



Geotechnical
Environmental and
Water Resources
Engineering

**Quarterly Groundwater Monitoring Report
Fourth Quarter (Q4) 2008**

Sag Harbor Former MGP Site

Village of Sag Harbor
Suffolk County, Long Island, NY
Site ID No. 1-52-159

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Table of Contents

1. Sag Harbor Site and Adjacent Off-Site Areas **1**

Tables

- 1 Water Level Measurements and Calculated Water Elevations – Q4 2008
- 2 Summary of Historic NAPL Observations
- 3 Summary of BTEX, MTBE, and PAH Results – Q4 2008
- 4 Summary of Historic Total BTEX Results
- 5 Summary of Historic Total PAH Results

Figures

- 1 Site Location Map
- 2 Monitoring Well Location Map
- 3 Shallow Groundwater Contours – High Tide – 12/18/08
- 4 Shallow Groundwater Contours – Low Tide – 12/18/08
- 5 Intermediate Groundwater Contours – High Tide – 12/18/08
- 6 Intermediate Groundwater Contours – Low Tide – 12/18/08

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1. Sag Harbor Site and Adjacent Off-Site Areas

Q4 2008 Groundwater Monitoring Event Summary

Event Date: December 15 -18, 2008

Site Phase: Quarterly groundwater monitoring

Location: The location of the Sag Harbor Former MGP Site is depicted on **Figure 1**.

Monitoring Program: *Number of Wells:* A total of 12 monitoring wells are located on and adjacent to the site (see **Figure 2**). MW-05 was destroyed sometime between March and June 2007. Monitoring wells MW-01, MW-02, MW-03, MW-04, MW-06, SHMW-01S, SHMW-01I, SHMW-02I, SHMW-02D, SHMW-04S, SHMW-04I, SHMW-05S, SHMW-05I, SHMW-06S, SHMW-06I, SHMW-07S, SHMW-07I, SHMW-08S and SHMW-08I were either destroyed or deemed inaccessible during the Q4 sampling event due to the ongoing remediation activities occurring at the site.

Hydrological Data: Groundwater levels were measured at 10 of the 12 remaining monitoring wells. Depth to groundwater and calculated groundwater elevations are shown on **Table 1**. The groundwater flow direction was generally to the west towards Sag Harbor Cove (see **Figures 3** through **6**). The ranges in depth to water and water table elevation data, as well as calculated hydraulic gradients for the shallow and intermediate portions of the aquifer in Q4 2008 were as follows:

- Depth to the water table in shallow wells at high tide ranged from **+0.27** (SHMW-12S) to **5.09** (SHMW-11S) feet below the well measuring point.
- Water table elevations in shallow wells at high tide ranged from **0.65** (SHMW-11S) to **4.44** (SHMW-13S) feet above mean sea level (MSL).
- Depth to the water table in shallow wells at low tide ranged from **+0.26** (SHMW-12S) to **5.63**

(SHMW-11S) feet below the well measuring point.

- Water table elevations in shallow wells at low tide ranged from **0.11** (SHMW-11S) to **4.49** (SHMW-13S) feet above MSL.
- The calculated shallow hydraulic gradient for high tide was **0.0046** feet/foot. The calculated shallow hydraulic gradient for low tide was **0.0057** feet/foot.
- Depth to groundwater in intermediate wells at high tide ranged from **0.11** (SHMW-12I) to **3.76** (SHMW-10I) feet below the well measuring point.
- Groundwater elevations in intermediate wells at high tide ranged from **2.13** (SHMW-10I) to **3.34** (SHMW-13I) feet above MSL.
- Depth to groundwater in intermediate wells at low tide ranged from **0.37** (SHMW-12I) to **5.15** (SHMW-10I) feet below the well measuring point.
- Groundwater elevations in intermediate wells at low tide ranged from **0.74** (SHMW-10I) to **2.92** (SHMW-12I) feet above MSL.
- The calculated intermediate hydraulic gradient for high tide was **0.0019** feet/foot. The calculated intermediate hydraulic gradient for low tide was **0.0033** feet/foot.

*NAPL
 Thickness
 Data:*

Table 2 provides a summary of historic non-aqueous phase liquid (NAPL) data. In Q4 2008, seven monitoring wells (SHMW-03S, SHMW-03I, SHMW-09S, SHMW-10S, SHMW-11S, SHMW-12S, and SHMW-13S) were monitored for NAPL as part of the groundwater monitoring program. As shown in **Table 2**, light non-aqueous phase liquid (LNAPL) and dense non-aqueous phase liquid (DNAPL) were not found in these monitoring wells during Q4 2008.

*Chemical
Data:*

A total of **12** monitoring wells were sampled for BTEX and MTBE (EPA Method 8260) and PAHs (EPA Method 8270). Well sampling was conducted on December 15 and December 16, 2008. Chemical data for Q4 2008 (see **Table 3**) indicate:

- Total BTEX concentrations ranged from less than method detection limits in 9 of 12 wells sampled to **483** micrograms per liter (µg/L) in SHMW-09S.
- Total PAH concentrations ranged from less than method detection limits in 9 of 12 wells sampled to **503** µg/L in SHMW-09S.

