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**Annual Groundwater Monitoring and Operations,
Maintenance, & Monitoring Report 2021/2022
Halesite Former MGP Site**

Town of Huntington, Suffolk County,
Long Island, New York
Site ID No. 1-52-173

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A. Oxygen Injection System OM&M Data

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Abbreviations, Acronyms, and Measurements

AKRF	Allee King Rosen & Fleming
AWQS	Ambient Water Quality Standards
BTEX	Benzene, Toluene, Ethylbenzene, and total Xylenes
°C	Degrees Celsius
DER	Division of Environmental Remediation
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
DTW	Depth-to-Groundwater
D&B	Dvirka and Bartilucci
ft bgs	feet below ground surface
GEI	GEI Consultants, Inc., P. C.
GM	Groundwater Monitoring
LNAPL	Light Non-Aqueous Phase Liquid
mg/L	milligrams per liter
MGP	Manufactured Gas Plant
mS/cm	microSiemens per centimeter
MSL	Mean Sea Level
mV	millivolts
NAPL	Non-Aqueous Phase Liquid
NYSDEC	New York State Department of Environmental Protection
OM&M	Operations Maintenance & Monitoring
ORP	oxidation reduction potential
PAH	Polycyclic Aromatic Hydrocarbon
pH	potential Hydrogen
PSEG-LI	Public Service Electric and Gas Company – Long Island
Q1	First Quarter
Q2	Second Quarter
Q3	Third Quarter
Q4	Fourth Quarter
RAP	Remedial Action Plan
RIR	Remedial Investigation Report
TOGS	Technical and Operational Guidance Series
TSDF	Treatment, Storage, and Disposal Facility
µg/L	micrograms per liter
USDOT	United States Department of Transportation
VHB	Vanasse Hangen Brustlin, Inc.
WLE	Water Level Elevation

1. Introduction

This annual report presents the results of the groundwater monitoring (GM) and operations, maintenance, and monitoring (OM&M) work completed during this reporting period (Q4 2021 through Q3 2022) for the Halesite Former Manufactured Gas Plant (MGP) Site (the Site) located on North New York Avenue in Halesite, within the Town of Huntington, Suffolk County, New York.

The sampling and data collection procedures were conducted in general accordance with the New York State Department of Environmental Conservation (NYSDEC)-approved OM&M Plan (GEI Consultants, Inc. [GEI], 2009). This report has been prepared in accordance with the requirements of Section 6 of Division of Environmental Remediation, Technical Guidance for Site Investigation and Remediation (DER-10), and Order-on-Consent, Index No. D1-0001-98-11 signed by KeySpan Corporation (currently known as National Grid) and the NYSDEC.

GM and OM&M activities included groundwater monitoring, non-aqueous phase liquid (NAPL) monitoring and recovery, and OM&M of the oxygen injection system. In addition to the Site background and geology subsections provided below, the remaining report sections are organized as follows:

- **Section 2:** NAPL Monitoring and Recovery.
- **Section 3:** Groundwater Monitoring.
- **Section 4:** Conclusions and Recommendations.

1.1 Background

The Site is approximately one acre in size and is located along North New York Avenue, approximately 200 feet east of Huntington Harbor (Figure 1). The topography of the Site generally slopes towards the harbor. The elevation of the Site ranges from approximately 15 feet above mean sea level (MSL) near the western boundary in the lowland area to approximately 85 feet above MSL at the eastern boundary in the upland area. The undeveloped upland area rises sharply eastward from approximately 20 to 60 feet above MSL and continues to slope upwards to a high point near the northeast corner of the property.

The former MGP Site is believed to have initiated operations around 1892 and continued to operate through approximately 1918. The MGP structures were later dismantled and removed from the Site. The results of the investigations and discussion of the Site history are presented in the Final Remedial Investigation Report (RIR), dated April 2004.

Currently, an active Public Service Electric and Gas-Long Island (PSEG-LI) electric substation is located on the western-third, or lowland area, of the Site. The remaining eastern two-thirds of the property, or upland area, is undeveloped land that is characterized by a steep slope. The slope was formerly heavily vegetated but was cleared and stabilized with new plantings during Site remediation. The surrounding area is currently primarily residential with a mixture of commercial properties along New York Avenue.

A final Remedial Action Plan (RAP) entitled “Remedial Action Plan, Halesite Former MGP Site, Halesite, New York,” prepared by GEI, was submitted by National Grid (KeySpan) and approved by the NYSDEC in March 2006. A summary of Site investigation and remedial activities is presented below in Table 1a.

Table 1a. Summary of Site Investigation and Remedial Activities

Date	Remedial Activity	Activity Detail	Conducted By
1997	Phase I Site Investigation	Piezometer and monitoring well installation, soil, and groundwater sampling	Fluor Daniel GTI
2001 to 2004	Remedial Investigations	Included soil, soil vapor and groundwater sampling, monitoring well installations	D&B VHB
August 2005	Substation Clean Utility Corridor Installation Project	Removal of approximately 180 tons of soil and other material from the substation area	GEI
October 2008	Shallow Soil Excavation	Removal of approximately 400 tons of impacted soil, including the top two feet of soil in the upland area	AKRF/Creamer
November 2008 to February 2009	On-site Impacted Soil Excavation	Removal of approximately 5,800 tons of impacted soil from four onsite source areas	AKRF/Creamer
February 2009	DNAPL Delineation Program	Soil borings	GEI
February to March 2009	Offsite Impacted Soil Excavation	Removal of approximately 1,150 tons of off-site impacted soil from adjacent office building parking lot	AKRF/Creamer
May 2009	Oxygen Injection System (Including Additional Monitoring Well Installations)	Installed in the lowland area, to treat groundwater impacted by residual soil contamination	AKRF/GEI
2009 to Current	DNAPL Recovery	See Section 2	GEI

Notes:

- DNAPL: Dense Non-Aqueous Phase Liquid
- D&B: Dvirka and Bartilucci
- VHB: Vanasse Hangen Brustlin, Inc.
- AKRF: Allee King Rosen & Fleming

1.2 Site Geology

The subsurface sediments underlying the Site and surrounding area are comprised of a relatively thick sequence of sand, gravel, silt, and clay.

From the ground surface, four distinct stratigraphic units exist, and consist of topsoil/fill material, a shallow sand unit, a fine-grained unit, and a glacial sand unit. The fine-grained unit is generally continuous on-site and is encountered at depths ranging from approximately 8 to 70 feet below ground surface (ft bgs) in the lowland and upland areas of the Site, respectively, with thicknesses of up to 8 feet in the upland area. This unit is not present in the extreme western portion of the lowland area and immediately downgradient of the Site. Additional information regarding Site geology is available in the April 2004 RIR.

2. NAPL Monitoring and Recovery

2.1 Program Scope and Purpose

Thirteen passive NAPL recovery wells (RW-1 through RW-11, RW-5D, and RW-9D) exist along the perimeter of the lowland area. These recovery wells, along with monitoring wells MW-03, HHMW-05S2R, HHMW-09S2, and HHMW-22S1 are monitored for the presence of NAPL. Well HHMW-15S has historically exhibited measurable thicknesses of NAPL; however, based on recent observations, it appears the well screen has become clogged with silt and NAPL and is no longer usable for NAPL monitoring. Well locations are depicted on Figure 2.

Recovery wells RW-5D and RW-9D and monitoring wells MW-03, HHMW-05S2, HHMW-09S2, HHMW-15S, HHMW-22S1 are monitored quarterly. The remaining recovery wells are monitored annually. Recovery from wells with sufficient thicknesses of NAPL is conducted on an as-needed basis. It should be noted that the recovery wells were constructed with a 2-foot sump, designed to immobilize any DNAPL accumulating within the wells. Wells with measurable thickness has historically been limited to recovery wells RW-5D and RW-9D.

2.2 NAPL Monitoring and Recovery Data

Historically, NAPL has been observed in nine on-site recovery and monitoring wells and one off-site monitoring well (HHMW-22S1). Since completion of the remedial excavations, NAPL has not been detected in the Upland area. However, as the substation is still active, remedial excavations have not been able to be completed within the substation and, as a result, NAPL has continued to be detected within and in the vicinity of the substation area.

DNAPL has either not been observed or has been only identified at trace levels at off-site monitoring well HHMW-22S1 since Q4 2015. To date, LNAPL has not been observed in this well.

A summary of NAPL monitoring at the Site is provided below in Table 2a.

Table 2a. Historical NAPL Summary

Well	Location	Historical Maximum NAPL Thickness (feet)	Period Measured (Start)	Current Well Status	Current Monitoring Frequency	Comments
HMMW-12	Upland	0.4*	Q2 2005	Abandoned	NA	Abandoned – Replaced by HMMW-16 Cluster**
HMMW-10	Lowland – substation	2.3	Q2 2005	Abandoned	NA	--
HHRW-01	Lowland – substation	--	NA	Destroyed	NA	Replaced by HMMW-10
HMMW-05S2R	Lowland	0.2	Q3 2012	Active	Quarterly	--
HMMW-09S2	Lowland	3.68	Q4 2008	Active	Quarterly	--
HMMW-15S	Lowland – substation	2.6	Q4 2011	Active	Quarterly	Replacement for HHRW-01
HMMW-22S1	Lowland – off-site office bldg.	3.8	Q3 2009	Active	Quarterly	--
RW-5D	Lowland	1.25	Q4 2009	Active	Quarterly	--
RW-9D	Lowland	3.0	Q1 2017	Active	Quarterly	--
MW-03	Lowland	0.02	Q3 2014	Active	Quarterly	--

Notes:

*: Light non-aqueous phase liquid (LNAPL), all other measurements are dense non-aqueous phase liquid (DNAPL).

** : No evidence of NAPL has been observed at the HMMW-16 cluster.

NA: Not Applicable.

Recovery wells continue to exhibit the greatest DNAPL thicknesses. DNAPL was observed in only five wells during this reporting period, ranging from trace levels to 2.83 feet (recovery well RW-9D). NAPL thickness measurements for this and historical reporting periods are provided on Table 2-1.

2.2.1 DNAPL Recovery

A summary of the recent DNAPL thicknesses and total amounts recovered from monitoring and recovery wells are shown below in Table 2b. In addition, Table 2-2 provides DNAPL recovery data for these wells beginning in Q4 2009 through Q3 2022.

Table 2b. Summary of Recent DNAPL Thickness and Recovery Totals in On-site Wells

Well ID	Screen Interval	Average DNAPL Thickness (feet)			Approximate Total Volume Recovered this Reporting Period	Approximate Cumulative Total Volume Removed
	(feet)	2020	2021	2022*	(gallons)	(gallons)
RW-5D	15-25	0.29	0.19	0.27	0.00	11.50
RW-9D	14-24	0.95	1.76	0.79	6.00	118.20
HMMW-05S2R	18-28	0.03	0.03	0.06	0.00	0.45
HMMW-09S2	17.5-27.5	NO	0.01	0.01	0.00	0.88
HMMW-15S**	7.5-12.5	0.01	0.01	NM	0.00	4.65
HMMW-22S1 (off-site)	7.5-12.5	0.01	0.01	NM	0.00	8

Notes:

*: Values represent the first three quarters (Q1, Q2, and Q3) of 2022.

** : Well screen likely clogged; well requires rehabilitation (redevelopment) or replacement, as necessary.

NO: Not observed

Trace amounts of DNAPL counted as 0.01 feet when calculating averages.

2.3 Waste Management

The DNAPL and associated purge water recovered during this reporting period were staged in properly labeled United States Department of Transportation (USDOT)-approved 55-gallon drums in a designated area on-site for subsequent off-site disposal by a licensed liquid hazardous waste transporter at an approved treatment, storage, and disposal facility (TSDF).

3. Oxygen Injection System OM&M and Groundwater Monitoring

3.1 Oxygen Injection System OM&M

3.1.1 Program Purpose and Scope

An oxygen injection system exists around the perimeter of the lowland area to treat groundwater impacted by residual soil contamination at the Site, which could not be excavated due to accessibility issues associated with the steep slopes in the upland area and the active electrical substation in the lowland area. The oxygen injection system became operational on May 4, 2009, and its location is depicted on Figure 2. The purpose of the oxygen injection system is to infuse oxygen into groundwater to promote microbial reduction of groundwater impacts.

3.1.2 Current Monitoring Activities

A list of monitoring wells associated general site locations, and current sampling frequencies (annual or semi-annual) are provided on Table 3-1. Current oxygen injection system monitoring activities are summarized below in Table 3a.

Table 3a. Description and Location of Analytical and Monitoring Results

Current Activity	Description	Frequency	Location of Results
Oxygen System Monitoring	Routine inspection, operational parameter monitoring, and system optimization	Monthly	Appendix A (field logs not included)
Performance Monitoring of Oxygen Injection System*	Monitoring of groundwater chemistry parameters	Semi-annually	Table 3-2
	Groundwater sampling	Semi-annually	Tables 3-4, 3-5, 3-6

In order to ensure that system runtime is maximized between on-site monitoring events, a telemetry system provides remote access to system parameters and settings. This system also transmits email alerts of alarms, signaling that the system is down.

3.1.3 Oxygen Injection System OM&M Data

System Operational Data: The oxygen injection system operated for approximately 355 out of 365 days during this reporting period. The majority of system downtime occurred during Q2 2022, primarily due to air conditioning and associated overheating issues that were subsequently repaired.

The system injected between approximately 7,975 pounds (Q2 2022) to 11,946 pounds (Q3 2022) of oxygen during each quarter and 550,870 pounds since system startup in May 2009. Calculated injected oxygen mass is provided in Appendix A.

Groundwater Parameters

Groundwater parameters including dissolved oxygen (DO), oxidation reduction potential (ORP), pH, conductivity, and temperature are monitored to evaluate system performance. The oxygen injection system has historically been generally effective at increasing DO concentrations and ORP in groundwater. ORP values in groundwater were lower than the baseline values in downgradient wells during the current annual monitoring period; however, this is largely due to the elimination of numerous wells with historically higher ORP values and low concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX) and polycyclic aromatic hydrocarbon (PAHs). Table 3b summarizes these parameters, as well as pH, conductivity, and temperature, for this reporting period.

Table 3b. Summary of Groundwater Parameters

		Baseline Value	Operational Value	Q1 2022	Q3 2022
		Average	Average	Average	Average
DO (mg/L)	Upgradient	3.21	7.30	13.26	11.91
	Injection Area	4.78	17.09	20.47	26.50
	Downgradient	5.17	4.06	0.00	0.02
ORP (mV)	Upgradient	204	285	386	252
	Injection Area	170	204	69	-1
	Downgradient	125	97	-11	-35
pH	Upgradient	5.30	5.10	4.54	5.74
	Injection Area	5.75	5.54	5.70	7.25
	Downgradient	5.93	5.86	6.22	6.26
Conductivity (mS/cm)	Upgradient	0.233	0.424	0.309	0.262
	Injection Area	0.589	0.502	0.586	0.812
	Downgradient	0.574	0.544	1.670	0.274
Temperature (°C)	Upgradient	12.61	13.55	11.25	15.77
	Injection Area	10.40	13.49	10.89	22.55
	Downgradient	11.73	14.39	7.35	21.78

Notes:

mg/L: milligrams per liter

mV: millivolts

mS/cm: micro Siemens per centimeter

°C: degrees Celsius

Baseline values were established during the April 2009 sampling round, prior to system start-up

Green highlight indicates increase from baseline value

A complete summary of groundwater parameter data is included in Table 3-2.

3.2 Groundwater Monitoring

3.2.1 Program Purpose and Scope

Groundwater monitoring is completed on a semi-annual basis to monitor groundwater quality and oxygen injection system effectiveness. Well locations and geographic boundaries of the Site are depicted on Figure 2.

The Site has been divided into three separate areas: upgradient of the oxygen injection system, the oxygen injection area, and downgradient of the Site. A fourth off-site side-gradient area also exists to the south of the Site (see Figure 2). In addition, the wells are divided into two hydrogeologic zones (shallow and intermediate). The boundary between the two hydrogeologic zones is defined by the fine-grained unit, which is present throughout the majority of the Site and downgradient areas. Monitoring wells are typically sampled across the tidal cycle due to the close proximity of the Site to Huntington Harbor.

Ten monitoring wells within the well network are currently routinely sampled as part of the groundwater sampling program at the Site. In general, monitoring wells HHMW-05S2R, HHMW-15S, and MW-03, and side-gradient HHMW-22S1 located in the parking lot of the adjacent office building, are routinely not able to be sampled due to the presence of DNAPL within these wells.

As approved by NYSDEC on March 22, 2021, depth-to-groundwater measurements and groundwater elevation calculations are currently completed on an annual basis.

3.2.2 Site Activity

The following groundwater monitoring activities were conducted during the annual monitoring period:

- Depth-to-groundwater (DTW) measurements were collected from 31 on-site and off-site monitoring wells on August 15, 2022 (Table 3-3).
- Groundwater samples were collected for laboratory analysis from five on-site and off-site monitoring wells during the Q1 2022 semi-annual sampling event.
- Groundwater samples were collected for laboratory analysis from eight on-site and offsite monitoring wells during the Q3 2022 annual sampling event.

3.2.3 Groundwater Elevation Data

Measured groundwater levels and calculated elevations are provided in Table 3-3. Groundwater contour maps representing groundwater flow during the Q3 2022 monitoring

period are provided on Figures 3 and 4. The groundwater flow direction at the Site is generally westward, towards Huntington Harbor.

3.2.4 Groundwater Analytical Data

Of the 10 wells currently comprising the groundwater sampling program, oxygen system area wells HHMW-05S2-R and HHMW-15S were not sampled during this reporting period due to the presence of DNAPL within well HHMW-05S2-R, and the well screen of HHMW-15S apparently being clogged with silt or NAPL requiring rehabilitation (redevelopment) or replacement, as necessary.

Groundwater analytical data (BTEX and PAH) generated during this reporting period are presented on Table 3-4, while historical total BTEX and PAH results are presented on Tables 3-5 and 3-6, respectively. Contaminant concentrations are compared to New York State Technical and Operational Guidance Series (TOGS), 1.1.1 – Ambient Water Quality Standards and Guidance Values (AWQS) for Class GA groundwater.

3.2.4.1 BTEX and PAH Concentrations and Trends

BTEX

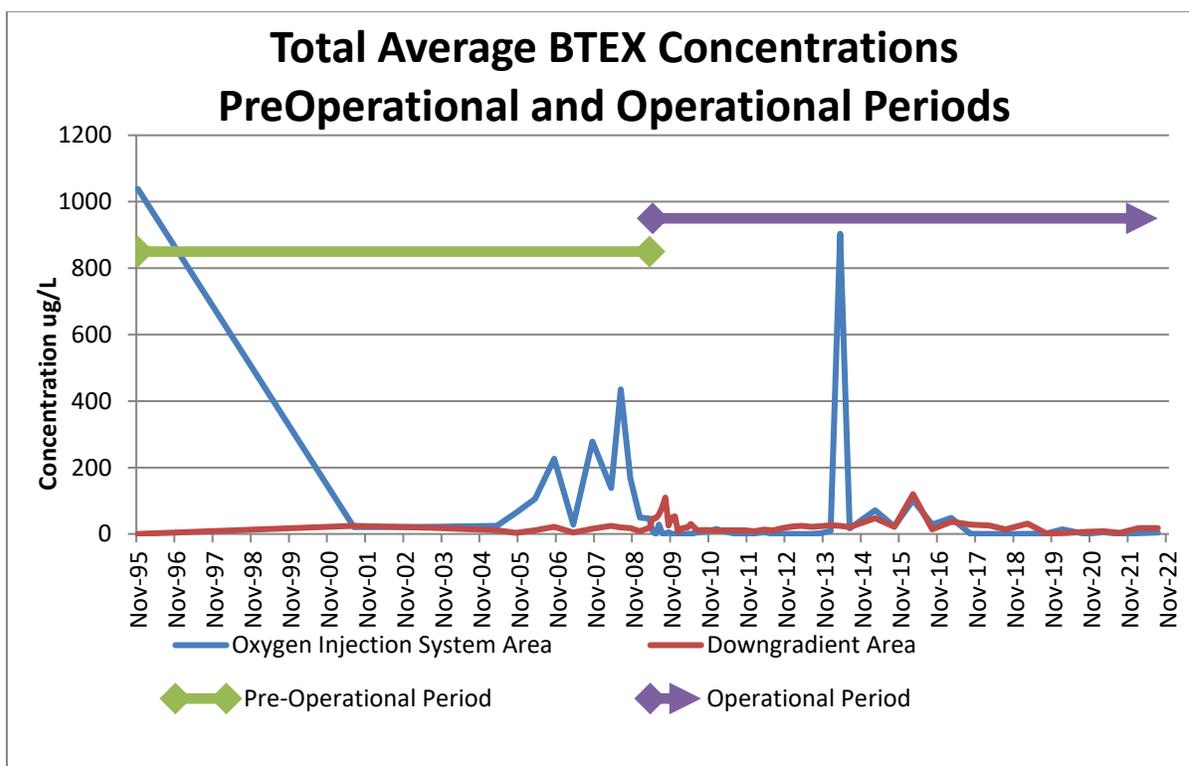
Exceedances of the AWQS for BTEX were limited to two of eight monitoring wells during this reporting period: downgradient well HHMW-19S1 and side-gradient well HHMW-22S1 (Figure 2), as follows:

- Downgradient well HHMW-19S1 exhibited an exceedance of ethylbenzene in the semi-annual sampling event with an estimated concentration of 15 micrograms per liter ($\mu\text{g/L}$), and an exceedance of toluene during the annual event with a concentration of 14 $\mu\text{g/L}$. The AWQS for both ethylbenzene and toluene is 5 $\mu\text{g/L}$.
- Side-gradient well HHMW-22S1 exhibited all BTEX compounds at concentrations well above their respective AWQS, with total BTEX identified at a concentration of 546 $\mu\text{g/L}$. During sampling, it was noted that the recharge rate was not sufficient to adequately recharge the well upon purging and the purge water was noted to be turbid and exhibited an odor. The poor recharge rate indicates that the well screen is likely clogged with silt and NAPL from past NAPL recovery events. As such, BTEX analytical results are likely biased high.

