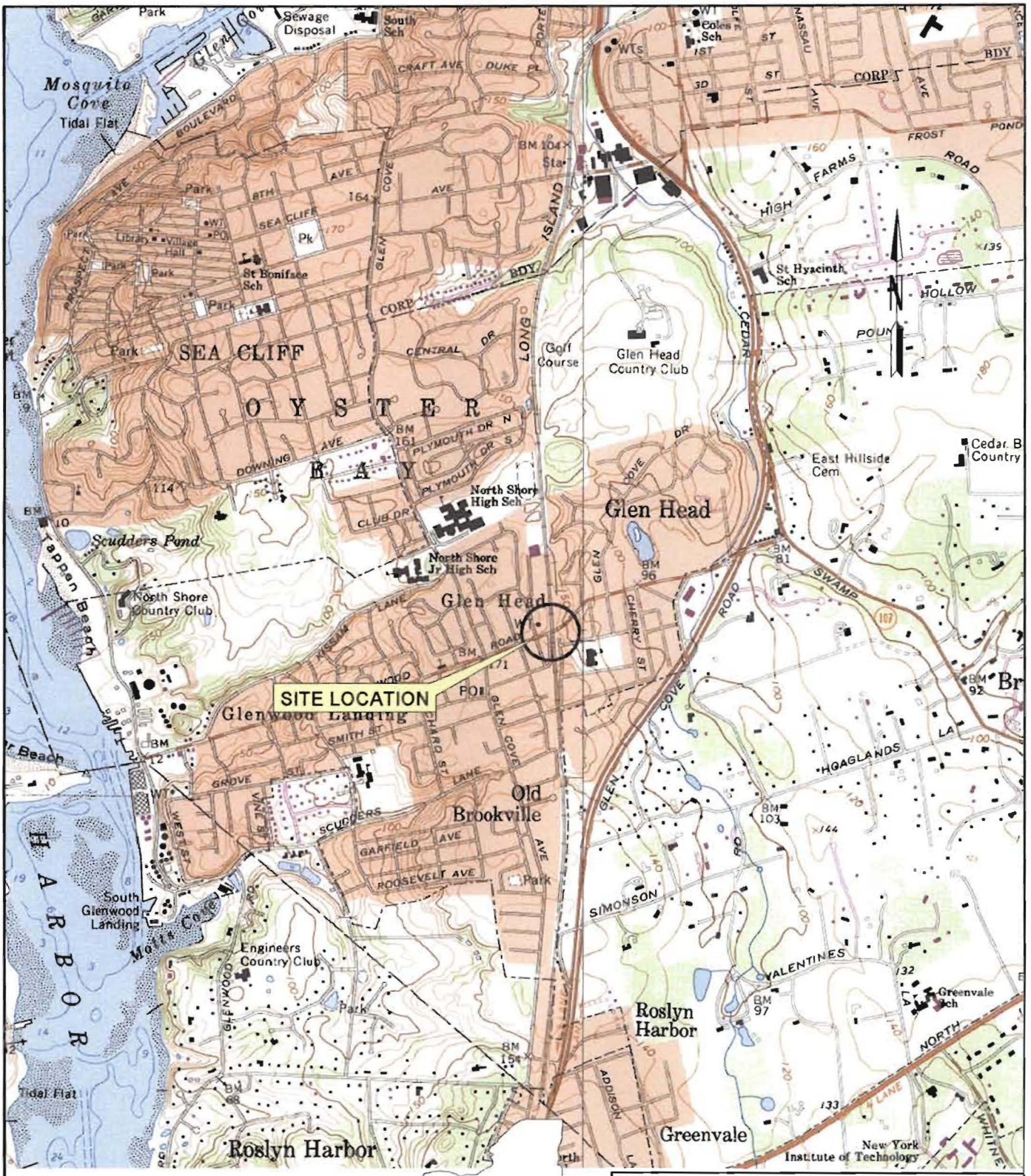
c. Nearest Water Supply: Dist. 1500 ft Direction: Northeast Active (X)Yes ( )No

d. Nearest Building: Distance (on-site) Direction: Not applicable Uses: Dry cleaning, misc. commercial/industrial

e. In State Economic Development Zone?	( )Y	(X)N	i. Controlled Site Access?	( )Y	(X)N
f. Crops or livestock on site?	( )Y	(X)N	j. Exposed hazardous waste?	( )Y	(X)N
g. Documented fish or wildlife mortality?	( )Y	(X)N	k. HRS Score _____		
h. Impact on special status fish or wildlife resource?	( )Y	(X)N	l. For Class 2: Priority Category		

13. SITE OWNER'S NAME	14. ADDRESS	15. TELEPHONE
Glen Head Cleaners: Joseph Petruzziello	1 Dumond Place Glen Head, NY 11545	516-676-4367
former Charrell Cleaners: current property owner: Michael and Robert Rich	12 University Place Glen Head, NY 11545	
former unnamed cleaners: current property owner: John Caggiano	62 Glen Head Road Glen Head, NY 11545	
Station Valet Cleaners: (Tax/owner information not available)		
former Fresh & Clean Dry Cleaners: **current property owner: Robert Moskow**	12 Railroad Avenue Glen Head, NY 11545	

16. PREPARER		17. APPROVED	
Signature	Date	Signature	Date
Name, Title, Organization		Name, Title, Organization	



Glen Head Site:
40.833648° N
73.627223° w

NEW YORK STATE
QUADRANGLE LOCATION

0 2000 ft

SCALE
1 in. = 2000 ft
Srv-E\650456\GlenHeadusgs.dsf

Map source:
USGS 7.5-minute Quadrangle Map,
Sea Cliff, NY, 1968, photorevised 1979, and
Hicksville, NY, 1967, photorevised 1979.
Printed from Wildflower Productions "Topo".

Figure 1

Site Location

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

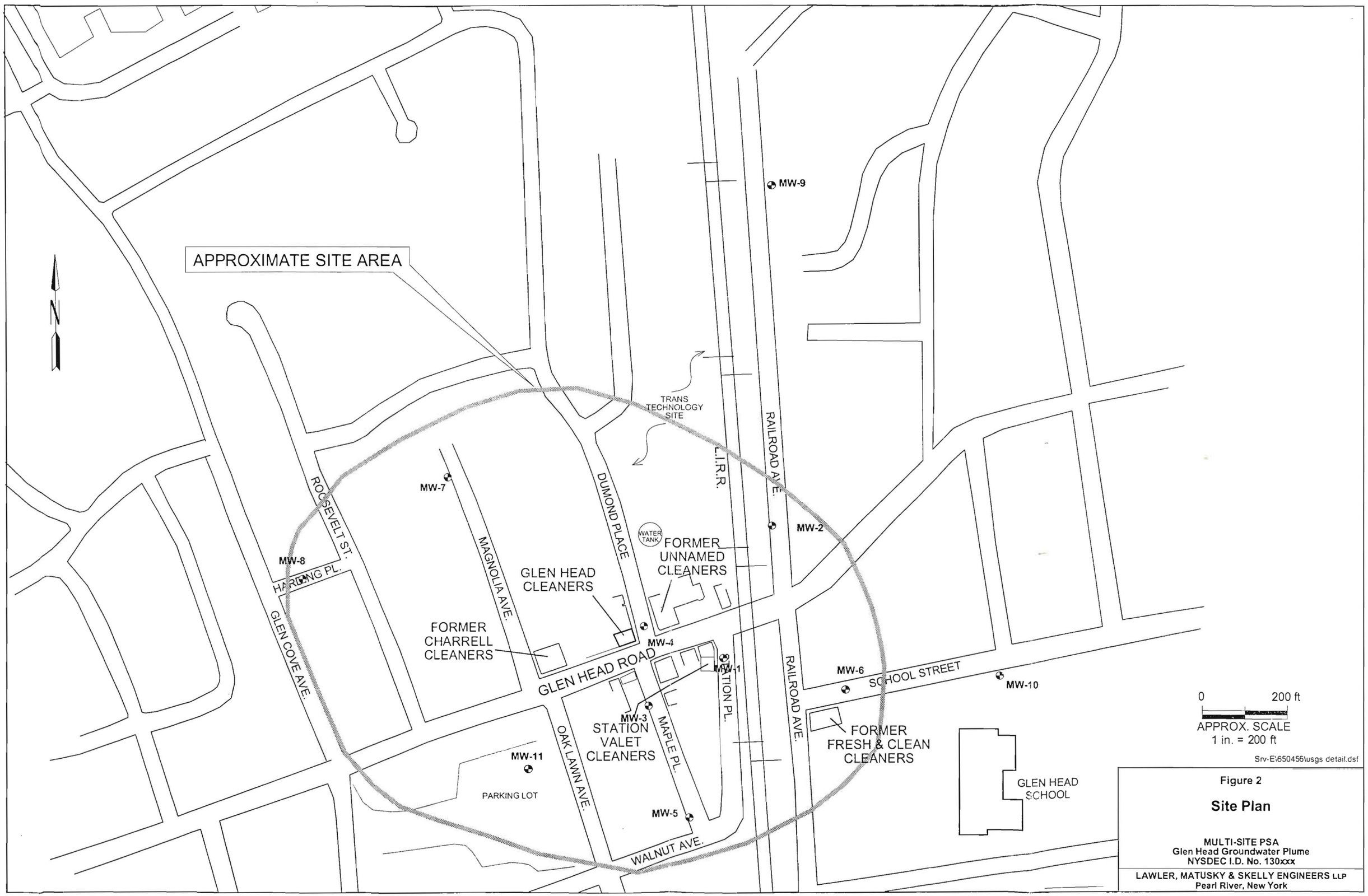


Figure 2

Site Plan

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

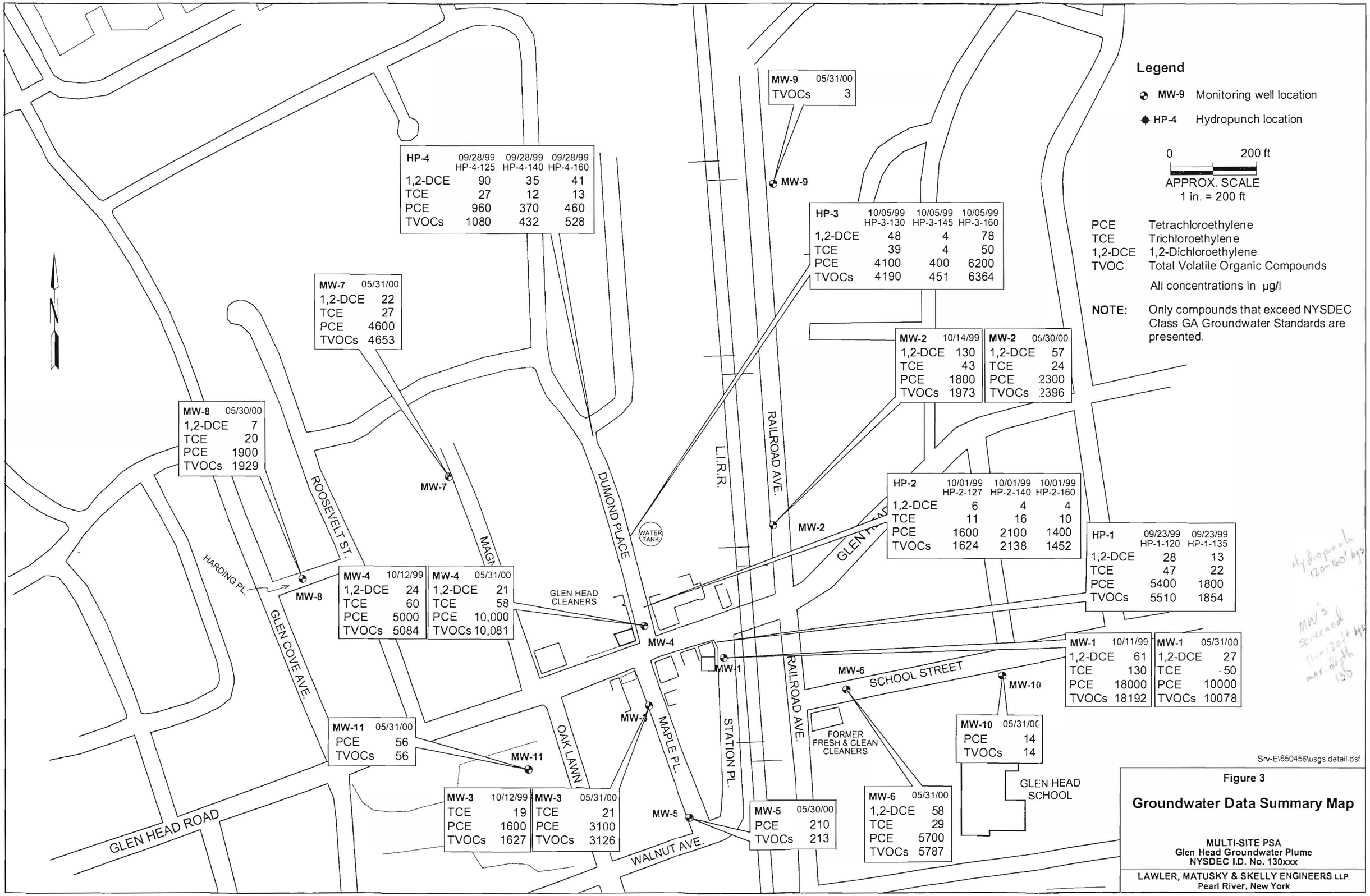
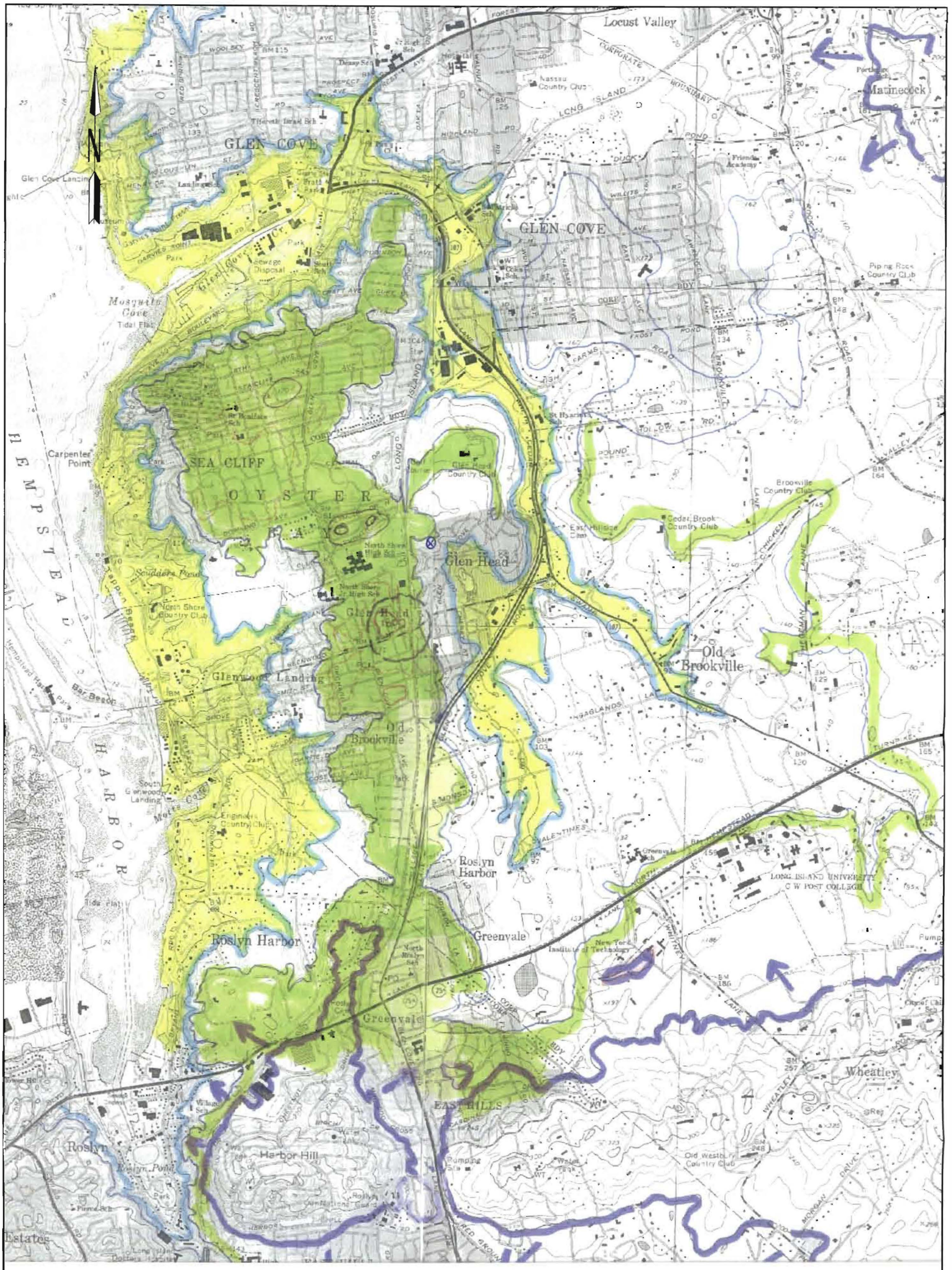


Figure 3

Groundwater Data Summary Map

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York



LEGEND

- Areas with topographic elevations greater than 150 ft MSL
- Areas with topographic elevations less than 100 ft MSL
- 200 ft MSL contour line in vicinity of site

0 2000'

Scale in Feet
(1 in. = 2275')

\glenheadtopography.dsf

LMS Lawler, Matusky & Skelly Engineers LLP One Blue Hill Plaza • Pearl River, New York 10965 ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS	MULTI-SITE PSA Glen Head Groundwater Plume NYSDEC I.D. No. 130xxx	Regional Topographic Map	Figure 4

Not to scale

Srv-E\650456\GlenHead 3d.dsf

Figure 5

3-Dimensional Topography Map of Site Area

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

GENERAL GROUNDWATER FLOW DIRECTION

N

47

48

49

50

51

52

MW-9
49.34

MW-7
46.97

MW-8
46.44

MW-Getty 1
46.69

MW-Sun 1
47.16

MW-11
48.26

MW-4
50.43

MW-1
50.70

MW-3
50.53

MW-5
50.70

MW-2
50.79

MW-6
52.27

MW-10
52.98

ROOSEVELT ST.

HARDING PL.

GLEN COVE AVE.

MAGNOLIA AVE.

DUMOND PLACE

WATER TANK

L.I.R.R.

RAILROAD AVE.

MAPLE PL.

STATION PL.

OAK LAWN AVE.

WALNUT AVE.

GLEN HEAD ROAD

SCHOOL STREET

PARKING LOT

GLEN HEAD SCHOOL

Legend

MW-9 Monitoring well location

49.34 Groundwater elevation, ft MSL

52 Groundwater elevation contour (ft MSL)

NOTE: All groundwater measurements were field-collected by LMS in May and June 2000

0 200 ft

APPROX. SCALE
1 in. = 200 ft

Srv-E\650456\usgs detail.dsf

Figure 6

Site Groundwater Flow Map

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

GROUNDWATER DATA SUMMARY

Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS160 HP-1-120 9928683 09/23/1999 WATER ug/L	LMS160 HP-1-135 9928684 09/23/1999 WATER ug/L	LMS160 HP-2-127 9929686 10/01/1999 WATER ug/L	LMS160 HP-2-140 9929687 10/01/1999 WATER ug/L	LMS160 HP-2-160 9929688 10/01/1999 WATER ug/L	LMS160 HP-3-130 9930429 10/05/1999 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
	[DF1:50]	[DF1:20]	[DF 1:10]	[DF 1:25]	[DF 1:10]	[DF 1:25]	
Volatile Organic Compounds (ug/L)							
Acetone	27 g	14 g	ND g	16 g	32 g	ND g	50 GV
1,1-Dichloroethene	1	ND	ND	ND	ND	2	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	**28**	**13**	**6**	4	4	**48 g**	5
2-Butanone	5 g	2 jg	5 g	2 jg	6 g	ND g	50 GV
1,1,1-Trichloroethane	2	3	1	ND	ND	1	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	1
Trichloroethene	**47 g**	**22 g**	**11**	**16**	**10**	**39 g**	5
Benzene	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	**5400 dg**	**1800 dg**	**1600 d**	**2100 d**	**1400 d**	**4100 d**	5
Toluene	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	1	ND	ND	ND	5
Total VOCs:	**5510**	**1854**	**1624**	**2138**	**1452**	**4190**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.