**Data Trend
Analysis:**

In general, fairly consistent BTEX and PAH concentrations (see historical data in **Tables 4** and **5**) have been detected in shallow groundwater on and adjacent to the site when compared to previous sampling events.

In Q4 2008, BTEX concentrations were below laboratory detection limits in three of the six shallow wells sampled. BTEX concentrations have been below detection limits in two shallow wells (SHMW-11S and SHMW-13S) since these wells were installed in 2002. In two of the three shallow wells that had detectable BTEX concentrations, the BTEX concentrations were lower than their respective means. In the remaining well (SHMW-12S), the BTEX concentration was similar to, within the same order of magnitude, as its mean.

Between Q3 2008 and Q4 2008, BTEX concentrations decreased in one of the three shallow wells with detected BTEX concentrations that were sampled in both quarters. Although BTEX increases were observed in the remaining two shallow wells, these increases were consistent with typical historical fluctuations. In general, BTEX increases were insignificant, similar to, or within the same order of magnitude in concentrations between Q3 2008 and Q4 2008.

In Q4 2008, six intermediate wells were sampled. None of the intermediate wells sampled in Q4 2008 had detectable levels of BTEX.

In Q4 2008, PAH concentrations were below the laboratory detection limits in three of the six shallow wells sampled. In two of the three shallow wells that had detectable PAH concentrations, the PAH concentrations were lower than their respective means. In the remaining well (SHMW-12S), the PAH concentration was similar to, within the same order of magnitude, as its mean.

Between Q3 2008 and Q4 2008, PAH concentrations remained below laboratory detection limits in three shallow wells. PAH concentrations increased in the remaining three shallow wells sampled; however, these increases were generally not significant being similar to Q3 2008 concentrations and consistent with typical historical fluctuations.

In Q4 2008, six intermediate wells were sampled. None of the intermediate wells sampled in Q4 2008 had detectable levels of PAHs.

MTBE concentrations remained below laboratory detection limits in all of the wells sampled. The MTBE concentration in well SHMW-12S was estimated at a concentration of 2 ug/L, below the method detection level of 10 ug/L.

Water table elevations (see **Table 1**) at shallow wells during high tide conditions have increased between Q3 2008 and Q4 2008 in three of the five wells measured. Increases in these wells ranged from 0.09 to 0.32 feet. The average increase over these wells was 0.24 feet. The remaining two wells had decreases of 0.25 and 0.04 feet.

Water table elevations at shallow wells during low tide conditions have decreased between Q3 2008 and Q4 2008 in three of the five wells measured. Decreases ranged from 0.02 to 0.24 feet. The average decrease over these wells was 0.16 feet. The remaining two wells had increases of 0.19 and 0.33 feet.

Variable dissolved constituent concentrations detected in shallow groundwater over the past events are likely due, in part to the rise and fall of the water table resulting in periods of both decreased and increased dissolution of adsorbed BTEX and PAHs trapped beneath the interface.

The historical NAPL data (see **Table 2**) indicate that measurable quantities of NAPL have primarily been found in two on-site shallow monitoring wells (MW-02 and MW-05), one on-site intermediate well (SHMW-02I), and one off-site shallow well (SHMW-04S). Historically, trace amounts of NAPL have been found in two on-site shallow wells (MW-03 and MW-04), and one off-site shallow well (SHMW-06S). All of the wells in which NAPL has been historically detected were either destroyed or deemed inaccessible in Q4 2008. NAPL was not detected in any of the remaining wells.

Current Plans: Continue quarterly groundwater and NAPL monitoring at accessible

monitoring wells. Remedial activities at the site began in late Q3 2008 and are scheduled to be completed in Q2 2009.

Tables

Table 1
Sag Harbor Former MGP Site
Groundwater Monitoring Program
Water Level Measurements and Calculated Water Elevations - Q4 2008