Historical average total BTEX concentrations at and downgradient of the Site are presented in the graph below. It is noted that concentrations included in the graph have only included shallow wells since 2016, at which time sampling of intermediate wells in these areas was discontinued in accordance with the approved reduction criteria. In general, average total BTEX concentrations have remained low, and have exhibited a marked reduction in the

oxygen injection system area following start-up of the system in May 2009. Temporary increases are likely the result of new monitoring wells being installed in targeted areas, temporarily increasing average BTEX concentrations in this area. Similarly, the slight increase noted in 2016 is likely attributable to the elimination of wells exhibiting historically low contaminant concentrations.

Excluding HHMW-19S1, total BTEX concentrations in downgradient wells have generally remained low since oxygen injection system start-up in May 2009. However, total BTEX concentrations in HHMW-19S1 have decreased substantially since Q1 2016 (283 µg/L), exhibiting concentrations of only 18 µg/L during this reporting period.



Note: Graph does not include monitoring well HHMW-15S since it was not sampled in recent sampling events (prior to Q2 2014) due to the presence of DNAPL.

PAHs

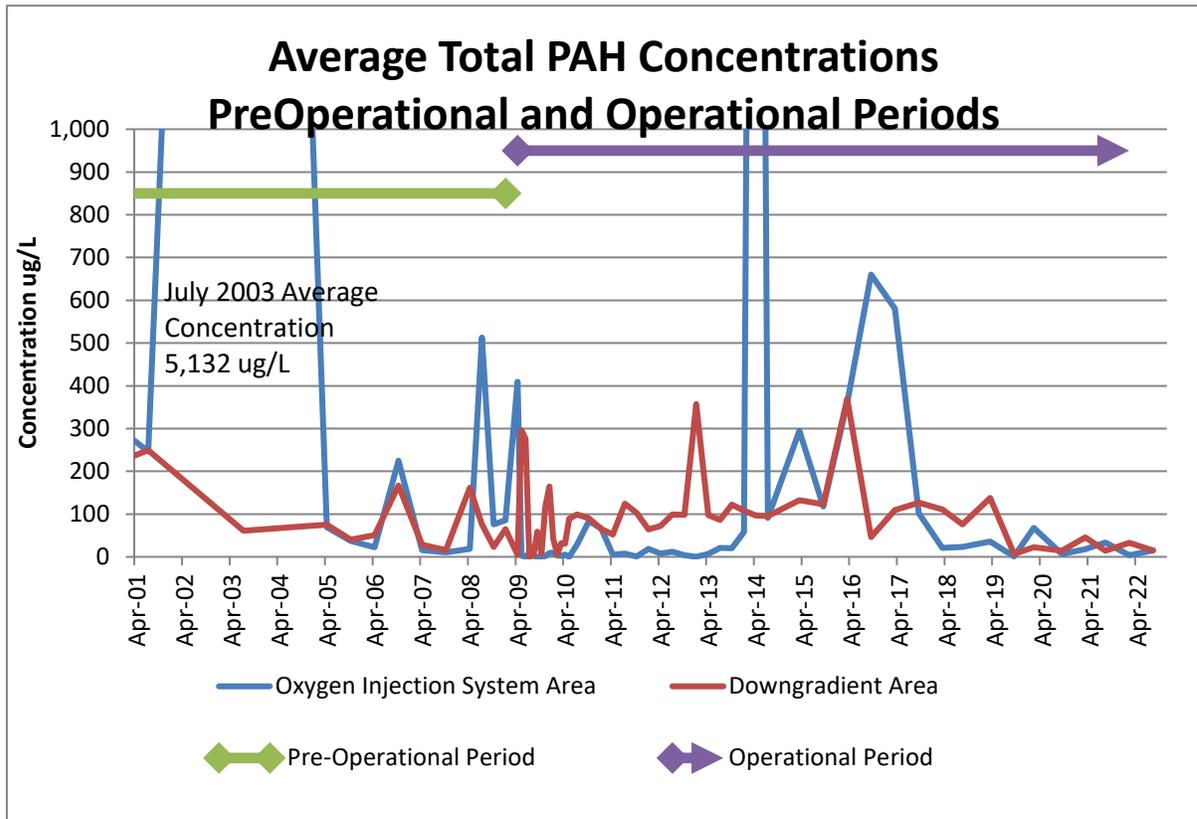
Exceedances of the AWQS for PAHs were identified in five of eight monitoring wells located throughout the Site during this reporting period. The greatest concentrations of PAHs were identified in side-gradient well HHMW-22S1, followed by upland area well HHMW-14 (Figure 2), as further detailed below.

Analytical results from this reporting period are summarized as follows:

- Upgradient well HHMW-14 exhibited several PAH compounds at concentrations above their respective AWQS, with total PAHs identified at concentrations ranging from 307 µg/L to 385 µg/L.
- Oxygen system area well HHMW-09S1 exhibited several PAH compounds at concentrations slightly to marginally above their respective AWQS in Q3 2022, with total PAH concentrations ranging from 1.2 µg/L in Q1 2022 (with no exceedances noted) to 30.45 µg/L (blind duplicate sample) in Q3 2022.
- Side-gradient well HHMW-22S1 exhibited several PAH compounds at concentrations well above their respective AWQS, with total PAHs identified at a concentration of 1,510 µg/L. As identified above, it was noted that the recharge rate was not sufficient to adequately recharge the well upon purging and the purge water was noted to be turbid and exhibited an odor. The poor recharge rate indicates that the well screen is likely clogged with silt and NAPL from past NAPL recovery events. As such, PAH analytical results are likely biased high.
- Naphthalene was also sporadically identified in downgradient well HHMW-19S1 at concentrations slightly above their respective AWQS in Q1 2022, with total PAH concentrations ranging from 17 µg/L to 21 µg/L (blind duplicate sample).

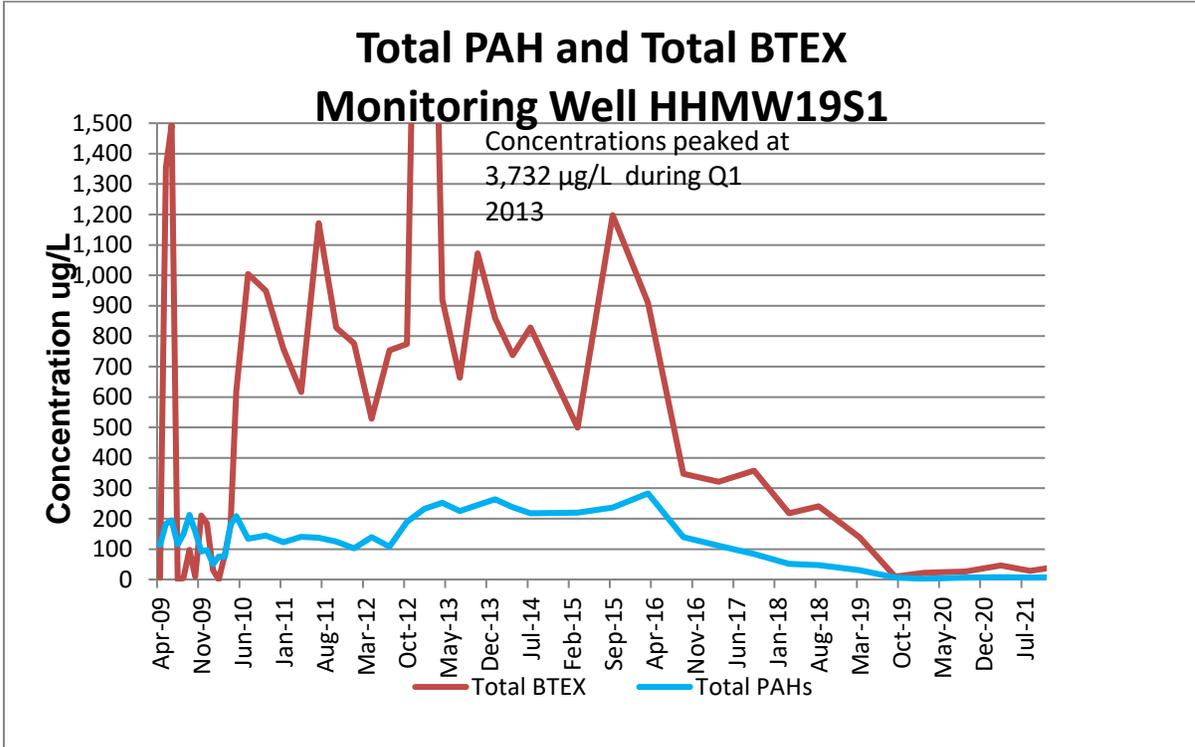
Historical average total PAH concentrations at and downgradient of the Site are presented in the graph below. Average total PAH concentrations at and downgradient of the Site have been trending downward since 2016 to 2017, when a temporary marked increase in average PAH concentrations was noted, which is likely attributable to the sampling of several wells that have historically exhibited measurable thicknesses of DNAPL (MW-03 and HHMW-05S2R). Since this time, total PAH concentrations have decreased, as these wells were generally not able to be sampled due to the reemergence of DNAPL within the wells. Decreases in several other wells have also been observed during this time.

As indicated above, oxygen system area well MW-03 has historically exhibited measurable thicknesses of DNAPL and has, therefore, not been able to be routinely sampled; however, this well did not exhibit measurable thicknesses on DNAPL or exceedances of the AWQS during this reporting period. Overall, PAH concentrations have remained generally low in the majority of the wells in the area of the oxygen injection system, including this reporting period, resulting in the elimination of several wells from the sampling program, in accordance with the approved reduction criteria.



Note:
Does not include data from any monitoring wells with measurable thicknesses of DNAPL at the time of sampling.

Elevated PAH concentrations in the downgradient area have generally been limited to well HHMW-19S1. Similar to total BTEX, the total PAH concentrations in well HHMW-19S1 have continued to trend downward well below historical highs (3,732 µg/L), exhibiting total PAH concentrations ranging from only 15 µg/L to 40 µg/L during this reporting period, as indicated in the graph below.



4. Conclusions and Recommendations

4.1 Conclusions

The oxygen injection system at the Site is operating as designed. DNAPL continues to be observed in limited on-site wells, with select recovery wells continuing to exhibit the greatest thicknesses and produce the greatest DNAPL recovery totals. DNAPL was observed in only five wells during this reporting period, ranging from a trace to 2.83 feet (recovery well RW-9D). DNAPL recovery at the Site is limited, with a total of approximately 6 gallons recovered during this reporting period.

Operation of the oxygen injection system and DNAPL recovery efforts at the Site have resulted in the reduction of historical total BTEX and total PAH concentrations of over an order-of-magnitude at the Site. Excluding side-gradient well HHMW-22S1, only one BTEX compound was identified marginally exceeding its AWQS in only one well (downgradient well HHMW-19S1) during this reporting period. Excluding side-gradient well HHMW-22S1, several PAH compounds were identified slightly to marginally exceeding their respective AWQS in five wells during this reporting period. However, only naphthalene was detected slightly above its AWQS in downgradient well HHMW-19S1 during this reporting period in one of the two monitoring events. Overall, BTEX and PAH concentrations in downgradient well HHMW-19S continue to decrease.

Side-gradient well HHMW-22S1 exhibited several BTEX and PAH compounds at concentrations well above their respective AWQS; however, it should be noted that the recharge rate was not sufficient to adequately recharge the well upon well purging, and the purge water was noted to be turbid and exhibited an odor. The poor recharge rate indicates that the well screen is likely clogged with silt and NAPL from past NAPL recovery events. As such, these analytical results are likely biased high.

4.2 Recommendations

Based on review of the above well gauging and associated analytical results, it is recommended to continue groundwater monitoring and oxygen injection system OM&M activities per the current schedule and in accordance with the approved reduction criteria detailed in the July 2014 letter titled, “Long Term Groundwater Monitoring Program Reductions and Remediation System Shutdown Criteria,” as follows:

- As identified in Section 2.1, recovery wells RW-5D and RW-9D and monitoring wells MW-03, HHMW-05S2, HHMW-09S2, HHMW-22S1 will be monitored for NAPL quarterly, with the remaining recovery wells monitored annually.

- It is further recommended that recovery of DNAPL from recovery wells with a 2-foot sump, where accumulated NAPL is immobile, should be completed when DNAPL is observed at a thickness of 1-foot or more, while recovery of DNAPL from recovery wells without a sump should be completed when DNAPL is observed at a thickness of 4-inches or more. Any recovered NAPL/aqueous solution will be containerized and properly disposed off-site.
- As the well screen at well HHMW-15S has apparently become clogged with silt and NAPL from past NAPL recovery events and is no longer usable for NAPL or groundwater monitoring, it is recommended that this well be rehabilitated (redeveloped) or replaced, as necessary.
- Similarly, as the well screen at well HHMW-22S1 is likely clogged with silt and NAPL from past NAPL recovery events, it is recommended that this well be rehabilitated or replaced, as necessary.
- As identified in Section 3.2.1, depth-to-groundwater measurements and groundwater elevation calculations will be completed on an annual basis.
- The current list of 10 monitoring wells will be sampled per the frequencies (annual or semi-annual) identified on Table 3-1. If NAPL is observed with a well during gauging, the well will not be sampled.
- Oxygen injection system OM&M will be completed per the frequencies identified on Table 3a.

5. References

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- GEI (2009). "Operations, Maintenance, and Monitoring Plan, Halesite Former MGP Site." May 6.
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- GEI (2009). "Groundwater Monitoring Report, Second Quarter 2009, Halesite Former Manufactured Gas Plant Site, Halesite, New York," August 31.
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- New York State Department of Health (2006). Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October.
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Tables

Table 2-1. NAPL Gauging Summary
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2009											
	5/11/2009	5/14/2009	5/18/2009	5/21/2009	5/26/2009	6/11/2009	7/7/2009	8/7/2009	9/8/2009	10/29/2009	11/17/2009	12/2/2009
DNAPL Thickness (in feet)												
RW-1	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-5	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-5D	NO	~0.25	~ 0.38	~ 0.2	~0.1	Trace	Trace	0.5	1.0	0.83	1.08	1.25
RW-6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-7	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-8	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-9	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-9D	NO	NO	NO	NO	NO	NO	NO	Trace	0.4	0.5	0.875	1.08
RW-10	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-11	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
HHMW-09S2	NM	NM	NM	NM	NM	7.48*	NM	NM	0.5	0.42	0.67	0.67
HHMW-15S	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.67**	NM	NM
HHMW-05S2R	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 2-1. NAPL Gauging Summary
Halesite Former MGP Site
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Well ID	2010											
	1/29/2010	3/2/2010	3/26/2010	4/30/2010	5/28/2010	6/18/2010	7/28/2010	8/31/2010	10/4/2010	10/29/2010	11/30/2010	12/30/2010
DNAPL Thickness (in feet)												
RW-1	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-5	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-5D	NM ⁽¹⁾	NM ⁽¹⁾	NM ⁽¹⁾	Trace	Trace	NM ⁽¹⁾	NM ⁽¹⁾	0.08	0.08	0.08	0.08	Trace
RW-6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-7	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-8	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-9	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-9D	NM ⁽¹⁾	NM ⁽¹⁾	NM ⁽¹⁾	0.11	0.3	NM ⁽¹⁾	NM ⁽¹⁾	0.42	0.58	0.75	0.75	0.83
RW-10	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-11	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
HHMW-09S2	NM ⁽¹⁾	NM ⁽¹⁾	NM ⁽¹⁾	0.11	Trace	NM ⁽¹⁾	NM ⁽¹⁾	NO	NO	0.08	0.08	Trace
HHMW-15S	0.33**	NM	NM	0.12**	NM	NM	0.97**	NM	NM	0.71**	NM	NM
HHMW-05S2R	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 2-1. NAPL Gauging Summary
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2011											
	1/24/2011	2/18/2011	3/29/2011	4/29/2011	5/20/2011	6/22/2011	7/19/2011	8/29/2011	9/30/2011	10/20/2011	11/15/2011	12/23/2011
DNAPL Thickness (in feet)												
RW-1	NO	NO	NO									
RW-2	NO	NO	NO									
RW-3	NO	NO	NO									
RW-4	NO	NO	NO									
RW-5	NO	NO	NO									
RW-5D	0.17	0.04	0.08	0.08	0.08	0.08	0.04	0.08	0.08	0.08	0.04	0.16
RW-6	NO	NO	NO									
RW-7	NO	NO	NO									
RW-8	NO	NO	NO									
RW-9	NO	NO	NO									
RW-9D	0.75	0.75	0.83	0.75	0.83	0.75	0.58	0.58	0.83	0.67	0.83	0.75
RW-10	NO	NO	NO									
RW-11	NO	NO	NO									
HMMW-09S2	0.17	Trace	Trace	0.04	Trace	0.08	Trace	Trace	0.08	0.04	Trace	0.16
HMMW-15S	0.8**	NM	NM	0.9**	NM	NM	1.5**	NM	NM	2.6**	NM	NM
HMMW-05S2R	NM	NM	NM									
MW-03	NM	NM	NM									

Table 2-1. NAPL Gauging Summary
Halesite Former MGP Site
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Well ID	2012											
	1/26/2012	2/27/2012	3/26/2012	5/2/2012	5/31/2012	6/27/2012	7/31/2012	8/29/2012	9/25/2012	11/9/2012	11/30/2012	12/12/2012
DNAPL Thickness (in feet)												
RW-1	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-4	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-5	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-5D	0.16	0.08	0.3	0.4	0.4	0.3	0.08	Trace	0.2	0.2	0.2	0.2
RW-6	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-7	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-8	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-9	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-9D	0.75	0.75	0.8	1.4	0.7	0.7	0.75	0.8	1.1	1.3	0.7	0.8
RW-10	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-11	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
HHMW-09S2	Trace	Trace	Trace	Trace	Trace	Trace	Trace	0.1	Trace	Trace	Trace	Trace
HHMW-15S	0.8	NM	NM	2.1	NM	NM	NM	NM	4.0	NM	NM	3.5
HHMW-05S2R	NM	NM	NM	NM	NM	NM	NM	NM	0.2	Trace	Trace	0.1
MW-03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 2-1. NAPL Gauging Summary
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2013										
	1/17/2013	2/18/2013	3/29/2013	4/26/2013	5/31/2013	7/25/2013	8/28/2013	9/30/2013	10/30/2013	11/26/2013	12/27/2013
DNAPL Thickness (in feet)											
RW-1	NO	NO	NO								
RW-2	NO	NO	NO								
RW-3	NO	NO	NO								
RW-4	NO	NO	NO								
RW-5	NO	NO	NO								
RW-5D	0.3	0.2	0.3	0.1	0.3	0.08	0.06	Trace	0.04	0.25	0.375
RW-6	NO	NO	NO								
RW-7	NO	NO	NO								
RW-8	NO	NO	NO								
RW-9	NO	NO	NO								
RW-9D	0.9	0.7	0.9	0.9	0.7	1.0	0.83	0.6	0.58	0.58	0.58
RW-10	NO	NO	NO								
RW-11	NO	NO	NO								
HHMW-09S2	Trace	Trace	0.1	Trace	0.1	NO	Trace	0.02	Trace	Trace	NO
HHMW-15S	NM	NM	3.0	NM	NM	NM	NM	0.8	NM	NM	Trace
HHMW-05S2R	Trace	0.1	0.1	Trace	Trace	0.1	NO	0.02	Trace	Trace	Trace
MW-03	NM	NM	NM								