* - Denotes QA/QC sample; ER, equipment rinsate; TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1.

(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

b - Compound found in associated blank.

d - Compounds identified in an analysis at a dilution factor.

J - Estimated concentration; compound present below quantitation limit.

GV - Guidance Value

ND - Not detected at analytical reporting limit

DF - Dilution Factor.

g - Value considered estimated based on data validator's report (Appendix B).

Note - Numbers in bold exceed cleanup standard.

GROUNDWATER DATA SUMMARY
Glen Head Groundwater Plume PSA

SDG Number	LMS160	LMS160	LMS160	LMS160	LMS160	LMS168	
LMS Sample ID	HP-3-145	HP-3-160	HP-4-125	HP-4-140	HP-4-160	MW-1	
Lab Sample Number	9930430	9930431	9929528	9929529	9929530	9931123	
Sampling Date	10/06/1999	10/05/1999	09/28/1999	09/28/1999	09/28/1999	10/11/1999	
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	NYSDEC CLASS GA STANDARDS (a)
	[DF 1:5]	[DF 1:50]	[DF 1:10]	[DF 1:5]	[DF 1:5]	[DF 1:500]	
Volatile Organic Compounds (ug/L)							
Acetone	33 g	26 g	ND g	13 g	8 g	ND	50 GV
1,1-Dichloroethene	ND	2	ND	ND	ND	1	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	4 g	**78 g**	**90**	**35**	**41**	**61**	5
2-Butanone	8 g	5 jg	ND	ND	ND	ND	50 GV
1,1,1-Trichloroethane	2	3	ND	2	2	ND	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	1
Trichloroethene	4 g	**50 g**	**27**	**12**	**13**	**130**	5
Benzene	ND	ND	ND	ND	1	ND	1
Tetrachloroethene	**400 d**	**6200 d**	**960 d**	**370d**	**460 d**	**18000 bdg**	5
Toluene	ND	ND	2	ND	3	ND	5
Styrene	ND	ND	1	ND	ND	ND	5
Total VOCs:	**451**	**6364**	1080	**432**	**528**	**18192**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L
* - Denotes QA/QC sample ER, equipment rinsate, TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1.
(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Compound found in associated blank
d - Compounds identified in an analysis at a dilution factor
j - Estimated concentration; compound present below quantitation limit.
GV - Guidance Value.
ND - Not detected at analytical reporting limit
DF - Dilution Factor
g - Value considered estimated based on data validator's report (Appendix B).
Note - Numbers in bold exceed cleanup standard.

Table 1 (Page 3 of 6)
GROUNDWATER DATA SUMMARY
Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS178 GHMW1 20000531-095 05/31/2000 WATER ug/L	LMS168 MW-2 9931559 10/14/1999 WATER ug/L	LMS178 GHMW2 20000531-011 05/30/2000 WATER ug/L	LMS168 MW-2A* 9931124 10/12/1999 WATER ug/L	LMS168 MW-3 9931125 10/12/1999 WATER ug/L	LMS178 GHMW3 20000531-096 05/31/2000 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
	[DF 1:100]	[DF 1:25]	[DF 1:20]	[DF 1:100]	[DF 1:16]	[DF 1:20]	
Volatile Organic Compounds (ug/L)							
Acetone	ND	ND	ND	ND	ND	ND	50 GV
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	27	**130**	**57**	**24**	3	3	5
2-Butanone	ND	ND	ND	ND	ND	ND	50 GV
1,1,1-Trichloroethane	1	ND	1	2	2	2	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	1
Trichloroethene	**50**	**43 g**	**24**	**66**	**19**	**21**	5
Benzene	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	**10000d**	**1800 d**	**2300 d**	**5200 bdg**	**1600 bdg**	**3100 d**	5
Toluene	ND	ND	ND	4	3	ND	5
Styrene	ND	ND	ND	ND	ND	ND	5
Total VOCs:	**10078**	**1973**	**2382**	**5296**	**1627**	**3126**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Denotes QA/QC sample: ER, equipment rinsate, TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1
(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Compound found in associated blank.
d - Compounds identified in an analysis at a dilution factor.
J - Estimated concentration; compound present below quantitation limit.
GV - Guidance Value.
ND - Not detected at analytical reporting limit.
DF - Dilution Factor.
g - Value considered estimated based on data validator's report (Appendix B).
Note - Numbers in bold exceed cleanup standard.

GROUNDWATER DATA SUMMARY
Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS168 MW-4 9931126 10/12/1999 WATER ug/L	LMS178 GHMW4 20000531-097 05/31/2000 WATER ug/L	LMS178 GHMW5 20000531-012 05/30/2000 WATER ug/L	LMS178 GHMW6 20000531-098 05/31/2000 WATER ug/L	LMS178 GHMW7 20000531-099 05/31/2000 WATER ug/L	LMS178 GHMW8 20000531-013 05/30/2000 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
	[DF 1:16]	[DF 1:100]	[DF 1:2.5]	[DF 1:50]	[DF 1:50]	[DF 1:20]	
Volatile Organic Compounds (ug/L)							
Acetone	ND	ND	ND	ND	ND	ND	50 GV
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	**24 d**	**21**	ND	**58**	**22**	**7**	5
2-Butanone	ND	ND	ND	ND	ND	ND	50 GV
1,1,1-Trichloroethane	ND	2	2	ND	4	2	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	1
Trichloroethene	**60 d**	**58**	1	**29**	**27**	**20**	5
Benzene	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	**5000 bdg [DF 1:100]**	**10000 d**	**210 d**	**5700d**	**4600 d**	**1900d**	5
Toluene	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	5
Total VOCs:	**5084**	**10081**	**213**	**5787**	**4653**	**1929**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
• - Denotes QA/QC sample: ER, equipment rinsate, TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1.
(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Compound found in associated blank.
d - Compounds identified in an analysis at a dilution factor.
j - Estimated concentration; compound present below quantitation limit.
GV - Guidance Value.
ND - Not detected at analytical reporting limit.
DF - Dilution Factor.
g - Value considered estimated based on data validator's report (Appendix B).
Note - Numbers in bold exceed cleanup standard

GROUNDWATER DATA SUMMARY

Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS178 GHMW9 20000531-014 05/30/2000 WATER ug/L	LMS178 GHMW10 20000531-100 05/31/2000 WATER ug/L	LMS178 GHMW11 20000531-101 05/31/2000 WATER ug/L	LMS178 GHMW12* 20000531-102 05/31/2000 WATER ug/L	LMS160 ER-1* 9930428 10/05/1999 WATER ug/L	LMS160 TB-1* 9928685 09/24/1999 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
				[DF1:100]			
Volatile Organic Compounds (ug/L)							
Acetone	ND	ND	ND	ND	ND g	ND	50 GV
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	1	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	ND	ND	ND	**28**	ND	ND	5
2-Butanone	ND	ND	ND	ND	ND g	ND	50 GV
1,1,1-Trichloroethane	1	ND	ND	1	ND	ND	5
1,2-Dichloropropane	1	ND	ND	ND	ND	ND	1
Trichloroethene	ND	ND	ND	**50**	ND g	ND	5
Benzene	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	ND	**14**	**56**	**8900 d**	ND	2	5
Toluene	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	5
Total VOCs:	3	14	56	**8979**	ND	2	100 1

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.

* - Denotes QA/QC sample: ER, equipment rinsate; TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1.

(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

b - Compound found in associated blank

d - Compounds identified in an analysis at a dilution factor.

j - Estimated concentration; compound present below quantitation limit.

GV - Guidance Value

ND - Not detected at analytical reporting limit

DF - Dilution Factor

g - Value considered estimated based on data validator's report (Appendix B).

Note - Numbers in bold exceed cleanup standard

Table 1 (Page 6 of 6)
GROUNDWATER DATA SUMMARY
Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS160 TB-2* 9929531 09/29/1999 WATER ug/L	LMS160 TB-3* 9929889 10/01/1999 WATER ug/L	LMS160 TB-4* 9930432 10/06/1999 WATER ug/L	LMS168 TB-5* 9931127 10/11/1999 WATER ug/L	LMS178 TB-5/30* 20000531-015 05/30/2000 WATER ug/L	LMS178 TB-5/31* 20000531-103 05/31/2000 WATER ug/L	LMS168 TB-6* 9931660 10/14/1999 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
Volatile Organic Compounds (ug/L)								
Acetone	ND g	ND g	ND g	ND	ND	ND	ND	50 GV
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	ND	5
2-Butanone	ND	ND g	ND g	ND	ND	ND	ND	50 GV
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	1
Trichloroethene	ND	ND	ND g	ND	ND	ND	ND	5
Benzene	ND	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	1	ND	ND	ND	ND	ND	ND	5
Toluene	ND	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	ND	5
Total VOCs:	1	ND	ND	ND	ND	ND	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Denotes QA/QC sample: ER, equipment rinsate; TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1.
(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Compound found in associated blank.
d - Compounds identified in an analysis at a dilution factor.
j - Estimated concentration; compound present below quantitation limit
GV - Guidance Value.
ND - Not detected at analytical reporting limit.
DF - Dilution Factor.
g - Value considered estimated based on data validator's report (Appendix B).
Note - Numbers in bold exceed cleanup standard.

2.0 USEPA SITE INSPECTION QUESTIONNAIRE

SITE SUMMARY

Provide a brief description of the site and its operational history. State the site name, owner, operator, type of facility and operations, size of property, active or inactive status, and years of waste generation. Summarize waste treatment, storage, or disposal activities that have or may have occurred at the site; note whether these activities are documented or alleged. Identify all source types and prior spills, floods, or fires. Summarize highlights of the PA and other investigations if available. Follow the outline on the next page:

SITE CONDITIONS AND BACKGROUND

1. PHYSICAL LOCATION (Address, Lat-Long, Map Ref.)

The Glen Head Groundwater Plume site consists of an area that includes several former and active dry cleaning and industrial facilities located in the Village of Glen Head (Township of Oyster Bay) in Nassau County, New York (refer to Figures 1 and 2). The site area consists of mixed land uses including commercial and residential. The commercial properties in the site vicinity are primarily located along Glen Head Road and Glen Cove Avenue. The approximate site coordinates (central location) are 40.833648 (latitude) and 73.627223 (longitude). Figure 2 displays the approximate site boundaries (i.e., Glen Cove Avenue to the west, the northern end of Railroad Avenue to the north, Railroad Avenue to the east [near Glen Head School], and Walnut Avenue to the south). The total approximate site area is 40 acres. **Ref.: 1**

2. SITE CHARACTERISTICS (include a description of the buildings or structures on site and their physical condition).

One active and four former dry cleaning facilities were primarily targeted during the Preliminary Site Assessment (PSA) as potential sources of tetrachloroethylene (PCE), and other volatile organic compound (VOC), contamination in the shallow aquifer in the site area: Glen Head Cleaners [GH Cleaners], located on the northwest corner of the intersection of Glen Head Road and Dumond Place (an active dry cleaning facility); the former Charrell Cleaners [C Cleaners], located at 36 Glen Head Road, about 250 ft west of GH Cleaners; a former dry cleaners [unnamed] located on the northeast corner of the intersection of Glen Head Road and Dumond Place, about 50 ft east of GH Cleaners; Station Valet Cleaners [SV Cleaners, no active dry cleaning activities presently occur] located along Station Place, about 50 ft south of Glen Head Road; and the former Fresh and Cleaner Dry Cleaners [FC Cleaners], located along Railroad Avenue near the eastern portion of the site. In addition to the active and former dry cleaning establishments noted to exist at the Glen Head Groundwater Plume site, the former TransTechnology industrial facility, located north of Glen Head Road, between Dumond Place and the LIRR railroad tracks, has also been identified as a possible source site. Figure 2 displays

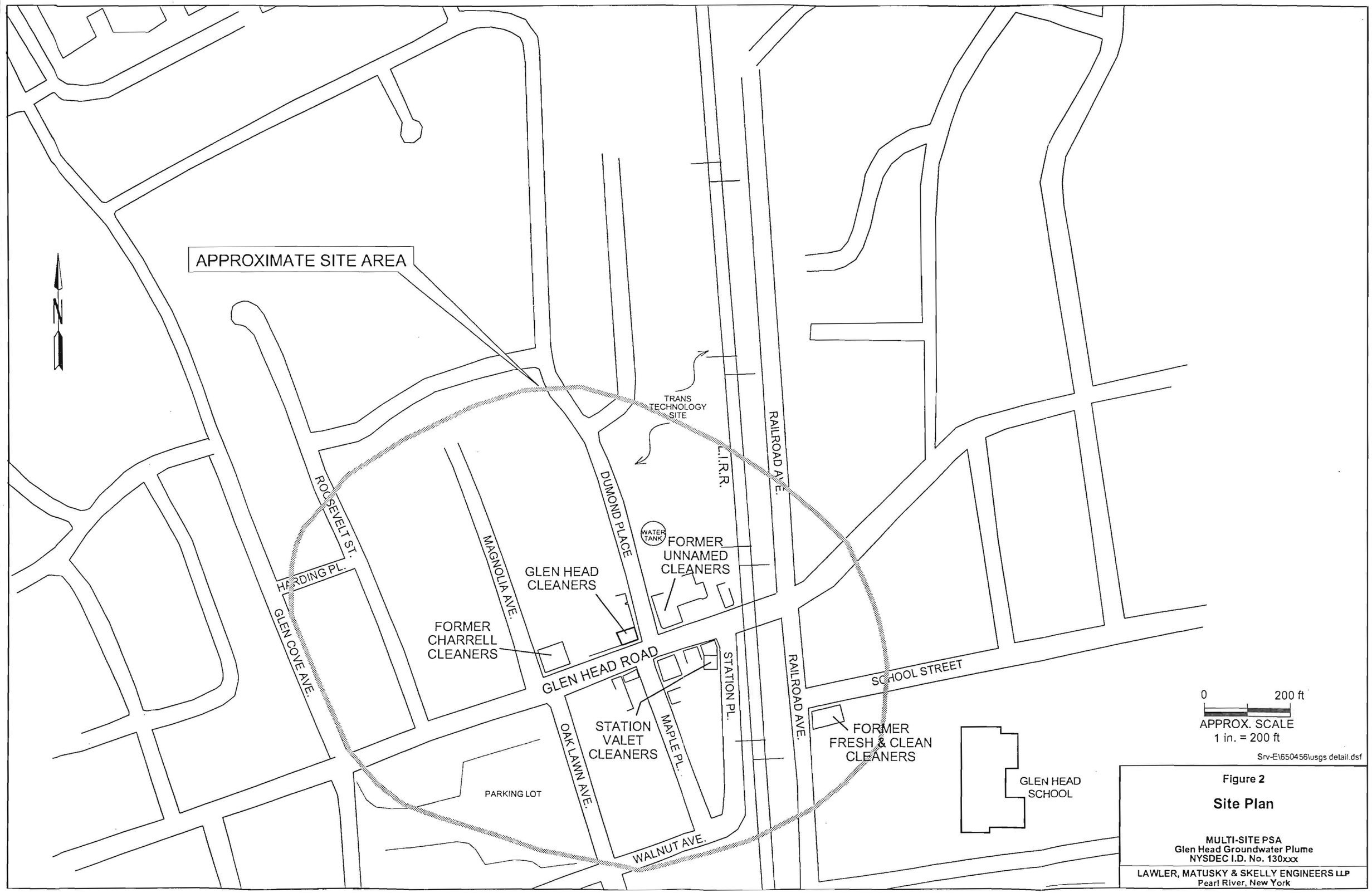
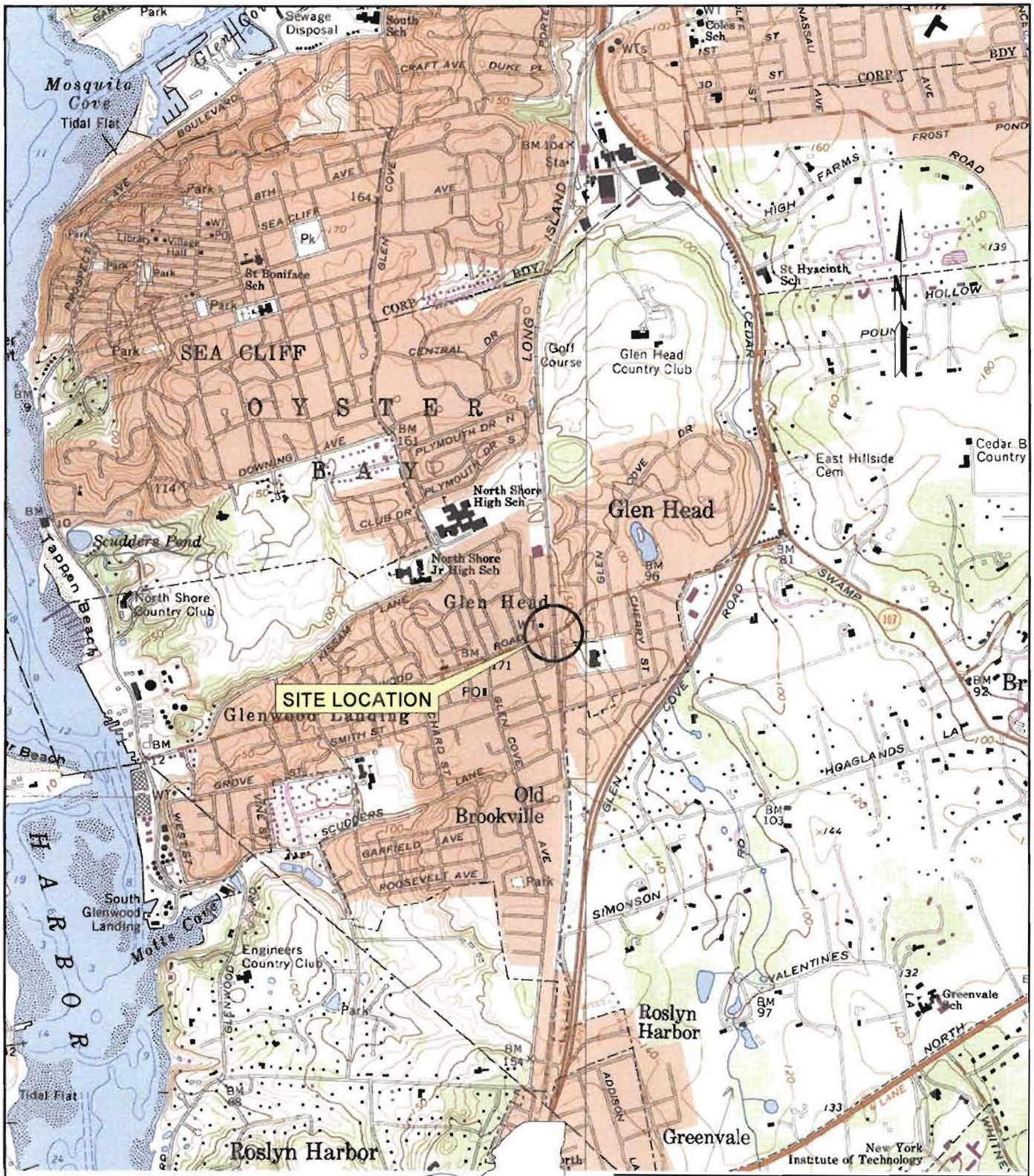


Figure 2

Site Plan

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York



Glen Head Site:
40.833648° N
73.627223° w

Map source:
USGS 7.5-minute Quadrangle Map,
Sea Cliff, NY, 1968, photorevised 1979, and
Hicksville, NY, 1967, photorevised 1979.
Printed from Wildflower Productions "Topo".