Well ID	Top of Casing Elevation (ft)	Tide	Time	12/18/2008		Notes
				Depth to Water (ft)	Groundwater Elevation (ft)	
MW-01	5.09	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
MW-02	4.48	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
MW-03	4.59	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
MW-04	4.13	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
MW-05	5.07	High	--	--	--	Well destroyed
		Low	--	--	--	
MW-06	5.38	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-01S	4.52	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-01I	4.47	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-02I	5.22	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-02D	5.19	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-03S	5.43	High	1443	3.42	2.01	
		Low	844	3.53	1.90	
SHMW-03I	5.43	High	1443	2.51	2.92	
		Low	844	3.24	2.19	
SHMW-04S	5.71	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-04I	5.71	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-05S	6.23	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-05I	6.14	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-06S	4.44	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-06I	4.43	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-07S	5.05	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-07I	5.00	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-08S	5.26	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-08I	5.08	High	--	--	--	Well inaccessible or abandoned
		Low	--	--	--	
SHMW-09S	4.36	High	1449	1.15	3.21	
		Low	850	1.20	3.16	
SHMW-09I	4.41	High	--	--	--	Well box flooded
		Low	--	--	--	
SHMW-10S	5.91	High	1445	4.36	1.55	
		Low	846	5.02	0.89	
SHMW-10I	5.89	High	1446	3.76	2.13	
		Low	847	5.15	0.74	
SHMW-11S	5.74	High	1448	5.09	0.65	
		Low	848	5.63	0.11	
SHMW-11I	5.79	High	--	--	--	Car parked over well during high and low tides and could not obtain water levels
		Low	--	--	--	
SHMW-12S	3.42	High	1452	+0.27	3.69	Artesian
		Low	856	+0.26	3.68	
SHMW-12I	3.29	High	1453	0.11	3.18	
		Low	855	0.37	2.92	
SHMW-13S	4.68	High	1456	0.24	4.44	Measuring points appear altered
		Low	900	0.19	4.49	
SHMW-13I	4.70	High	1457	1.36	3.34	
		Low	900	1.86	2.84	

-- Not Available

+: Measured above measuring point

Table 2
Sag Harbor Former MGP Site
Groundwater Monitoring Program
Summary of Historic NAPL Observations

Well ID	May 2002 Observations	May 2004 Observations	August 2004 Observations	October 2004 Observations	November 2004 Observations	December 2004 Observations	January 2005 Observations	February 2005 Observations	March 2005 Observations	April/Q1 2005 Observations	June/Q2 2005 Observations	September/Q3 2005 Observations
MW-01	None Observed	Odor	None Observed	Not Checked	NR	NR	NR	NR	NR	NR	NR	NR
MW-02	Approx. 0.16' of DNAPL, sheen on surface	Approx. 0.15' of DNAPL, sheen on surface	Approx. 0.29' of DNAPL	Approx. 0.2' of DNAPL	Approx. 0.01' of DNAPL, 1.0' intermittent DNAPL	Approx. 0.1' of DNAPL	Approx. 0.11' of DNAPL	Approx. 0.16' of DNAPL	Approx. 0.15' of DNAPL	Approx. 0.15' of DNAPL	Trace DNAPL at bottom of tape	Approx. 0.13' of DNAPL
MW-03	Intermittent DNAPL for 1.5'	Approx. 0.03' of DNAPL, naphthalene-like odor	NR	Trace DNAPL at bottom of tape	Trace DNAPL at bottom of tape	Trace DNAPL at bottom of tape	Trace DNAPL at bottom of tape	Trace DNAPL at bottom of tape	Trace DNAPL at bottom of tape	Trace DNAPL at bottom of tape	Trace DNAPL at bottom of tape	Trace DNAPL at bottom of tape
MW-04	None Observed	Approx. 0.02' of DNAPL, naphthalene-like odor	NR	Trace DNAPL at bottom of tape	None Observed	None Observed	Trace DNAPL at bottom of tape	Not Checked (under snow pile)	None Observed	None Observed	None Observed	Trace DNAPL at bottom of tape
MW-05	Blebs of LNAPL	Approx. 1.0' of DNAPL, naphthalene-like odor	Approx. 0.75' of DNAPL	Approx. 4.5' of LNAPL/NAPL	Approx. 0.35' of DNAPL, 3.6' intermittent DNAPL	Trace DNAPL at bottom of tape, bubbles in WC	Trace DNAPL at bottom of tape	Approx. 0.6' of DNAPL, approx. 0.02' of LNAPL	Sporadic DNAPL, approx. 0.1' of LNAPL	Sporadic DNAPL, approx. 0.1' of LNAPL	Approx. 3.0' of DNAPL	Approx. 0.75' of DNAPL, approx. 0.12' of LNAPL
MW-06	None Observed	Slight naphthalene-like odor	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-01S	None Observed	Slight naphthalene-like odor	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-01I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-02I	None Observed	Approx. 4.9' of DNAPL, sheen	Approx. 4.7' of DNAPL	Approx. 4.9' of DNAPL	Approx. 1.0' of DNAPL, 3.0' intermittent DNAPL	Approx. 0.6' of DNAPL	Approx. 0.65' of DNAPL	Approx. 0.5' of DNAPL	Approx. 0.45' of DNAPL	Approx. 1.1' of DNAPL	Approx. 0.75' of DNAPL	Approx. 0.4' of DNAPL
SHMW-02D	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Notes:
DNAPL - Dense Non-aqueous Phase Liquid
LNAPL - Light Non-aqueous Phase Liquid
WC - Water Column
NR - Gauging Not Required

Table 2
Sag Harbor Former MGP Site
Groundwater Monitoring Program
Summary of Historic NAPL Observations