Table 2-1. NAPL Gauging Summary
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2014									
	1/31/2014	2/28/2014	3/31/2014	4/28/2014	6/3/2014	6/25/2014	8/1/2014	8/29/2014	9/30/2014	12/29/2014
DNAPL Thickness (in feet)										
RW-1	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-2	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-3	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-4	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-5	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-5D	0.04	0.125	0.17	0.04	0.125	NO	Trace	0.08	0.21	0.16
RW-6	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-7	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-8	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-9	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-9D	0.58	0.58	0.83	0.5	0.75	0.3	0.9	1.67	0.54	1.25
RW-10	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
RW-11	NO	NO	NO	NO	NO	NO	NO	NO	NM	NM
HHMW-09S2	Trace	Trace	Trace	Trace	0.02	NO	NO	Trace	Trace	0.02
HHMW-15S	NM	NM	NO***	NM	NM	Trace	NM	NM	0.17	Trace
HHMW-05S2R	0.04	NM	0.04	0.04	0.02	Trace	Trace	0.06	0.04	0.16
MW-03	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	0.02	NO

Table 2-1. NAPL Gauging Summary
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2015				2016				2017			
	3/31/2015	6/30/2015	9/25/2015	12/29/2015	4/12/2016	7/14/2016	10/4/2016	12/28/2016	3/30/2017	6/28/2017	9/25/2017	12/20/2017
DNAPL Thickness (in feet)												
RW-1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-5D	0.06	0.04	0.21	0.08	0.04	0.04	0.42	0.04	0.06	0.08	0.06	0.33
RW-6	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-7	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-9D	1.25	1.16	1.0	1.2	1.7	1.1	1.5	2.4	3.0	2.5	2.4	2.6
RW-10	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
RW-11	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NO	NM
HMMW-09S2	0.04	Trace	0.04	Trace	Trace	Trace	NO	NO	Trace	Trace	Trace	NO
HMMW-15S	Trace	0.08	1.25	0.33	0.04	0.04	0.06	0.67	0.04	0.06	Trace	Trace
HMMW-05S2R	0.04	0.02	0.08	0.125	0.125	Trace	0.02	0.06	0.06	0.06	0.13	Trace
MW-03	NO	NO	Trace	NO	NO	NO	Trace	Trace	Trace	Trace	Trace	NO

Table 2-1. NAPL Gauging Summary
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2018				2019				2020				2021				2022		
	4/6/2018	6/13/2018	9/24/2018	12/7/2018	3/28/2019	6/28/2019	9/27/2019	12/27/2019	2/26/2020	4/22/2020	9/18/2020	12/29/2020	3/23/2021	6/16/2021	8/10/2021	12/30/2021	3/15/2022	6/30/2022	8/15/2022
DNAPL Thickness (in feet)																			
RW-1	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-2	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-3	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-4	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-5	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-5D	0.04	0.25	0.41	0.21	0.025	0.42	0.55	0.25	0.45	0.25	0.16	0.21	NO	0.25	0.33	0.42	0.60	0.20	0.01
RW-6	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-7	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-8	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-9	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-9D	3.17	1.42	2.2	1.42	2.17	1.25	1.41	0.75	0.6	0.83	1.25	1.16	1.54	1.25	1.4	2.83	1.34	0.80	0.23
RW-10	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
RW-11	NM	NM	NO	NO	NO	NO	NO	NM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
HHMW-09S2	NO	NO	Trace	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	Trace	Trace	Trace	Trace	NO
HHMW-15S	Trace	0.04	Trace	Trace	Trace	NO	NO	NO	NO	NO	NO	Trace	Trace	Trace	Trace	Trace	NM	NM	NM
HHMW-05S2R	0.04	0.04	0.04	0.04	Trace	0.04	0.04	NO	0.02	0.04	0.04	Trace	Trace	NO	Trace	0.08	Trace	0.12	0.5
MW-03	NO	NO	Trace	NO	NO	NO	NO	NO	NO	Trace	NO	NO	NO	NO	Trace	NO	NO	NO	NO

No measurable levels of LNAPL have been observed to date.

Notes:

- NAPL = Non-aqueous phase liquid
- DNAPL = Dense non-aqueous phase liquid
- MGP = Manufactured Gas Plant
- NO = None observed
- NM = Not measured
- NM ⁽¹⁾ = Not measured - see Table 2-2
- * = Measurement suspect
- ** = Measurement taken during quarterly sampling round
- *** = Measurement taken in April 2014

Table 2-2. Onsite NAPL Gauging and Recovery Log
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2009	2010														2010	
	12/14/2009 ⁽¹⁾	1/5/2010 ⁽²⁾	1/12/2010 ⁽³⁾	1/19/2010 ⁽³⁾	1/26/2010 ⁽³⁾	2/5/2010 ⁽³⁾	2/12/2010 ⁽⁴⁾	3/8/2010 ⁽³⁾	4/1/2010 ⁽³⁾	4/30/2010 ⁽³⁾	6/4/2010 ⁽³⁾	7/20/2010 ⁽³⁾	8/31/2010 ⁽³⁾	10/4/2010 ⁽³⁾	10/29/2010 ⁽³⁾	11/30/2010 ⁽³⁾	12/30/2010 ⁽³⁾
Initial Thickness (in feet)																	
RW-5D	1.25	1.25	0.5	0.33	0.25	0.17	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	trace
RW-9D	1.08	1.08	0.42	0.33	0.25	0.17	0.17	0.17	0.17	0.33	0.33	0.33	0.42	0.58	0.67	0.75	0.83
HHMW-05S2R	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
HHMW-09S2	NM	0.66	0.25	0.17	0.17	0.17	0.08	0.17	0.25	0.08	0.08	0.08	0.00**	0.00**	0.08**	0.08	trace
HHMW-15S	0.67****	NM	NM	NM	0.33****	NM	NM	NM	NM	0.12****	NM	0.97****	NM	NM	0.71****	NM	NM
Amount Removed (in gallons)																	
RW-5D	1.5	NA	1.1*	0.40	0.30	0.20	0.10	NA	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00
RW-9D	1.5	NA	1*	0.40	0.30	0.20	0.20	NA	0.20	0.40	0.40	0.40	0.50	0.70	0.80	0.90	1.00
HHMW-05S2R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HHMW-09S2	NA	NA	0.1*	0.05	0.05	0.05	0.02	NA	0.08	0.02	0.02	0.02	0.00	0.00	0.00	0.02	0.00
HHMW-15S	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 2-2. Onsite NAPL Gauging and Recovery Log
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2011												2012	2012						
	1/24/2011 ⁽³⁾	2/18/2011 ⁽³⁾	3/29/2011 ⁽³⁾	4/29/2011 ⁽³⁾	5/20/2011 ⁽³⁾	6/22/2011 ⁽³⁾	7/19/2011 ⁽³⁾	8/29/2011 ⁽³⁾	9/30/2011 ⁽³⁾	10/20/2011 ⁽³⁾	11/15/2011 ⁽³⁾	12/23/2011 ⁽³⁾	1/26/2012 ⁽³⁾	2/27/2012 ⁽³⁾	3/26/2012 ⁽³⁾	5/2/2012 ⁽³⁾	5/31/2012 ⁽³⁾	6/27/2012 ⁽³⁾	7/31/2012 ⁽³⁾	
Initial Thickness (in feet)																				
RW-5D	0.17	0.04	0.08	0.08	0.08	0.08	0.04	0.08	0.08	0.08	0.04	0.16	0.16	0.08	0.3	0.4	0.4	0.3	0.08	
RW-9D	0.75	0.75	0.83	0.75	0.83	0.75	0.59	0.58	0.83	0.67	0.83	0.75	0.75	0.75	0.8	1.4	0.7	0.7	0.75	
HHMW-05S2R	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM										
HHMW-09S2	trace	trace	trace	0.04	trace	0.08	trace**	trace**	0.08**	0.04**	trace**	.16**	.16**	trace**	trace	trace	trace	trace	trace	
HHMW-15S	0.8****	NM	NM	0.9****	NM	NM	1.5****	NM	NM	2.6	NM	NM	0.8	NM	NM	2.1	NM	NM	NM	
Amount Removed (in gallons)																				
RW-5D	0.20	0.05	0.10	0.10	0.10	0.10	0.05	0.10	0.07	0.10	0.04	0.14	0.14	0.07	0.27	0.36	0.36	0.27	0.07	
RW-9D	0.90	0.90	1.00	0.90	1.00	0.90	0.71	0.70	1.00	0.80	1.00	0.90	0.90	0.90	0.96	1.68	0.84	0.84	0.68	
HHMW-05S2R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA										
HHMW-09S2	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
HHMW-15S	NA	2.00	NA	NA	NA	NA	NA	NA	NA	NA	NA									

Table 2-2. Onsite NAPL Gauging and Recovery Log
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID					
	8/29/2012 ⁽³⁾	9/25/2012 ⁽³⁾	11/12/2012 ⁽³⁾	11/30/2012 ⁽³⁾	12/12/2012 ⁽³⁾
Initial Thickness (in feet)					
RW-5D	trace	0.2	0.2	0.2	0.2
RW-9D	0.8	1.1	1.3	0.7	0.8
HHMW-05S2R	NM	0.2	NM	NM	0.1
HHMW-09S2	0.1	trace	trace	trace	trace
HHMW-15S	NM	4.0	NM	NM	3.5
Amount Removed (in gallons)					
RW-5D	0.00	0.18	0.18	0.18	0.18
RW-9D	0.72	0.99	1.17	0.63	0.72
HHMW-05S2R	NA	0.25	NA	NA	0.10
HHMW-09S2	0.00	0.00	0.00	0.00	0.00
HHMW-15S	NA	1.25	NA	NA	0.60

Table 2-2. Onsite NAPL Gauging and Recovery Log
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2013				2013								2014									
	1/17/2013 ⁽³⁾	2/18/2013 ⁽³⁾	3/29/2013 ⁽³⁾	4/26/2013 ⁽³⁾	5/31/2013 ⁽³⁾	7/25/2013	6/28/2013	9/30/2013	10/30/2013	11/26/2013	12/18/2013	1/31/2014	2/28/2014	3/31/2014	4/28/2014	6/3/2014	6/25/2014	8/1/2014	8/29/2014	9/30/2014	12/29/2014	
Initial Thickness (in feet)																						
RW-5D	0.30	0.20	0.30	0.10	0.30	0.08	0.06	trace	0.04	0.25	0.38	0.04	0.13	0.17	0.04	0.13	0.00	trace	0.08	0.21	0.16	
RW-9D	0.90	0.70	0.90	0.90	0.70	1.00	0.83	0.58	0.58	0.58	0.58	0.58	0.58	0.83	0.58	0.75	0.30	0.90	1.67	0.54	1.25	
HHMW-05S2R	trace	0.1	0.1	trace	trace	0.1	NO	0.02	trace	trace	trace	0.04	NM	0.04	0.04	0.02	trace	trace	0.06	0.04	0.16	
HHMW-09S2	trace	trace	0.1	trace	0.1	NO	trace	0.02	trace	0.02	NO	trace	trace	trace	trace	0.02	0.00	0.00	trace	trace	0.02	
HHMW-15S	NM	NM	3.0	NM	NM	NM	NM	0.8	NM	NM	trace	NM	NM	0.00	NM	NM	trace	NM	NM	0.17	trace	
Amount Removed (in gallons)																						
RW-5D	0.27	0.18	0.27	0.09	0.27	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.25	0.20	
RW-9D	0.81	0.63	0.81	0.81	0.63	3.00	1.00	0.75	0.50	0.50	0.40	0.50	0.40	0.75	0.50	0.75	0.25	0.75	2.50	0.75	2.00	
HHMW-05S2R	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
HHMW-09S2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
HHMW-15S	NA	NA	0.60	NA	NA	NA	NA	0.10	NA	NA	0.00	NA	NA	0.00	NA	NA	0.00	0.00	0.00	0.00	0.00	

Table 2-2. Onsite NAPL Gauging and Recovery Log
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2015				2016				2017				2018				2019
	3/31/2015	6/30/2015	9/25/2015	12/29/2015	4/12/2016	7/14/2016	10/4/2016	12/28/2016	3/30/2017	6/28/2017	9/25/2017	12/20/2017	4/6/2018	6/13/2018	9/24/2018	12/7/2018	3/28/2019
Initial Thickness (in feet)																	
RW-5D	0.06	0.04	0.21	0.08	0.04	0.04	0.42	0.04	0.06	0.08	0.06	0.33	0.04	0.25	0.41	0.21	0.25
RW-9D	1.25	1.16	1.00	1.20	1.70	1.10	1.50	2.40	3.00	2.50	2.40	2.60	3.17	1.42	2.20	1.42	2.17
HHMW-05S2R	0.04	0.02	0.08	0.125	0.125	trace	0.02	0.06	0.06	0.06	0.13	Trace	0.04	0.04	0.04	0.04	Trace
HHMW-09S2	0.04	trace	0.04	trace	trace	trace	NO	NO	Trace	Trace	Trace	NO	NO	NO	Trace	NO	NO
HHMW-15S	0.16	0.08	1.25	0.33	0.04	0.04	0.06	0.67	0.04	0.06	Trace	Trace	Trace	0.04	Trace	Trace	Trace
Amount Removed (in gallons)																	
RW-5D	0.00	0.00	0.10	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.30	0.00	0.00
RW-9D	2.00	2.25	1.75	1.75	2.00	1.50	2.25	3.50	4.50	3.50	3.50	3.75	4.50	2.25	3.50	2.00	3.00
HHMW-05S2R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HHMW-09S2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HHMW-15S	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 2-2. Onsite NAPL Gauging and Recovery Log
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well ID	2019			2020				2021				2022			Total (gallons)
	6/28/2019	9/27/2019	12/27/2019	2/26/2020	7/7/2020	9/18/2020	12/29/2020	3/23/2021	6/16/2021	8/10/2021	12/30/2021	3/15/2022	6/30/2022	8/15/2022	
Initial Thickness (in feet)															
RW-5D	0.42	0.55	0.25	0.45	0.25	0.16	0.21	NO	0.16	0.16	0.42	0.60	0.20	0.01	
RW-9D	1.25	1.41	0.75	0.60	1.00	1.25	1.16	1.54	1.25	1.40	2.83	1.34	0.80	0.23	
HHMW-05S2R	0.04	0.04	0.02	0.02	0.04	0.04	Trace	Trace	Trace	Trace	0.08	Trace	0.12	0.05	
HHMW-09S2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	Trace	Trace	Trace	NO	
HHMW-15S	NO	NO	NO	NO	NO	NO	Trace	Trace	Trace	Trace	Trace	NM	NM	NM	
Amount Removed (in gallons)															
RW-5D	0.00	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.50
RW-9D	2.00	2.00	1.25	0.00	1.25	1.25	1.50	2.00	1.75	2.00	4.00	2.00	0.00	0.00	118.20
HHMW-05S2R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45
HHMW-09S2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88***
HHMW-15S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.65
															135.7

Notes:

- NAPL = Non-Aqueous Phase Liquid
- MGP = Manufactured Gas Plant
- (1) = DNAPL purged with bailer
- (2) = Oil-sorbent socks installed
- (3) = Oil-sorbent socks removed and replaced (thickness measured after sock was removed)
- (4) = Oil-sorbent socks removed in order to measure DNAPL recharge.
- * = Volume estimated based on well diameter and thickness measurements.
- ** = Oil-sorbent sock not replaced
- *** = Includes 0.4 gallons recovered between December 2008 and February 2009
- **** = Measured during quarterly sampling round
- NA = Not applicable
- NM = Not measured
- NO = None observed

Table 3-1. Groundwater Monitoring Well Sampling Schedule
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance Monitoring Report

Monitoring Well ID	Screen Interval (feet bgs)	Sample Frequency
Upgradient Groundwater Monitoring Wells		
HHMW-13	39-49	A
HHMW-14	64-74	S
HHMW-16S1	15-20	S
HHMW-16S2	25-35	NS
HHMW-17S1	12-17	NS
HHMW-17S2	22-32	NS
HHMW-18S1	7-12	A
HHMW-18S2	17-27	NS
Area of Oxygen Injection System Groundwater Monitoring Wells		
HHMW-04I	30-40	NS
HHMW-05S1-R	6-11	NS
HHMW-05S2-R*	18-28	S
HHMW-09S1	6-11	S
HHMW-09S2	17.5-27.5	NS
HHMW-09I	43-53	NS
HHMW-09D	85-95	NS
HHMW-15S*	5-10	S
MW-03*	2-12	S
MW-04	1-21	NS
Side-gradient Groundwater Monitoring Wells		
HHMW-22S1*	3-8	S
HHMW-22S2	13-23	NS
Downgradient Groundwater Monitoring Wells		
HHMW-07S1	3-8	NS
HHMW-07S2	16-26	NS
HHMW-07I	45-55	NS
HHMW-07D	115-125	NS
HHMW-08S	2-12	NS
HHMW-08I	35-45	NS
HHMW-11SR	3-13	NS
HHMW-11I**	31-41	NS
HHMW-19S1	2-7	S
HHMW-19S2	15-25	NS
HHMW-20S1	2-7	NS
HHMW-20S2	15-25	NS
HHMW-21S1	2-7	NS
HHMW-21S2	15-25	NS

Notes:

Bold font denotes that the well is currently routinely sampled.

MGP = Manufactured Gas Plant

* = Not Sampled due to presence of DNAPL

** = Well abandoned

NS = Not Sampled

A = Annual

S = Semi-annual

DNAPL = Dense Non-Aqueous Phase Liquid

Table 3-2. Summary of Groundwater Parameter Data
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Monitoring Well		2009									2010						
		Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jul-10	Oct/Nov-10
pH (standard units)																	
Upgradient	HHMW-13	5.53	--	--	5.21	--	--	--	5.09	--	--	5.43	--	4.74	--	5.02	5.17
	HHMW-14	5.40	--	--	5.60	--	--	--	5.17	--	--	5.47	--	4.97	--	4.68	5.21
	HHMW-16S1	5.08	4.73	4.20	6.20	4.47	4.28	4.34	6.21	6.53	3.91	4.47	4.48	5.05	4.30	4.53	4.60
	HHMW-16S2	5.12	5.43	3.94	6.10	5.23	5.25	5.25	5.05	5.51	5.29	4.26	5.09	4.86	4.82	5.01	5.15
	HHMW-17S1	5.31	4.95	5.87	4.40	5.06	4.71	4.78	5.93	6.96	5.14	4.97	4.63	4.94	4.58	4.96	4.21
	HHMW-17S2	5.32	5.13	6.37	5.38	5.10	5.08	5.16	4.95	5.36	5.45	5.50	5.40	4.98	4.82	5.31	4.87
	HHMW-18S1	5.34	5.65	6.42	4.65	5.34	5.12	5.09	4.91	6.92	5.18	5.35	5.42	5.74	4.86	4.94	4.20
	HHMW-18S2	5.30	5.63	6.36	5.44	5.05	5.16	5.11	6.31	5.31	5.15	5.31	5.31	5.10	4.78	5.19	4.28
Oxygen Injection Area	HHMW-04I	5.35	--	--	--	--	--	5.13	--	--	--	5.01	--	5.12	--	5.15	3.41
	HHMW-05S1-R	6.65	6.67	6.13	5.62	6.05	6.18	5.89	6.96	7.11	6.15	6.33	5.43	5.98	5.58	6.06	4.77
	HHMW-05S2-R	5.31	5.68	5.60	4.78	4.98	5.22	5.12	4.93	5.31	5.19	5.43	5.40	5.12	4.98	5.07	4.12
	HHMW-09D	6.02	--	--	--	--	--	--	--	--	5.93	--	--	5.86	--	5.83	--
	HHMW-09I	5.55	--	--	--	--	--	--	--	--	5.44	--	--	5.39	--	5.12	6.18
	HHMW-09S1	5.30	--	--	6.38	--	--	--	6.85	--	5.80	--	--	4.35	--	4.68	5.21
	HHMW-09S2	5.61	--	--	5.39	--	--	--	5.17	--	5.59	--	--	4.85	--	4.92	5.01
	HHMW-15S	--	5.62	--	5.61	--	--	--	--	--	--	--	--	5.34	--	--	--
	MW-03	6.67	--	--	7.03	--	--	6.33	--	--	6.67	--	--	6.59	--	6.38	7.33
	MW-04	5.29	--	--	5.21	--	--	4.98	--	--	5.48	--	--	5.10	--	4.95	3.14
S*	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-22S2	5.40	--	--	5.71	--	--	5.15	--	--	5.18	--	--	--	4.82	5.18	3.57
Downgradient	HHMW-06I	5.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	6.76	--	--	--	--	--	6.28	--	--	6.45	--	--	6.34	--	6.24	6.91
	HHMW-06S2	5.45	--	--	--	--	--	5.37	--	--	5.83	--	--	--	4.88	5.00	5.55
	HHMW-07I	5.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	6.16	--	--	7.05	--	--	6.16	--	--	6.09	--	--	6.44	--	6.33	6.41
	HHMW-07S2	5.34	--	--	4.68	--	--	5.26	--	--	5.28	--	--	5.24	--	5.00	5.27
	HHMW-08S	5.67	--	--	--	--	--	5.45	--	--	5.63	--	--	5.31	--	5.25	5.82
	HHMW-19S1	6.63	6.48	6.67	7.26	6.27	6.03	5.45	5.59	5.96	5.71	5.79	5.99	5.72	5.55	5.68	9.60
	HHMW-19S2	5.41	5.75	6.02	5.57	5.25	5.39	5.26	6.92	7.11	5.32	5.46	4.90	5.25	4.63	4.94	3.93
	HHMW-20S1	6.85	6.76	6.99	--	--	--	--	--	--	5.06	6.74	6.12	6.70	8.04	6.31	8.94
	HHMW-20S2/20S2R	5.41	5.34	5.00	--	--	--	--	--	--	6.54	4.90	5.13	5.00	4.76	4.93	3.91
	HHMW-21S1	6.82	6.25	6.26	--	--	--	--	--	--	6.20	6.29	5.85	--	5.65	5.84	5.41
	HHMW-21S2	5.58	5.56	5.23	--	--	--	--	--	--	5.34	5.57	--	--	4.95	5.14	3.91
	HHMW-11I	5.70	--	--	--	--	--	--	--	--	5.56	--	--	5.45	--	5.16	4.43
	HHMW-11S/11SR	--	--	--	--	--	--	--	--	--	6.42	--	--	6.00	--	6.08	7.83