Srv-E\650456\GlenHeadusgs.dsf

HV-1
(wetland waterway) whole thing

Figure 1

Site Location

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

the locations of the five active/former dry cleaning facilities along with the location of the TransTechnology site.

Numerous file review and record search requests were made for this PSA to attempt to identify other former dry cleaning facilities that may have existed in the site vicinity. The record searches met with limited success. However, a dry cleaner address search conducted through an Internet search engine revealed that there are six active dry cleaning facilities listed within approximately 1.5 miles of the Glen Head Groundwater Plume site (see Reference No. 4). In addition, two active and one former dry cleaning establishments were identified along Glen Cove Avenue during site visits and file reviews. However, as groundwater flow at the site was estimated to flow toward the west/northwest (as was ultimately determined, as described below) and Glen Cove Avenue is considered to be downgradient from the possible sources identified above, these three dry cleaners were not considered to be part of the Glen Head Groundwater Plume site and were not investigated for the PSA. This investigation focused on the site area and the potential PCE source areas, as described above and in Figure 2. **Ref.: 2, 3, and 4.**

The site area, including the above-mentioned active and former dry cleaning establishments, is serviced by a municipal potable water supply system (Sea Cliff Water Company of Glen Cove, New York, refer to Section IV of PSA Report). According to village records, a municipal sanitary sewer system does not exist in the section of the Village of Glen Head that contains the Glen Head Groundwater Plume site. Thus, it is surmised that on-site sanitary/septic systems exist (and historically existed) at the site area. As observed during site investigations, stormwater at the site is generally collected by a system of drywells that discharge to groundwater. It is possible that discharges of PCE/PCE wastes from the above-noted potential sources may have occurred into on-site sanitary or drywell structures historically. As described in Sections III and IV, groundwater in the site vicinity flows to the west-north-west.

Historic maps of the site area from 1932 and 1943 were reviewed. On each map, the site area and surrounding vicinity (selected as the area approximately bounded by Glen Cove Avenue to the west, the northern end of Railroad Avenue to the north, approximately 700 ft east of Railroad Avenue to the east, and Walnut Avenue to the south) were analyzed for land use changes and development. The areas around the above-mentioned potential sources were focused on. Copies of the two historic maps that were reviewed are included in Reference No. 2. **Ref.: 2**

The historic map from 1932 shows the general site area layout. Glen Head Road, Railroad Avenue, Orchard Avenue (referred to as School Street today), Dumond Place, Maple Place, Oak Lawn Avenue, Roosevelt Street, and Glen Cove Avenue are all present. Railroad tracks (today owned by LIRR) are also shown in their current position. The roadway presently referred to as Station Place (west of LIRR tracks and south of Glen Head Road) is shown on the 1932 map but is unnamed. The street currently known as Magnolia Avenue (one block west of Dumond Place) is known as William Avenue on the 1932 historic map. The Sea Cliff Water Company storage tank that presently exists along the east side of Dumond Place is not shown on the 1932 map. Utility lines (water) are shown to be located within Glen Head Road, Railroad Avenue, Orchard

Avenue, Maple Place, Oak Lawn Avenue, and Glen Cove Avenue. The Glen Head School is shown to exist east of Railroad Avenue along the south side of Orchard Avenue (its present location) in the 1932 map. **Ref.: 2.**

Commercial establishments that presently exist along Glen Cove Avenue (western part of Glen Head Groundwater Plume site) are not depicted on the 1932 historic map, as the lots are shown to be undeveloped. Residential structures and garages are shown to exist along the east side of Glen Cove Avenue, south of Glen Head Road. A filling station with four underground storage tanks (USTs) is shown at the northeast corner of the intersection of Glen Head Road and Glen Cove Avenue (also location of present-day filling station). **Ref.: 2.**

Several commercial buildings/properties (most unspecified) are located along Glen Head Road from Glen Cove Avenue east to Railroad Avenue (and beyond the site focus area). Residential properties are also shown to exist along Glen Head Road, and also at areas north and south of Glen Head Road. A bank and office are located at the northwest corner of the Roosevelt Street/Glen Head Road intersection. The 1932 map also indicates that oils were possibly stored in an automobile garage that was situated behind a store building located along the south side of Glen Head Road, approximately 260 ft east of Glen Cove Avenue. A small, one story, unspecified shop is shown on the 1932 map to be located along the west side of Maple Place, approximately 150 feet south of Glen Head Road. The property along the north side of Glen Head Road that was known to house a former dry cleaner (C Cleaners, 36 Glen Head Road) was not shown to be developed as of 1932. A three-story commercial building was shown to exist at the northwest corner of the intersection of Dumond Place and Glen Head Road (current location of Glen Head Cleaners, 56 Glen Head Road). The use of this building is not specified in the 1932 historic map. **Ref.: 2.**

A small office is shown to be located along the west side of Dumond Place, approximately 110 feet north of Glen Head Road. A group of three adjacent stores are depicted at the northeast corner of the Dumond Place/Glen Head Road intersection on the 1932 map. A "cleaning and pressing" operation (unnamed potential source identified above) is shown to exist at the middle store, located approximately 20 feet east of Dumond Place along the north side of Glen Head Road. A drug store and office is shown at the southeast corner of the intersection of Maple Place and Glen Head Road. A large coal yard, with railroad siding, four coal pocket areas, and office building, is shown to be located along the east side of Maple Place approximately 100 feet south of Glen Head Road. A chain of four adjacent stores is shown along the present location of Station Place, just west of the railroad tracks and south of Glen Head Road. The building uses are not specified on the 1932 map, but the building that housed SV Cleaners is shown to exist. Some commercial development is also shown along the east side of Railroad Avenue on the 1932 map. A small office structure is located at the southeast corner of Orchard Avenue (today known as School Street) and Railroad Avenue (location of former FC Dry Cleaners, described above); however, no evidence of dry cleaning was indicated on the historic map. Several adjacent stores also exist along Railroad Avenue, between Orchard Avenue and Glen Head Road. A post office

was noted to exist at one of these locations. A commercial building is also depicted along Railroad Avenue at a location south of the former FC Cleaners. **Ref.: 2.**

A railroad station building is shown east of the tracks, along the west side of Railroad Avenue, south of Glen Head Road. A hotel was depicted on the 1932 map in the vicinity of the Glen Head Groundwater Plume site along the north side of Glen Head Road, approximately150 feet east of the railroad tracks. A freight depot is shown on the 1932 map to be located approximately 900 feet north of Glen Head Road, along the east side of the railroad tracks. Further east along the north side of Glen Head Road, an auto service establishment (approximately 700 feet east of Railroad Avenue) and the Post Brick Company (approximately 1500 feet east of Railroad Avenue) exist. Coverage of the TransTechnology property located north of Glen Head Road was not provided on the 1932 historic map that was reviewed. **Ref.: 2.**

The 1943 historic map is relatively unchanged from the 1932 map. Two additional filling stations (with USTs) are now shown to be located at the Glen Head Road/Glen Cove Avenue intersection (at the northwest and southeast corners). The filling station at the northeast corner of the intersection of Glen Head Road and Glen Cove Avenue still exists, and an "auto greasing" building has been added at this property since 1932 (approximately 60 ft north of Glen Head Road). The small shop previously noted to exist along the west side of Maple Place (across from the coal yard) is not depicted in the 1943 map. The coal yard and railroad track configurations are basically unchanged since 1932. Along the east side of Dumond Place, a 500,000 gallon water tank is shown to exist approximately 250 feet north of Glen Head Road (at current location). A new office building is also shown along the east side of Dumond Place, just south of the water tank. A filling station (present location of automobile repair shop) located along the north side of Glen Head Road has been constructed since 1932, between Dumond Place and the railroad tracks. Another filling station was constructed by 1943 at the southeast corner of the intersection of Railroad Avenue and Glen Head Road. Post Brick Company is no longer depicted on the 1943 map. **Ref.: 2.**

Significant development along Glen Cove Avenue is still not depicted in the 1943 map. The property containing the former C Cleaners along the north side of Glen Head Road is also not shown to be developed as of 1943. The buildings that have housed GH Cleaners, SV Cleaners, and FC Cleaners are still depicted (basically same configurations as shown in 1932; no specific dry cleaning activities noted). The building located near the northeast corner of the Dumond Place/Glen Head Road intersection (unnamed possible source; labeled as "pressing and cleaning" on 1932 map) still exists, but the building use is not specified on the 1943 map. The hotel noted on the 1932 historic map is still shown to be present along north side of Glen Head Road. The 1943 map that was reviewed does not provide coverage of the TransTechnology site. **Ref.: 2.**

The following paragraphs provide brief discussions of the potential sources (and also the TransTechnology site) that were identified during the PSA. Figure 2 provides a lay-out of the Glen Head Groundwater Plume site and the locations of the potential sources.

GH Cleaners: Glen Head Cleaners (Tax Section No. 21, Block 228, Lot 17) is an active dry cleaning facility located at the northwest corner of the intersection of Dumond Place and Glen Head Road (see Figure 2). It appears that dry cleaning operations currently take place in the ground floor of the three-story structure and within the one-story building extension off of the north side of the structure, along Dumond Place. The building that houses GH Cleaners has been in existence since at least 1932. It has been noted that PCE was historically used and disposed of at the site (see below). Glen Head Cleaners has an EPA ID No. of NYD077359529 and is listed as a large quantity (hazardous waste) generator. RCRA violations (SRC #5896) have also been noted to have occurred at this facility. **Ref.: 2, 3, 5, 6.**

Representatives of NCDOH conducted an inspection of GH Cleaners at 56 Glen Head Road on 22 January 1980 (it was not determined through file information what prompted this investigation). A survey form was prepared that noted equipment make/model; reclamation processes; chemical usage; liquid discharges; and solid discharges. It was noted that 600 gallons per year of PCE were purchased by the facility, and that liquid discharge at the facility occurred one time per week (quantity of 1 quart per week). The still and drier were noted to have liquid wastes that went to a drain. Solid discharges at the GH Cleaners facility in 1980 were noted to be cartridge filters, that were disposed of about every 3 months. Further notes that were made during the NCDOH inspection (22 January 1980) were that no sewer system was available to serve the facility; the facility operated about 25 hrs per week; machines were vented to the outside; there were two ceiling and two wall exhaust fans; and that bulk materials were stored on-site in a tank of sorts. As noted in a 2 December 1980 letter from NCDOH (Reference No. 8), it was evidently determined sometime in 1980 that wastewater containing PCE was being disposed of at the facility onto the ground surface or through plumbing into a septic tank system or cesspools. NCDOH noted that such disposal practices were in violation of ECL, Article 17, Titles 7 and 8, 6NYCRRR Parts 750-757. GH Cleaners was instructed to cease this discharge practice immediately and provide an adequate receptacle for all future PCE/solvent wastes. Wastes collected were to be held on-site for disposal through a NYSDEC registered industrial waste scavenger, and, where possible, wastewaters were to be utilized in dry cleaning processes (i.e., pre-spotting). **Ref.: 7, 8.**

A subsequent inspection (4 December 1980) was conducted by NCDOH. No cause for action was identified. Several periodic inspections of the GH Cleaners facility were made by NCDOH (see Reference No. 9). Overall inspection ratings of "Satisfactory" were given by NCDOH in 1981, 1985, 1987, 1989, 1990, 1991, 1992, 1993, 1994, 1995, and 1996. Safety Kleen was identified as the certified industrial waste scavenger for the facility, starting in 1987. **Ref.: 9.**

On 3 February 1988, a letter was sent to the GH Cleaners facility from NCDOH. The letter outlined the requirements of Article XI of the Nassau County Health Ordinance and how it requires the registration and regulation of toxic and hazardous materials stored in USTs, ASTs, containers, or in bulk. NCDOH indicated in the letter that, according to its files for GH Cleaners, the facility may fall under Article XI provisions. GH Cleaners was identified as facility ID #512 in the letter. **Ref.: 10.**

An application for an Article XI toxic or hazardous materials storage facility permit was filed by GH Cleaners in 1988 and 1989. Three items/areas were submitted for registration: one 550 gallon #2 fuel oil tank, located north of the facility building along Dumond Place; an indoor storage area (housing various dry cleaning equipment/processes/chemicals, such as washing machines, PCE storage drums, miscellaneous spotting chemicals drum, and miscellaneous waterproofing chemicals); and an outdoor bulk storage area, located west of the building (for PCE waste including still bottoms and spent cartridge filters). A copy of the application form is included as Reference No. 11. No record of investigations of the outdoor bulk storage area (area S-2 noted in the application) was found during file searches. **Ref.: 11.**

An on-site inspection was conducted by personnel from NYSDEC and NCDOH on 31 July 1998. Activities associated with the generation of hazardous wastes (various dry cleaning processes) were noted. Several notices of violations were also issued, as shown in a compilation of facility information included as Reference No. 12. Many of the compliance violations cited were associated with improper storage of PCE waste, improper labeling of storage containers, and miscellaneous operational and facility issues. Subsequent reports noted that the first generation dry cleaning machines were disconnected in August 1998, and that GH Cleaners was investigating the use of a non-PCE dry cleaning solvent. **Ref.: 12, 13.**

PCE contamination in an interior floor drain/drywell (Class V injection well) was identified at GH Cleaners (no information pertaining to the discovery of the contamination was found during the file reviews). P.W. Grosser of Bohemia, New York, was subsequently hired in 1997 to conduct an investigation of the drywell structure, under the USEPA Underground Injection Control (UIC) program. Elevated concentrations of PCE (as high as 2,100 ppm) were detected in sediment samples collected from beneath the drywell structure. As documented in the P.W. Grosser Closure Report (see Reference No. 14), contaminated sediment within the interior drywell was delineated, removed, and disposed of off-site. The Class V structure and associated piping were also decommissioned. EPA closed the file on this UIC action in February 1999. However, no investigations of other on-site areas, such as sanitary systems or outdoor stormwater drywells, were evidently conducted at GH Cleaners. It is possible that discharges of wastes from potential PCE sources at GH Cleaners may have historically occurred into on-site sanitary or drywell structures. **Ref.: 14, 15.**

C Cleaners: Charrell Cleaners (Tax Section No.21, Block 228, Lot 12) was formerly located at 36 Glen Head Road, approximately 200 ft west of Dumond Place. It was not determined during file reviews when C Cleaners functioned; however, historic maps revealed that the building that housed C Cleaners was constructed sometime after 1943. A restaurant, Ruby Café, currently occupies the one-story brick building. No information pertaining to on-site investigations, waste storage, spills, or violations was found for C Cleaners during the records searches that were conducted for the PSA. As noted, it is possible that discharges of wastes from this potential source may have historically occurred into on-site sanitary or drywell structures. **Ref.: 2, 3.**

Unnamed Cleaners east of GH Cleaners: This facility was identified on the 1932 historic map that was reviewed for the PSA ("pressing and cleaning" were noted to occur). The building, which still exists, is located near the northeast corner of the Dumond Place/Glen Head Road intersection (across Dumond Place from GH Cleaners, at 62 Glen Head Road; Tax Section 21, Block N-3, Lot 18). The two-story building appears to have a wood frame construction, and is currently occupied by a florist. No record of any on-site investigation, waste storage, spills, or violations was found during file searches that were conducted for the PSA. As noted, it is possible that discharges of wastes from this potential source may have historically occurred into on-site sanitary or drywell structures. **Ref.: 2, 3.**

SV Cleaners: The one-story masonry building that houses SV Cleaners has historically been located at 3 Station Place (just west of the LIRR tracks, approximately 50 ft south of Glen Head Road) since as early as 1932. No tax information was obtained for this facility. It has been reported that this facility is solely used today as a pick-up/drop-off location for dry cleaning, and that there is no active dry cleaning conducted at the premises. Active dry cleaning may have been conducted at the property historically. No other on-site information pertaining to spills, waste disposal, or violations was found during the records searches that were conducted for the PSA. As noted, it is possible that discharges of wastes from this potential source may have historically occurred into on-site sanitary or drywell structures when dry cleaning operations were occurring at the facility. **Ref.: 2, 3, 16.**

FC Cleaners: This former dry cleaning facility (Tax Section No. 20, Block 13, Lot 314) was located on the southeast corner of the intersection of Railroad Avenue and School Street (address: 22 Railroad Avenue), in the vicinity of the eastern portion of the Glen Head Groundwater Plume site. Dry cleaning occurred at this location historically. NCDOH files show that FC Cleaners has been out of business since 1988. Files also show that an illegal discharge of contaminated liquid waste to on-site sanitary systems occurred; however, no record of sampling/investigation was found. The two-story concrete block building is currently occupied by a doctor's office. FC Cleaners is listed as a RCRA large quantity generator (EPA ID No. NYD082782079). No other information pertaining to on-site investigations, waste disposal activities, spills, or violations was found during the records searches that were conducted for the PSA. As noted, it is possible that discharges of wastes from the potential sources may have historically occurred into on-site sanitary or drywell structures. **Ref.: 2, 3, 5, 6, 16.**

TransTechnology site: Until 1978, the TransTechnology site (Tax Section No. 21, Block N3, Lot 21) located north of Glen Head Road (at 1 Roberts Lane) was used by Lundy Electronics Company (Lundy) as a machine shop and electronics manufacturing facility. In the early 1980s, Lundy was acquired by TransTechnology, an electronics assembler. Since that time, portions of the site have been leased by TransTechnology to various tenants whose activities have reportedly included woodworking, metals fabrication, and warehousing. Until 1994, TransTechnology assembled electronic components on-site, and a waste manifest from as recently as 1997 (see Reference No. 17a) shows that TCE and PCE wastes were generated on-site. Since 1992, site assessments of the TransTechnology property have occurred. Investigations consisted of

monitoring well and soil boring installation. Soil, soil vapor, groundwater, drywell liquid, and drywell sediment samples have been collected and analyzed. No significant concentrations of VOCs have been detected in on-site soils, but on-site groundwater contained elevated concentrations of several VOCs, including PCE, at up to 16,000 ug/l (from a monitoring well located at the southern part of property, approximately 150 ft north of Glen Head Road). Chromium has also been detected at elevated levels at the TransTechnology site, at concentrations up to 2,870 ppm in on-site soil/sediment and 200 ug/l in on-site groundwater. **Ref.: 17, 17a, 18.**

Investigations at the TransTechnology site have also found that soils underlying the site consist of fine to medium sands. Geophysical logging data also suggested that a silty zone is located across the site at the 45 to 90 ft depth. The water table was reported to be located approximately 110 ft bgs, and the general direction of groundwater flow at the site was reportedly toward the northwest. Investigations conducted by Eder in 1992 suggested that on-site groundwater was contaminated with VOCs originating from an off-site source. **Ref.: 17, 18.**

After a follow-up site investigation performed in 1993, which included additional soil and groundwater sampling at the TransTechnology site, Eder stated that there were no active VOC sources on the TransTechnology property. Eder also reported that a PCE and TCE groundwater plume was present at the southwest portion of the property, and that this plume had migrated onto the TransTechnology property from an off-site upgradient source. The likely source was reported to be a dry cleaning facility located along Glen Head Road. Concentrations of VOCs were also found in on-site, upgradient monitoring wells. A small area of near-surface VOC-impacted soil was found in the vicinity of a leaching pool at the TransTechnology site. However, according to Eder, site data did not indicate that VOCs were migrating vertically to the groundwater table. Summaries of the 1992 and 1993 Eder investigations are included within the Conestoga-Rovers & Associates Subsurface Investigation Report (1997) that is included as Reference No. 18. The 1996-1997 Conestoga-Rovers & Associates site investigation yielded similar conclusions to the Eder assessments. In addition, it was concluded that the groundwater contamination at the TransTechnology site was limited primarily to the upper 10 ft of the saturated zone and that TCE measurements in on-site groundwater could be attributed to an off-site and/or an on-site source based on the groundwater flow pattern and distribution. **Ref.: 18.**

3. RELEASE OR THREATENED RELEASE INTO THE ENVIRONMENT OF A HAZARDOUS SUBSTANCE, OR POLLUTANT OR CONTAMINANT (be certain to indicate whether this is a release from a facility as defined in 40 CFR 300.5)

The Glen Head Groundwater Plume site (see Figure 2) lies in the area located immediately south of the TransTechnology site that has known groundwater contamination and past on-site industrial activities. Investigations at the TransTechnology site indicated that on-site groundwater had concentrations of up to 16,000 ug/l of PCE. A PSA was initiated for the NYSDEC by Lawler, Matusky & Skelly Engineers LLP (LMS) in September - October 1999 in

an attempt to determine locations of PCE sources and local groundwater flow conditions. After a review of the initial PSA data, a second phase of investigatory work was conducted in May 2000 to better characterize the site and the potential sources of groundwater contamination. A detailed summary of the PSA is described below (see Item No. 4). As alluded to, the major contaminant of concern targeted at the Glen Head Groundwater Plume site was PCE, a compound used in dry cleaning. **Ref: 17.**

Since PCE contamination was documented at the Glen Head Groundwater Plume site during the PSA, it is suspected that releases of PCE occurred at the site. This contamination may have contributed to the groundwater contamination that was previously detected at the former TransTechnology site. Possible sources of PCE contamination have been identified during the PSA (i.e., the five active/former dry cleaning facilities described above); however, definite sources of contamination could not be confirmed during the PSA. It is probable that at least one - and possibly more- of the five potential sources noted above (or other sources not identified herein) have contributed to the local groundwater contamination. In addition, it is possible that improper handling of PCE/PCE waste or poor housekeeping practices (for instance, the discharge of wastes to an interior drywell at the GH Cleaners facility [described above]) that may have historically occurred at the potential source facilities may have resulted in releases of PCE to the subsurface at the Glen Head Groundwater Plume site.