Well ID	May 2002 Observations	May 2004 Observations	August 2004 Observations	October 2004 Observations	November 2004 Observations	December 2004 Observations	January 2005 Observations	February 2005 Observations	March 2005 Observations	April/Q1 2005 Observations	June/Q2 2005 Observations	September/Q3 2005 Observations
SHMW-03S	None Observed	Odor	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-03I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-04S	None Observed	Approx. 0.6' of DNAPL, naphthalene-like odor	NR	Approx. 0.7' of DNAPL, 2.3' intermittent DNAPL	Approx. 0.55' of DNAPL	Approx. 0.29' of DNAPL	Approx. 0.35' of DNAPL	Approx. 0.22' of DNAPL	Approx. 0.25' of DNAPL	Approx. 0.25' of DNAPL	Approx. 0.90' of DNAPL	Approx. 0.26' of DNAPL
SHMW-04I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-05S	None Observed	Blebs of DNAPL in purge water, odor	NR	None Observed	None Observed	None Observed	None Observed	None Observed	None Observed	None Observed	None Observed	None Observed
SHMW-05I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-06S	Slight sheen and naphthalene-like odor	Naphthalene-like odor	NR	NR	NR	NR	NR	NR	NR	NR	NR	Trace DNAPL at bottom of tape
SHMW-06I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-07S	Sheen and naphthalene-like odor	Slight odor	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-07I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-08S	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Notes:

DNAPL - Dense Non-aqueous Phase Liquid
LNAPL - Light Non-aqueous Phase Liquid
WC - Water Column
NR - Gauging Not Required

Table 2
Sag Harbor Former MGP Site
Groundwater Monitoring Program
Summary of Historic NAPL Observations

Well ID	May 2002 Observations	May 2004 Observations	August 2004 Observations	October 2004 Observations	November 2004 Observations	December 2004 Observations	January 2005 Observations	February 2005 Observations	March 2005 Observations	April/Q1 2005 Observations	June/Q2 2005 Observations	September/Q3 2005 Observations
SHMW-08I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-09S	None Observed	Slight naphthalene-like odor	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-09I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-10S	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-10I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-11S	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-11I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-12S	None Observed	Sheen, strong sulfur-like odor	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-12I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-13S	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SHMW-13I	None Observed	None Observed	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Notes:
DNAPL - Dense Non-aqueous Phase Liquid
LNAPL - Light Non-aqueous Phase Liquid
WC - Water Column
NR - Gauging Not Required

Table 2
Sag Harbor Former MGP Site
Groundwater Monitoring Program
Summary of Historic NAPL Observations

Well ID	December/Q4 2005 Observations	March/Q1 2006 Observations	June/Q2 2006 Observations	September/Q3 2006 Observations	December/Q4 2006 Observations	March/Q1 2007 Observations	June/Q2 2007 Observations	September/Q3 2007 Observations	December/Q4 2007 Observations	March/Q1 2008 Observations	June/Q2 2008 Observations	September/Q3 2008 Observations	December/Q4 2008 Observations
MW-01	NR	NR	NR	NR	NR	NR	NR	NR	None Observed	None Observed	Trace DNAPL	Trace DNAPL (at bottom of tubing)	Well Inaccessible or Abandoned
MW-02	Approx. 0.09' DNAPL, naphthalene-like odor	Approx. 0.01' DNAPL	Approx. 0.12' of DNAPL	Approx. 0.15' DNAPL	Approx. 0.10' DNAPL	Approx. 0.20' DNAPL	Approx. 0.07' DNAPL	Approx. 0.11' DNAPL	Approx. ~0.08'	Trace DNAPL	Moderate DNAPL; not measureable	Trace DNAPL	Well Inaccessible or Abandoned
MW-03	None, naphthalene-like odor	No DNAPL observed	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	No DNAPL observed	Trace DNAPL (coating on tubes)	None Observed	Trace DNAPL (coating on tubes)	Trace	Trace DNAPL (On bottom 1.5' of tubes)	Trace DNAPL	Trace DNAPL (0.05' at bottom of tubing)	Well Inaccessible or Abandoned
MW-04	Trace DNAPL at bottom of tape	Trace DNAPL	Trace DNAPL	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Approx. ~0.02'	NR	Trace DNAPL	Trace DNAPL (at bottom of tubing)	Well Inaccessible or Abandoned
MW-05	DNAPL blebs in purge H ₂ O, 0.5' DNAPL coating on tubes	Approx. 0.15' of DNAPL, approx. 0.1' of LNAPL	Approx. 0.22' DNAPL; 0.05' of LNAPL	Approx. 0.55' DNAPL; 0.06' of LNAPL	Trace LNAPL; DNAPL in purge water (not measurable)	Trace LNAPL; DNAPL in purge water (not measurable)	Well Destroyed	Well Destroyed	Well Destroyed	Well Destroyed	Well Destroyed	Well Destroyed	Well Destroyed
MW-06	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	None Observed	None Observed	None Observed	Well Inaccessible or Abandoned
SHMW-01S	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	None Observed	None Observed	None Observed	Well Inaccessible or Abandoned
SHMW-01I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	Well Inaccessible or Abandoned
SHMW-02I	Approx. 1.3' of DNAPL, naphthalene-like odor	Approx. 0.35' of DNAPL	Approx. 0.43' of DNAPL	Approx. 0.5' of DNAPL	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Approx. ~0.60'	Approx. 3' DNAPL	Approx. 1.5' DNAPL	Approx. 4' DNAPL	Well Inaccessible or Abandoned
SHMW-02D	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	Well Inaccessible or Abandoned