Table 3-2. Summary of Groundwater Parameter Data
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

		2009									2010							
Monitoring Well		Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jul-10	Oct/Nov-10	
Conductivity (mS/cm)																		
Upgradient	HHMW-13	0.240	--	--	0.280	--	--	--	0.245	--	--	0.233	--	0.276	--	0.213	0.167	
	HHMW-14	0.243	--	--	0.280	--	--	--	0.256	--	--	0.240	--	0.201	--	0.228	0.168	
	HHMW-16S1	0.148	0.160	0.233	0.241	0.478	0.634	0.713	0.900	1.040	1.250	0.910	0.571	1.400	1.320	1.160	0.664	
	HHMW-16S2	0.202	0.277	0.260	0.267	0.297	0.320	0.270	2.780	0.271	0.234	0.239	0.228	0.209	0.245	0.226	0.196	
	HHMW-17S1	0.258	0.473	0.762	0.860	0.357	1.540	1.030	1.450	1.340	1.280	1.410	1.380	0.795	0.630	0.373	0.317	
	HHMW-17S2	0.289	0.310	0.308	0.323	0.652	0.387	0.281	0.292	0.286	0.363	0.295	0.462	0.223	0.215	0.158	0.233	
	HHMW-18S1	0.232	0.234	0.231	0.247	0.175	0.245	0.198	0.290	0.243	0.249	0.244	0.469	0.343	0.272	0.271	0.190	
	HHMW-18S2	0.251	0.251	0.249	0.263	0.265	0.279	0.233	0.273	0.243	0.206	0.214	0.205	0.280	0.216	0.215	0.206	
Oxygen Injection Area	HHMW-04I	0.285	--	--	--	--	--	0.254	--	--	--	0.283	--	0.316	--	0.208	0.181	
	HHMW-05S1-R	0.559	0.545	0.780	0.854	0.725	1.110	0.926	0.866	0.720	0.669	0.640	0.656	0.419	0.537	0.804	0.360	
	HHMW-05S2-R	0.276	0.348	0.780	0.342	0.328	0.289	0.245	0.261	0.284	0.225	0.235	0.284	0.642	0.316	0.199	0.183	
	HHMW-09D	0.145	--	--	--	--	--	--	--	--	0.120	--	--	0.165	--	0.112	--	
	HHMW-09I	0.214	--	--	--	--	--	--	--	--	0.255	--	--	0.241	--	0.199	0.176	
	HHMW-09S1	2.840	--	--	2.660	--	--	--	0.980	--	0.711	--	--	3.200	--	2.660	0.704	
	HHMW-09S2	0.365	--	--	0.284	--	--	--	0.309	--	0.252	--	--	0.219	--	0.189	0.194	
	HHMW-15S	--	1.080	--	0.565	--	--	--	--	--	--	--	--	0.413	--	--	--	
	MW-03	0.441	--	--	1.490	--	--	--	1.270	--	--	0.805	--	--	0.611	--	0.751	0.973
	MW-04	0.178	--	--	0.347	--	--	--	0.348	--	--	0.999	--	--	0.560	--	0.569	0.340
S*	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-22S2	0.259	--	--	0.291	--	--	0.241	--	--	0.214	--	--	--	0.224	0.222	0.178	
Downgradient	HHMW-06I	0.163	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-06S1	1.490	--	--	--	--	--	0.739	--	--	0.845	--	--	2.080	--	1.840	0.316	
	HHMW-06S2	0.311	--	--	--	--	--	0.290	--	--	0.253	--	--	--	0.286	0.265	0.264	
	HHMW-07I	0.179	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-07S1	0.511	--	--	0.862	--	--	1.280	--	--	0.774	--	--	0.537	--	0.529	0.478	
	HHMW-07S2	0.268	--	--	0.317	--	--	0.239	--	--	0.294	--	--	0.281	--	0.211	0.182	
	HHMW-08S	0.539	--	--	--	--	--	0.417	--	--	0.461	--	--	0.323	--	0.287	0.270	
	HHMW-11I	0.279	--	--	--	--	--	--	--	--	0.339	--	--	0.304	--	0.236	0.196	
	HHMW-11S/11SR	--	--	--	--	--	--	--	--	--	1.280	--	--	0.900	--	0.960	0.369	
	HHMW-19S1	0.273	0.290	0.255	0.246	0.234	0.254	0.364	0.278	0.299	0.367	0.531	0.344	0.319	0.272	0.369	0.352	
	HHMW-19S2	0.414	0.473	0.671	0.510	0.367	0.348	0.255	0.309	0.328	0.340	0.329	0.360	0.320	0.230	0.223	0.214	
	HHMW-20S1	2.670	2.360	2.340	--	--	--	--	--	--	0.242	2.420	1.680	0.910	0.797	1.160	0.369	
	HHMW-20S2/20S2R	0.357	0.335	0.328	--	--	--	--	--	--	2.660	0.257	0.254	0.426	0.371	0.236	0.201	
	HHMW-21S1	0.341	0.412	0.440	--	--	--	--	--	--	0.445	0.441	0.340	--	0.573	0.464	0.373	
	HHMW-21S2	0.236	0.254	0.263	--	--	--	--	--	--	0.200	0.209	--	--	0.323	0.200	0.179	

Table 3-2. Summary of Groundwater Parameter Data
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

		2009									2010							
Monitoring Well		Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jul-10	Oct/Nov-10	
Dissolved Oxygen (mg/L)																		
Upgradient	HHMW-13	6.95	--	--	0.00	--	--	--	0.00	--	--	0.00	--	5.39	--	0.89	0.00	
	HHMW-14	9.10	--	--	14.81	--	--	--	6.87	--	--	6.82	--	7.80	--	6.76	7.28	
	HHMW-16S1	5.79	11.94	0.00	0.00	8.88	1.55	13.32	16.80	13.10	9.00	23.00	9.23	8.18	0.00	11.83	16.29	
	HHMW-16S2	0.00	5.11	0.00	2.25	8.40	8.00	8.32	7.67	7.68	7.11	7.90	8.20	7.70	8.20	6.90	7.63	
	HHMW-17S1	0.00	7.40	10.60	18.38	15.88	30.00	17.18	15.00	9.00	25.00	27.00	22.00	21.00	9.00	19.00	15.20	
	HHMW-17S2	0.00	10.87	4.59	7.79	8.40	7.61	8.00	5.36	7.85	7.92	8.20	9.50	7.40	8.10	7.84	4.20	
	HHMW-18S1	0.00	0.00	0.00	0.00	2.37	0.00	0.00	0.00	0.00	3.56	3.53	6.09	9.80	0.00	7.73	2.10	
	HHMW-18S2	3.80	0.00	0.00	1.17	3.50	1.84	1.69	2.10	3.72	2.86	2.30	5.30	2.49	1.90	0.00	1.50	
Oxygen Injection Area	HHMW-04I	8.43	--	--	--	--	--	20.00	--	--	--	27.00	--	13.90	--	8.88	7.40	
	HHMW-05S1-R	0.00	0.00	0.00	0.22	10.10	7.23	14.91	14.70	19.90	22.00	25.00	14.81	23.00	9.52	23.00	18.80	
	HHMW-05S2-R	1.28	0.00	26.00	26.00	44.00	26.00	14.32	19.02	16.85	19.01	27.00	28.00	33.00	26.00	24.00	13.00	
	HHMW-09D	8.67	--	--	--	--	--	--	--	--	7.29	--	--	9.04	--	7.38	--	
	HHMW-09I	8.78	--	--	--	--	--	--	--	--	8.86	--	--	8.78	--	8.02	6.90	
	HHMW-09S1	10.49	--	--	0.00	--	--	--	12.40	--	10.01	--	--	3.42	--	3.79	8.40	
	HHMW-09S2	0.00	--	--	28.00	--	--	--	20.00	--	32.00	--	--	26.00	--	32.00	33.00	
	HHMW-15S	--	0.00	--	0.00	--	--	--	--	--	--	--	--	7.70	--	--	--	
	MW-03	0.00	--	--	4.21	--	--	20.00	--	--	15.41	--	--	19.80	--	18.00	7.00	
	MW-04	5.39	--	--	25.00	--	--	20.00	--	--	37.00	--	--	20.00	--	28.00	36.00	
S*	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-22S2	8.40	--	--	10.52	--	--	--	9.67	--	--	8.11	--	--	8.80	9.29	8.40	
Downgradient	HHMW-06I	7.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-06S1	0.00	--	--	--	--	--	0.00	--	--	6.03	--	--	0.51	--	0.56	0.00	
	HHMW-06S2	6.72	--	--	--	--	--	4.78	--	--	5.12	--	--	--	6.60	5.75	4.10	
	HHMW-07I	8.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-07S1	3.14	--	--	0.00	--	--	0.00	--	--	0.00	--	--	0.00	--	0.00	0.00	
	HHMW-07S2	0.11	--	--	0.00	--	--	1.10	--	--	2.95	--	--	1.20	--	2.65	1.65	
	HHMW-08S	0.00	--	--	--	--	--	20.00	--	--	31.00	--	--	27.00	--	24.00	27.00	
	HHMW-11I	5.19	--	--	--	--	--	--	--	--	6.27	--	--	4.10	--	4.19	3.40	
	HHMW-11S/11SR	--	--	--	--	--	--	--	--	--	0.00	--	--	0.00	--	0.00	0.00	
	HHMW-19S1	11.27	5.99	1.59	10.10	6.90	5.77	3.79	0.77	6.15	0.69	3.05	2.75	0.00	0.00	0.00	0.00	
	HHMW-19S2	0.97	0.00	0.00	0.00	1.50	0.70	1.09	0.50	0.30	3.95	2.76	0.80	1.28	0.00	1.47	0.00	
	HHMW-20S1	7.21	0.00	0.00	--	--	--	--	--	--	2.43	1.58	0.25	0.00	0.00	0.38	0.00	
	HHMW-20S2/20S2R	2.28	0.00	0.00	--	--	--	--	--	--	2.20	3.20	4.20	4.00	3.90	4.10	3.20	
	HHMW-21S1	12.05	4.45	0.70	--	--	--	--	--	--	5.30	4.67	7.48	--	0.54	4.61	3.10	
	HHMW-21S2	7.84	3.81	0.34	--	--	--	--	--	--	7.34	7.80	--	--	8.70	8.40	7.70	

Table 3-2. Summary of Groundwater Parameter Data
Halesite Former MGP Site
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		2009									2010							
Monitoring Well		Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jul-10	Oct/Nov-10	
Temperature (degrees Celsius)																		
Upgradient	HHMW-13	16.41	--	--	16.82	--	--	--	12.67	--	--	11.01	--	12.40	--	13.00	12.24	
	HHMW-14	14.90	--	--	16.88	--	--	--	12.22	--	--	10.83	--	12.30	--	12.84	12.14	
	HHMW-16S1	11.74	13.50	13.04	14.71	13.63	12.56	12.74	13.40	12.00	12.00	11.71	10.75	10.94	10.85	13.29	12.44	
	HHMW-16S2	11.51	12.62	12.95	13.19	13.50	12.81	12.04	12.31	11.89	11.67	10.00	11.70	11.80	12.40	12.82	12.17	
	HHMW-17S1	11.69	12.54	13.91	16.31	14.98	16.30	13.52	15.60	13.60	10.55	11.45	11.10	11.25	11.54	12.92	13.50	
	HHMW-17S2	11.05	16.03	13.97	16.16	16.20	15.74	13.04	14.50	12.73	9.41	11.70	11.80	11.90	12.50	13.37	12.80	
	HHMW-18S1	11.28	12.66	13.12	14.07	14.54	15.58	13.80	12.52	12.60	11.94	9.26	6.68	11.10	11.16	18.20	14.20	
	HHMW-18S2	12.27	13.77	13.68	15.08	14.50	14.84	12.01	13.10	11.07	12.18	9.80	10.90	11.94	12.20	17.57	13.10	
Oxygen Injection Area	HHMW-04I	11.11	--	--	--	--	--	14.12	--	--	--	10.70	--	11.70	--	15.91	11.70	
	HHMW-05S1-R	9.82	10.82	13.21	15.35	19.20	20.06	15.64	16.30	15.50	11.48	8.70	6.30	10.70	11.01	19.89	16.10	
	HHMW-05S2-R	10.53	11.48	11.17	12.64	14.10	15.33	14.06	14.45	13.97	12.77	11.80	10.90	10.99	11.10	14.77	14.60	
	HHMW-09D	11.22	--	--	--	--	--	--	--	--	11.10	--	--	11.58	--	14.05	--	
	HHMW-09I	11.31	--	--	--	--	--	--	--	--	11.29	--	--	11.71	--	14.15	12.60	
	HHMW-09S1	10.71	--	--	18.02	--	--	--	14.40	--	9.75	--	--	10.33	--	16.22	14.20	
	HHMW-09S2	11.37	--	--	16.85	--	--	--	12.94	--	9.01	--	--	11.60	--	14.79	13.10	
	HHMW-15S	--	10.02	--	17.40	--	--	--	--	--	--	--	--	13.00	--	--	--	
	MW-03	7.97	--	--	16.09	--	--	15.38	--	--	8.12	--	--	10.80	--	19.41	16.10	
	MW-04	9.56	--	--	18.81	--	--	16.31	--	--	10.22	--	--	10.43	--	16.38	13.10	
S*	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-22S2	11.62	--	--	13.24	--	--	12.93	--	--	10.45	--	--	--	12.40	14.55	12.60	
Downgradient	HHMW-06I	11.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-06S1	11.11	--	--	--	--	--	16.45	--	--	8.73	--	--	13.60	--	23.36	16.70	
	HHMW-06S2	11.10	--	--	--	--	--	13.70	--	--	10.95	--	--	--	13.80	16.67	13.90	
	HHMW-07I	11.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-07S1	10.43	--	--	18.92	--	--	14.91	--	--	8.69	--	--	13.70	--	23.10	15.85	
	HHMW-07S2	11.11	--	--	13.06	--	--	13.26	--	--	12.28	--	--	11.87	--	15.26	13.34	
	HHMW-08S	11.09	--	--	--	--	--	15.34	--	--	10.40	--	--	12.80	--	19.88	15.40	
	HHMW-11I	10.98	--	--	--	--	--	--	--	--	12.20	--	--	12.40	--	14.74	14.50	
	HHMW-11S/11SR	--	--	--	--	--	--	--	--	--	9.36	--	--	12.02	--	22.04	18.30	
	HHMW-19S1	15.54	13.69	15.80	19.20	26.60	21.99	15.40	15.26	12.99	10.19	8.20	9.00	13.20	14.10	20.15	16.40	
	HHMW-19S2	12.11	12.06	13.07	13.15	20.10	14.80	12.99	13.90	13.70	12.41	11.85	11.18	12.10	11.26	13.61	13.10	
	HHMW-20S1	11.20	13.63	16.27	--	--	--	--	--	--	10.82	7.31	7.72	12.99	13.73	21.58	18.20	
	HHMW-20S2/20S2R	11.05	11.36	13.55	--	--	--	--	--	--	7.92	11.30	11.00	12.20	12.40	15.19	15.00	
	HHMW-21S1	14.41	14.79	17.28	--	--	--	--	--	--	8.29	7.30	9.43	--	14.79	22.90	17.60	
	HHMW-21S2	11.57	12.17	12.94	--	--	--	--	--	--	11.06	10.90	--	--	13.50	14.52	14.00	

Table 3-2. Summary of Groundwater Parameter Data
Halesite Former MGP Site
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		2009									2010							
Monitoring Well		Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jul-10	Oct/Nov-10	
Oxidation Reduction Potential (mV)																		
Upgradient	HHMW-13	179	--	--	250	--	--	--	253	--	--	384	--	250	--	224	247	
	HHMW-14	234	--	--	295	--	--	--	251	--	--	371	--	253	--	317	286	
	HHMW-16S1	195	267	301	227	184	245	263	186	254	295	233	298	260	321	229	241	
	HHMW-16S2	281	340	330	300	258	258	259	264	185	410	286	277	246	242	312	275	
	HHMW-17S1	259	368	343	322	155	316	290	88	129	385	287	295	291	322	281	249	
	HHMW-17S2	28	339	323	301	259	263	243	256	239	383	281	284	239	233	282	277	
	HHMW-18S1	213	223	256	278	116	232	234	202	47	201	200	157	236	245	238	214	
	HHMW-18S2	246	309	279	299	260	248	243	53	318	371	304	294	203	266	282	214	
Oxygen Injection Area	HHMW-04I	242	--	--	--	--	--	296	--	--	--	315	--	288	--	201	242	
	HHMW-05S1-R	23	9	257	254	115	125	227	11	32	152	169	168	123	193	181	172	
	HHMW-05S2-R	215	242	342	335	262	248	282	240	326	423	226	285	259	178	293	185	
	HHMW-09D	209	--	--	--	--	--	--	--	--	331	--	--	189	--	206	--	
	HHMW-09I	247	--	--	--	--	--	--	--	--	194	--	--	233	--	173	244	
	HHMW-09S1	185	--	--	185	--	--	--	63	--	331	--	--	317	--	106	167	
	HHMW-09S2	223	--	--	316	--	--	--	332	--	447	--	--	258	--	291	258	
	HHMW-15S	--	137	--	176	--	--	--	--	--	--	--	--	186	--	--	--	
	MW-03	-85	--	--	5	--	--	168	--	--	255	--	--	50	--	-49	-7	
MW-04	272	--	--	337	--	--	315	--	--	272	--	--	223	--	237	271		
S*	HHMW-22S2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-22S2	260	--	--	316	--	--	280	--	--	382	--	--	--	258	301	257	
Downgradient	HHMW-06I	217	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-06S1	7	--	--	--	--	--	-90	--	--	41	--	--	-36	--	-127	-106	
	HHMW-06S2	169	--	--	--	--	--	136	--	--	255	--	--	--	205	172	135	
	HHMW-07I	209	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	HHMW-07S1	5	--	--	-23	--	--	-60	--	--	-22	--	--	1	--	-96	-75	
	HHMW-07S2	230	--	--	261	--	--	208	--	--	157	--	--	190	--	184	259	
	HHMW-08S	205	--	--	--	--	--	247	--	--	230	--	--	188	--	214	240	
	HHMW-11I	196	--	--	--	--	--	--	--	--	179	--	--	249	--	233	204	
	HHMW-11S/11SR	--	--	--	--	--	--	--	--	--	-59	--	--	-38	--	-107	-31	
	HHMW-19S1	-65	-3	-3	-49	-80	-34	-36	-32	-8	44	-4	-52	-96	-100	-85	-169	
	HHMW-19S2	223	180	166	142	217	223	120	10	6	233	224	231	243	247	171	212	
	HHMW-20S1	-88	-72	-85	--	--	--	--	--	--	345	-86	-87	-122	-99	-143	-149	
	HHMW-20S2/20S2R	122	379	322	--	--	--	--	--	--	-105	313	280	282	285	244	248	
	HHMW-21S1	87	251	224	--	--	--	--	--	--	127	106	231	--	205	138	172	
HHMW-21S2	235	327	254	--	--	--	--	--	--	394	280	--	--	218	237	253		