4. SITE ASSESSMENT ACTIVITIES / OBSERVATIONS

The PSA was conducted for the Glen Head Groundwater Plume site (Site No. 1-30-098) by LMS to characterize PCE contamination in on-site groundwater and to evaluate potential contaminant sources and groundwater flow patterns at the site. As part of the PSA, reviews of agency files (NYSDEC Region 1 office in Stony Brook, New York; NYSDEC main office in Albany, New York; the New York State Department of Health (NYSDOH) office in Albany, New York, and the NCDOH office in Mineola, New York) and historic maps were conducted.

Possible VOC sources at the Glen Head Groundwater Plume site were initially identified by NYSDEC Region 1, based on groundwater data obtained from the TransTechnology site that is located in an apparent downgradient position from former and active dry cleaning facilities in the vicinity of Glen Head Road and Dumond Place. Elevated levels of PCE (as high as 16,000 ug/l), TCE (1800 ug/l), and other VOCs were detected in the groundwater at the TransTechnology site, indicating that the sole source aquifer had been impacted. An auto body repair shop (located at 66 Glen Head Road, approximately 125 ft east of Dumond Place) was also identified as being a potential source of the contamination. **Ref: 17.**

On July 16 1999, a site reconnaissance of the Glen Head Groundwater Plume site area was conducted by LMS to delineate groundwater sample locations and observe the physical layout of the site. The initial portion of the PSA field activities was conducted by LMS in September and October 1999 to attempt to determine groundwater contaminant sources. As the major

contaminant of concern at the site was anticipated to be PCE, active and former dry cleaning facilities were primarily targeted as potential sources (as described above). In particular, three such properties in the presumed upgradient position of the TransTechnology site (GH Cleaners, SV Cleaners, and the unnamed former dry cleaning establishment on the corner of Dumond Place and Glen Head Road) were initially (1999) evaluated for the Glen Head Groundwater Plume site PSA.

During the initial phase of the PSA field work, a total of four monitoring wells and four hydropunches were conducted: one monitoring well was located along Station Place (MW-1), one monitoring well was located along Railroad Avenue (MW-2), one monitoring well was placed along Maple Place (MW-3), and one well was installed along Dumond Place (MW-4). The wells were installed by CT&E Environmental Services (CT&E) of West Creek, New Jersey (a complete description of all PSA field activities is provided below in Section III). The four monitoring wells were subsequently surveyed by YEC, Inc. (YEC) of Valley Cottage, New York, and water levels were obtained by LMS during the course of PSA activities. In addition to the monitoring wells, CT&E conducted hydropunch groundwater sampling at four locations during the initial PSA work. One hydropunch sample was collected along Station Place (HP-1) and three hydropunch samples (HP-2, -3, and -4) were collected on Dumond Place. Figure 3 shows the four monitoring well and four hydropunch locations from the 1999 PSA field activities.

The monitoring wells were installed to a maximum depth of 129 ft bgs, and shallow groundwater samples were collected by LMS at depths ranging from approximately 111 to 120 ft bgs at the well locations. In addition, two to three groundwater samples were collected at each of the four hydropunch locations. The hydropunch groundwater samples were collected from depths ranging from approximately 120 to 160 ft bgs. All groundwater samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by H2M Labs, Inc. (H2M) of Melville, New York, according to NYSDEC Analytical Services Protocol (ASP) Method 95-1. The results are shown in Table 1 and graphically summarized in Figure 3. Laboratory analytical summary sheets are included in Appendix A, and data validation information is contained in Appendix B.

Analysis of groundwater samples collected from on-site monitoring wells during the October 1999 sampling event indicate the presence of elevated concentrations of PCE (18000 ug/l), TCE (130 ug/l), and total 1,2-DCE (61 ug/l) in MW-1, located on Station Place in front of SV Cleaners. These concentrations exceed the NYSDEC Class GA groundwater standards of 5 ug/l.

Concentrations of PCE, TCE, and 1,2-DCE (total) were also found to exceed NYSDEC Class GA standards in groundwater collected from MW-2, located on Railroad Avenue. PCE was detected at a concentration of 1800 ug/l, TCE was present at 43 ug/l, and 1,2-DCE (total) was found at 130 ug/l in MW-2.

Based on preliminary groundwater elevation data, MW-3, located on Maple Place south of Glen Head Road and GH Cleaners, was presumed to be sidegradient to SV Cleaners and upgradient of GH Cleaners and the former dry cleaning facility at the northeast corner of the Dumond Place/Glen Head Road intersection. PCE and TCE levels detected in MW-3 during the 1999 sampling event were found to

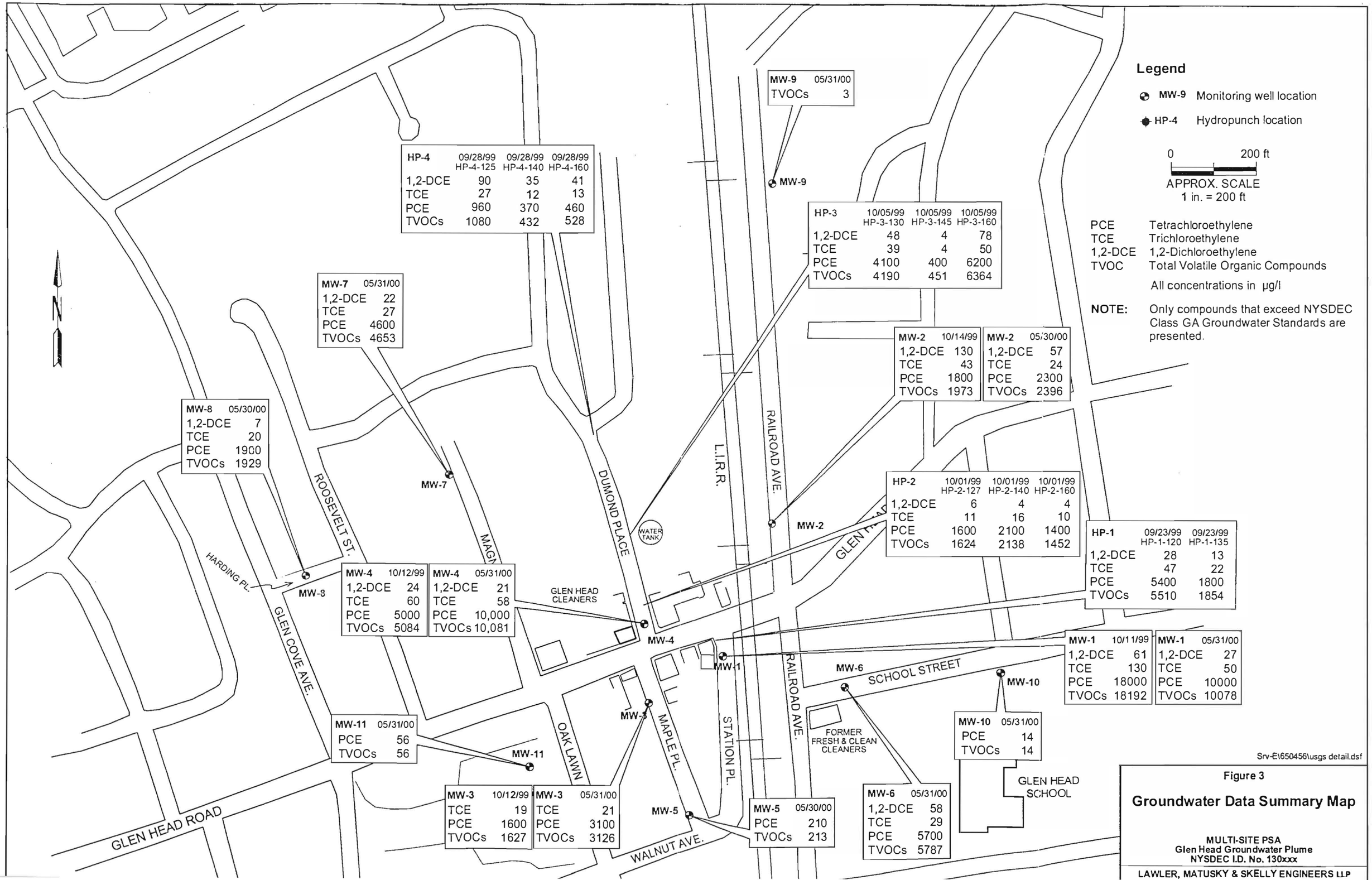


Figure 3

Groundwater Data Summary Map

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP

Table 1 (Page 1 of 6)
GROUNDWATER DATA SUMMARY
Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS160 HP-1-120 9928683 09/23/1999 WATER ug/L	LMS160 HP-1-135 9928684 09/23/1999 WATER ug/L	LMS160 HP-2-127 9929686 10/01/1999 WATER ug/L	LMS160 HP-2-140 9929687 10/01/1999 WATER ug/L	LMS160 HP-2-160 9929688 10/01/1999 WATER ug/L	LMS160 HP-3-130 9930429 10/05/1999 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
	[DF1:50]	[DF1:20]	[DF 1:10]	[DF 1:25]	[DF 1:10]	[DF 1:25]	
Volatile Organic Compounds (ug/L)							
Acetone	27 g	14 g	ND g	16 g	32 g	ND g	50 GV
1,1-Dichloroethene	1	ND	ND	ND	ND	2	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	**28**	**13**	**6**	4	4	**48 g**	5
2-Butanone	5 g	2 jg	5 g	2 jg	6 g	ND g	50 GV
1,1,1-Trichloroethane	2	3	1	ND	ND	1	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	1
Trichloroethene	**47 g**	**22 g**	**11**	**16**	**10**	**39 g**	5
Benzene	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	**5400 dg**	**1800 dg**	**1600 d**	**2100 d**	**1400 d**	**4100 d**	5
Toluene	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	1	ND	ND	ND	5
Total VOCs:	**5510**	**1854**	**1624**	**2138**	**1452**	**4190**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Denotes QA/QC sample: ER, equipment rinsate; TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1
(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Compound found in associated blank.
d - Compounds identified in an analysis at a dilution factor.
j - Estimated concentration, compound present below quantitation limit.
GV - Guidance Value
ND - Not detected at analytical reporting limit.
DF - Dilution Factor
g - Value considered estimated based on data validator's report (Appendix B).
Note - Numbers in bold exceed cleanup standard.

Table 1 (Page 2 of 6)
GROUNDWATER DATA SUMMARY
Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS160 HP-3-145 9930430 10/05/1999 WATER ug/L	LMS160 HP-3-160 9930431 10/05/1999 WATER ug/L	LMS160 HP-4-125 9929528 09/28/1999 WATER ug/L	LMS160 HP-4-140 9929529 09/28/1999 WATER ug/L	LMS160 HP-4-160 9929530 09/28/1999 WATER ug/L	LMS168 MW-1 9931123 10/11/1999 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
	[DF 1:5]	[DF 1:50]	[DF 1:10]	[DF 1:5]	[DF 1:5]	[DF 1:500]	
Volatile Organic Compounds (ug/L)							
Acetone	33 g	26 g	ND g	13 g	8 g	ND	50 GV
1,1-Dichloroethene	ND	2	ND	ND	ND	1	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	4 g	**78 g**	**90**	**35**	**41**	**61**	5
2-Butanone	8 g	5 jg	ND	ND	ND	ND	50 GV
1,1,1-Trichloroethane	2	3	ND	2	2	ND	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	1
Trichloroethene	4 g	**50 g**	**27**	**12**	13	**130**	5
Benzene	ND	ND	ND	ND	1	ND	1
Tetrachloroethene	**400 d**	**6200 d**	**960 d**	**370d**	**460 d**	**18000 bdg**	5
Toluene	ND	ND	2	ND	3	ND	5
Styrene	ND	ND	1	ND	ND	ND	5
Total VOCs:	**451**	**6364**	1080	**432**	528	**18192**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Denotes QA/QC sample. ER, equipment rinsate; TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1.
(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Compound found in associated blank.
d - Compounds identified in an analysis at a dilution factor.
j - Estimated concentration; compound present below quantitation limit.
GV - Guidance Value.
ND - Not detected at analytical reporting limit.
DF - Dilution Factor.
g - Value considered estimated based on data validator's report (Appendix B)
Note - Numbers in bold exceed cleanup standard.

GROUNDWATER DATA SUMMARY

Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS178 GHMW1 20000531-095 05/31/2000 WATER ug/L	LMS168 MW-2 9931559 10/14/1999 WATER ug/L	LMS178 GHMW2 20000531-011 05/30/2000 WATER ug/L	LMS168 MW-2A* 9931124 10/12/1999 WATER ug/L	LMS168 MW-3 9931125 10/12/1999 WATER ug/L	LMS178 GHMW3 20000531-096 05/31/2000 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
	[DF 1:100]	[DF 1:25]	[DF 1:20]	[DF 1:100]	[DF 1:16]	[DF 1:20]	
Volatile Organic Compounds (ug/L)							
Acetone	ND	ND	ND	ND	ND	ND	50 GV
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	**27**	**130**	**57**	**24**	3	3	5
2-Butanone	ND	ND	ND	ND	ND	ND	50 GV
1,1,1-Trichloroethane	1	ND	1	2	2	2	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	1
Trichloroethene	**50**	**43 g**	**24**	**66**	**19**	**21**	5
Benzene	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	**10000d**	**1800 d**	**2300 d**	**5200 bdg**	**1600 bdg**	**3100 d**	5
Toluene	ND	ND	ND	4	3	ND	5
Styrene	ND	ND	ND	ND	ND	ND	5
Total VOCs:	**10078**	**1973**	**2382**	**5296**	**1627**	**3126**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Denotes QA/QC sample. ER, equipment rinsate; TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4 Sample GHMW12 is blind duplicate of sample GHMW1.
(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.
b - Compound found in associated blank.
d - Compounds identified in an analysis at a dilution factor.
j - Estimated concentration; compound present below quantitation limit.
GV - Guidance Value.
ND - Not detected at analytical reporting limit
DF - Dilution Factor.
g - Value considered estimated based on data validator's report (Appendix B).
Note - Numbers in bold exceed cleanup standard.

GROUNDWATER DATA SUMMARY

Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS168 MW-4 9931126 10/12/1999 WATER ug/L	LMS178 GHMW4 20000531-097 05/31/2000 WATER ug/L	LMS178 GHMW5 20000531-012 05/30/2000 WATER ug/L	LMS178 GHMW6 20000531-098 05/31/2000 WATER ug/L	LMS178 GHMW7 20000531-099 05/31/2000 WATER ug/L	LMS178 GHMW8 20000531-013 05/30/2000 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
	[DF 1:16]	[DF 1:100]	[DF 1:2.5]	[DF 1:50]	[DF 1:50]	[DF 1:20]	
Volatile Organic Compounds (ug/L)							
Acetone	ND	ND	ND	ND	ND	ND	50 GV
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	**24 d**	**21**	ND	**58**	**22**	**7**	5
2-Butanone	ND	ND	ND	ND	ND	ND	50 GV
1,1,1-Trichloroethane	ND	2	2	ND	4	2	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	1
Trichloroethene	**60 d**	**58**	1	**29**	**27**	**20**	5
Benzene	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	**5000 bdg [DF 1:100]**	**10000 d**	**210 d**	**5700d**	**4600 d**	**1900d**	5
Toluene	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	5
Total VOCs:	**5084**	**10081**	**213**	**5787**	**4653**	**1929**	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1 1.1) with a groundwater effluent limitation less than 100 ug/L

* - Denotes QA/QC sample: ER, equipment rinsate; TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1.

(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998.

b - Compound found in associated blank

d - Compounds identified in an analysis at a dilution factor.

j - Estimated concentration; compound present below quantitation limit

GV - Guidance Value.

ND - Not detected at analytical reporting limit.

DF - Dilution Factor.

g - Value considered estimated based on data validator's report (Appendix B).

Note - Numbers in bold exceed cleanup standard.