Notes:
DNAPL - Dense Non-aqueous Phase Liquid
LNAPL - Light Non-aqueous Phase Liquid
WC - Water Column
NR - Gauging Not Required

Table 2
Sag Harbor Former MGP Site
Groundwater Monitoring Program
Summary of Historic NAPL Observations

Well ID	December/Q4 2005 Observations	March/Q1 2006 Observations	June/Q2 2006 Observations	September/Q3 2006 Observations	December/Q4 2006 Observations	March/Q1 2007 Observations	June/Q2 2007 Observations	September/Q3 2007 Observations	December/Q4 2007 Observations	March/Q1 2008 Observations	June/Q2 2008 Observations	September/Q3 2008 Observations	December/Q4 2008 Observations
SHMW-03S	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	None Observed	None Observed	None Observed	None Observed
SHMW-03I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	None Observed
SHMW-04S	Approx. 0.5' DNAPL, naphthalene-like odor	Approx. 0.25' of DNAPL	Approx. 0.5' of DNAPL	Approx. 0.25' of DNAPL	Approx. 0.30' of DNAPL	Approx. 0.40' DNAPL	Approx. 0.50' DNAPL	Approx. 0.5' DNAPL	Approx. -0.61'	Approx. 1.05' DNAPL	Approx. 0.6' DNAPL	Approx. 0.75' DNAPL	Well Inaccessible or Abandoned
SHMW-04I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	Well Inaccessible or Abandoned
SHMW-05S	None Observed	No DNAPL observed	None Observed	None Observed	None Observed	None Observed	None Observed	NR	None Observed	None Observed	None Observed	None Observed	Well Inaccessible or Abandoned
SHMW-05I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	Well Inaccessible or Abandoned
SHMW-06S	Approx. 0.10' DNAPL, naphthalene-like odor	Trace DNAPL	Approx. 0.2' of DNAPL	Approx. 0.2' of DNAPL	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Trace DNAPL (coating on tubes)	Trace	Trace DNAPL (on tubing)	Trace DNAPL	Trace DNAPL (on tubing)	Well Inaccessible or Abandoned
SHMW-06I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	Well Inaccessible or Abandoned
SHMW-07S	NR	NR	NR	NR	NR	None Observed	NR	NR	Trace	NR	NR	Trace DNAPL (on side of tubing approx 1' off bottom)	Well Inaccessible or Abandoned
SHMW-07I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	Well Inaccessible or Abandoned
SHMW-08S	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	None Observed	None Observed	None Observed	Well Inaccessible or Abandoned

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Table 2
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Groundwater Monitoring Program
Summary of Historic NAPL Observations

Well ID	December/Q4 2005 Observations	March/Q1 2006 Observations	June/Q2 2006 Observations	September/Q3 2006 Observations	December/Q4 2006 Observations	March/Q1 2007 Observations	June/Q2 2007 Observations	September/Q3 2007 Observations	December/Q4 2007 Observations	March/Q1 2008 Observations	June/Q2 2008 Observations	September/Q3 2008 Observations	December/Q4 2008 Observations
SHMW-08I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	Well Inaccessible or Abandoned
SHMW-09S	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	None Observed	None Observed	None Observed	None Observed
SHMW-09I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	NR
SHMW-10S	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	None Observed	None Observed	None Observed	None Observed
SHMW-10I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	NR
SHMW-11S	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	None Observed	None Observed	None Observed	None Observed
SHMW-11I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	NR
SHMW-12S	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	None Observed	None Observed	None Observed	None Observed
SHMW-12I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	NR
SHMW-13S	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	None Observed	None Observed	None Observed	None Observed
SHMW-13I	NR	NR	NR	NR	NR	None Observed	NR	NR	None Observed	NR	NR	NR	NR

Notes:
DNAPL - Dense Non-aqueous Phase Liquid
LNAPL - Light Non-aqueous Phase Liquid
WC - Water Column
NR - Gauging Not Required

Table 3
Sag Harbor Former MGP Site
Groundwater Monitoring Program
Summary of BTEX, MTBE, and PAH Results - Q4 2008