Table 3-2. Summary of Groundwater Parameter Data
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Monitoring Well	2011				2012				2013				2014			
	Jan-11	Apr-11	Jul-11	Nov-11	Jan-12	Apr-12	Aug-12	Nov-12	Jan-13	Apr-13	Jul-13	Oct-13	Jan-14	Apr-14	Sep-14	
pH (standard units)																
Upgradient	HHMW-13	5.45	5.10	4.90	5.00	4.92	4.50	4.65	4.81	4.07	4.41	5.69	5.24	5.20	5.15	4.93
	HHMW-14	4.82	5.20	4.95	4.50	4.25	4.00	7.10	7.05	6.34	6.08	6.48	5.19	5.23	5.41	5.30
	HHMW-16S1	4.40	4.48	4.31	3.70	4.24	4.39	4.87	5.07	4.62	5.24	5.07	4.44	5.30	4.40	5.57
	HHMW-16S2	5.49	4.80	5.27	5.30	5.21	5.40	6.30	6.85	6.31	6.68	6.36	5.67	5.07	4.98	5.05
	HHMW-17S1	4.71	4.84	5.05	4.10	4.44	5.86	5.98	5.54	5.21	5.30	5.25	5.40	5.81	6.21	5.99
	HHMW-17S2	5.47	5.38	5.53	4.75	4.59	5.00	5.25	5.95	5.54	5.28	5.24	5.12	5.90	6.15	6.12
	HHMW-18S1	4.70	5.70	5.19	4.76	4.87	5.03	5.19	5.26	4.81	5.14	5.11	4.86	4.60	5.33	4.70
	HHMW-18S2	5.07	5.27	5.11	4.98	4.61	4.61	5.33	5.40	5.32	5.21	5.09	5.02	4.89	4.73	5.35
Oxygen Injection Area	HHMW-04I	5.14	5.25	5.30	4.62	4.73	4.91	5.31	5.43	5.32	5.33	5.31	5.01	4.84	5.14	5.30
	HHMW-05S1-R	5.52	6.10	6.20	6.00	4.89	5.24	6.26	6.26	6.00	6.30	6.29	6.02	5.82	5.78	5.92
	HHMW-05S2-R	5.39	5.20	5.68	4.65	4.62	4.56	5.15	5.31	5.02	5.27	5.16	5.11	4.92	5.36	5.38
	HHMW-09D	6.01	--	--	--	5.33	--	--	--	5.56	--	--	--	5.56	--	--
	HHMW-09I	5.59	5.51	5.70	5.68	4.89	--	--	--	5.52	--	--	--	5.02	--	--
	HHMW-09S1	5.72	6.29	4.88	5.02	5.31	5.06	5.26	5.23	5.78	5.82	5.75	4.91	5.37	6.63	5.40
	HHMW-09S2	4.74	--	--	4.79	4.79	5.24	5.36	5.43	4.91	5.40	5.14	5.26	4.98	4.92	4.99
	HHMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	6.86	6.87	--	6.24	6.14	6.95	6.74	6.66	6.51	6.74	6.61	6.36	6.00	6.42	6.16
	MW-04	5.42	5.54	5.10	4.39	4.79	5.63	5.32	5.43	5.04	5.37	5.77	5.21	5.16	5.64	4.96
S*	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-22S2	--	3.45	5.17	5.02	4.41	5.34	5.03	5.27	5.17	5.27	5.24	5.11	4.88	5.41	4.91
Downgradient	HHMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	6.93	6.68	6.61	6.00	6.57	--	--	--	--	--	--	--	--	--	--
	HHMW-06S2	5.15	5.21	5.70	5.17	4.75	--	--	--	--	--	--	--	--	--	--
	HHMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	7.03	6.39	6.82	7.98	5.97	6.50	6.60	6.73	6.68	6.69	6.46	6.48	6.30	6.68	6.11
	HHMW-07S2	5.13	5.36	6.89	4.87	4.73	5.40	5.43	5.55	4.93	5.50	5.70	5.35	5.03	4.81	5.41
	HHMW-08S	6.09	5.74	6.57	4.18	3.89	5.87	5.39	5.92	5.63	5.77	6.05	5.52	5.37	5.85	5.73
	HHMW-19S1	6.49	4.16	6.73	7.50	4.75	6.78	6.50	6.37	6.14	6.36	6.21	6.00	5.90	6.27	5.94
	HHMW-19S2	4.77	5.34	5.49	4.87	4.73	5.45	5.50	5.43	5.26	4.51	5.28	5.16	4.99	4.74	5.35
	HHMW-20S1	6.48	6.46	7.20	6.23	6.32	7.09	6.85	6.85	6.50	6.83	6.73	6.60	6.42	6.96	6.32
	HHMW-20S2/20S2R	5.60	5.31	6.68	5.11	3.79	4.75	5.22	5.30	5.10	5.39	5.66	5.11	4.97	5.94	5.33
	HHMW-21S1	6.07	5.81	5.96	4.38	4.77	6.04	5.86	5.95	5.72	5.89	5.77	5.58	5.65	6.05	5.46
	HHMW-21S2	5.03	4.99	5.50	5.31	4.77	5.46	5.56	5.69	5.47	5.59	5.41	5.36	5.16	5.15	5.54
	HHMW-11I	6.17	5.65	6.03	5.15	3.97	5.69	5.63	5.77	5.37	5.63	5.92	5.46	5.27	5.87	5.65
	HHMW-11S/11SR	7.42	6.35	6.94	7.02	5.58	6.70	6.36	6.44	6.17	6.47	6.37	6.15	6.14	6.59	6.00

Table 3-2. Summary of Groundwater Parameter Data
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Monitoring Well	2011				2012				2013				2014			
	Jan-11	Apr-11	Jul-11	Nov-11	Jan-12	Apr-12	Aug-12	Nov-12	Jan-13	Apr-13	Jul-13	Oct-13	Jan-14	Apr-14	Sep-14	
Conductivity (mS/cm)																
Upgradient	HHMW-13	0.219	0.160	0.120	0.187	0.194	0.830	0.770	0.765	0.873	0.895	0.271	0.411	0.390	0.395	0.230
	HHMW-14	0.239	0.152	0.112	0.113	0.285	0.535	0.590	0.638	0.682	0.619	0.301	0.417	0.390	0.415	0.595
	HHMW-16S1	0.925	0.653	0.779	0.689	0.798	0.700	0.850	0.881	0.885	0.840	0.595	0.997	0.381	0.700	0.930
	HHMW-16S2	0.241	0.190	0.201	0.198	0.206	0.490	0.500	0.529	0.615	0.667	0.319	0.343	0.610	0.701	0.900
	HHMW-17S1	0.378	0.548	0.749	0.427	0.507	0.245	0.268	0.393	0.334	0.415	0.268	0.480	0.810	0.369	0.341
	HHMW-17S2	0.250	0.307	0.515	0.305	0.317	0.550	0.306	0.359	0.396	0.268	0.281	0.361	0.480	0.310	0.409
	HHMW-18S1	0.377	0.284	0.305	0.289	0.328	0.265	0.251	0.258	0.234	0.398	0.311	0.510	0.370	0.365	0.300
	HHMW-18S2	0.205	0.272	0.239	0.271	0.268	0.208	0.229	0.231	0.249	0.240	0.244	0.369	0.243	0.217	0.246
Oxygen Injection Area	HHMW-04I	0.204	0.327	0.265	0.300	0.232	0.298	0.244	0.270	0.300	0.284	0.308	0.452	0.311	0.142	0.330
	HHMW-05S1-R	0.359	0.380	0.444	0.388	0.297	0.307	0.582	0.387	0.331	0.316	0.365	0.470	1.23	0.448	3.230
	HHMW-05S2-R	0.201	0.788	0.275	0.291	0.252	0.214	0.280	0.255	0.289	0.276	0.301	0.347	0.269	0.262	0.283
	HHMW-09D	0.121	--	--	--	0.157	--	--	--	0.120	--	--	--	0.164	--	--
	HHMW-09I	0.173	0.237	0.219	0.188	0.190	--	--	--	0.226	--	--	--	0.213	--	--
	HHMW-09S1	0.241	0.373	1.190	0.838	0.632	0.903	0.474	0.521	0.249	0.526	0.300	0.705	0.269	0.200	0.405
	HHMW-09S2	0.188	--	--	0.315	0.243	0.227	0.344	0.292	0.206	0.258	0.305	0.333	0.298	0.266	0.253
	HHMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	0.633	0.775	--	0.699	0.894	0.632	0.600	0.614	1.090	0.631	0.732	1.100	0.967	1.420	1.270
	MW-04	0.253	0.388	0.250	0.290	0.294	0.202	0.370	0.313	0.238	0.277	0.306	0.418	0.278	0.256	0.316
S*	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-22S2	--	0.180	0.255	0.217	0.200	0.209	0.260	0.242	0.285	0.278	0.277	0.394	0.270	0.269	0.293
Downgradient	HHMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	0.412	1.600	1.740	1.540	2.010	--	--	--	--	--	--	--	--	--	--
	HHMW-06S2	0.210	0.228	0.387	0.291	0.255	--	--	--	--	--	--	--	--	--	--
	HHMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	0.442	1.150	0.544	0.591	0.638	0.495	0.529	0.591	0.611	1.02	0.538	0.927	1.40	1.98	0.87
	HHMW-07S2	0.131	0.283	0.568	0.258	0.204	0.187	0.225	0.228	0.199	0.255	0.268	0.350	0.257	0.241	0.257
	HHMW-08S	0.207	0.475	0.681	0.314	0.295	0.274	0.295	0.307	0.330	0.309	0.346	0.512	0.308	0.525	0.401
	HHMW-11I	0.212	0.307	0.783	0.280	0.251	0.260	0.237	0.270	0.292	0.276	0.287	0.331	0.287	0.276	0.288
	HHMW-11S/11SR	0.920	0.895	0.788	0.392	0.532	0.430	0.323	0.545	0.586	0.537	0.647	0.703	0.675	1.790	1.000
	HHMW-19S1	0.431	0.644	0.400	0.392	0.453	0.420	0.369	0.481	0.490	0.683	0.567	0.778	1.28	2.53	1.48
	HHMW-19S2	0.251	0.271	0.266	0.273	0.292	0.235	0.215	0.262	0.287	0.251	0.273	0.329	0.273	0.245	0.275
	HHMW-20S1	0.410	0.616	0.769	0.790	1.140	0.770	0.562	0.304	0.382	0.412	0.699	0.857	0.698	0.730	0.874
	HHMW-20S2/20S2R	0.238	0.325	0.979	0.300	0.243	0.287	0.265	0.274	0.305	0.295	0.328	0.361	0.303	0.306	0.297
	HHMW-21S1	0.370	0.369	0.647	0.340	0.297	0.272	0.454	0.354	0.363	0.356	0.368	0.500	0.442	0.644	0.413
HHMW-21S2	0.210	0.206	0.254	0.226	0.251	0.197	0.214	0.228	0.251	0.218	0.244	0.301	0.258	0.130	0.259	

Table 3-2. Summary of Groundwater Parameter Data
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Monitoring Well	2011				2012				2013				2014			
	Jan-11	Apr-11	Jul-11	Nov-11	Jan-12	Apr-12	Aug-12	Nov-12	Jan-13	Apr-13	Jul-13	Oct-13	Jan-14	Apr-14	Sep-14	
Dissolved Oxygen (mg/L)																
Upgradient	HMMW-13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	7.02	5.46	0.30	5.10	5.89
	HMMW-14	6.44	7.01	0.00	0.00	0.00	0.00	0.00	0.21	0.00	3.07	8.78	8.92	8.35	10.90	
	HMMW-16S1	15.45	15.30	13.20	4.80	4.90	5.94	0.00	0.00	0.00	0.00	3.92	19.99	9.38	3.99	4.32
	HMMW-16S2	6.94	7.52	7.30	8.00	6.21	0.00	0.00	0.00	0.00	0.00	7.70	11.22	6.17	4.10	9.38
	HMMW-17S1	21.00	17.00	20.11	11.90	11.93	19.99	16.96	23.07	29.00	12.44	29.48	24.31	7.67	6.98	6.47
	HMMW-17S2	8.95	6.73	5.63	7.79	9.97	5.43	5.49	9.11	13.01	5.74	7.31	14.02	14.00	17.24	18.24
	HMMW-18S1	3.70	9.34	4.33	1.63	3.98	7.11	2.89	4.97	4.91	10.11	5.03	2.81	8.10	11.59	7.80
	HMMW-18S2	4.02	3.50	4.25	4.93	4.80	6.03	4.59	3.76	4.82	3.23	4.26	3.57	3.95	5.80	6.98
Oxygen Injection Area	HMMW-04I	9.16	9.35	21.10	10.03	8.50	10.68	19.43	12.73	18.77	8.28	6.61	10.56	10.96	7.58	10.03
	HMMW-05S1-R	26.00	19.99	34.00	9.94	28.00	32.00	19.99	7.81	26.00	24.70	19.57	22.60	21.65	17.90	20.00
	HMMW-05S2-R	15.20	28.33	26.26	12.78	21.60	23.00	19.99	9.92	16.61	12.21	19.42	19.00	16.10	19.87	19.24
	HMMW-09D	4.33	--	--	--	9.66	--	--	--	9.19	--	--	--	8.42	--	--
	HMMW-09I	4.89	9.41	7.83	0.00	5.99	--	--	--	7.17	--	--	--	9.71	--	--
	HMMW-09S1	12.89	11.30	3.40	5.20	15.50	11.07	8.98	9.91	5.31	5.25	8.95	9.96	7.48	7.64	8.23
	HMMW-09S2	29.00	--	--	33.91	29.00	28.00	30.00	29.03	38.00	22.89	28.97	34.00	38.26	23.50	30.00
	HMMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	16.01	6.52	--	15.08	15.19	21.00	10.85	14.56	25.00	19.08	8.87	16.10	25.59	16.37	18.35
	MW-04	27.00	20.00	20.00	19.99	23.07	21.00	19.72	24.34	36.00	37.60	25.07	33.86	33.34	25.10	30.00
S*	HMMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HMMW-22S2	--	12.37	12.12	7.40	7.02	9.84	8.92	5.28	9.12	7.41	6.33	9.51	8.60	7.97	7.90
Downgradient	HMMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HMMW-06S1	0.00	2.85	1.82	0.00	3.28	--	--	--	--	--	--	--	--	--	--
	HMMW-06S2	5.03	6.16	6.24	7.16	4.32	--	--	--	--	--	--	--	--	--	--
	HMMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HMMW-07S1	0.00	0.00	0.00	0.00	2.51	2.81	0.00	0.35	0.71	0.98	0.65	3.50	0.68	0.83	0.40
	HMMW-07S2	0.00	8.10	0.00	3.41	0.00	1.90	4.89	1.82	2.21	4.28	7.12	2.10	2.06	0.75	5.66
	HMMW-08S	25.00	22.65	22.00	16.30	23.00	22.00	21.00	18.58	31.98	27.00	16.39	24.03	31.41	15.60	16.47
	HMMW-11I	3.00	4.19	0.00	5.62	3.31	3.58	3.48	3.41	5.24	4.85	6.60	8.34	4.35	2.80	6.57
	HMMW-11S/11SR	0.00	0.00	0.00	0.00	2.38	0.00	0.00	0.09	0.44	0.90	0.43	0.68	0.90	0.88	0.55
	HMMW-19S1	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.25	0.70	1.10	0.99	1.81	0.60	1.90	0.69
	HMMW-19S2	0.00	2.31	2.97	3.07	3.32	0.39	1.20	2.81	2.11	1.45	5.25	7.02	1.81	2.49	3.88
	HMMW-20S1	0.00	0.00	0.00	0.00	2.53	0.37	0.00	0.00	1.08	1.40	0.66	0.39	1.16	1.37	0.84
	HMMW-20S2/20S2R	2.34	11.00	4.60	5.41	3.35	3.79	4.08	3.46	4.69	5.10	8.30	8.64	4.29	3.09	8.15
	HMMW-21S1	7.56	5.37	4.56	2.72	5.48	4.92	3.84	3.85	6.70	4.96	3.39	4.30	4.84	5.87	4.55
	HMMW-21S2	6.75	5.50	8.83	8.10	9.97	7.72	8.20	6.01	7.02	6.09	6.58	11.73	7.90	5.98	7.22

Table 3-2. Summary of Groundwater Parameter Data
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Monitoring Well	2011				2012				2013				2014			
	Jan-11	Apr-11	Jul-11	Nov-11	Jan-12	Apr-12	Aug-12	Nov-12	Jan-13	Apr-13	Jul-13	Oct-13	Jan-14	Apr-14	Sep-14	
Temperature (degrees Celsius)																
Upgradient	HHMW-13	11.66	12.00	19.20	15.10	7.07	10.40	21.22	15.66	10.15	12.01	26.13	13.75	12.20	11.65	11.00
	HHMW-14	11.75	11.68	17.50	12.23	7.81	10.30	20.60	15.14	9.41	12.15	21.94	11.62	11.50	11.47	11.63
	HHMW-16S1	12.02	11.82	19.54	13.14	8.60	15.20	19.25	13.93	9.84	12.83	21.84	12.61	8.70	10.02	14.00
	HHMW-16S2	10.97	12.10	16.47	13.87	5.90	10.24	21.30	13.59	10.07	11.49	28.45	12.13	8.21	10.17	14.12
	HHMW-17S1	12.05	11.66	22.14	13.75	7.90	18.41	26.06	10.01	9.82	15.88	22.08	16.31	11.35	11.47	10.73
	HHMW-17S2	10.96	11.95	23.76	14.77	6.41	8.80	22.14	11.53	9.25	20.85	21.85	12.81	12.54	8.73	9.24
	HHMW-18S1	8.17	10.42	17.42	13.10	9.53	19.58	17.66	13.49	9.27	13.88	17.29	13.29	10.33	12.00	14.50
	HHMW-18S2	8.97	11.69	15.72	12.26	10.70	18.81	15.33	12.14	9.90	13.05	17.50	12.30	10.92	17.09	14.25
Oxygen Injection Area	HHMW-04I	10.27	11.08	22.49	12.25	11.79	12.95	15.60	9.47	10.59	11.42	18.74	13.20	9.16	15.86	15.32
	HHMW-05S1-R	10.42	9.33	18.05	15.90	9.85	12.51	20.87	14.07	9.29	10.23	19.25	16.22	11.06	9.00	17.75
	HHMW-05S2-R	12.43	10.33	13.69	13.94	12.32	13.14	16.50	13.49	10.57	12.25	14.64	14.01	13.10	10.76	13.44
	HHMW-09D	7.27	--	--	--	10.67	--	--	--	10.31	--	--	--	11.03	--	--
	HHMW-09I	8.45	11.51	18.28	11.75	8.77	--	--	--	10.95	--	--	--	11.16	--	--
	HHMW-09S1	9.29	12.00	24.10	13.61	12.62	11.61	22.72	15.62	9.25	13.12	19.71	14.32	9.19	10.63	20.02
	HHMW-09S2	8.60	--	--	13.14	10.15	11.22	15.96	16.33	10.60	18.93	15.69	12.71	10.79	11.22	15.26
	HHMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	7.22	8.90	--	15.55	8.79	10.83	20.15	16.58	7.02	9.86	21.83	16.98	9.99	8.99	17.42
	MW-04	11.57	9.83	16.81	14.01	11.87	17.18	15.33	12.11	10.44	10.74	18.39	14.57	10.95	12.69	15.92
S*	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-22S2	--	12.68	16.82	10.10	6.41	12.14	17.97	11.14	9.60	11.79	15.07	12.23	10.86	11.42	12.99
Downgradient	HHMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	6.45	11.68	23.44	16.75	8.21	--	--	--	--	--	--	--	--	--	--
	HHMW-06S2	10.82	12.54	14.16	12.57	11.20	--	--	--	--	--	--	--	--	--	--
	HHMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	4.62	10.90	21.84	15.95	7.90	15.14	22.15	15.47	8.93	12.87	21.90	17.23	7.86	10.44	19.44
	HHMW-07S2	10.41	11.50	17.40	12.63	11.85	13.61	14.10	13.41	10.85	11.78	14.64	14.57	12.03	14.76	14.27
	HHMW-08S	10.10	11.02	20.50	15.90	11.23	15.94	21.42	16.29	9.84	11.42	18.56	16.63	10.86	12.10	18.36
	HHMW-11I	10.40	11.20	15.90	12.80	11.09	13.66	17.13	14.80	9.85	11.54	17.13	14.16	11.10	13.70	14.48
	HHMW-11S/11SR	6.00	10.32	21.36	16.27	10.01	13.20	22.75	18.28	8.74	10.79	21.16	18.34	10.04	11.17	19.55
	HHMW-19S1	8.09	10.70	18.64	15.97	9.82	14.55	23.95	16.42	9.38	11.50	20.85	17.06	8.40	11.00	20.02
	HHMW-19S2	12.28	11.45	13.49	12.67	11.84	14.66	20.47	13.25	11.40	13.25	15.13	13.53	11.77	15.11	14.23
	HHMW-20S1	6.41	10.97	20.37	16.19	9.56	15.17	23.38	17.09	8.83	12.75	21.20	18.51	9.12	11.27	20.07
	HHMW-20S2/20S2R	9.99	11.00	16.40	12.67	11.74	16.11	17.91	13.16	10.87	12.24	15.40	14.73	11.94	11.87	16.18
	HHMW-21S1	5.54	11.42	23.83	16.39	8.90	15.64	22.84	16.84	9.29	12.04	22.60	18.29	8.97	11.37	21.20
	HHMW-21S2	8.61	11.32	17.49	12.26	10.62	16.10	16.45	14.22	11.34	11.30	17.43	14.17	11.41	15.49	16.79