Table 1 (Page 5 of 6)
GROUNDWATER DATA SUMMARY
Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS178 GHMW9 20000531-014 06/30/2000 WATER ug/L	LMS178 GHMW10 20000531-100 05/31/2000 WATER ug/L	LMS178 GHMW11 20000531-101 05/31/2000 WATER ug/L	LMS178 GHMW12* 20000531-102 05/31/2000 WATER ug/L	LMS160 ER-1* 9930428 10/05/1999 WATER ug/L	LMS160 TB-1* 9928685 09/24/1999 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
				[DF1:100]			
Volatile Organic Compounds (ug/L)							
Acetone	ND	ND	ND	ND	ND g	ND	50 GV
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	1	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	ND	ND	ND	**28**	ND	ND	5
2-Butanone	ND	ND	ND	ND	ND g	ND	50 GV
1,1,1-Trichloroethane	1	ND	ND	1	ND	ND	5
1,2-Dichloropropane	1	ND	ND	ND	ND	ND	1
Trichloroethene	ND	ND	ND	**50**	ND g	ND	5
Benzene	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	ND	**14**	**56**	**8900 d**	ND	2	5
Toluene	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	5
Total VOCs:	3	14	56	**8979**	ND	2	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Denotes QA/QC sample: ER, equipment rinsate, TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1.
(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998
b - Compound found in associated blank.
d - Compounds identified in an analysis at a dilution factor.
j - Estimated concentration; compound present below quantitation limit.
GV - Guidance Value.
ND - Not detected at analytical reporting limit.
DF - Dilution Factor.
g - Value considered estimated based on data validator's report (Appendix B).
Note - Numbers in bold exceed cleanup standard

Table 1 (Page 6 of 6)
GROUNDWATER DATA SUMMARY
Glen Head Groundwater Plume PSA

SDG Number LMS Sample ID Lab Sample Number Sampling Date Matrix Units	LMS160 TB-2* 9929531 09/29/1999 WATER ug/L	LMS160 TB-3* 9929889 10/01/1999 WATER ug/L	LMS160 TB-4* 9930432 10/06/1999 WATER ug/L	LMS168 TB-5* 9931127 10/11/1999 WATER ug/L	LMS178 TB-5/30* 20000531-015 05/30/2000 WATER ug/L	LMS178 TB-5/31* 20000531-103 05/ 1/2000 WATER ug/L	LMS168 TB-6* 9931660 10/14/1999 WATER ug/L	NYSDEC CLASS GA STANDARDS (a)
Volatile Organic Compounds (ug/L)								
Acetone	ND g	ND g	ND g	ND	ND	ND	ND	50 GV
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	5
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	ND	5
2-Butanone	ND	ND g	ND g	ND	ND	ND	ND	50 GV
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	5
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	1
Trichloroethene	ND	ND	ND g	ND	ND	ND	ND	5
Benzene	ND	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene	1	ND	ND	ND	ND	ND	ND	5
Toluene	ND	ND	ND	ND	ND	ND	ND	5
Styrene	ND	ND	ND	ND	ND	ND	ND	5
Total VOCs:	1	ND	ND	ND	ND	ND	ND	100[1]

1 - This value applies to the total of all organic substances listed in the New York State Groundwater Effluent Limitations table from the Division of Water, Technical and Operational Guidance Series (1.1.1) with a groundwater effluent limitation less than 100 ug/L.
* - Denotes QA/QC sample. ER, equipment rinsate, TB, trip blank. Sample MW-2A is blind duplicate of sample MW-4. Sample GHMW12 is blind duplicate of sample GHMW1.
(a) - NY State Division of Water Technical and Operational Guidance Series (1.1.1) June 1998
b - Compound found in associated blank
d - Compounds identified in an analysis at a dilution factor.
j - Estimated concentration: compound present below quantitation limit
GV - Guidance Value.
ND - Not detected at analytical reporting limit.
DF - Dilution Factor.
g - Value considered estimated based on data validator's report (Appendix B)
Note - Numbers in bold exceed cleanup standard.

exceed Class GA standards with detected concentrations of 1600 and 19 ug/l, respectively.

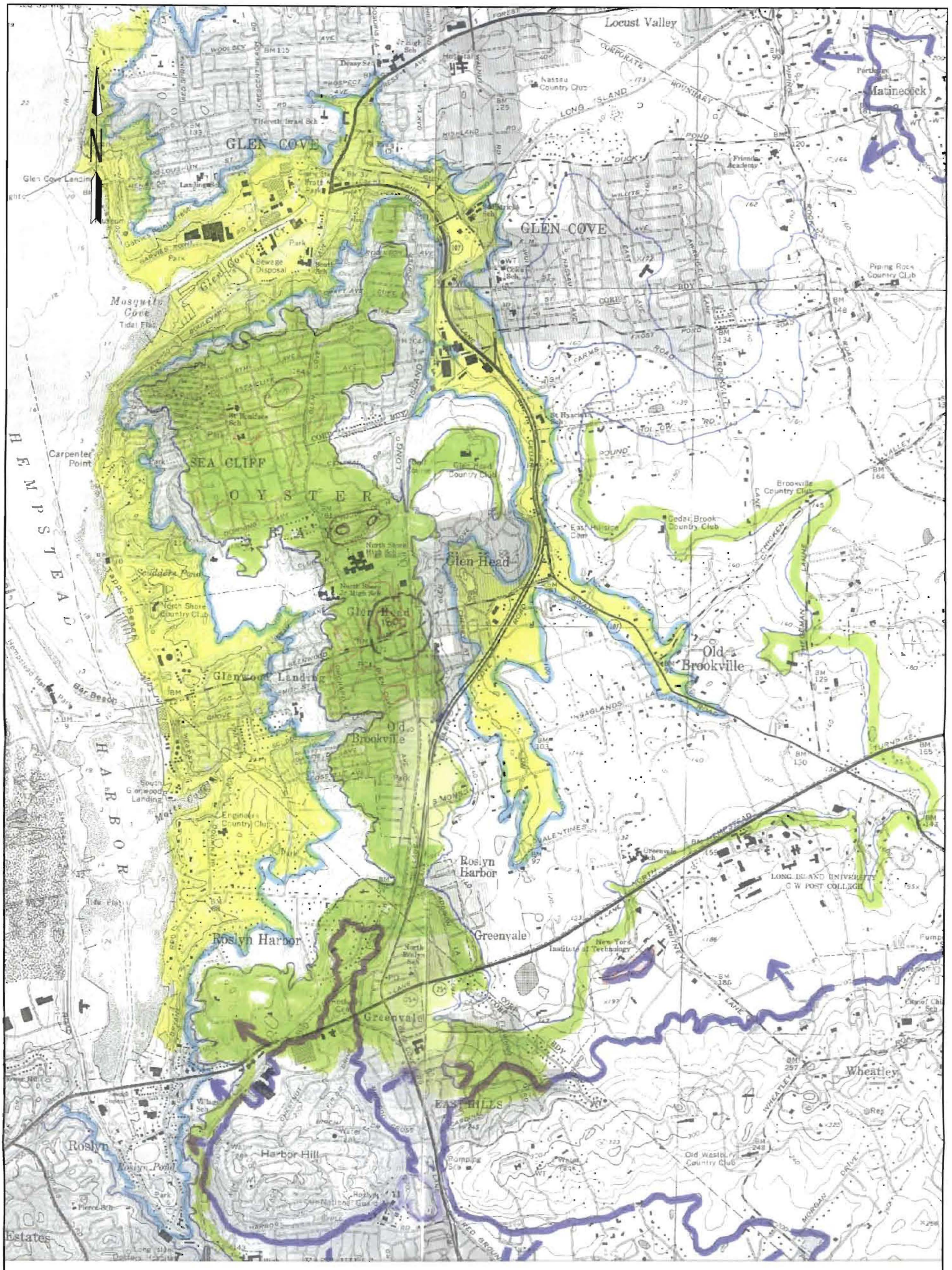
Concentrations of PCE (5000 ug/l), TCE (60 ug/l), and total 1,2-DCE (24 ug/l) in groundwater collected from MW-4 during the October 1999 sampling episode were also found to exceed the respective Class GA standards. MW-4 was installed along Dumond Place, between the GH Cleaners property and the unnamed former dry cleaning facility (see Figure 3).

Hydropunch groundwater samples were collected from two depths at HP-1, located north of MW-1 near the intersection of Station Place and Glen Head Road. In the sample collected from 120 ft bgs, PCE (5400 ug/l), TCE (47 ug/l), and total 1,2-DCE (28 ug/l) were detected at levels exceeding the NYSDEC Class GA groundwater standard of 5 ug/l for each of these compounds. Concentrations of these compounds were also found to violate Class GA standards in the groundwater collected from the deeper interval (135 ft bgs) at HP-1. The PCE, TCE, and total 1,2-DCE concentrations detected at this depth were 1800, 22, and 13 ug/l, respectively. As shown on Table 1, groundwater samples collected from HP-2, HP-3, and HP-4 also had elevated levels of these three VOCs.

During the period of time that the first phase of PSA work was taking place, the owner of GH Cleaners corresponded with NYSDEC regarding information relating to active and former dry cleaning locations in Glen Head. In a letter dated 15 September 1999 the owner provided NYSDEC with a map detailing the locations of active and former facilities in the vicinity of the site. Dry cleaning activities along the western portion of the site (i.e., along Glen Cove Avenue) and at the eastern portion of the site (FC Cleaners) were highlighted, along with the three active/former dry cleaners that were initially targeted during the 1999 PSA work. **Ref.: 19.**

Based on the new information regarding dry cleaning operations in the site area and the results of the hydropunch and monitoring well sampling that occurred in September - October 1999, it was clear that the primary objectives of the PSA (i.e., to delineate the extent of groundwater contamination at the site, to identify or confirm one or more potential source areas and upgradient, "clean"[i.e., non-VOC contaminated] groundwater locations) had not been accomplished. As depicted on Table 1 and Figure 3, PCE was detected at elevated levels in all eight of the 1999 groundwater sample locations. After a review of this initial PSA data and the potential source locations identified, it was surmised that a localized groundwater flow pattern different from the regional flow, or other PCE sources, could possibly exist at the Glen Head Groundwater Plume site.

A subsequent (January 2000) study of topography and groundwater flow in the site area was conducted by LMS. Reviews of monitoring well elevations and groundwater levels (obtained from the first phase of the PSA) and site maps were conducted in an attempt to better characterize groundwater flow at the site. A localized topographic high (and, thus, a potential hydrogeologic high) was identified to exist northwest of the area originally investigated for the PSA. Site area topography can be viewed in Figures 4 and 5. A review of groundwater levels (and the surmised local groundwater flow pattern) obtained from the four monitoring wells installed during the first phase of the PSA did not appear to demonstrate any influence from this local topographic feature. However, as the four monitoring wells were all located east of the localized topographic high, the actual groundwater flow patterns over the entire site could not be confirmed.



LEGEND

- Areas with topographic elevations greater than 150 ft MSL
- Areas with topographic elevations less than 100 ft MSL
- 200 ft MSL contour line in vicinity of site

0 2000'

Scale in Feet
(1 in. = 2275')

\glenheadtopography.dsf

LMS Lawler, Matusky & Skelly Engineers LLP One Blue Hill Plaza • Pearl River, New York 10965 ENVIRONMENTAL SCIENCE & ENGINEERING CONSULTANTS	MULTI-SITE PSA Glen Head Groundwater Plume NYSDEC I.D. No. 130xxx	Regional Topographic Map	Figure 4

Not to scale

Srv-E\650456\GlenHead 3d.dsf

Figure 5

3-Dimensional Topography Map of Site Area

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

The initial (1999) PSA data appeared to document a significant, widespread contaminant plume and provided a tentative confirmation of groundwater flow direction. In general, the site was found to be complicated by the fact that there were several potential sources of contamination and the first phase PSA data did not clearly indicate the actual source(s). The 1999 PSA data provided rationale for the needs to conduct additional investigations for the site PSA, to conclusively identify groundwater contamination sources, and to fully understand the local hydrogeology.

Thus, the second phase of PSA work was initiated (in April 2000) to attempt to identify and investigate all potential sources of the contamination. Existing data and additional information pertaining to the Glen Head Groundwater Plume site area were evaluated. Based on these data (and hydrogeological and topographical analyses), seven additional monitoring well locations were determined. The monitoring wells were installed in May 2000 by American Auger & Ditching (American Auger) of Constantia, New York, to attempt to better characterize the local hydrogeology and groundwater contamination potentially associated with up to five active and former dry cleaning facilities in the site vicinity. The seven new monitoring wells were surveyed by YEC. In addition, existing observation wells previously installed at gasoline service stations on the northwest and southeast corners of the intersection of Glen Cove Avenue and Glen Head Road (western portion of Glen Head Groundwater Plume site) were surveyed since permission was obtained to collect water level data. An attempt was also made to gain access to monitoring wells on the TransTechnology property for the purpose of measuring water levels; however, access to this property for the PSA was denied. Figure 3 displays the location of the seven new monitoring wells (MW-5 through MW-11). A detailed description of field activities, including monitoring well installations, is included below in Part III.

Groundwater samples from all 11 PSA monitoring wells (four installed in 1999; seven installed in May 2000) were collected in May 2000 by LMS and analyzed by H2M for TCL VOCs. Table 1 and Figure3 include summaries of the analytical results. Laboratory analytical summary sheets are included in Appendix A, and data validation information is contained in Appendix B.

During the May 2000 PSA sampling event, the four monitoring wells (MW-1, MW-2, MW-3, and MW-4) were re-sampled. MW-1, located near SV Cleaners along Station Place, again contained elevated concentrations of PCE (10,000 ug/l), TCE (50 ug/l), and 1,2-DCE (27 ug/l). However, the concentrations of these compounds had decreased from the 1999 sampling event. MW-2 (located along Railroad Avenue) also contained elevated concentrations of the same three VOCs, at levels similar to those detected during the 1999 sampling event (PCE: 2300 ug/l; TCE: 24 ug/l; and 1,2-DCE: 57 ug/l). Elevated concentrations of PCE (3100 ug/l) and TCE (21 ug/l) were again detected in MW-3, located along Maple Place, just south of Glen Head Road. The TCE concentration detected during the May 2000 sampling event was similar to the level found in October 1999 (19 ug/l); however, the PCE concentration detected in May 2000 had increased from the 1999 level of 1600 ug/l. MW-4, located along Dumond Place just north of Glen Head Road and between GH Cleaners and the unnamed former dry cleaners, again was found to contain elevated concentrations of PCE (10,000 ug/l), TCE (58 ug/l), and 1,2-DCE (21 ug/l). As shown on Table 1, the TCE and 1,2-DCE levels detected during the two PSA sampling episodes were found to be similar. However,

the concentration of PCE was observed to have increased from 5,000 ug/l (October 1999) to 10,000 ug/l (May 2000).

During the May 2000 PSA field work, seven new monitoring wells (MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, and MW-11 - refer to Figure 3) were installed, as noted above. Section III of this report includes a complete description of the monitoring well locations and PSA field activities. Copies of all Glen Head Groundwater Plume site PSA field notes are included in Appendix C.

MW-5 was positioned on the south end of Maple Place (approximately 400 ft south of Glen Head Road) near the intersection of Walnut Avenue. Since MW-3, located north of MW-5 on Maple Place, was originally thought to be situated upgradient of potential PCE sources (i.e, GH Cleaners, unnamed former dry cleaners) but was found to contain significant levels of VOCs, MW-5 was drilled further south of Glen Head Road to possibly provide a "clean", upgradient sampling point. However, a PCE concentration of 210 ug/l (above the Class GA standard of 5 ug/l) was detected in MW-5 during the May 2000 groundwater sampling.

Monitoring well MW-6 was installed on School Street just east of the Railroad Avenue intersection. This location is just north of the former property at which FC Cleaners operated (22 Railroad Avenue) and was chosen to address the presence of drywells (and possible historic PCE/PCE waste discharges) in a small parking lot at the rear of the property. During the May 2000 sampling event, elevated concentrations of PCE (5,700 ug/l), TCE (29 ug/l), and 1,2-DCE (58 ug/l) were found.

MW-7 was installed at the north end of Magnolia Avenue (see Figure 3). This location was selected since it is at nearly the highest ground surface elevation in the area (refer to Figures 4 and 5), and if local groundwater flow is controlled by topography it would be expected that this point could be "clean" and upgradient relative to other samples collected from lower topographical points. If the topography was found not to influence the local groundwater flow, however, this well would still aid in delineating the extent of contamination that is downgradient or sidegradient to the potential PCE sources identified at the site. Elevated levels of three VOCs (PCE: 4,600 ug/l; TCE: 27 ug/l; and 1,2-DCE: 22 ug/l) were detected in MW-7 in May 2000.

MW-8 was installed along Harding Place, near the western boundary of the Glen Head Groundwater Plume site. The well was installed at a somewhat lower topographical elevation from MW-7. However, if the topography was found not to influence the local groundwater flow, MW-8 would still aid in delineating the extent of contamination that is downgradient or sidegradient to the five potential PCE sources identified at the Glen Head Groundwater Plume site. [The location of this well was also considered to be a possible downgradient/sidegradient point to evaluate the former and active dry cleaning facilities along Glen Cove Avenue, depending on the results of the PSA groundwater flow analysis.] Analytical results from the May 2000 sampling event showed that elevated levels of PCE (1,900 ug/l), TCE (20 ug/l), and 1,2-DCE (7 ug/l) were present in MW-8.

Monitoring well MW-9 was installed just inside of the northernmost gate of the Town of Oyster Bay highway department storage yard (at the north end of Railroad Avenue, approximately 950 ft north of Glen Head Road). This location was selected since contaminants of concern were detected in the

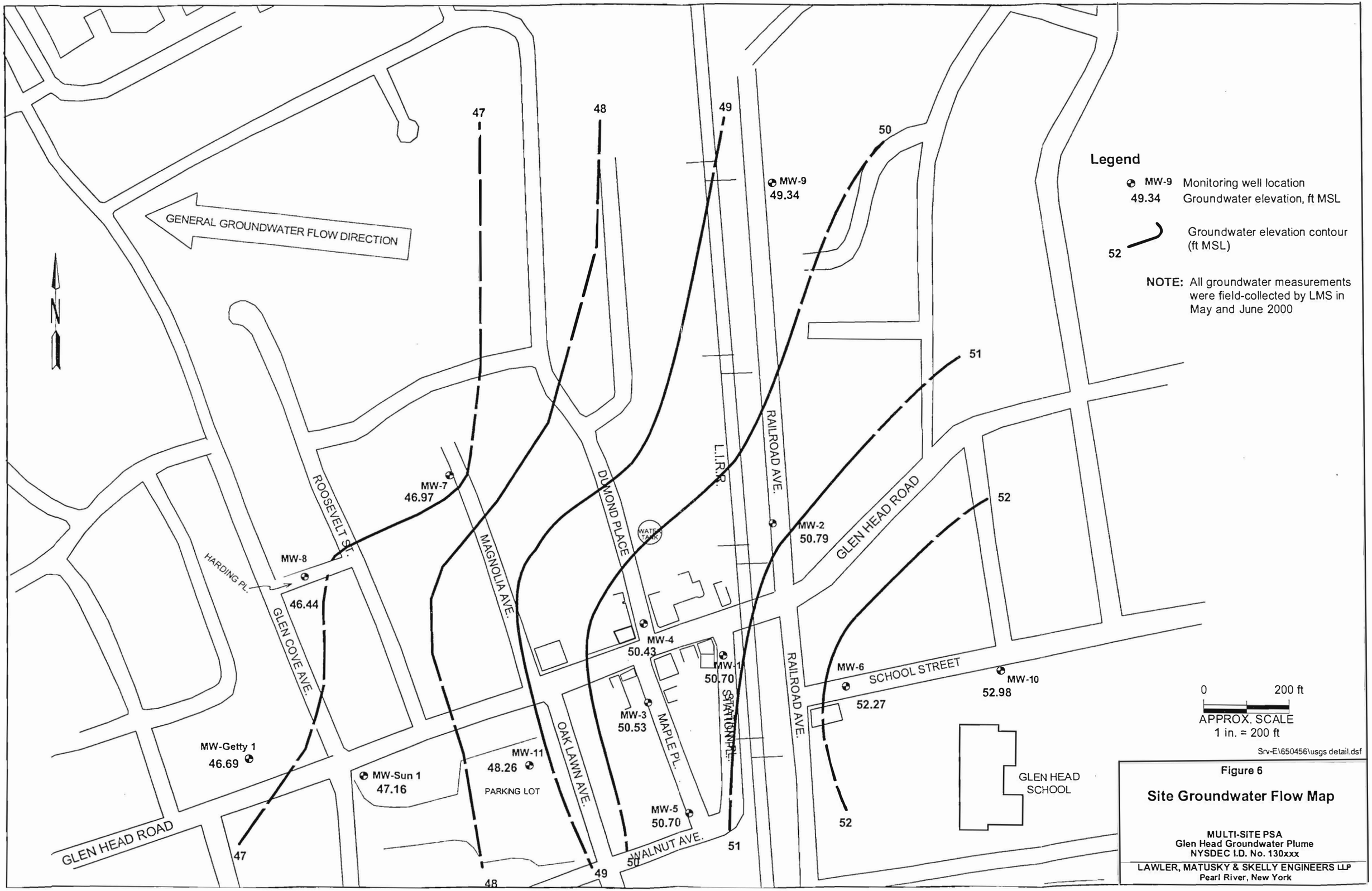


Figure 6

Site Groundwater Flow Map

MULTI-SITE PSA
Glen Head Groundwater Plume
NYSDEC I.D. No. 130xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

first phase of the PSA at MW-2, also located on Railroad Avenue, directly south of MW-9. Thus, an additional sampling point was required to determine the northern extent of VOC contamination at the site. It was also thought that if the topographic high noted to exist west of Dumond Place (see Figures 4 and 5) had an influence on local groundwater flow, then MW-9 may be positioned to detect impacts on the groundwater quality from potential sources southwest of MW-9. No elevated levels of VOCs were detected in MW-9 during the May 2000 PSA sampling. PCE and TCE were not detected in MW-9.