Sample Name: Sample Interval: Sample Date:	NYS AWQS	SHMW-03S 2.0-12.0 12/15/2008	SHMW-03I 35.0-45.0 12/15/2008	SHMW-09S 2.0-12.0 12/16/2008	SHMW-09I 35.0-45.0 12/16/2008	SHMW-10S 5.0-15.0 12/16/2008	Duplicate of SHMW-10S 5.0-15.0 12/16/2008	SHMW-10I 35.5-45.5 12/16/2008	SHMW-11S 3.5-13.5 12/16/2008	SHMW-11I 35.0-45.0 12/16/2008	SHMW-12S 1.5-6.5 12/15/2008	SHMW-12I 35.0-45.0 12/15/2008	SHMW-13S 1.5-6.5 12/15/2008	SHMW-13I 35.0-45.0 12/15/2008
BTEX (ug/L)														
Benzene	1	1 J	10 U	180	10 U	10 U	10 U	10 U	10 U	10 U	230	10 U	10 U	10 U
Toluene	5	10 U	10 U	1 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	5	9 J	10 U	210	10 U	10 U	10 U	10 U	10 U	10 U	11	10 U	10 U	10 U
Xylene, total	5	3 J	10 U	92	10 U	10 U	10 U	10 U	10 U	10 U	38	10 U	10 U	10 U
Total BTEX	NE	13	ND	483	ND	ND	ND	ND	ND	ND	279	ND	ND	ND
Other VOCs (ug/L)														
Methyl tert-butyl ether	NE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2 J	10 U	10 U	10 U
Non-carcinogenic PAHs (ug/L)														
Acenaphthene	20*	16	10 U	120	10 U	10 U	10 U	10 U	10 U	10 U	5 J	10 U	10 U	10 U
Acenaphthylene	NE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	50*	10 U	10 U	3 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[g,h,i]perylene	NE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	50*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	50*	4 J	10 U	23	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylnaphthalene,2-	NE	10 U	10 U	90	10 U	10 U	10 U	10 U	10 U	10 U	5	10 U	10 U	10 U
Naphthalene	10*	6	10 U	250	10 U	10 U	10 U	10 U	10 U	10 U	270	10 U	10 U	10 U
Phenanthrene	50*	3 J	10 U	17	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	50*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Non-carcinogenic PAH's	NE	29	ND	503	ND	ND	ND	ND	ND	ND	280	ND	ND	ND
Carcinogenic PAHs (ug/L)														
Benz[a]anthracene	0.002*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[a]pyrene	ND	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[b]fluoranthene	0.002*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo[k]fluoranthene	0.002*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	0.002*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz[a,h]anthracene	NE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno[1,2,3-cd]pyrene	0.002*	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total Carcinogenic PAH's	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total PAH's	NE	29	ND	503	ND	ND	ND	ND	ND	ND	280	ND	ND	ND

Notes:

ug/L - micrograms per liter or parts per billion (ppb)

BTEX - benzene, toluene, ethylbenzene, and xylenes

VOCs - volatile organic compounds

PAHs - polycyclic aromatic hydrocarbons

Total BTEX, Total PAHs are calculated using detects only.

NYS AWQS - New York State Ambient Water Quality Standards and Guidance Values for GA groundwater

* indicates the value is a guidance value and not a standard

NE - not established

ND - not detected; total concentration is listed as ND because no compounds were detected in the group

Bolding indicates a detected result value

Shading and bolding indicates that the detected result value exceeds the NYS AWQS objective it was compared to

Validation Qualifiers:

J - estimated value

U - indicates not detected to the reporting limit for organic analysis and the method detection limit for inorganic analysis

Table 4
Sag Harbor Former MGP Site
Groundwater Monitoring Program
Summary of Historic Total BTEX Results