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Monitoring Well	2011				2012				2013				2014			
	Jan-11	Apr-11	Jul-11	Nov-11	Jan-12	Apr-12	Aug-12	Nov-12	Jan-13	Apr-13	Jul-13	Oct-13	Jan-14	Apr-14	Sep-14	
Oxidation Reduction Potential (mV)																
Upgradient	HHMW-13	250	210	312	261	389	320	800	744	661	732	261	182	193	175	402
	HHMW-14	299	209	330	425	589	550	790	674	584	601	289	220	399	91	96
	HHMW-16S1	270	214	400	700	850	900	NM	283	237	288	281	271	214	89	97
	HHMW-16S2	273	274	260	220	236	380	500	432	357	299	210	220	--	101	112
	HHMW-17S1	310	335	291	231	154	195	340	251	244	301	188	191	125	108	110
	HHMW-17S2	278	275	188	268	327	290	280	405	344	233	306	221	231	383	301
	HHMW-18S1	300	248	236	196	196	260	247	276	309	304	286	260	208	287	287
	HHMW-18S2	294	299	278	355	290	316	267	325	287	330	242	252	209	207	251
Oxygen Injection Area	HHMW-04I	291	294	301	308	215	270	249	308	269	280	171	266	173	95	277
	HHMW-05S1-R	240	232	114	150	139	480	202	169	231	183	186	322	216	186	243
	HHMW-05S2-R	269	294	248	290	352	344	272	288	293	404	222	221	258	297	255
	HHMW-09D	237	--	--	--	255	--	--	--	213	--	--	--	171	--	--
	HHMW-09I	270	321	189	210	189	--	--	--	220	--	--	--	198	--	--
	HHMW-09S1	133	215	283	192	--	235	168	281	101	122	175	161	147	119	133
	HHMW-09S2	312	--	--	310	234	243	294	285	292	248	228	238	198	297	318
	HHMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	12	93	--	150	266	157	90	91	79	70	58	57	-8	12	-17
	MW-04	292	253	182	216	298	261	285	299	306	379	310	256	281	239	303
S*	HHMW-22S2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-22S2	--	50	286	187	164	279	258	313	285	333	234	220	247	294	306
Downgradient	HHMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	78	47	-75	-106	-8	--	--	--	--	--	--	--	--	--	--
	HHMW-06S2	200	280	141	159	159	--	--	--	--	--	--	--	--	--	--
	HHMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	-35	5	-98	-100	-53	-77	-135	-132	-155	-149	-147	-158	-40	-130	-63
	HHMW-07S2	287	225	-67	198	203	144	208	251	258	212	256	169	94	236	183
	HHMW-08S	216	247	250	118	219	254	234	245	234	196	279	216	144	273	240
	HHMW-11I	198	265	293	219	242	261	178	282	215	364	293	222	121	232	218
	HHMW-11S/11SR	-90	-50	-108	-22	5	-70	-45	-38	-41	-60	-106	-40	-41	-54	-27
	HHMW-19S1	-81	6	-122	-150	-110	155	-149	-109	-78	-112	-130	-103	-85	-92	-53
	HHMW-19S2	277	245	230	219	126	235	151	278	267	266	293	222	93	220	239
	HHMW-20S1	-28	-16	-120	-127	-66	-84	-136	-59	-5	-8	-125	-95	-36	21	12
	HHMW-20S2/20S2R	203	275	281	221	273	288	197	302	277	280	320	232	145	310	265
	HHMW-21S1	133	253	216	115	164	185	190	221	235	356	245	145	157	169	175
HHMW-21S2	260	283	187	215	296	255	205	297	256	236	202	216	195	206	255	

Table 3-2. Summary of Groundwater Parameter Data
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Monitoring Well	2015		2016		2017		2018		2019		2020		2021		2022		
	Mar-15	Sep-15	Mar-16	Sep/Oct-16	Mar-17	Sep-17	Mar-18	Aug-18	Mar-19	Sep-19	Feb-20	Sep-20	Mar-21	Aug-21	Feb-22	Aug-22	
pH (standard units)																	
Upgradient	HHMW-13	5.37	4.78	2.04	5.33	--	4.88	--	--	--	5.19	--	5.18	--	5.81	--	5.71
	HHMW-14	5.43	5.15	2.43	5.37	--	4.90	--	5.41	--	5.41	--	5.36	5.60	5.50	4.54	5.84
	HHMW-16S1	4.79	4.34	1.16	1.16	--	4.11	4.56	4.75	4.76	4.14	4.97	4.97	--	5.09	--	5.57
	HHMW-16S2	--	4.71	--	4.04	5.34	4.74	--	5.20	--	5.08	--	--	--	--	--	--
	HHMW-17S1	--	4.86	--	5.76	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-17S2	--	4.50	--	3.53	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-18S1	4.87	4.67	4.48	5.16	5.50	4.88	--	5.16	--	5.27	--	5.10	5.34	5.37	--	5.85
	HHMW-18S2	--	4.88	--	5.33	--	--	--	--	--	--	--	--	--	--	--	--
Oxygen Injection Area	HHMW-04I	--	4.79	--	5.31	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S1-R	5.32	5.62	4.81	5.56	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S2-R	--	5.04	--	5.34	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09I	--	5.01	--	5.71	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09S1	5.42	5.21	3.29	5.95	6.10	5.41	6.39	5.06	6.35	6.04	6.33	5.62	5.87	6.38	5.02	--
	HHMW-09S2	--	4.98	--	5.53	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	6.12	5.49	5.92	6.17	6.56	--	--	--	--	--	6.72	--	6.72	--	6.38	7.25
	MW-04	--	4.95	--	5.53	--	--	--	--	--	--	--	--	--	--	--	--
O ₂	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.17
	HHMW-22S2	--	4.99	--	5.35	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient	HHMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	6.24	5.73	5.03	6.62	6.77	6.35	--	5.54	--	7.50	--	6.95	--	7.13	--	--
	HHMW-07S2	--	5.06	--	5.50	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-08S	--	5.18	--	5.93	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-19S1	5.99	6.09	5.47	6.28	6.45	6.07	5.96	5.87	6.64	6.94	7.00	6.46	6.57	6.59	6.22	6.26
	HHMW-19S2	5.10	4.84	--	5.45	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-20S1	6.55	6.49	6.62	6.64	--	--	6.55	6.00	--	7.53	--	--	--	--	--	--
	HHMW-20S2/20S2R	--	4.76	--	5.48	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-21S1	--	5.51	--	5.87	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-21S2	--	4.84	--	5.61	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11I	--	5.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11S/11SR	6.27	6.24	--	6.76	8.89	6.75	--	5.95	--	7.09	--	--	--	--	--	--

Table 3-2. Summary of Groundwater Parameter Data
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Monitoring Well	2015		2016		2017		2018		2019		2020		2021		2022		
	Mar-15	Sep-15	Mar-16	Sep/Oct-16	Mar-17	Sep-17	Mar-18	Aug-18	Mar-19	Sep-19	Feb-20	Sep-20	Mar-21	Aug-21	Feb-22	Aug-22	
Conductivity (mS/cm)																	
Upgradient	HHMW-13	0.312	0.26	0.219	0.273	--	0.390	--	--	--	0.270	--	0.184	--	0.250	--	0.272
	HHMW-14	0.310	0.19	0.222	0.273	--	0.39	--	0.205	--	0.267	--	0.190	0.215	0.249	0.309	0.282
	HHMW-16S1	1.130	0.62	0.424	0.424	--	0.85	0.754	0.337	0.489	0.612	0.599	0.308	--	0.486	--	0.273
	HHMW-16S2	--	0.25	--	0.261	0.335	0.40	--	0.193	--	0.283	--	--	--	--	--	--
	HHMW-17S1	--	0.34	--	0.304	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-17S2	--	0.26	--	0.294	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-18S1	0.437	0.34	0.269	0.447	0.344	0.406	--	0.220	--	0.408	--	0.226	0.278	0.255	--	0.220
	HHMW-18S2	--	0.24	--	0.268	--	--	--	--	--	--	--	--	--	--	--	--
Oxygen Injection Area	HHMW-04I	--	0.311	--	0.316	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S1-R	0.219	0.234	0.234	0.204	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S2-R	--	0.238	--	0.333	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09I	--	0.217	--	0.220	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09S1	0.299	0.309	0.15	0.254	0.289	0.357	0.361	0.212	0.200	0.221	0.183	0.153	0.130	0.200	0.162	--
	HHMW-09S2	--	0.299	--	0.379	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	1.660	1.360	2.690	1.650	1.630	--	--	--	--	--	1.740	--	0.868	--	1.010	0.812
	MW-04	--	0.265	--	0.301	--	--	--	--	--	--	--	--	--	--	--	--
O ₂	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.073
	HHMW-22S2	--	0.25	--	0.303	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient	HHMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	1.62	0.45	0.707	1.15	0.92	2.12	--	1.82	--	0.261	--	0.634	--	1.070	--	--
	HHMW-07S2	--	0.22	--	0.276	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-08S	--	0.37	--	0.414	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11I	--	0.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11S/11SR	0.747	0.81	--	0.877	0.530	0.590	--	0.220	--	0.310	--	--	--	--	--	--
	HHMW-19S1	1.82	1.06	1.08	0.710	2.33	1.17	2.33	0.753	0.718	0.467	0.258	0.420	0.667	0.689	1.670	0.274
	HHMW-19S2	0.302	0.26	--	0.288	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-20S1	1.390	0.70	0.385	0.536	--	--	0.940	0.193	--	0.172	--	--	--	--	--	--
	HHMW-20S2/20S2R	--	0.27	--	0.347	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-21S1	--	0.37	--	0.480	--	--	--	--	--	--	--	--	--	--	--	--
HHMW-21S2	--	0.24	--	0.267	--	--	--	--	--	--	--	--	--	--	--	--	

Table 3-2. Summary of Groundwater Parameter Data
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

		2015		2016		2017		2018		2019		2020		2021		2022	
Monitoring Well		Mar-15	Sep-15	Mar-16	Sep/Oct-16	Mar-17	Sep-17	Mar-18	Aug-18	Mar-19	Sep-19	Feb-20	Sep-20	Mar-21	Aug-21	Feb-22	Aug-22
Dissolved Oxygen (mg/L)																	
Upgradient	HHMW-13	2.68	7.49	0.00	2.04	--	2.17	--	--	--	0.00	--	1.18	--	5.86	--	2.10
	HHMW-14	7.90	8.05	5.39	6.68	--	6.95	--	6.87	--	6.84	--	9.25	6.29	7.89	13.26	30.56
	HHMW-16S1	11.53	9.67	16.02	7.67	11.12	14.06	17.80	10.43	15.45	13.67	6.07	18.21	--	9.26	--	11.56
	HHMW-16S2	--	7.22	--	8.14	--	8.48	--	5.59	--	6.69	--	--	--	--	--	--
	HHMW-17S1	--	15.33	--	13.11	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-17S2	--	5.62	--	5.90	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-18S1	14.79	5.00	10.84	4.56	22.67	3.07	--	0.60	--	7.66	--	2.95	8.41	4.48	--	3.41
	HHMW-18S2	--	3.55	--	5.25	--	--	--	--	--	--	--	--	--	--	--	--
Oxygen Injection Area	HHMW-04I	--	17.80	--	5.96	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S1-R	17.39	31.00	14.89	9.66	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S2-R	--	18.98	--	9.38	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09I	--	10.47	--	6.17	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09S1	16.12	6.97	8.66	6.47	2.98	5.94	9.66	1.96	2.13	5.04	2.30	3.87	7.06	5.37	8.87	--
	HHMW-09S2	--	48.00	--	27.92	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	16.47	20.28	31.62	24.84	50.00	--	--	--	--	--	16.10	--	18.94	--	32.07	26.50
	MW-04	--	35.55	--	20.52	--	--	--	--	--	--	--	--	--	--	--	--
O ₂	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.45
	HHMW-22S2	--	8.42	--	7.00	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient	HHMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	1.58	1.91	4.88	0.35	5.62	0.43	--	0.00	--	0.00	--	0.00	--	0.00	--	--
	HHMW-07S2	--	2.76	--	2.62	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-08S	--	24.30	--	14.65	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11I	--	2.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11S/11SR	0.34	1.34	--	1.5	2.95	1.54	--	0.00	--	0.00	--	--	--	--	--	--
	HHMW-19S1	3.53	1.05	6.37	3.04	7.70	1.50	0.74	0.00	0.37	0.00	0.92	0.00	0.00	0.00	0.00	0.02
	HHMW-19S2	2.25	2.40	--	5.02	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-20S1	1.62	1.36	0.00	0.63	--	--	2.55	0.00	--	0.00	--	--	--	--	--	--
	HHMW-20S2/20S2R	--	4.80	--	7.30	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-21S1	--	3.11	--	4.78	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-21S2	--	8.10	--	7.05	--	--	--	--	--	--	--	--	--	--	--	--

Table 3-2. Summary of Groundwater Parameter Data
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

		2015		2016		2017		2018		2019		2020		2021		2022	
Monitoring Well		Mar-15	Sep-15	Mar-16	Sep/Oct-16	Mar-17	Sep-17	Mar-18	Aug-18	Mar-19	Sep-19	Feb-20	Sep-20	Mar-21	Aug-21	Feb-22	Aug-22
Temperature (degrees Celsius)																	
Upgradient	HHMW-13	10.76	23.34	14.34	14.79	--	12.80	--	--	--	12.50	--	11.77	--	21.05	--	13.08
	HHMW-14	10.95	20.82	14.32	14.32	--	13.66	--	14.48		13.27	--	11.48	12.11	17.83	11.25	12.60
	HHMW-16S1	9.51	20.33	14.27	11.16	--	12.98	11.37	18.08	11.22	12.38	10.89	12.39	--	19.52	--	20.55
	HHMW-16S2	--	16.34	--	14.32	10.82	13.74	--	17.98	--	12.31	--	--	--	--	--	--
	HHMW-17S1	--	16.46	--	13.66	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-17S2	--	17.78	--	15.25	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-18S1	7.91	20.99	15.21	14.52	6.15	13.77	--	19.66	--	18.17	--	16.47	12.27	16.07	--	16.83
	HHMW-18S2	--	19.10	--	14.07	--	--	--	--	--	--	--	--	--	--	--	--
Oxygen Injection Area	HHMW-04I	--	15.37	--	17.60	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S1-R	6.07	20.28	14.17	20.29	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S2-R	--	16.93	--	16.07	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09I	--	14.41	--	12.80	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09S1	3.20	26.65	13.63	20.72	12.29	18.66	8.93	21.87	9.52	16.88	8.52	18.96	10.76	18.87	13.94	--
	HHMW-09S2	--	15.16	--	13.57	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	6.48	18.60	11.75	17.19	7.05	--	--	--	--	--	8.86	--	10.55	--	7.84	22.55
	MW-04	--	16.05	--	17.89	--	--	--	--	--	--	--	--	--	--	--	--
S ₂	HHMW-22S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.68
	HHMW-22S2	--	13.58	--	12.82	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient	HHMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	3.77	21.04	9.52	22.02	5.80	19.14	--	21.76	--	21.27	--	16.80	--	22.81	--	--
	HHMW-07S2	--	14.86	--	14.49	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-08S	--	20.23	--	19.22	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11I	--	18.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11S/11SR	6.31	22.08	--	18.61	8.78	19.84	--	21.95	--	20.29	--	--	--	--	--	--
	HHMW-19S1	5.27	22.24	10.75	22.57	5.97	18.89	12.69	22.08	8.95	21.53	6.19	20.52	9.43	21.96	7.35	21.78
	HHMW-19S2	10.09	16.28	--	15.34	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-20S1	5.53	23.96	11.38	21.18	--	--	9.07	22.59	--	21.39	--	--	--	--	--	--
	HHMW-20S2/20S2R	--	15.55	--	14.56	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-21S1	--	26.26	--	24.13	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-21S2	--	18.11	--	17.03	--	--	--	--	--	--	--	--	--	--	--	--

Table 3-2. Summary of Groundwater Parameter Data
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

		2015		2016		2017		2018		2019		2020		2021		2022	
Monitoring Well		Mar-15	Sep-15	Mar-16	Sep/Oct-16	Mar-17	Sep-17	Mar-18	Aug-18	Mar-19	Sep-19	Feb-20	Sep-20	Mar-21	Aug-21	Feb-22	Aug-22
Oxidation Reduction Potential (mV)																	
Upgradient	HHMW-13	217	260	350	211	--	205	--	--	--	221	--	243	--	103	--	218
	HHMW-14	211	263	349	224	--	219	--	328	--	206	--	297	185	135	386	243
	HHMW-16S1	270	307	419	419	--	297	232	397	241	311	267	201	--	129	--	232
	HHMW-16S2	--	288	--	329	277	236	--	365	--	269	--	--	--	--	--	--
	HHMW-17S1	--	301	--	244	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-17S2	--	309	--	353	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-18S1	216	274	362	295	295	223	--	345	--	248	--	264	208	218	--	315
	HHMW-18S2	--	288	--	260	--	--	--	--	--	--	--	--	--	--	--	--
Oxygen Injection Area	HHMW-04I	--	299	--	268	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S1-R	181	248	330	233	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-05S2-R	--	243	--	163	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09I	--	280	--	123	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-09S1	106	41	157	5	113	10	35	114.00	58	39.00	63	-13.00	177.00	4.00	0.00	--
	HHMW-09S2	--	322	--	203	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-15S	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	MW-03	99	9	36	22	33	--	--	--	--	--	-18.00	--	93.00	--	138.00	-1.00
	MW-04	--	294	--	260	--	--	--	--	--	--	--	--	--	--	--	--
O ₂ *	HHMW-22S2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	39.00
	HHMW-22S2	--	205	--	269	--	--	--	--	--	--	--	--	--	--	--	--
Downgradient	HHMW-06I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-06S2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-07S1	-2	2	22	-125	104	-140	--	57	--	-150	--	-177	--	-133	--	--
	HHMW-07S2	--	213	--	108	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-08S	--	278	--	214	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11I	--	273	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-11S/11SR	-3	-28	--	-125	60	-98	--	126	--	-122	--	--	--	--	--	--
	HHMW-19S1	54	-62	20	-127	1	-98	-145	20	-82	-130	-43	-175	-85	-108	-11	-35
	HHMW-19S2	110	267	--	98	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-20S1	-25	47	98	-1	--	--	-59	72.00	--	-118.00	--	--	--	--	--	--
	HHMW-20S2/20S2R	--	290	--	188	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-21S1	--	203	--	198	--	--	--	--	--	--	--	--	--	--	--	--
	HHMW-21S2	--	294	--	229	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

- MGP = Manufactured Gas Plant
- mS/cm = millisiemens per centimeter
- mg/L = milligrams per liter
- mv = millivolts
- * = Sidegradient
- = not measured

Table 3-3. Water Level Measurements and Calculated Water Elevations
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance Monitoring Report