Installation of MW-10 was conducted in the front lawn of the Glen Head School on School Street (see Figure 3). This location was chosen to address the possibility of contaminated groundwater migrating to the east- toward areas with lower ground surface elevations assuming groundwater flow corresponds with topography- from the former FC Cleaners. Due to the low ground surface elevation in the MW-10 vicinity (refer to Figures 4 and 5), this well was installed at a significantly shallower depth than any of the other wells installed as part of the PSA. PCE was detected in MW-10 at a concentration of 14 ug/l, which is slightly above the 5 ug/l Class GA groundwater standard. No other VOCs were detected in this well during the May 2000 sampling event.

MW-11 was installed in a Town of Oyster Bay municipal parking lot located between Oak Lawn Avenue and Glen Cove Avenue (refer to Figure 3). If the local groundwater flow was actually found to be westerly, this monitoring well would be located downgradient and/or sidegradient of the five possible PCE sources identified for the Glen Head Groundwater Plume site. [In addition, if groundwater was ultimately found to flow north or northeast at the site, then MW-11 would be in a sidegradient position to assess possible contamination from the active/former dry cleaners located along Glen Cove Avenue.] One VOC, PCE (56 ug/l), was detected at an elevated concentration during the May 2000 sampling episode. No other VOCs were detected in MW-11.

Static water levels from the 11 PSA monitoring wells, and also from two service station wells along Glen Cove Avenue that were accessed (refer to Section III), were field-measured in May 2000 by LMS. These measurements and the surveyed elevations of the wells were used to calculate groundwater elevations at each location. These groundwater elevations were used to construct a potentiometric surface map of the site area (see Figure 6). Results of the groundwater elevation data analysis indicate that local groundwater flow is to the west-northwest at the site. This westerly gradient is very likely controlled by the proximity of the site to Hempstead Harbor, located approximately 6000 ft west of the site. It thus appears that the local ground topography has no (or very little) effect on the local groundwater flow patterns.

5. CERCLA STATUS

Not assigned.

6. **OTHER ACTIONS TO DATE** (e.g., Federal removal[1], Federal remedial[2] or pre-remedial actions, State actions, other legal violations)

Only the actions described above. Except for the closure of an interior drywell at GH Cleaners (under the EPA UIC program), no other Federal or State remedial actions have occurred to date.

7. **STATE AND LOCAL AUTHORITIES ROLE** (Intervention)

In June 1999, NYSDEC assigned LMS to conduct a PSA to determine locations of PCE sources that are contributing to groundwater contamination and to assess the local groundwater flow conditions.

POSSIBLE THREAT TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES (permits - local, state, and federal)

1. **POSSIBLE THREATS TO THE PUBLIC HEALTH AND WELFARE**

The groundwater sampling data that were generated from the 1999 and 2000 PSA sampling events revealed that concentrations of VOCs analyzed for were above NYS Class GA standards at several locations, as shown in Table 1 and Figure 3. Elevated levels of VOCs, particularly PCE, were detected in the groundwater in the vicinity of (i.e., downgradient, sidegradient) the five active/former dry cleaners described above as possible sources and the TransTechnology site.

The nearest public water supply well is located about 1500 ft to the north of Glen Head Road (side- to upgradient) of the Glen Head Groundwater Plume site. There is also a public supply well located approximately 1.5 miles to the north-northwest (downgradient) of the Glen Head Groundwater Plume site. Both wells are owned and operated by Sea Cliff Water Company. No elevated levels of VOCs have been reported to have impacted either potable supply well; however, given the size and concentrations in the groundwater contaminant plume identified during the PSA, future impacts to the downgradient well may occur if no actions are taken. **Ref.: 20, 26.**

2. **POSSIBLE THREATS TO THE ENVIRONMENT**

As stated above, shallow groundwater at the Glen Head Groundwater Plume site is contaminated with VOCs, particularly PCE. No potential impacts to Hempstead Harbor (surface water located approximately 6000 ft west of the site) or a retention basin/unnamed pond (surface water located about 1700 ft northeast of the site) were identified during the PSA. and no sampling of surface waters was conducted as part of the PSA. **Ref.: 1.**

PERMITS - LOCAL, STATE, AND FEDERAL

GH Cleaners and FC Cleaners are listed as hazardous waste generators in the RCRIS (RCRA

Information System) database, as described in Section I, Item No. 2 above. The RCRIS database identifies hazardous waste permits for generators, receivers, and transporters of hazardous waste. No records of other permits were found during file searches.

EXPECTED CHANGE IN THE ENVIRONMENTAL CONDITIONS SHOULD ACTION BE DELAYED OR NOT TAKEN AS CONSISTENT WITH REPORT INFORMATION AND RECOMMENDATION

Widespread VOC/PCE groundwater contamination was found at the Glen Head Groundwater Plume site. Shallow groundwater was mainly investigated for the PSA, and it is possible that PCE contamination exists in deeper groundwater at the site. As no soil sampling was conducted for this PSA (and only limited soil sampling data were found for GH Cleaners and the TransTechnology site during file searches), it is unknown whether the potential PCE sources identified for this PSA are active.

ENFORCEMENT HISTORY OF THE SITE

1. Is there an organization taking appropriate, timely action?

LMS conducted the PSA under contract to NYSDEC in 1999 and 2000. After a review of the PSA report, NYSDEC will determine the appropriate action.

CITE REFERENCES

1= Short term or emergency action
2= Long term cleanup action
*= Confidential

SITE SKETCH

Provide a sketch of the site with available information. Indicate all pertinent features of the site and nearby environments including: delineation of site boundary, land cover/trees and other vegetation, utilities (water, electrical, gas, sewage, storm drains), sources of wastes, areas of visible and buried wastes, buildings, residences, access roads, parking areas, fences or other barriers restricting access to the site, fields, drainage channel or pathways, water bodies, wells, sensitive environments and other features such as hills and valleys. Be certain to indicate a north arrow.

Refer to Figure 2.

SITE ASSESSMENT REPORT:

PART I: SITE INFORMATION

1a. Site Name/Alias Glen Head Groundwater Plume site

Street Address In the vicinity of Glen Head Road, between Glen Cove Avenue and Railroad Avenue. Address information for five possible sources (active/former dry cleaning facilities) is provided in Section I, Item No.2

City Village of Glen Head (Town of Oyster Bay) **State** New York **Zip Code** 11545

2. County Nassau **County Code*** 30 **Cong. Dist** 3

3. CERCLIS ID No. Not Assigned **Region** NA

4. Tax Map Section No. 20-21 **Block No.** Multiple (refer to Section I) **Lot No.** Multiple (refer to Section I)

5. Latitude 40.833648 **Longitude** 73.627223

USGS Quad: Sea Cliff, New York

6. Approximate size of site: For purposes of this PSA report, the site area is assumed to be bounded by Glen Cove Avenue to the west, the northern end of Railroad Avenue to the north, Railroad Avenue to the east [near Glen Head School], and Walnut Avenue to the south. Approx. 40 acres.

7a. GH Cleaners: Owner Joseph Petruzziello **Telephone Number** 516-676-4367

Street 1 Dumond Place

City Glen Head **State:** NY **Zip Code** 11545

7b. Former C Cleaners: Current Property Owner Michael and Robert Rich **Telephone Number**

Street 12 University Place

City Glen Head **State:** NY **Zip Code** 11545

7c. Former Unnamed Cleaners: Current Property Owner John Caggiano **Telephone Number**

Street 62 Glen Head Road

City Glen Head **State:** NY **Zip Code** 11545

7d. SV Cleaners: Owner Information not available **Telephone Number**

Street

City **State:** **Zip Code**

7e. Former FC Cleaners: Current Property Owner Robert Moskow **Telephone Number**

Street 12 Railroad Avenue

City Glen Head **State:** NY **Zip Code** 11545

8a. GH Cleaners: Operator Same as owner

8b. Former C Cleaners: Operator N/A

8c. Former Unnamed Cleaners: Operator N/A

8d. SV Cleaners: Operator N/A (no active dry cleaning occurs)

8e. Former FC Cleaners: Operator N/A

9. Type of Ownership

Private (X) **Federal ( )** **County ( )** **Municipal ( )**
Unknown ( ) **Other ( )**

10. Owner/Operator Notification on File: Both GH Cleaners and former FC Cleaners are identified in the RCRIS database as large quantity generators.

RCRA 3001 Date _____

Other ***(Specify, Date)*** **Unknown**

11. Permit Information

Permit	Date Issued	Expiration Date

Comments: Both GH Cleaners and FC Cleaners are identified in the RCRIS database as large quantity generators. Refer to Section I, Item No. 2 for additional information.

12. Site Status **Active (X)** **Unknown**

13. Years of Operation

No records were found as to the years of operation of the five potential source identified at the site.

14. Identify the types of waste sources (e.g., landfill, surface impoundment, piles, stained soil, above- or below-ground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) Waste Sources

Waste Unit No.	Waste Source Type	Facility Name for Unit
1.	Groundwater Plume	Not Applicable

(b) Other Areas of Concern N/A.

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

PCE disposal activities were confirmed to have occurred at GH Cleaners (i.e., to an interior drywell) and suspected at other locations at the site. Illegal on-site waste discharges were also reported to have occurred at FC Cleaners (see Section I, Item No. 2).

15. Describe the regulatory history of the site, including the scope and objectives of any previous response actions, investigations and litigation by State, Local and Federal agencies (indicate type, affiliation, date of investigations).

There have been no previous investigations in the vicinity of the Glen Head Groundwater

Plume site, other than investigations conducted at the TransTechnology site and NCDOH/NYSDEC investigations of GH Cleaners (described in Section I, Item No. 2).

a) Is the site or any waste source subject to Petroleum Exclusion? Identify petroleum products and by products that justify this decision.

No.

b) Are pesticides produced and stored on site? Does the facility apply pesticides (FIFRA or Federal Insecticide, Fungicide, and Rodenticide Act) to any part of the property?

The facilities investigated at the site do not produce or store pesticides.

c) Is the site or any waste source subject to RCRA Subtitle C (briefly explain)?

Two of the active/former dry cleaning facilities are listed as large quantity generators in the RCRIS (RCRA Information System) database. The RCRIS database identifies hazardous waste permits for generators, receivers, and transporters of hazardous waste. PCE is a listed "F002" hazardous waste (spent halogenated solvent) under 40 CFR 261.31. Therefore, it is assumed that the PCE detected in the groundwater could be subject to RCRA Subtitle C. **Ref: 3, 5, 6.**

d) Is the site or any waste source maintained under the authority of the Nuclear Regulatory Commission (NRC) ?

No.

16. Information available from:

Contact: Elaine Zuk

Agency: NYSDEC

Telephone Number: (518) 457-0639

Preparer: Michael Musso
Scott Englert
Terry Schneider

Agency/Company:
Lawler, Matusky & Skelly Engineers LLP

Date: September 2000

Telephone Number: (845) 735-8300

PART II: WASTE SOURCE INFORMATION

For each of the waste units (sources) identified in Part I, complete the following items.

Waste Unit (#) 1 -

Source Type

__	**Constituent**	__	**Wastestream**
__	**Landfill**	__	**Contaminated Soil**
__	**Surface Impoundment (buried/backfilled)**	__	**Pile(Specify type: chemical, junk, trash, tailings, etc.)**
__	**Drums**	__	**Land Treatment**
__	**Tanks/Containers**	_X_	**Other(Specify):**Groundwater Contamination

Description:

1. **Describe the types of containers, impoundments or other storage systems (i.e. concrete lined surface impoundment) and any labels that may be present.**

   None identified.

2. **Describe the physical condition of the containers or storage systems (i.e. rusted and/or bulging metal drums).**

   Not applicable.

3. **Describe any secondary containment that may be present (e.g. drums on concrete pad in building or above ground tank surrounded by berm).**

   Not applicable.

Hazardous Waste Quantity - The horizontal and vertical limits of the plume were not fully defined during the PSA. Thus, the quantity of groundwater contamination could not be determined.

Hazardous Substances/Physical State - The hazardous substance of PCE (and common PCE breakdown products) was detected in the groundwater. The original physical state of the substance is presumed to have been a liquid form of PCE solvent or waste material.

PART III: SAMPLING RESULTS

EXISTING ANALYTICAL DATA

Review and summarize any previously existing groundwater, soil, sediment, surface water, air, or waste sample analyses. Discuss the precision, accuracy, representativeness and completeness of previous sampling efforts. Describe the concentrations of chemicals of concern based on available data and media impacted. These parameters should be evaluated by examining the results of routine quality control procedures. Any suspected problems with this data should be identified. This is especially if the data cannot be used for HRS purposes. Any problems should receive the immediate attention of the work assignment manager. Identify data gaps.

A description of previous sampling efforts, including summaries of analytical data, is provided above in Section I, Item No. 4, "Site Assessment Activities/Observations". QA/QC samples were not identified to be associated with all of the analyses that were conducted for the historic sampling events; however, no suspected problems with the data were readily noted.

SITE INSPECTION RESULTS

As appropriate to the particular site collect samples from air, drainage ditches, soil (surface and subsurface), standing pools of liquids, storage containers, stream and pond surface water, sediments (upgradient, at suspected source and downgradient) and ground water (upgradient, beneath site and downgradient). Samples are to be used for NPL listing purposes or to support an EE/CA (Engineering Evaluation/Cost Analysis) (as opposed to sampling used to determine immediate fire, explosion or direct contact hazards), and should go through CLP for full TAL and TCL analysis. Background samples are always necessary to document an observed release. Those samples that are considered background samples should be clearly identified.

The initial phase of field work for the Glen Head Groundwater Plume PSA consisted of the installation of four monitoring wells and the collection of hydropunch samples from four locations within the Village of Glen Head (refer to Figure 3). These eight locations were originally identified to address the high levels of VOCs that were historically detected in groundwater at the immediate apparent upgradient position from the TransTechnology property. Previous investigations conducted at the TransTechnology property indicated that groundwater upgradient of this property exhibited significant PCE contamination. The monitoring well and hydropunch locations chosen for the first phase of the PSA thus addressed the groundwater along Glen Head Road, from Station Place to Maple Place, and northward along Dumond Place. The area along Glen Head Road was thought to be upgradient of the TransTechnology site, based on flow directions determined from the TransTechnology investigations and the general regional gradient in northern Long Island. However, the topography of the land surface was a complicating factor in that elevations in the immediate site area are substantially higher than surrounding areas (refer to ground surface elevation contours in

Figures 4 and 5). The four monitoring wells were installed at points that could potentially indicate whether the topography induced localized groundwater flow patterns that deviate from the regional flow.

LMS contracted CT&E to conduct this initial phase of drilling (i.e, hydropunch and monitoring well installation) for the PSA. As drilling progressed at each location, split spoon samples were collected (at varying intervals) to characterize the stratigraphy of the site. Each well was constructed using 2 in ID schedule 40 PVC riser and a 10 ft section of 10 slot screen, #1 Morie equivalent filter sand, a seal consisting of bentonite slurry, and cement - bentonite grout. Installation of each well was completed by grouting in place a flush mount manhole cover to protect the PVC riser and locking cap. Figure 3 displays the monitoring well and hydropunch locations. Appendix C includes a copy of all LMS field notes for the PSA.

Monitoring well MW-1 was drilled on 13-14 September 1999 on Station Place in front of SV Cleaners. The well was drilled to a total depth of 125 ft bgs and was set at approximately 123 ft bgs with construction completed on 24 September 1999. Groundwater was first encountered during drilling of MW-1 at approximately 114 ft bgs, and subsequent measurement of the water level after construction was completed indicated water at 115.5 ft bgs. During drilling of this well, split spoon samples were collected at 2 ft intervals between the depths of 0-7 ft bgs, 3 ft intervals between the depths of 10-102 ft bgs, and continuously from 110-115 ft bgs.

Drilling of MW-2 was initiated on 15 September 1999 just off of Glen Head Road, south of the 70 Glen Head Road property. Upon drilling to 80 ft bgs, the 70 Glen Head Road property owner location indicated that permission to complete the installation of the well was denied. The borehole was backfilled with cuttings and the remainder of the open borehole was grouted to the surface. After abandoning the installation of MW-2, Tropical Storm Floyd impacted the area, delaying any further field work at the Glen Head Groundwater Plume site until drilling resumed on 21 September 1999.

While a decision was being made on where to re-locate MW-2, MW-3 was drilled on the west side of Maple Place, approximately 100 ft south of Glen Head Road. Groundwater was encountered at approximately 120 ft bgs and drilling continued to a depth of approximately 129 ft bgs. Drilling and installation of the well was completed on 24 September 1999. Split spoon samples were collected during the drilling of MW-3 at 2 to 3 ft intervals from 2-17 ft and 50-122 ft bgs and at 8 ft intervals from 25-47 ft bgs.

Drilling of MW-4, located just north of Glen Head Road on Dumond Place (in the vicinity of GH Cleaners and the unnamed cleaners), commenced on 22 September 1999 and was completed on the same day. The borehole was advanced to approximately 132 ft bgs and the well was ultimately set at 129 ft bgs. To expedite the well drilling at this highly-trafficked location, it was decided that no split spoon samples would be collected at MW-4. During installation of MW-4, groundwater was noted at a depth of approximately 121 ft bgs. Construction of the well was completed on 24 September 1999 with the installation of the flush mount pad.

On 4 October 1999, drilling work for MW-2 (new location) commenced. Due to property owner concerns and traffic congestion and obstructions encountered along Glen Head Road, it was decided to relocate this well to Railroad Avenue north of Glen Head Road (see Figure 3). MW-2 terminated at approximately 118 ft bgs, and the well was set at the same depth. Split spoon samples were collected from the ground surface to 112 ft bgs at intervals of 2 to 3 ft. Boring logs for the spoon samples, along with monitoring well installation logs, are compiled in Appendix C.

Once well installation was completed, development of the wells was required to flush fine-grained sediments from the filter pack and screen. Development of the wells was conducted by CT&E and LMS in October 1999 using either a submersible pump or hand bailer. Development criteria involved pumping or bailing the wells for 2 consecutive hours or until turbidity levels were reduced to an acceptable level (< 50 NTUs). Development logs for the monitoring wells installed as part of this phase of the PSA are included in Appendix C. The four monitoring wells that were installed were also surveyed as to location and elevation by YEC, Inc. of Valley Cottage, New York. Information from the land survey is included in Appendix D.

Groundwater samples were also collected during the first phase of field work for the PSA using a hydropunch tool. The hydropunch tool allows in-situ sampling of groundwater from discrete intervals within the aquifer of interest. The method of sampling utilized in this investigation involved attaching a hydropunch tool to a string of drill rods lowered through the center of the hollow stem augers used to advance the boring to the target depth(s). During CT&E's hydropunch drilling, split spoon samples were also collected. Since the hydropunch location at HP-1 (northwest corner of Glen Head Road and Station Place, see Figure 3) was located very close to MW-1, limited split spoon samples were collected at HP-1. Split spoons were recovered generally more frequently during drilling of HP-2, HP-3, and HP-4 located along Dumond Place. Appendix C contains the boring logs derived from the analysis of split spoon samples collected during hydropunch drilling.

The hydropunch itself consists of a hollow tube fitted with an inner screen that is designed to extend outward and allow the infiltration of groundwater into the hollow tube. The tool, fitted to a string of drill rods, is driven through the end of the augers to the desired depth. The rods are then pulled up several feet and the lithostatic pressure causes the screened section of the hydropunch to be pulled out of the hollow tube, thereby allowing the entrance of groundwater into the tool. The infiltration of water is typically a relatively slow process; after a given amount of time has elapsed (usually about 30 min.) the hydropunch is brought to the surface. As the tool is raised through the formation the lithostatic pressure causes the screened section to be further extended, activating a seal that holds the groundwater from the sampled interval within the outer tube of the hydropunch. Once sampling of the desired intervals was completed, the borehole was grouted to the surface and an asphalt patch was applied, as necessary.