Well No.	Screen Interval (feet)	Total BTEX Concentrations (ug/l)																										
		Sampling Date																										
		1995	2000		2002	2004		2005				2006				2007				2008				Min	Max	Mean		
		Nov	Mar	Apr	May	May	Aug	Mar/Apr	June	Sept	Dec	March	June	Sept	Dec	March	June	Sept	Dec	March	June	Sep	Dec					
MW-01	1.50 - 7.32	2,720	10	68	9	4	0	0	12	67	--	13,720	7,591	--	14,174	12,267	8,678	12,810	15,181	98	8,865	7,415	2,240	--	98	15,181	9,129	
MW-02	0.50 - 7.25	5,429	8,840	7,940	5,840	13,287	8,740	7,333	13,010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-03	2.17 - 10.17	1,222	668	1,553	1,363	2,573	--	2,050	2,867	560	2,622	4,880	1,971	4,965	2,398	1,680	2,930	3,225	2,831	2,842	2,241	2,875	--	--	560	4,965	2,416	
MW-04	1.25 - 6.81	864	35	--	10	208	--	0	0	225	299	268	193	181	101	0	51	89	66	--	15	79	--	--	0	864	149	
MW-05	2.46 - 7.46	9,100	170	5	102	11,600	2,938	2,697	18,900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	18,900	5,689
MW-06	2.47 - 7.47	334	47	30	91	49	--	33	55	39	36	74	37	11	54	0	37	31	0	1	33	7	--	--	0	334	50	
SHMW-01S	1.0 - 6.0	--	--	1,413	874	2,102	--	1,367	1,810	406	1,313	2,562	2,085	5,183	2,915	691	2,460	2,600	1,684	1,595	306	243	--	--	243	5,183	1,756	
SHMW-01I	35.0 - 45.0	--	--	5	0	0	--	--	--	--	0	--	--	--	0	0	--	--	--	--	--	--	--	--	--	0	5	1
SHMW-02I	35.0 - 45.0	--	--	26	0	1,179	16	20	20	19	25	0	0	0	0	--	11	12	15	18	41	29	--	--	0	1,179	80	
SHMW-02D	65.0 - 75.0	--	--	5	4	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	--	--	0	5	2
SHMW-03S	2.0 - 12.0	--	--	63	0	110	--	48	53	46	75	131	67	97	13	122	80	12	50	3	0	5	13	0	131	52		
SHMW-03I	35.0 - 45.0	--	--	0	52	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	0	0	52	7	
SHMW-04S	2.0 - 12.0	--	--	7,940	3,154	12,180	--	9,369	17,730	8,960	21,920	25,860	9,361	18,398	10,489	6,883	20,488	16,120	10,378	7,567	8,059	7,561	--	--	3,154	25,860	12,357	
SHMW-04I	35.0 - 45.0	--	--	5	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	--	--	0	5	1
SHMW-05S	2.0 - 12.0	--	--	37	69	83	--	107	282	2,960	115	202	45	43	26	35	458	676	98	77	83	64	--	--	26	2,960	303	
SHMW-05I	35.0 - 45.0	--	--	0	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	--	--	0	0	0
SHMW-06S	2.0 - 6.0	--	--	2,392	2,463	3,057	--	2,630	1,950	--	2,910	2,622	1,702	4,289	2,196	1,475	2,285	2,162	1,565	1,296	1,343	1,298	--	--	1,296	4,289	2,214	
SHMW-06I	35.0 - 45.0	--	--	0	0	0	--	--	--	--	0	--	--	--	--	0	--	--	--	0	--	--	--	--	--	0	0	0
SHMW-07S	1.0 - 11.0	--	--	2,011	1,562	414	--	1,482	3,340	2,458	1,722	1,400	1,060	--	1,137	185	--	2,139	726	--	1,075	1,374	--	--	185	3,340	1,472	
SHMW-07I	35.0 - 45.0	--	--	0	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	--	--	0	0	0
SHMW-08S	1.0 - 7.0	--	--	5	2	9	--	0	14	0	15	11	0	19	0	0	0	0	12	8	9	10	--	--	0	19	6	
SHMW-08I	35.0 - 45.0	--	--	0	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	--	--	0	0	0
SHMW-09S	2.0 - 12.0	--	--	1,024	506	1,100	--	500	1,000	--	920	1,130	770	768	500	418	1,240	178	600	1,039	1,298	671	483	178	1,298	786		
SHMW-09I	35.0 - 45.0	--	--	0	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	--	--	0	0	0
SHMW-10S	5.0 - 15.0	--	--	--	0	0	--	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	
SHMW-10I	35.5 - 45.5	--	--	--	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	--	0	0	0	
SHMW-11S	3.5 - 13.5	--	--	--	0	0	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SHMW-11I	35.0 - 45.0	--	--	--	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	--	0	0	0	
SHMW-12S	1.5 - 6.5	--	--	--	0	344	--	142	930	69	290	140	463	581	182	85	623	81	0	166	482	111	279	0	930	276		
SHMW-12I	35.0 - 45.0	--	--	--	0	0	--	--	--	--	0	--	--	--	0	--	--	--	23	--	--	--	--	0	0	23	4	
SHMW-13S	1.5 - 6.5	--	--	--	0	0	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SHMW-13I	35.0 - 45.0	--	--	--	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	0	0	0	0	

NOTES:
 -- not analyzed or not applicable
 ug/L - micrograms per liter
 BTEX - benzene, toluene, ethylbenzene, and xylene

Table 5
Sag Harbor Former MGP Site
Groundwater Monitoring Program
Summary of Historic Total PAH Results