Well and Piezometer I.D.	Top of Casing Elevation (ft)	8/15/2022		Notes
		Depth to Groundwater (ft)	Groundwater Elevation (ft)	
Upland Groundwater Monitoring Wells				
HMMW-13	55.75	44.82	10.93	
HMMW-14	76.12	65.05	11.07	
HMMW-16S1	38.01	27.90	10.11	
HMMW-16S2	37.69	27.80	9.89	
HMMW-17S1	30.63	20.60	10.03	
HMMW-17S2	31.09	20.92	10.17	
Lowland Groundwater Monitoring Wells				
HMMW-05S1R	17.40	7.70	9.70	
HMMW-05S2R	17.44	7.33	10.11	
HMMW-09S1	19.26	9.36	9.90	
HMMW-09S2	19.33	9.59	9.74	
HMMW-09I	19.23	9.25	9.98	
HMMW-09D	18.83	9.10	9.73	
HMMW-15S	NA	NM	NA	No access into the electric yard.
HMMW-18S1	20.66	11.20	9.46	
HMMW-18S2	21.01	10.47	10.54	
MW-03	14.66	3.31	11.35	
MW-04	18.46	8.70	9.76	
Downgradient Groundwater Monitoring Wells				
HMMW-07S1	11.59	3.78	7.81	
HMMW-07S2	11.40	2.98	8.42	
HMMW-07I	10.86	0.90	9.96	
HMMW-07D	11.13	0.88	10.25	
HMMW-08S	8.67	4.86	3.81	
HMMW-08I	8.59	1.52	7.07	
HMMW-11SR	NM	4.09	NA	Abandoned - Re-installed on 9/27/16. Not re-surveyed.
HMMW-19S1	11.87	3.81	8.06	
HMMW-19S2	11.52	3.70	7.82	
HMMW-20S1	10.27	2.83	7.44	
HMMW-20S2R	NM	NM	NA	Abandoned - Re-installed on 9/27/16. Not re-surveyed.
HMMW-21S1	9.77	3.75	6.02	
HMMW-21S2	10.09	1.57	8.52	
Side-gradient Groundwater Monitoring Wells				
HMMW-22S1	16.00	5.88	10.12	
HMMW-22S2	16.40	6.51	9.89	

Notes:

MGP = Manufactured Gas Plant
ft = feet
NC = Not Calculated
NM = Not Measured

Table 3-4. Groundwater Analytical Results
Halesite Former MGP
Annual Groundwater Monitoring and Operations, Maintenance Monitoring Report

Site Area				Upland Area						Oxygen Injection System Area						Downgradient			Side-Gradient
Location Name	HHMW-13	HHMW-14	HHMW-14	HHMW-16S1	HHMW-16S1	HHMW-18S1	HHMW-09S1	HHMW-09S1	HHMW-09S1	MW-03	MW-03	HHMW-19S1	HHMW-19S1	HHMW-19S1	HHMW-22S1				
Sample Name	HHMW-13	HHMW-14	HHMW-14	HHMW-16S1	HHMW-16S1	HHMW-18S1	HHMW-09S1	HHMW-09S1	DUP-01	MW-03	MW-03	HHMW-19S1	DUP-01	HHMW-19S1	HHMW-22S1				
Start Depth	39	64	64	15	15	7	6	6	6	2	2	2	2	2	3				
End Depth	49	74	74	20	20	12	11	11	11	12	12	7	7	7	8				
Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft				
Sample Date	8/16/2022	2/28/2022	8/16/2022	2/28/2022	8/15/2022	8/15/2022	2/28/2022	8/15/2022	8/15/2022	2/28/2022	8/15/2022	2/28/2022	2/28/2022	8/15/2022	8/15/2022				
Parent Sample									HHMW-09S1				HHMW-19S1						
Analyte	Units	CAS No.	NYS AWQS																
BTEX	µg/L																		
Benzene		71-43-2	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.0	0.87 J	0.88 J	30	
Toluene		108-88-3	5	1 U	1.3 J	1 U	0.90 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	14	76	
Ethylbenzene		100-41-4	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.52 J	0.39 J	15 J	9.3 J	0.40 J	320		
Total Xylene		1330-20-7	5	2 U	1 U	2 U	0.83 J	2 U	1 U	2.9	2.9	3.8	4.7	2.4	1.8	3.1	120		
Total BTEX (ND=0)		TBTEX_ND0	NE	ND	1.3	ND	0.90	0.83	ND	ND	2.9	2.9	4.3	5.9	18	12.0	18	546	
PAH17	µg/L																		
Acenaphthene		83-32-9	20*	10 U	4.0 J	3.8 J	10 U	10 U	10 U	10 U	10 U	4.4 J	5.2 J	16	16	14	50 U		
Acenaphthylene		208-96-8	NE	2.1 J	36	34	10 U	0.98 J	10 U	1.2 J	2.4 J	2.5 J	0.87 J	1.1 J	10 U	10 U	1.4 J	98	
Anthracene		120-12-7	50*	2.0 J	14	18	10 U	10 U	10 U	10 U	2.2 J	1.5 J	10 U	10 U	10 U	10 U	27 J		
Benzo[a]anthracene		56-55-3	0.002*	2.9	11	21	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	95		
Benzo[a]pyrene		205-99-2	0.002*	1.2	14	27	1 U	1 U	1 U	1 U	3.8	5.0	1 U	1 U	1 U	1 U	210		
Benzo[b]fluoranthene		207-08-9	0.002*	1.5 J	10	19	2 U	2 U	2 U	2 U	2.3	2.8	2 U	2 U	2 U	2 U	140		
Benzo[g,h,i]perylene		191-24-2	NE	0.95 J	9.4 J	21	10 U	0.92 J	10 U	10 U	5.5 J	8.4 J	10 U	10 U	10 U	10 U	200		
Benzo[k]fluoranthene		50-32-8	ND	1 U	6.1	7.8	1 U	1 U	1 U	1 U	1.0	0.97 J	1 U	1 U	1 U	1 U	51		
Chrysene		218-01-9	0.002*	1.9 J	11	21	2 U	2 U	2 U	2 U	1.0 J	2 U	2 U	2 U	2 U	2 U	97		
Dibenz(a,h)anthracene		53-70-3	NE	1 U	1.3	3.8	1 U	1 U	1 U	1 U	0.76 J	1 U	1 U	1 U	1 U	1 U	30		
Fluoranthene		206-44-0	50*	6.9 J	22	34	10 U	10 U	10 U	10 U	0.88 J	10 U	110						
Fluorene		86-73-7	50*	1.1 J	31	28	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2.9 J	10 U	13 J	
Indeno[1,2,3-cd]pyrene		193-39-5	0.002*	2 U	8.5	19	2 U	2 U	2 U	2 U	4.2	6.6	2 U	2 U	2 U	2 U	170		
2-Methylnaphthalene		91-57-6	NE	0.72 J	23	17	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	3.5 J		
Naphthalene		91-20-3	10*	2 U	0.66 J	0.57 J	2 U	2 U	2 U	2 U	2 U	0.55 J	2 U	17	21	2 U	6.6 J		
Phenanthrene		85-01-8	50*	4.8 J	70	55	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	39 J		
Pyrene		129-00-0	50*	17	35	55	10 U	10 U	10 U	10 U	1.8 J	10 U	220						
Total PAH (17) (ND=0)		TPAH17_ND0	NE	43	307	385	ND	1.9	ND	1.2	23.6	30.45	5.8	6.3	33	40	15	1,510	

Table 3-5. Summary of Historical Total BTEX Results
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well No.	Screen Interval (feet)	BTEX Concentrations (µg/L)														BTEX Concentrations (µg/L)																									
		Sampling Date														Sampling Date																									
		1995				2001				2003				2005				2006				2007				2008				2009				2009				2010			
		Nov	Jul	Jul	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Jul	Oct	Jan	Apr/May	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	July	Oct/Nov											
Pre-operational Period														Operational Period																											
Upland Groundwater Monitoring Wells																																									
HHMW-12	45.0 - 55.0	*	*	6	35	0	12	35	10	16	31	15	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾													
HHMW-13	39.0 - 49.0	*	*	2	0	0	0	0	0	0	3	0	0	0	0	NS	NS	0	NS																						
HHMW-14	64.0 - 74.0	*	*	2	0	0	0	0	0	0	0	0	0	0	NS	NS	0	NS																							
HHMW-16S1	25.0 - 30.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	23	0	0	22	15	30	29	31	23	38	14	1	0	0	7	32										
HHMW-16S2	35.0 - 45.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
HHMW-17S1	20.0 - 25.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
HHMW-17S2	30.0 - 40.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
HHMW-18S1	9.0 - 14.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0										
HHMW-18S2	19.0 - 29.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
Oxygen Injection System Area GW Monitoring Wells																																									
HHMW-01I	35.0 - 45.0	**	0	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾																				
HHMW-04I	30.0 - 40.0	**	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																			
HHMW-05S1-R	6.0 - 11.0	**	178	114	0	0	501	637	0	980	80	1980	735	129	120	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
HHMW-05S2-R	18.0 - 28.0	**	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																			
HHMW-05I	30.0 - 40.0	**	0	0	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾																				
HHMW-05D	80.0 - 90.0	**	0	0	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾																				
HHMW-09S1	6.0 - 11.0	**	5	0	0	0	0	0	0	233	0	49	1	0	0	NS	NS	0	NS	NS																					
HHMW-09S2	17.5 - 27.5	**	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																			
HHMW-09I	43.0 - 53.0	**	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS																			
HHMW-09D	85.0 - 95.0	**	1	0	0	0	0	0	0	0	0	0	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS										
HHMW-10	15.0 - 20.0	**	0	143	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾																			
HHRW-01	13.0 - 23.0	***	***	***	***	***	0	0	0	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾											
HHMW-15S	7.5 - 12.5	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	237	NS	NS	68	NS	NS																				
MW-01	5.0 - 25.0	6	0	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾																				
MW-02	6.0 - 26.0	29	0	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾																				
MW-03	2.0 - 12.0	4119	127	44	144	318	136	720	167	179	611	145	104	356	110	NS	NS	20	NS	NS	21	NS																			

Table 3-5. Summary of Historical Total BTEX Results
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well No.	Screen Interval (feet)	BTEX Concentrations (µg/L)														BTEX Concentrations (µg/L)															
		Sampling Date														Sampling Date															
		1995		2001		2003		2005		2006		2007		2008		2009		2009							2010						
		Nov	Jul	Jul	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Jul	Oct	Jan	Apr/May	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	July	Oct/Nov	
MW-04	1.0 - 21.0	--	0	--	0	0	0	0	0	0	0	0	0	3	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	0	0	
P-01	12.1 - 15.4	0	20	--	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾														
P-02	12.3 - 16.4	0	1	4	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾														
Downgradient Groundwater Monitoring Wells																															
HHMW-06S1	2.5 - 7.5	**	0	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS	NS	NS	NS	0	NS	NS	0	NS	NS	0	NS	0	0	
HHMW-06S2	12.0 - 22.0	**	0	0	0	0	0	0	0	NS	0	0	0	0	0	NS	NS	NS	NS	NS	0	NS	NS	0	NS	NS	NS	0	0	0	
HHMW-06I	35.0 - 45.0	**	0	0	NS	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS										
HHMW-07S1	3.0 - 8.0	**	220	138	52	0	43	119	NS	98	148	113	108	66	62	NS	NS	103	NS	NS	14	NS	NS	31	NS	NS	0	NS	2	3	
HHMW-07S2	16.0 - 26.0	**	0	1	0	0	0	0	0	0	0	0	0	2	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	0	0		
HHMW-07I	45.0 - 55.0	**	0	0	NS	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS										
HHMW-07D	115.0 - 125.0	**	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS													
HHMW-08S	2.0 - 12.0	**	1	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS	NS	NS	NS	0	NS	NS	0	NS	NS	0	NS	0	0	
HHMW-08I	35.0 - 45.0	**	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS													
HHMW-11S/11SR	3.0 - 13.0	*	*	65	23	21	32	31	21	13	22	0	17	10	20	NS	NS	NS	NS	NS	NS	NS	2	NS	NS	3	NS	0	1		
HHMW-11I	31.0 - 41.0	*	*	0	0	0	0	0	0	0	0	26	0	0	0	NS	NS	NS	NS	NS	NS	NS	0	0	NS	0	NS	0	0		
HHMW-19S1	3.0 - 8.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	113	183	195	115	149	213	158	92	96	50	75	75	180	208	134	144	
HHMW-19S2	15.0 - 25.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	46	21	24	16	10	7	5	7	10	0	3	4	0	0	0	0	
HHMW-20S1	4.0 - 9.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	21	26	17	NS	NS	NS	NS	NS	NS	0	13	10	12	2	1	2	
HHMW-20S2/20S2R	15.0 - 25.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	11	2	0	NS	NS	NS	NS	NS	NS	14	1	2	0	0	0	0	
HHMW-21S1	3.0 - 8.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	0	0	NS	NS	NS	NS	NS	NS	0	NS	0	NS	0	0	0	
HHMW-21S2	15.0 - 25.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	0	0	NS	NS	0	0	0	
Sidegradient Groundwater Monitoring Wells																															
HHMW-22S1	4.0 - 9.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	
HHMW-22S2	15.0 - 25.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	NS	0	0	0	0

Table 3-5. Summary of Historical Total BTEX Results
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well No.	Screen Interval (feet)	BTEX Concentrations (µg/L)																BTEX Concentrations (µg/L)												Pre-operational Period			Operational Period									
		Sampling Date																Operational Period												Min	Max	Mean	Min	Max	Mean							
		2011				2012				2013				2014				2015		2016		2017		2018		2019		2020								2021		2022				
		Jan/Feb	Apr	July	Oct/Nov	Jan	Apr	July	Oct/Nov	Jan	Apr	July	Oct/Nov	Jan	Apr	Sept	Mar	Aug/Sept	Mar	Aug/Sept	Mar	Sept	Mar	Aug	Mar	Sept	Feb	Sept	Mar	Sept	Feb	Aug										
Upland Groundwater Monitoring Wells																																										
HHMW-12	45.0 - 55.0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	35	16	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾						
HHMW-13	39.0 - 49.0	0	0	0	0	3	2	2	1	2	0	0	0	0	0	0	10	2	2	2	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	3	0	0	10	1													
HHMW-14	64.0 - 74.0	0	0	0	1	5	2	0	0	3	0	0	0	0	0	0	83	2	1	3	NS ⁽¹⁾	0.27	NS ⁽¹⁾	0	NS ⁽¹⁾	0	NS ⁽¹⁾	0	1.3	0	0	2	0	0	83	3						
HHMW-16S1	25.0 - 30.0	16	7	3	2	20	40	17	15	2	0	0	0	5	26	13	35	3	4	4	NS ⁽¹⁾	0	10	0	4.7	0	7.31	4.3	14.09	6.34	0.9	0.83	0	0	0	0	40	11				
HHMW-16S2	35.0 - 45.0	0	2	0	2	0	1	3	0	0	0	0	0	0	0	0	NS	3	NS ⁽¹⁾	1	0	0	NS ⁽¹⁾	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	0	0	0	3	0				
HHMW-17S1	20.0 - 25.0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	0	0	0	1	0													
HHMW-17S2	30.0 - 40.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	0	0	0	1	0											
HHMW-18S1	9.0 - 14.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NS ⁽¹⁾	0	NS ⁽¹⁾	0	NS ⁽¹⁾	0	NS	0	NS	0	0	0	0	0	2	0				
HHMW-18S2	19.0 - 29.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	0	0	0	0	0											
Oxygen Injection System Area GW Monitoring Well																																										
HHMW-01I	35.0 - 45.0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾						
HHMW-04I	30.0 - 40.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾													
HHMW-05S1-R	6.0 - 11.0	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	1,980	393	0	17	1									
HHMW-05S2-R	18.0 - 28.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾											
HHMW-05I	30.0 - 40.0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾				
HHMW-05D	80.0 - 90.0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾				
HHMW-09S1	6.0 - 11.0	6	6	0	0	3	14	0	0	3	0	0	1	4	15	4	12	NS	6	0	0	0.58	0	0	0.44	1.3	0.94	0.75	0	0	0	2.9	0	233	22	0	15	2				
HHMW-09S2	17.5 - 27.5	0	NS	NS	0	0	0	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	6	2	0	106	6									
HHMW-09I	43.0 - 53.0	0	0	0	0	0	NS	NS	NS	0	NS	NS	NS	0	NS	NS	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾											
HHMW-09D	85.0 - 95.0	NS	NS	NS	NS	0	NS	NS	NS	0	NS	NS	NS	0	NS	NS	NS	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾													
HHMW-10	15.0 - 20.0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾				
HHRW-01	13.0 - 23.0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾				
HHMW-15S	7.5 - 12.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	7100	NS	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	237	237	237	0	7,100	2,389											
MW-01	5.0 - 25.0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾		
MW-02	6.0 - 26.0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾		
MW-03	2.0 - 12.0	113	43	NS	8	10	19	3	0	2	0	0	15	74	111	112	201	158	301	225	97.5	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾										

Table 3-6. Summary of Historical Total PAH Results
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

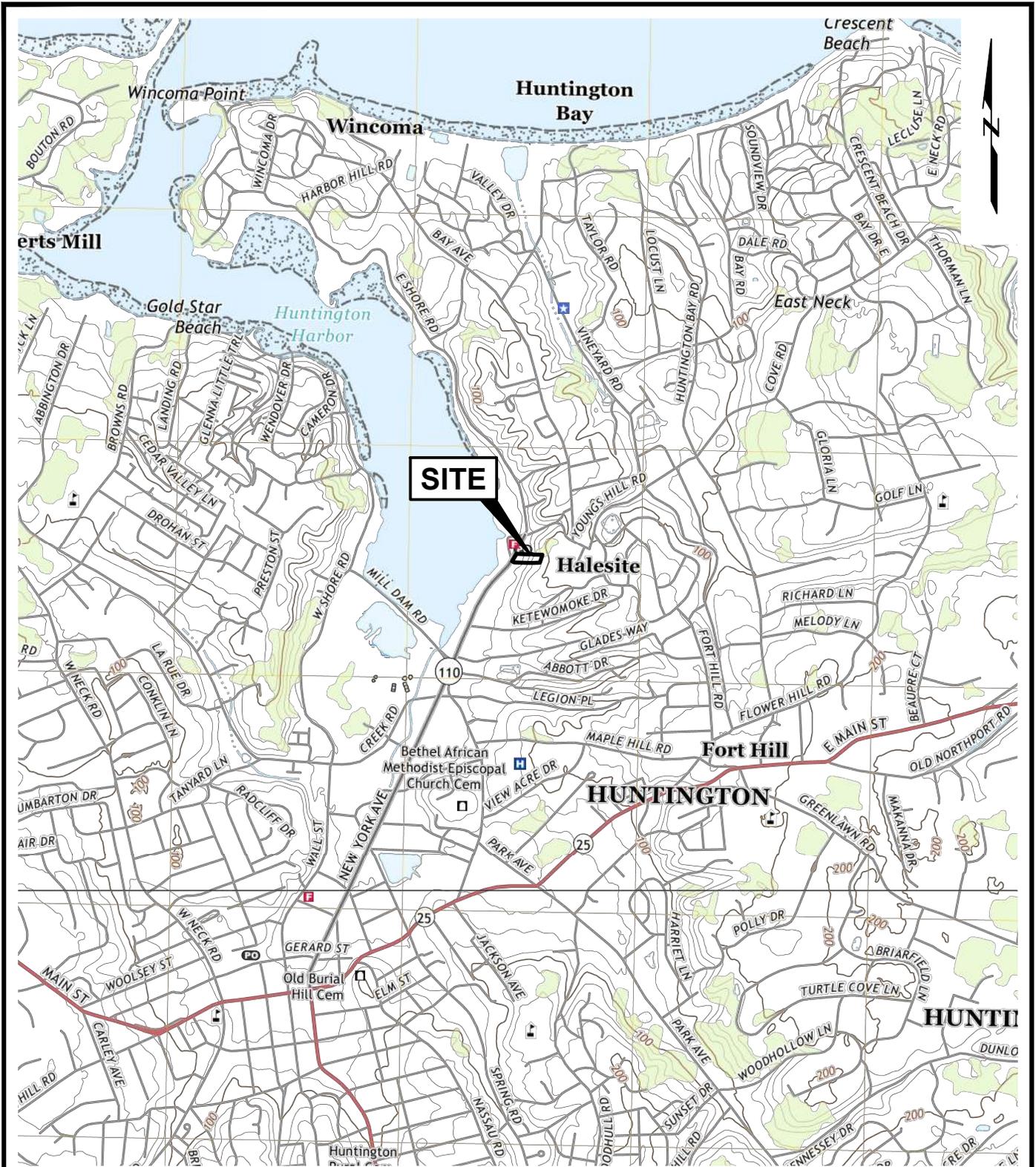
Well No.	Screen Interval (feet)	Total PAH Concentrations (µg/L)														Total PAH Concentrations (µg/L)																					
		Sampling Date														Sampling Date																					
		1995	2001	2003	2005		2006		2007		2008			2009		2009							2010							2011							
		Nov	Jul	Jul	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Jul	Oct	Jan	Apr/May	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	July	Oct/Nov	Jan/Feb	Apr	July	Oct/Nov			
Pre-operational Period														Operational Period																							
Downgradient Groundwater Monitoring Wells																																					
HHMW-06S1	2.5 - 7.5	**	1	0	0	0	0	0	0	0	0	0	0	0	0	NS	NS	NS	NS	NS	0	NS	NS	0	NS	NS	0	NS	0	0	0	0	0	1			
HHMW-06S2	12.0 - 22.0	**	374	0	77	11	0	0	NS	0	0	39	0	31	0	NS	NS	NS	NS	NS	16	NS	NS	0	NS	NS	NS	5	0	6	0	3	45	23			
HHMW-06I	35.0 - 45.0	**	0	0	NS	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS											
HHMW-07S1	3.0 - 8.0	**	1,688	505	360	0	140	981	0	3	1,046	479	32	364	9	NS	NS	0	NS	NS	14	NS	NS	285	NS	NS	67	NS	96	15	1	0	74	42			
HHMW-07S2	16.0 - 26.0	**	0	0	11	111	13	47	0	0	7	16	0	26	0	NS	NS	0	NS	NS	6	NS	NS	59	NS	NS	0	NS	2	31	18	0	9	54			
HHMW-07I	45.0 - 55.0	**	1	0	NS	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS											
HHMW-07D	115.0 - 125.0	**	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS												
HHMW-08S	2.0 - 12.0	**	181	14	0	28	116	58	72	58	0	0	34	78	0	NS	NS	NS	NS	NS	0	NS	NS	0	NS	NS	0	NS	0	0	0	0	0	2			
HHMW-08I	35.0 - 45.0	**	0	10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS												
HHMW-11S/11SR	3.0 - 13.0	*	*	63	79	130	88	80	98	49	79	0	97	82	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
HHMW-11I	31.0 - 41.0	*	*	82	0	0	0	0	0	0	0	0	0	0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS			
HHMW-19S1	3.0 - 8.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	5	1355	1495	0	4	97	10	210	184	31	0	82	178	619	1004	949	758	616	1,172	828		
HHMW-19S2	15.0 - 25.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	310	27	0	3	20	1	24	145	0	0	25	0	0	0	49	37	0	94	90		
HHMW-20S1	4.0 - 9.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	49	112	136	NS	0	27	48	28	0	111	65	36	0	154	154							
HHMW-20S2/20S2R	15.0 - 25.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	2	2	1	NS	NS	NS	NS	NS	NS	107	0	4	0	0	0	0	0	0	0	0		
HHMW-21S1	3.0 - 8.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	0	0	NS	NS	NS	NS	NS	NS	0	NS	0	NS	0	0	0	0	0	0	0		
HHMW-21S2	15.0 - 25.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	0	0	NS	NS	NS	NS	NS	NS	0	0	NS	NS	0	0	0	0	0	0	NS		
Sidegradient Groundwater Monitoring Wells																																					
HHMW-22S1	4.0 - 9.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾			
HHMW-22S2	15.0 - 25.0	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	0	NS	NS	NS	0	0	0	NS	1	0	0