The first hydropunch location (HP-1) for the Glen Head PSA was near the corner of Station Place and Glen Head Road, approximately 30 ft north of MW-1. HP-1 was drilled and sampled on 23 September 1999. Due to problems encountered with the hydropunch tool, the first groundwater sample (ID: HP-1-120) from HP-1 was collected from a depth of approximately 116 ft (just below the water table) using a disposable bailer lowered through the center of the augers. The hydropunch

was successfully utilized at HP-1 in obtaining a sample (ID: HP-1-135) from approximately 135 ft bgs.

Hydropunch points HP-2, HP-3, and HP-4 were all located along Dumond Place with HP-2 closest to Glen Head Road (approximately 40 ft north of MW-4). HP-4 was the northernmost hydropunch conducted along Dumond Place. All hydropunch locations are shown on Figure 3. Drilling for HP-2 was initiated on 29 September 1999. Drilling continued and hydropunching was initiated on 1 October 1999. The first hydropunch sampling attempted at HP-2 was from the 122-124 ft bgs interval. No groundwater was collected from this depth so the borehole was advanced to 125 ft bgs and a sample (ID: HP-2-127) was collected from the127-129 ft bgs interval. Two additional hydropunch samples were collected at HP-2; one sample was obtained at approximately 140 ft bgs (ID: HP-2-140) and the other from about 160 ft bgs (ID: HP-2-160).

HP-3 was drilled and sampled on 5 October 1999. Hydropunch samples were obtained from 130 ft (ID: HP-3-130), 145 ft (ID: HP-3-145), and 160 ft bgs (ID: HP-3-160). Drilling and sampling at hydropunch location HP-4, near the entrance to the former TransTechnology facility off of Dumond Place, occurred on 28 September 1999. Groundwater samples were collected from 125 ft (ID: HP-4-125), 140 ft (ID: HP-4-140), and 160 ft (HP-4-160) bgs at this location.

During drilling activities conducted at the four monitoring well and four hydropunch locations, soil cuttings that were generated were stored temporarily in a 15 cy roll-off container at a Town of Oyster Bay highway department storage yard along Railroad Avenue. A composite soil sample was collected and analyzed for TCLP characteristics by H2M. The waste was characterized to be "non-hazardous", and the roll-off container was subsequently removed from the yard for off-site disposal by Waste Management of Long Island (WMLI) of New Hyde Park, New York. Appendix E contains waste disposal information for the PSA.

The four on-site monitoring wells installed during the first phase of PSA work were sampled on 11 and 12 October 1999. Prior to sampling, three well volumes (casing volume plus filter pack volume) of groundwater were purged from each well using a submersible pump and dedicated polyethylene tubing to insure water collected for samples was representative of formation water. Purge and sample chemistries, including temperature, pH, specific conductivity, and turbidity, were monitored for each well to quantitatively demonstrate that groundwater collected for samples was indeed formation water. After purging, the water level in the well was allowed to recover and samples were collected using a Teflon bailer. Well sampling logs are included in Appendix C. Three laboratory-cleaned, non-preserved 40 ml amber vials were used during the collection of each PSA groundwater sample. For QA/QC purposes an additional six vials were collected as MS/MSD samples during both the monitoring well and hydropunch sampling. During the monitoring well sampling, an additional sample was collected from MW-4 as a blind duplicate (ID: MW-2A) and during the hydropunch sampling, an equipment rinsate sample was collected from the hydropunch equipment. Groundwater samples were shipped following chain-of-custody protocol for overnight delivery for analysis at a NYSDEC-approved off-site laboratory (H2M Labs) for TCL VOCs following NYSDEC Analytical Services Protocol (ASP) Method 8260B.

As shown on Table 1 and Figure 3, contaminant concentrations exceeding NYSDEC Class GA groundwater standards were detected in all monitoring well and hydropunch samples collected during the initial round of sampling. Additional PSA investigation work was recommended by LMS (January 2000) and subsequently approved by NYSDEC (April 2000).

LMS then began a more detailed literature study of the topography and hydrogeology of the site area. This was done in an attempt to locate the placement of new monitoring wells at positions that would complement data from the first phase of PSA work and provide a better understanding of local groundwater contamination and flow patterns. The physical nature of the Glen Head Groundwater Plume site area is relatively complex due to the presence of a topographic high, a stream to the east, and Hempstead Harbor to the west. Groundwater flow direction in the vicinity of the site was not determined with certainty using the groundwater elevation data garnered from the first phase of the PSA. Using 3D topographic mapping software, a series of topographic profiles were generated to provide a detailed view of the topography in the site vicinity (see Figure 5). A topographic high was identified just north of Glen Head Road and west of Dumond Place. In addition to the surface water bodies surrounding the site, it was thought that this area was a potentially significant control for local groundwater flow in the site vicinity and that additional monitoring wells should be installed for the PSA to address this possibility. Criteria for locating the additional wells also included addressing any other potential sources as outlined by NYSDEC or determined from the file information (see Section I, Item No. 4). In addition, since the groundwater flow system at the site was in general poorly understood based on water levels in only four monitoring wells from the first phase of PSA work, the new well locations were selected to provide somewhat radial coverage of the site area in order to characterize a variety of possible groundwater flow directions.

Installation and development of additional PSA monitoring wells were initiated on 2 May 2000. Seven new monitoring wells (11 total for the PSA) were installed during the second phase of PSA work. LMS contracted American Auger to provide drilling services for the installation of the additional monitoring wells. Since the stratigraphy of the subsurface had been characterized during the first phase of drilling for the PSA, it was decided that no additional split spoon soil samples were to be collected during the drilling of the additional wells. Each well was drilled using an auger rig utilizing 4.25 - in. I.D. hollow-stem augers. Well materials used in the construction of the wells included 2-in. I.D. schedule 40 PVC riser and screen (10 slot), Morie equivalent #1 grade filter pack sand, bentonite chip well seal, and a Portland cement / bentonite slurry grout. Each well was completed such that the PVC riser was cut off slightly below grade to allow installation of a flush mount protective manhole set in a cement pad. A copy of the PSA field notes is included in Appendix C.

The first additional monitoring well installed as part of the second phase of the PSA was MW-5 (the additional wells were numbered consecutively according to the convention started with the original four monitoring wells), located on the south end of Maple Place near the intersection of Walnut Avenue. Since MW-3, located north of MW-5 on Maple Place, was originally thought to be upgradient of a potential source(s), but was found to contain significant levels of VOCs, MW-5 was drilled further south of Glen Head Road (i.e., further in a possible upgradient direction from MW-3) to provide an upgradient sampling point. Drilling and installation of MW-5 was conducted on 2 May

2000. Upon drilling this well, it was initially difficult to determine the true depth to water in the formation. Drilling proceeded to a depth of 140 ft bgs with an apparent depth to water of about 130 ft bgs. After completing the installation of MW-5 the water level in the well was measured at approximately 123 ft bgs.

Monitoring well MW-6 was installed on 2 May 2000 on School Street near its intersection with Railroad Avenue. This location is just north of the former property at which FC Cleaners operated (22 Railroad Avenue) and was chosen to address the presence of drywells in a small parking lot at the rear of the property. This well was drilled to a total depth of 115 ft bgs with groundwater encountered at about 105 ft bgs. During installation of the well, the borehole caved approximately three feet; therefore, the well was actually set at a depth of approximately 112 ft bgs.

MW-7 was installed on 3 May 2000 in the town easement at the north end of Magnolia Avenue. This location was selected since it is at nearly the highest ground surface elevation in the area, and if local groundwater flow is controlled by topography it would be expected that this point could be "clean" relative to other samples collected from lower topographical points. If the topography was found not to influence the local groundwater flow, however, this well could still aid in delineating the extent of contamination. During drilling of MW-7 groundwater was reached at a depth of 134 ft bgs and the well was completed to a depth of 139 ft bgs.

MW-8 was installed as a point near the western boundary of the site. [Depending on the results from the PSA, MW-8 was also considered to be a possible downgradient/sidegradient point for former and existing dry cleaning facilities located on Glen Cove Avenue.] The well was located at a somewhat lower topographical elevation from MW-7. However, if the topography was found not to influence the local groundwater flow, MW-8 would still aid in delineating the extent of contamination that is downgradient or sidegradient to the five potential PCE sources identified at the Glen Head Groundwater Plume site. Drilling was completed to a depth of 139 ft bgs at MW-8, with groundwater first encountered at about 130 ft bgs.

Drilling of monitoring well MW-9 commenced on 3 May 2000 and was completed on 4 May. This well was installed just inside of the northernmost gate of the Town of Oyster Bay highway department storage yard (at the north end of Railroad Avenue). This location was selected since contaminants of concern were detected in the first phase of the PSA at MW-2 (also located on Railroad Avenue, directly south of MW-9). No additional data were found for groundwater in the area farther to the north of MW-2. Thus, an additional sampling point was required to determine the extent of the plume to the north. It was also thought that if the topographic high noted to exist west of Dumond Place had an influence on local groundwater flow, then MW-9 may be positioned to detect impacts on the groundwater quality from potential sources located southwest of MW-9. The well was drilled to a final depth of 115 ft bgs with groundwater first encountered at approximately 107 ft bgs. Upon attempting to measure the depth to water prior to development, it was discovered that the water level meter probe could not be lowered past a depth of 77 ft bgs. It was surmised at that time that the PVC well riser may have been compromised by heating after addition of grout and that failure of the well material subsequently occurred. Re-installation of MW-9 was required due to this failure. This was completed on 9 May 2000. The new well was drilled at a location

approximately 20 ft north of the original well.

Installation of MW-10 was conducted on 4 May 2000 in the front lawn of the Glen Head School on School Street. This location was chosen to address the possibility of contaminated groundwater migrating to the east from the former FC Cleaners at 22 Railroad Avenue (refer to Figure 3). MW-10 is located at the topographically lowest point in the study area. Due to the change in topography, this well was significantly shallower than any of the other wells installed as part of the PSA. The final depth of the well was 90 ft bgs as groundwater was encountered at approximately 75 ft bgs.

MW-11 was installed on 9 May 2000 in a Town of Oyster Bay municipal parking lot located between Oak Lawn Avenue and Glen Cove Avenue. This location was chosen to address possible scenarios regarding groundwater flow. If groundwater was flowing to the north/northeast, the location would be side- to downgradient of active/former dry cleaning facilities located on Glen Cove Avenue. If the flow was actually found to be westerly, MW-10 may serve as a side- to downgradient location relative to active/former dry cleaning facilities identified in this PSA. The well was completed to a depth of approximately 135 ft bgs with groundwater first encountered during drilling at about 125 ft bgs. Well installation logs are included in Appendix C.

During drilling activities conducted for the seven new monitoring wells, soil cuttings that were generated were stored temporarily in a 15 cy roll-off container at the Town of Oyster Bay highway department storage yard along Railroad Avenue. A composite soil sample was collected and analyzed for TCLP characteristics by H2M. The waste was characterized to be "non-hazardous", and the roll-off container was subsequently removed from the yard by WMLI for off-site disposal. Appendix E contains waste disposal information for the PSA.

After installations of the additional monitoring wells were completed, the wells were allowed to remain undisturbed for approximately 24 hrs to allow for proper hydration of the bentonite well seal and setting of the grout surrounding the riser to occur. After this period of time each well was developed to remove fine grained sediments from the well screen and filter pack. Development was conducted by American Auger and LMS using a 2-in submersible pump with a pump and surge technique. Pumping continued until turbidity measurements were sustained at levels below 50 NTU. During development, groundwater chemistries, including temperature, pH, specific conductance, and turbidity were monitored to document the progress of the removal of suspended material derived from the installation of the well. Monitoring well development logs are included in Appendix C.

Once the additional monitoring wells were installed, developed, and allowed to remain undisturbed for a period of more than one week after development, sampling of all of the wells installed for the PSA was conducted. The wells were sampled by LMS on 30-31 May 2000 following NYSDEC sampling protocols. Prior to sampling, three well volumes (casing volume plus filter pack volume) of groundwater was purged from each well using a submersible pump and dedicated polyethylene tubing to insure that water collected for samples was representative of formation groundwater. Since each well sampled was capable of producing large volumes of water during purging, only a minimal amount of time was required to allow for recovery of water levels prior to sampling. Groundwater chemistries, including temperature, pH, specific conductance, and turbidity, were collected during

the purge and sampling of the wells. Sampling at each well was conducted using dedicated Teflon bailers and required the collection of three 40 ml laboratory cleaned vials. Immediately following collection, samples were placed on ice to insure preservation and transported, following chain-of-custody protocol, to the contract analytical laboratory, H2M. Each shipment of samples was accompanied by laboratory provided trip blanks. The groundwater samples were analyzed at H2M for TCL VOCs following NYSDEC Analytical Services Protocol (ASP) Method 8260B.

Analytical results for all hydropunch and monitoring well groundwater samples collected during the PSA are presented in Table 1. A detailed discussion of the data is presented above in Section I, Item No. 4, "Site Assessment Activities/Observations."

For all samples collected as part of the PSA, there are no suspected problems with the analytical data. Appendix A contains a copy of the analytical laboratory data summary sheets, Appendix B contains the data validation and usability report, and Appendix C contains a copy of the field notes (including monitoring well completion logs, development logs, well sampling logs, boring logs, and field book notes) from the work conducted for the PSA.

PART IV: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to groundwater as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence and relationship to background.**

There is an observed release of PCE and its breakdown products (including TCE and 1,2-DCE) to the groundwater at the Glen Head Groundwater Plume site. Analyses of groundwater samples collected by LMS in September 1999, October 1999 and May 2000, during the PSA, indicated concentrations of PCE (ranging from 14 ug/l to 18,000 ug/l) above the New York State Class GA standard of 5 ug/l (see Table 1 and Figure 3). Information obtained during this PSA indicates that groundwater flows toward the west/northwest in the vicinity of the site, as shown on Figure 6 and described in Section I, Item No. 4. Therefore, the eastern most monitoring well, MW-10, has been designated as an upgradient well for the purpose of this investigation. Groundwater samples collected in May 2000 indicate that 14 ug/l of PCE was detected in the upgradient well, MW-10. Downgradient wells (MW-1, MW-2, MW-3, MW-4, MW-6, MW-7, and MW-8) and apparent sidegradient wells (MW-5, MW-9, and MW-11) sampled in May 2000 and October 1999 had detected concentrations of PCE in excess of three times that detected in the upgradient well MW-10.

MW-1, located directly downgradient of MW-10, was sampled in October 1999 and May 2000. Results from these analyses indicate the presence of PCE at 18,000 ug/l (October 1999) and 10,000 ug/l (May 2000). These were the highest PCE concentrations detected during the PSA. The lowest concentration of PCE detected in the apparent sidegradient wells was detected in MW-11 at 56 ug/l which is more than three times that detected in the upgradient well (14 ug/l).

There were/are several active dry cleaning facilities located within the area of the groundwater plume. Five possible PCE sources within the Glen Head Groundwater Plume site were identified during the PSA, as described in Section I of this report.

2. **Describe the aquifer of concern; include information such as stratigraphy, depth, thickness, geologic composition, areas of karst terrain, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction. Attach a sketch of stratigraphic column.**

According to published information, the site is located in an area of Long Island that is underlain by three hydrogeologic units, the Upper Glacial Formation (UGA), the Magothy Formation, and the Raritan Clay and Lloyd Sand Members of the Raritan Formation which overlie the southeasterly dipping bedrock surface (see Figure 7). According to information from a potable well in the vicinity of the site, the area is underlain by approximately 85 feet of the unconsolidated deposits of the UGA, which directly overlie approximately 150 feet of the sands and clayey sands of the Magothy Formation. The Magothy Formation overlies the Raritan clay unit of the Raritan Formation.

The UGA is composed of upper Pleistocene deposits of the Quaternary period of the Cenozoic era (2 million years before present to 8000 years before present). These deposits consist of till and outwash sediments. Till deposits are composed of clay, sand, gravel, and boulders while the outwash deposits consist of quartzose sand, fine to very coarse, and pebble to boulder sized gravel. Till is poorly permeable (10^{-3} to 10^{-1} darcys). Outwash deposits are moderately to highly permeable (1 to 10^{2} darcys). Regionally, the altitude of the potentiometric surface of the UGA in the area of the site is between 50 and 60 feet. According to information obtained during this investigation, the potentiometric surface of the UGA is located from 47 to 52 feet in the vicinity of the site (Figure 7).

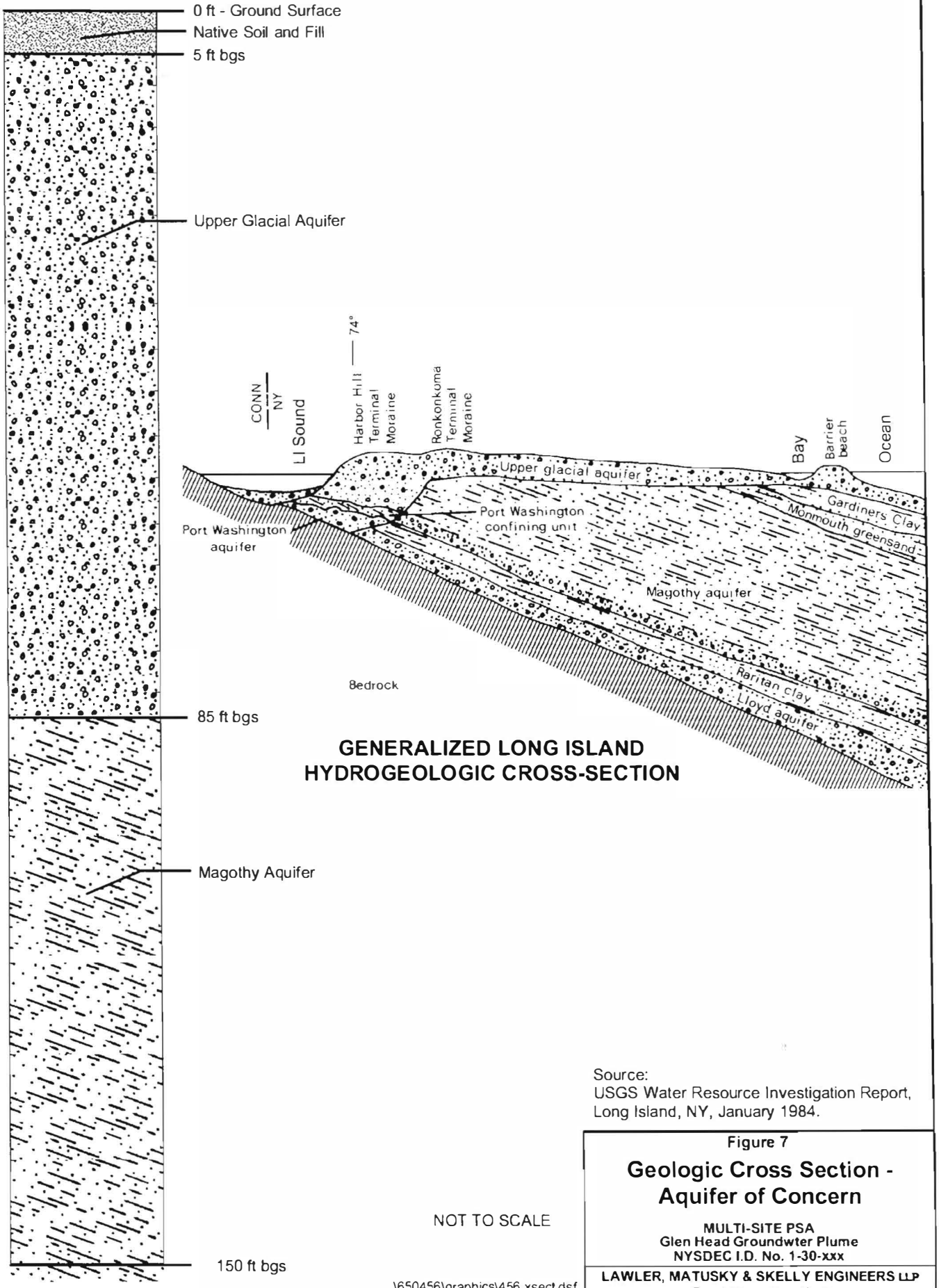
The Magothy Formation consists of upper Cretaceous deposits of the Cretaceous period of the Mesozoic era (135 to 65 mybp). These deposits are composed of fine to medium quartzose sand interbedded with discontinuous layers and/or lenses of coarse sand and sandy and solid clay. The permeability is poor to moderate with some areas of the aquifer exhibiting high permeability. The average permeability of the aquifer ranges from 10^{-2} to 10^{2} darcys. The Magothy Aquifer is the principal aquifer for the withdrawal of public drinking water supplies. A public supply well, GH (N 5792) of the Sea Cliff Water Company is located approximately 1500 feet north of Glen Head Road and the site. This well is approximately 300 feet deep and is screened in the Magothy.