Well No.	Screen Interval (feet)	Total PAH Concentrations (ug/l)																									
		Sampling Date																									
		1995	2000		2002	2004		2005				2006				2007				2008				Min	Max	Mean	
		Nov	Mar	Apr	May	May	Aug	Mar/Apr	June	Sept	Dec	March	June	Sept	Dec	March	June	Sept	Dec	March	June	Sep	Dec				
MW-01	1.50 - 7.32	4,906	1,548	257	402	30	24	0	61	200	0	0	0	97	95	0	54	87	39	145	2	35	--	0	4,906	380	
MW-02	0.50 - 7.25	6,991	5,511	5,114	10,729	25,167	4,414	5,809	10,504	--	6,919	5,209	--	0	8,617	3,150	7,421	5,398	165	400	3,455	3,488	--	0	25,167	6,235	
MW-03	2.17 - 10.17	7,034	3,065	3,433	3,774	3,522	--	2,272	4,557	516	92	1,256	565	4,831	6,212	349	489	463	2,904	508	96	1,109	--	92	7,034	2,352	
MW-04	1.25 - 6.81	3,612	75	--	0	90	--	0	22	1,098	103	11	37	66	31	0	66	238	6	--	0	22	--	0	3,612	304	
MW-05	2.46 - 7.46	16,386	779	101	1,160	431,600	2,049	918	188,200	--	--	--	--	--	--	--	--	--	--	--	--	--	--	101	431,600	80,149	
MW-06	2.47 - 7.47	5,416	894	653	258	33	--	90	79	204	0	22	0	0	645	35	46	17	0	0	0	10	--	0	5,416	420	
SHMW-01S	1.0 - 6.0	--	--	4,147	2,663	2,424	--	1,989	2,185	840	0	42	115	3,989	3,874	0	1,058	1,691	42	0	0	0	--	0	4,147	1,392	
SHMW-01I	35.0 - 45.0	--	--	32	0	0	--	--	--	--	0	--	--	--	0	--	--	--	--	--	--	--	--	0	32	6	
SHMW-02I	35.0 - 45.0	--	--	266	0	580,200	41	185	124	271	30	74	32	91	89	0	10	175	32	8	42	209	--	0	580,200	30,625	
SHMW-02D	65.0 - 75.0	--	--	308	76	89	--	--	--	--	0	--	--	--	0	--	--	--	15	--	--	--	--	0	308	81	
SHMW-03S	2.0 - 12.0	--	--	422	0	295	--	79	130	117	339	0	0	147	118	430	191	12	154	0	0	17	29	0	430	131	
SHMW-03I	35.0 - 45.0	--	--	2	320	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	0	0	320	46	
SHMW-04S	2.0 - 12.0	--	--	4,275	5,107	5,965	--	3,959	6,669	4,684	5,879	2,364	3,572	4,196	6,250	2,632	3,999	4,693	4,305	0	1,328	1,868	--	0	6,669	3,986	
SHMW-04I	35.0 - 45.0	--	--	18	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	0	18	3	
SHMW-05S	2.0 - 12.0	--	--	13	170	94	--	82	91	26	53	17	11	11	110	0	0	14	8	2	0	31	--	0	170	41	
SHMW-05I	35.0 - 45.0	--	--	0	17	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	0	17	3	
SHMW-06S	2.0 - 6.0	--	--	4,130	4,694	3,024	--	3,162	2,366	--	4,157	120	201	3,900	4,062	1,703	3,574	4,368	380	0	44	5,848	--	0	5,848	2,690	
SHMW-06I	35.0 - 45.0	--	--	2	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	0	2	0	
SHMW-07S	1.0 - 11.0	--	--	7,211	6,585	2,708	--	3,224	4,604	6,187	3,507	2,004	3,119	--	3,721	0	--	3,902	4	--	54	3,252	--	0	7,211	3,339	
SHMW-07I	35.0 - 45.0	--	--	0	0	0	--	--	--	--	0	--	--	--	2,212	--	--	--	0	--	--	--	--	0	2,212	369	
SHMW-08S	1.0 - 7.0	--	--	110	71	94	--	25	70	33	83	112	57	77	99	13	90	10	13	14	21	55	--	10	112	58	
SHMW-08I	35.0 - 45.0	--	--	13	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	0	13	2	
SHMW-09S	2.0 - 12.0	--	--	1,787	2,472	1,697	--	1,463	1,600	--	2,609	94	1,935	1,138	2,737	48	206	2,246	130	0	92	485	503	0	2,737	1,180	
SHMW-09I	35.0 - 45.0	--	--	3	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	--	0	0	3	0
SHMW-10S	5.0 - 15.0	--	--	--	22	6	--	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	22	2	
SHMW-10I	35.5 - 45.5	--	--	--	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	0	0	0	0	
SHMW-11S	3.5 - 13.5	--	--	--	0	3	--	173	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	173	10	
SHMW-11I	35.0 - 45.0	--	--	--	0	0	--	--	--	--	0	--	--	--	0	--	--	--	4	--	--	--	0	0	4	1	
SHMW-12S	1.5 - 6.5	--	--	--	60	218	--	71	600	230	260	110	470	310	280	15	560	0	155	9	137	259	280	0	600	224	
SHMW-12I	35.0 - 45.0	--	--	--	0	0	--	--	--	--	0	--	--	--	0	--	--	--	20	--	--	--	0	0	20	3	
SHMW-13S	1.5 - 6.5	--	--	--	0	0	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SHMW-13I	35.0 - 45.0	--	--	--	0	0	--	--	--	--	0	--	--	--	0	--	--	--	0	--	--	--	0	0	0	0	

NOTES:

-- not analyzed or not applicable
ug/L - micrograms per liter
PAHs - polycyclic aromatic hydrocarbons

Figures



SOURCE: Map created with TOPO! © ©2001 National Geographic
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SAG HARBOR FORMER MGP SITE
SAG HARBOR, NEW YORK

nationalgrid



Project 061140-18-2704

SITE LOCATION MAP

March 2009

Figure 1