The Raritan Clay unit consists of solid and silty clay with minor lenses of sand. Because of its poor to very poor permeability (the average vertical hydraulic conductivity is 0.001 ft/day), this unit acts as a confining layer over the Lloyd Sand member.

It is assumed, for the purpose of this investigation, that the UGA and the deposits of the Magothy Formation are hydraulically connected. Therefore both the UGA and the Magothy Formation (Magothy aquifer) are considered the aquifer of concern.

The site lies within a 4-mile radius of the Oyster Bay Special Groundwater Protection Area

SITE CROSS-SECTION



GENERALIZED LONG ISLAND HYDROGEOLOGIC CROSS-SECTION

Source:
USGS Water Resource Investigation Report,
Long Island, NY, January 1984.

NOT TO SCALE

\650456\graphics\456 xsect.dsf

Figure 7

Geologic Cross Section - Aquifer of Concern

MULTI-SITE PSA
Glen Head Groundwter Plume
NYSDEC I.D. No. 1-30-xxx

LAWLER, MATUSKY & SKELLY ENGINEERS LLP
Pearl River, New York

(SGPA) which is in the deep recharge Hydrogeologic Zone I. The vertical hydraulic gradient of this zone is downward and is approximately four times steeper than the horizontal hydraulic gradient. Deep flow areas recharge groundwater in the deep aquifers which are the principal long-term providers of drinking water for Long Island. This zone contributes water to the middle and lower portions of the Magothy Aquifer which is the principal aquifer for the withdrawal of public drinking water supplies. As the PSA focused on evaluating only the horizontal extent of the shallow groundwater contamination at the site, it should be noted that the VOC contamination may also be migrating vertically to deeper depths, based on local geological characteristics.

Refs: 20, 21, 22, 23, 24, 25, 26, 27.

3. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer(s) of concern?**

The depth of the disposal/storage is unknown. The contaminated groundwater plume in the vicinity of the site is considered the source of contamination for the purpose of this investigation. According to published information, groundwater levels on Long Island generally follow a seasonal pattern, in which they are highest in March and April. Published data indicate that the water table elevation in the vicinity of the site (measured in March and April 1997) was between 50 and 60 ft above mean sea level (msl). The elevation of the water table in the UGA, measured in the vicinity of the site in May 2000, was approximately 50 ft MSL (Figure 7). PCE, TCE, and 1,2-DCE were detected in groundwater samples collected from depths within the saturated zone of the aquifer of concern.

Refs: 27.

4. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the top of the aquifer of concern?**

The aquifer of concern is the Upper Glacial/Magothy. Approximately five ft of soil and fill overlie the upper Pleistocene deposits of till and outwash sediments of the UGA in the vicinity of the site. The permeability of the fill and soil is unknown. According to the literature, the sediments overlying the saturated zone are composed typically of till deposits of clay, sand, gravel, boulders, and outwash deposits which consist of quartzose sand, fine to very coarse, and pebble to boulder sized gravel. Till is poorly permeable (10^{-3} to 10^{-1} darcys). Outwash deposits are moderately to highly permeable (1 to 10^{2} darcys). Therefore, the permeability value of the least permeable continuous intervening stratum between the ground surface and the top of the aquifer of concern is 10^{-3} to 10^{-1} darcys in the vicinity of the site.

Refs: 23, 27.

5. What is the net precipitation at the site (inches)?

The average precipitation for nearby Mineola, New York was recorded as 43.55 inches in 1997. Mineola is listed in Region 4 of the National Climatic Data Center compilation for New York State. The total evaporation for Region 4 (measured at Greenport New York) in July, August, September, and October of 1997 was 21.28 inches. There were no values recorded for January through June or November to December of that year. Because of the lack of data, a zero total evaporation was assumed for these months. Therefore, the total net precipitation at the site was estimated as follows:

Total Precipitation:	43.55
-Evaporation:	21.28 (July through October)
Net Precipitation:	**22.27 inches**

Ref: 28.

6. What is the distance to and depth of the nearest well that is currently used for drinking purposes?

The nearest operational public groundwater supply well is Well GH (N 5792) of the Sea Cliff Water Company. It is located approximately 1500 ft north/northeast of Glen Head Road and the site and serves approximately 15,000 people. The well is constructed to a depth of 300 ft bgs and is screened from 255 to 295 ft bgs in the Magothy. The static water level was measured at 93 ft bgs on May 24, 1989. In addition, a second well of the Sea Cliff Water Company is located approximately 1.5 miles north-northwest (downgradient) of the Glen Head Groundwater Plume site.

The number of people that obtain drinking water from private wells located within a 4-mile radius of the site is unknown. According to a representative of the NYSDEC, areas that are served by public water (most of Nassau County) use private wells for non drinking water purposes. Most of these wells provide water for golf coarse irrigation, industrial use (process water), laundries, or for air-conditioning purposes. However, there are residential communities within a four mile radius of site which may be served by private wells.

Refs: 20, 24, 26, 29, 30.

7. If a release to groundwater is observed or suspected, determine the number of people that obtain drinking water from wells that are documented or suspected to be actually contaminated by hazardous substance(s) attributed to an observed release from the site.

Of the identified wells, the closest public supply well is well GH (N 5792) of the Sea Cliff Water Company, which is located north/northeast of the site (upgradient). A second well is

located approximately 1.5 miles downgradient from the Glen Head Groundwater Plume site. According to information from the Sea Cliff Water Company, there has been no impact to these potable supply wells from the site contamination (i.e., there are no exceedences of PCE, TCE, or 1,2-DCE in excess of the maximum contaminant limits (MCLs) for these VOCs).

Ref: 20, 26.

8. Identify the population served by wells (private + municipal) located within 4 miles of the site that draw from the aquifer(s) of concern.

According to the New York State Atlas of Community Water System Sources (NYSDOH Atlas) and the Nassau County Department of Health (NCDOH), wells of the Albertson, Glen Cove City, Jericho, Locust Valley, Manhasset-Lakeville, Old Westbury Village, Plandome Village, Port Washington, Roslyn, Sands Point Village, and Sea Cliff water districts lie within a 4-mile radius of the site. According to the NYSDOH Atlas the Community Hospital at Glen Cove, New York, also has a supply well within a 4-mile radius of the site. Collectively, 33 wells in these water districts serve approximately 90,000 people with potable groundwater. The nearest potable public supply well, well GH (N 5792) of the Sea Cliff Water Company is located approximately 1500 feet north/northeast of Glen Head Road and the site on the north side of Roslyn Drive (Figure 1). According to information from the Sea Cliff Water Company, the well serves approximately 15,000 residents. Another Sea Cliff Water Company well exists approximately 1.5 miles north-northwest of the Glen Head Groundwater Plume site.

The number of people obtaining water from private wells located within a 4-mile radius of the site is unknown. According to a representative of the NYSDEC, areas that are served by public water (most of Nassau County) use private wells for non drinking water purposes. Most of these wells provide water for golf coarse irrigation, industrial use (process water), laundries, or for air-conditioning purposes. However, there are residential communities within a 4- mile radius of site which may be served by private wells.

Refs: 20, 24, 26, 29, 30, 31.

.

Distance	Population
0 - 1/4 mi	552.5
>1/4 - ½ mi	1,657.5
>½ - 1 mi	6,633
>1 - 2 mi	19,108
>2 - 3 mi	26,174
>3 - 4 mi	36,080

9. **State whether groundwater is blended with surface water, groundwater, or both before distribution.**

The nearest public supply well is well GH (N 5792) which is located north/northeast of the site. The well is screened in the Magothy and according to information from Sea Cliff Water Company there is no blending of surface water with groundwater prior to distribution.

Refs: 20, 26.

10. **Is a designated well head protection area within 4 miles of the site?**

Yes. According to information received from the USEPA, Region 2, there is 50 feet of ownership by Nassau County around each public well with an additional 50 feet of control beyond that. Therefore, the designated well head protection area for public wells in Nassau County is 100 feet. The closest identified public supply well, well GH (N 5792) of the Sea Cliff Water Company, is located approximately 1500 feet north/northeast of Glen Head Road and the site area. Another Sea Cliff Water well is located 1.5 miles north-northwest of the site.

Ref: 20, 32.

11. **Does a waste source overlie a designated or proposed wellhead protection area? If a release to groundwater is observed or suspected, does a designated or proposed wellhead protection area lie within the contaminant boundary of the release?**

For the purpose of this investigation, the groundwater plume is considered the source at the site. The full extent of the contaminant plume has not been determined. A public supply well (well No. 5792 of the Sea Cliff Water Company) is located north/northeast of the site. An additional public well (Sea Cliff Water Company) is located approximately 1.5 miles north-northwest (downgradient) of the site.

Ref: 20.

12. **Identify one of the following resource uses of groundwater within 4 miles of the site (i.e., commercial livestock watering, ingredient in commercial food preparation, supply for commercial aquiculture, supply for major, or designated water recreation area, excluding drinking water use, irrigation (5-acre minimum) of commercial food or commercial forage crops.**

According to information from the Town of Oyster Bay, there are some small farm stands within a four mile radius of the site. They are however, less than five acres in size. According to information from the Long Island Regional Planning Board, there are several parcels of agricultural land within a four mile radius of the site. It is not know if these parcels support crops. A nearby golf club, the Glen Head Country Club, has a pool.

Groundwater is used to fill the pool.

Refs: 24, 33, 34.

SURFACE WATER ROUTE

13. Describe the likelihood of a release of contaminant(s) to surface water as follows: release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence and relationship to background.

None observed or suspected. Surface water samples were not collected as part of this investigation and no release to surface water is suspected from the site. An unnamed pond, (a retention basin) the nearest down slope surface water body, is located approximately 1700 feet northeast of the site (Figure 1). There is no evidence to suggest contamination in the soils in the vicinity of the site. The majority of the site is paved (at least 85%) and contains catch basins and/or storm sewers. The runoff in catch basins and/or storm sewers may discharge to this retention basin through which it would recharge the aquifer. The retention basin is not hydraulically connected to any other surface water body.

Refs: 1, 35, 36.

14. Identify the nearest down slope surface water. Include a description of possible surface drainage patterns from the site.

The nearest downslope waterbody is an unnamed pond (retention basin) which is located approximately 1700 feet northeast of the site. Based on the topography of the area, in the vicinity of the site, it appears that surface drainage would be directed to the east, northeast and southeast. The majority (at least 85%) of the area in the vicinity of the site is paved and runoff from the site would be diverted to catch basins and storm drains which may be diverted to this retention basin. The runoff would ultimately be recharged to the groundwater. The retention basin is not hydraulically connected to any other surface water body. Hempstead Bay, located approximately 6000 ft west of the Glen Head Groundwater Plume site, appears to influence the local groundwater patterns but does not apparently effect drainage patterns at the site.

Refs: 1, 35, 36.

15. **What is the distance to the nearest down slope surface water? Measure the distance along a course that runoff can be expected to follow.**

The nearest down slope surface water body is located approximately 1700 feet northeast of the site. Any runoff from the site, not diverted by catch basins and/or storm drains would most likely follow the topography of the site which slopes to the east, northeast and southeast.

Ref: 35.

16. **Identify all surface water body types within 15 downstream miles of the POE.**

Not applicable. The nearest downslope surface water body, an unnamed pond (retention basin) which is located approximately 1700 feet northeast of the site, is not tributary to any other surface water bodies.

Ref: 35.

Name	WB Type	Flow	Saline/Fresh /Brackish	Distance (miles)
N/A	N/A	N/A	N/A	N/A

17. **Determine the 2 yr, 24 hr rainfall (inches) for the site.**

According to information from the Northeast Regional Climate Center, the 2-year, 24 hour rainfall is 3.25 inches in the vicinity of the site.

Ref: 37.

18. **Determine size of drainage area (acres) for the sources at the site.**

Not applicable. The source of the contamination is the groundwater. The majority (at least 85%) of the area in the vicinity of the site is paved and runoff from the site is diverted to catch basins and/or storm drains that may discharge to a nearby retention basin.

Refs: 35, 36.

19. **Describe the predominant soil group in the drainage area.**

According to the Soil Survey of Nassau County the predominant soil in the drainage area is designated as Urban Land. Urban Land consists of areas where 85% of the surface is covered with asphalt, concrete, or other impervious building material. These areas are mostly parking lots, shopping centers, industrial parks, or institutional sites. Most areas are nearly level and some are gently sloping. Included are small areas of soil that have not been

appreciably altered or that are not under impervious cover. These consist of lawns and other landscaped areas. Most of the open areas are well-drained Riverhead, Hempstead or Enfield soils or are excessively drained Udipsamments. Udipsamments consist of manmade fills or borrow areas, most of which are grass-covered. In some areas the original soil material has been stripped and moved while others consist of sandy fill material. There are several groundwater recharge basins in the vicinity of the site. These basins are used for the collection of runoff from streets, parking lots, and buildings and act as reservoirs for groundwater recharge. The basins usually have steep sides and nearly level bottoms. Some of these basins are dry a majority of the time because the collected water rapidly infiltrates into the soil, while others may contain water for a longer period of time. The recharge basins in the vicinity of the site are semi-permanent and hold water for part of the time.

Refs: 35, 36, 38.

20. Determine the floodplain (1 yr., 10 yr., 100 yr., 500 yr., none) that the site is within.

None. According to the National Flood Insurance Program Flood Insurance Rate Map (FIRM) for Nassau County, the site is located within zone C. Areas within this zone are areas of minimal flooding.

Ref: 39.

21. Identify drinking water intakes in surface waters within 15 miles downstream of the point of surface water entry. For each intake identify: the name of the surface water body in which the intake is located, the distance in miles from the point of surface water entry, population served, and stream flow at the intake location.

Intake	WB Type	Distance From POE	Pop. Served	Flow (cfs)
N/A	N/A	N/A	N/A	N/A

Not applicable. No surface waters are reportedly used as potable sources in this region.

22. Identify fisheries that exist within 15 miles downstream of the point of surface water entry. For each fishery specify the following information:

Fishery	WB Type	Flow	Saline/Fresh Brackish	Distance (miles)
Hempstead Harbor	Bay	N/A	Saline	1.1

No fisheries exist in down slope surface waters. The nearest downslope surface water body

is an unnamed pond located approximately 1700 feet northeast of the site. The pond is not tributary to any other surface water bodies and according to information from the United States Department of the Interior National Wetlands Inventory (Hicksville quadrangle) the pond is classified as POWFx (a retention basin).

Hempstead Harbor exists approximately 6000 ft west of the site, and is known to support commercial and recreational fishing.

Ref: 35.

23. **Identify surface water sensitive environments that exist within 15 miles of the point of surface water entry.**

Environment	WB Type	Distance from POE	Flow (cfs)	Wetland Frontage (miles)
Wetland	Pond	0.32 miles	N/A	0.28 miles

There is no observed or suspected release to the surface water from the site, however, a wetland is located approximately 1700 feet northeast of the site. It is classified as POWFx (a retention basin) on the United States Department of the Interior National Wetlands Inventory Map (Hicksville quadrangle). Hempstead Bay, located approximately 6000 ft west of the Glen Head Groundwater Plume site, appears to influence the local groundwater patterns but does not apparently effect drainage patterns at the site.

Ref: 35.

24. **If a release to surface water is observed or suspected, identify any intakes, fisheries, and sensitive environments from question Nos. 18-20 that are or may be actually contaminated by hazardous substance(s) attributed to an observed release from the site.**

Not applicable. No surface water samples were collected. There is no known or suspected release to the surface water from the site, therefore, no sensitive environments are known to be impacted by the contaminant plume.

25. **Identify whether the surface water is used for any of the following purposes, such as: irrigation (5 acre minimum) of commercial food or commercial forage crops, watering of commercial livestock, commercial food preparation, recreation, potential drinking water supply?**

Not applicable. The nearest downslope surface water body is an unnamed pond located

approximately 1 700 feet northeast of the site. The pond is a federally-designated wetland (retention basin). **Ref: 35.**

SOIL EXPOSURE PATHWAY

26. Determine the number of people that occupy residences or attend school or day care on or within 200 feet of an area of observed contamination.

Not applicable. Soil samples were not collected during this investigation and soil contamination is not suspected. The source of the contamination is a groundwater plume.

27. Determine the number of people that regularly work on or within 200 feet of an area of observed or suspected contamination.

Not applicable. Soil samples were not collected during this investigation and soil contamination is not suspected.

28. Identify terrestrial sensitive environments on or within 200 feet of an area of observed or suspected contamination.

Not applicable. Soil samples were not collected during this investigation and soil contamination is not suspected.

29. Identify whether there are any of the following resource uses, such as commercial agriculture, silviculture, livestock production or grazing within an observed or suspected contamination boundary?

Not applicable. Soil samples were not collected during this investigation and soil contamination is not suspected.

AIR ROUTE

30. Describe the likelihood of release of contaminants to air as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release define the supporting analytical evidence and relationship to background.

This investigation did not include air sampling. There is no suspected release of contaminants to the air associated with the site. The contamination is associated with a groundwater plume in the vicinity of the site. The contaminants in the groundwater do not present an inhalation hazard since more than 85% of the site is paved.

Ref: 36.

31. Determine populations that reside within 4 miles of the site.

Distance	Population
0 (on-site)	0
0 - 1/4 mi	552.5
>1/4 - ½ mi	1,657.5
>½ - 1 mi	6,633
>1 - 2 mi	19,108
>2 - 3 mi	26,174
>3 - 4 mi	36,080

Ref: 40.

32. Identify sensitive environments and wetland acreage (wetland acreage only for wetlands sensitive environment) within 4 miles of the site.

There are several New York State and federally-mapped wetlands located within a 4-mile radius of the site. The closest New York State freshwater wetland (HV-1) is located approximately 2,500 feet east/northeast of the site. The wetland is linear and follows the course of Glen Cove Creek. The closest federally-mapped wetland (POWZx) is located approximately 1700 feet northeast of the site and is approximately 3.6 acres.

Refs: 35, 38, 41, 42.

Distance	Type of Sensitive Environment	Actual Distance from site (miles)	Wetland Acreage
>1/4-1/2 mi.	Wetland (HV-1)	0.47 miles	N/A (linear)
>½-1 mi.	Wetland (POWZx)	0.32 miles	3.6 acres

33. If a release to air is observed or suspected, determine the number of people that reside or are suspected to reside within the area of air contamination (might be actual contamination) from the release.

Not applicable. No air release of contaminants associated with the site has been observed or is suspected.

34. If a release to air is observed or suspected, identify any sensitive environments, listed in question No. 46, that are or may be located within the area of air contamination from the release.

Not applicable. No air release of contaminants associated with the site has been observed or is suspected.