Table 3-6. Summary of Historical Total PAH Results
Halesite Former MGP Site
Annual Groundwater Monitoring and Operations, Maintenance & Monitoring Report

Well No.	Screen Interval (feet)	Total PAH Concentrations (µg/L)														Total PAH Concentrations (µg/L)										Pre-operational Period			Operational Period						
		Sampling Date														Sampling Date										Min	Max	Mean	Min	Max	Mean				
		2012				2013				2014			2015			2016		2017		2018		2019		2020								2021		2022	
		Jan	Apr	July	Oct/Nov	Jan	Apr	July	Oct/Nov	Jan	Apr	Sept	Mar	Aug/Sept	Mar	Aug/Sept/Oct	Mar	Sept	Mar	Aug	Mar	Sept	Feb	Sept	Mar							Sept	Feb	Aug	
Downgradient Groundwater Monitoring Wells																																			
HHMW-06S1	2.5 - 7.5	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	1	0	0	1	0	
HHMW-06S2	12.0 - 22.0	0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	374	45	0	45	10		
HHMW-06I	35.0 - 45.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	0	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾		
HHMW-07S1	3.0 - 8.0	15	31	29	27	63	46	82	31	123	100	55	56	23	196	11	0	4.99	NS ⁽¹⁾	45.7	NS ⁽¹⁾	0	NS ⁽¹⁾	2	NS ⁽¹⁾	0	NS	NS	0	1,688	427	0	285	50	
HHMW-07S2	16.0 - 26.0	0	70	77	64	0	38	49	43	50	61	14	NS	7	NS ⁽¹⁾	16	NS ⁽¹⁾	NS ⁽¹⁾	0	111	18	0	77	29											
HHMW-07I	45.0 - 55.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	1	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾		
HHMW-07D	115.0 - 125.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	0	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾		
HHMW-08S	2.0 - 12.0	0	0	0	0	0	0	0	0	21	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	0	181	53	0	21	1											
HHMW-08I	35.0 - 45.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	10	5	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾		
HHMW-11S/11SR	3.0 - 13.0	43	30	31	35	34	33	28	30	36	35	58	51	76	NS ⁽¹⁾	32.3	8	17.43	NS ⁽¹⁾	8.5	NS ⁽¹⁾	9.1	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	130	77	4	76	37		
HHMW-11I	31.0 - 41.0	0	0	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	0	82	7	0	0	0			
HHMW-19S1	3.0 - 8.0	776	528	753	774	3732	921	663	1072	859	738	829	499	1198	909	347	321	358.3	218.1	241.16	137.91	9.1	22.1	26.2	45.73	28.9	33	15	5	5	5	0	3,732	558	
HHMW-19S2	15.0 - 25.0	0	57	72	92	62	3	58	98	82	119	53	50	14	NS ⁽¹⁾	49	NS ⁽¹⁾	0	0	0	0	310	50												
HHMW-20S1	4.0 - 9.0	0	79	124	87	37	28	69	68	19	13	36	5	31	4	7	NS ⁽¹⁾	NS ⁽¹⁾	4.04	8.2	NS ⁽¹⁾	9.9	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	49	49	49	0	154	48		
HHMW-20S2/20S2R	15.0 - 25.0	0	0	1	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	2	2	2	0	107	4											
HHMW-21S1	3.0 - 8.0	0	0	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	0	0	0	0	0	0												
HHMW-21S2	15.0 - 25.0	0	0	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	0	0	0												
Sidegradient Groundwater Monitoring Wells																																			
HHMW-22S1	4.0 - 9.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS ⁽¹⁾	NS	1,510	NS ⁽²⁾	NS ⁽²⁾	NS ⁽²⁾	1510	1,510	1510		
HHMW-22S2	15.0 - 25.0	0	0	0	0	0	0	0	0	0	0	0	NS	0	NS ⁽¹⁾	0	NS ⁽¹⁾	NS ⁽¹⁾	0	0	0	0	1	0											

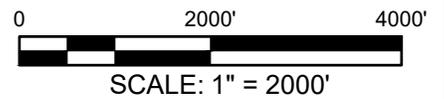
General Notes:
µg/L = Micrograms per liter
PAH = Polycyclic Aromatic Hydrocarbons
MGP = Manufactured Gas Plant
Monitoring wells HHMW-16S1, HHMW-16S2, HHMW-17S1, and HHMW-17S2 sampled on March 2, 2010 were included in the February monthly results.
⁽¹⁾: Monitoring well abandoned
⁽²⁾: Monitoring well not sampled due to the presence of DNAPL
* = Well constructed in 2003
** = Well constructed in 2001
*** = Well constructed in October 2005
**** = Well constructed in 2009
NS = Not sampled
DNAPL = Dense Non-Aqueous Phase Liquid

Figures



SOURCE:

MAP CREATED WITH THE FOLLOWING 7.5-MINUTE SERIES USGS TOPOGRAPHIC MAPS: LLOYD HARBOR, NY-CT QUADRANGLE, 2019 AND HUNTINGTON, NY, 2019 ([www.https://ngmdb.usgs.gov/topoview/viewer/](https://ngmdb.usgs.gov/topoview/viewer/)).



Halesite Former MGP Site
Halesite, New York

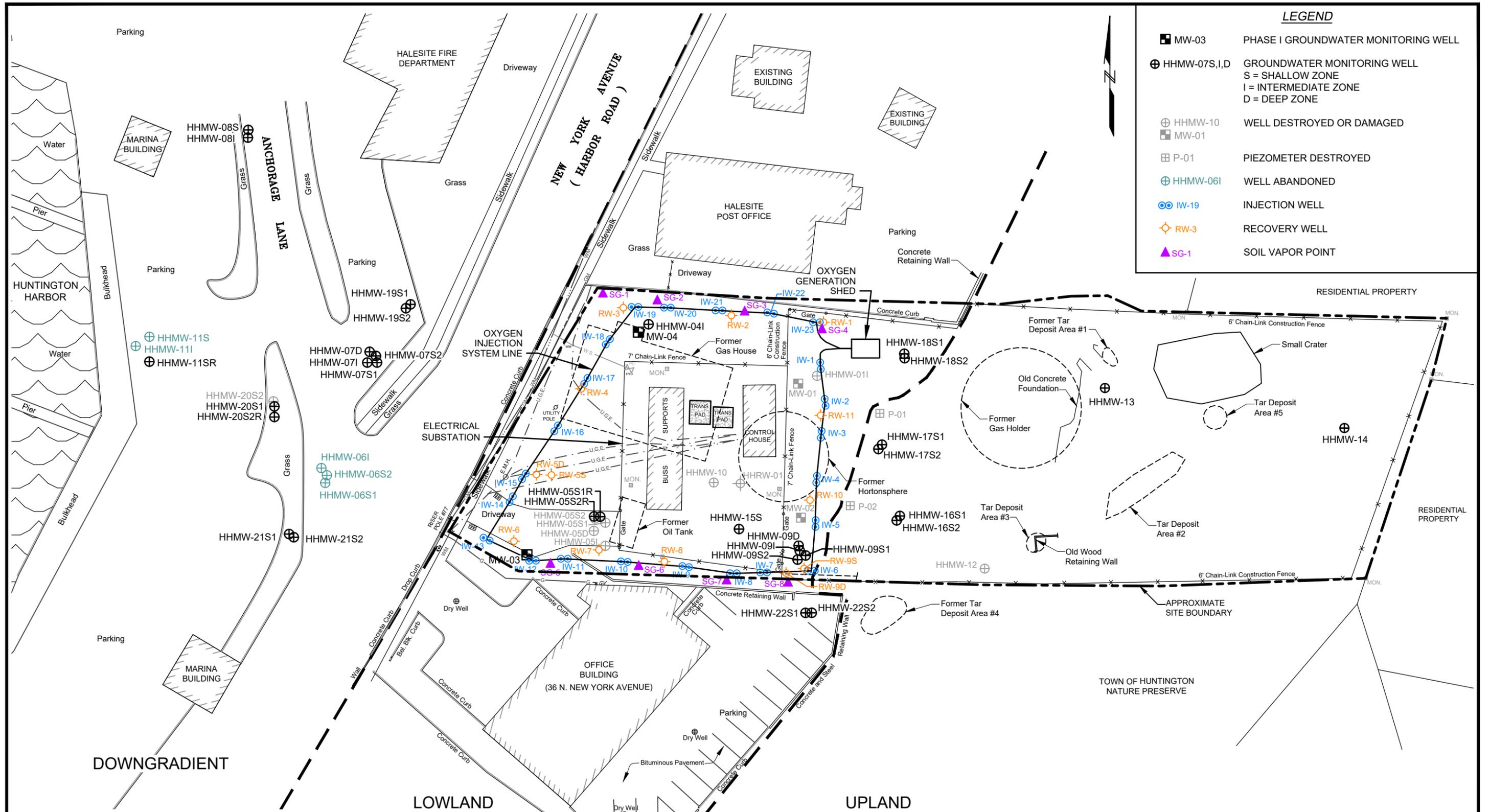


SITE LOCATION MAP

Project 1905774

January 2023

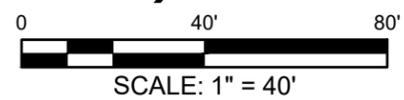
Fig. 1



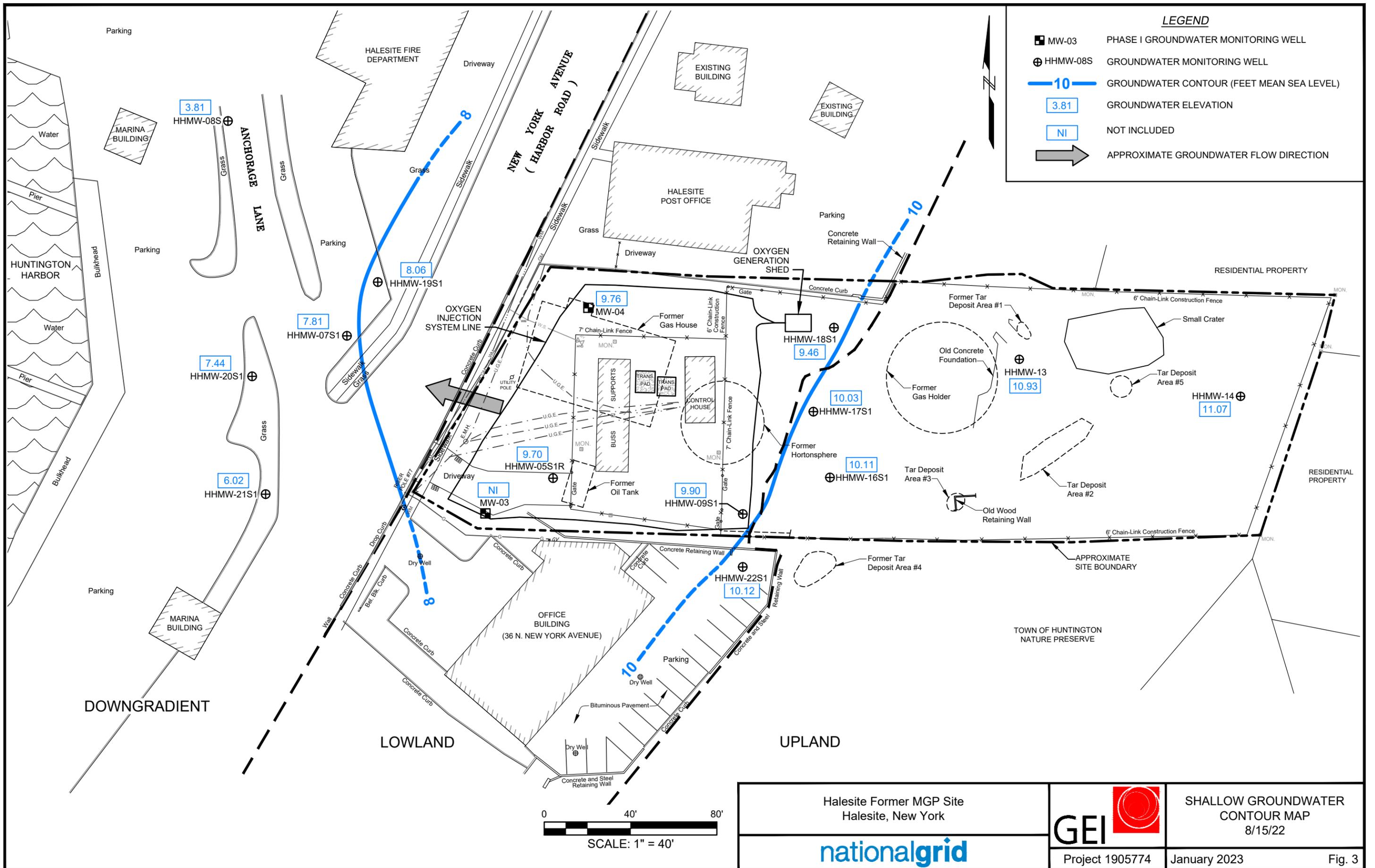
LEGEND

	MW-03	PHASE I GROUNDWATER MONITORING WELL
	HHMW-07S, I, D	GROUNDWATER MONITORING WELL S = SHALLOW ZONE I = INTERMEDIATE ZONE D = DEEP ZONE
	HHMW-10	WELL DESTROYED OR DAMAGED
	MW-01	PIEZOMETER DESTROYED
	HHMW-06I	WELL ABANDONED
	IW-19	INJECTION WELL
	RW-3	RECOVERY WELL
	SG-1	SOIL VAPOR POINT

- SOURCES:**
1. DRAWING TITLED *FINAL REMEDIAL INVESTIGATION HALESITE FORMER MGP SITE*, SCALE: 1"=30', DATED NOVEMBER 2003, PREPARED BY VANASSE HANGEN BRUSTLIN, INC., MIDDLETOWN, CONNECTICUT.
 2. DRAWING TITLED AS *CONSTRUCTED PLAN OF PROPERTY NOW OR FORMERLY OF LIPA SITUATED AT HALESITE TOWN OF HUNTINGTON, SUFFOLK COUNTY, NEW YORK, S.C.T.M. DISTRICT 0400 SECTION 31 BLOCK 02 LOT 21*, SCALE: 1"=20', DATED NOV. 14, 2008, REVISED 07/09/09, PREPARED BY NELSON & POPE, MELVILLE, N.Y.
 3. DRAWING TITLED AS *CONSTRUCTED PLAN OF PROPERTY AS DESCRIBED IN DEED/LIBER 12511; PAGE 573 (ALSO KNOWN AS P/O LOT 18 "MAP OF KETEWOMOKE") SITUATED AT HALESITE TOWN OF HUNTINGTON, SUFFOLK COUNTY, NEW YORK, S.C.T.M. DISTRICT 0400 SECTION 31 BLOCK 02 LOT 21*, SCALE: 1"=30', DATED JULY 14, 2008, UPDATED 05/06/09, PREPARED BY NELSON & POPE, MELVILLE, N.Y.



Halesite Former MGP Site Halesite, New York			OXYGEN INJECTION SYSTEM, MONITORING WELL, RECOVERY WELL AND SOIL VAPOR POINT LOCATION MAP



LEGEND

	MW-03	PHASE I GROUNDWATER MONITORING WELL
	HHMW-08S	GROUNDWATER MONITORING WELL
	10	GROUNDWATER CONTOUR (FEET MEAN SEA LEVEL)
	3.81	GROUNDWATER ELEVATION
	NI	NOT INCLUDED
		APPROXIMATE GROUNDWATER FLOW DIRECTION

Halesite Former MGP Site
Halesite, New York

Project 1905774

SHALLOW GROUNDWATER
CONTOUR MAP
8/15/22

January 2023

Fig. 3

Appendix A

Oxygen Injection System OM&M Data

Operational Days	Oxygen Injected Per Month
Month 1 Jul-22	31
Month 2 Aug-22	31
Month 3 Sep-22	30

Total Operational Days Jul. - Sept. 2022 92
Total Oxygen injected during this period (lbs) 11,496
Weight of Oxygen Injected through Q2 2022 (lbs) 539,374
Running total of Injected Oxygen (lbs) 550,870

Notes:

SCFH (M) = Measured flow rate
SCFH (C*) = Flow rate converted for oxygen (Flow meters are calibrated for air)
CF/D (V) = Volume of oxygen injected per day
PSI (M) = Measured pressure
PSIa (P) = Pressure converted to atmospheric pressure.
n = PV/RT = Mass of Oxygen (lbs)
Temperature = Degrees Rankine
R = Individual Gas Constant = 48.24 ft/T
1 lb-mole of oxygen=32 lbm

System Operating Specs

Total of 6 injection banks
Oxygen is injected for 13 minutes during each injection cycle
Each Injection bank operates for 4 injection cycles per day
Each injection point injects oxygen for 52 min per day (13 min per cycle * 4 Cycles)

Example

Bank 1 starts at 7AM

Bank 1 finishes injection at 7:13AM
System is recharging 7:13AM to 8:00AM
System is recharging 8:13AM to 9:00AM
Bank 3 starts injection at 9:00AM
Bank 3 finishes injection at 9:13AM
System is recharging from 9:13AM to 10:00AM
Bank 4 starts injection at 10:00AM
Bank 4 Finishes injection at 10:13AM
System is recharging from 10:13AM to 11:00PM
Bank 5 starts injection at 11:00AM

Bank 5 finishes injection at 11:13AM
System is recharging from 11:13AM to 12:00PM
Bank 6 starts injection at 12:00PM
System is recharging from 12:13PM to 1:00PM
(Keep repeating cycle for course of day)

		7/15/2022						8/31/2022						9/27/2022											
		O2%						87.8						88.5						94.0					
		R						48.24						48.24						48.24					
		Temp R (T)						637						654						639					
		System Hours																							
	Depth	SCFH (M)	SCFH (C*)	CF/D (V)	PSI (M)	PSIa (P)	n=PV/RT lbs O2	SCFH (M)	SCFH (C*)	CF/D (V)	PSI (M)	PSIa (P)	n=PV/RT lbs O2	SCFH (M)	SCFH (C*)	CF/D (V)	PSI (M)	PSIa (P)	n=PV/RT lbs O2						
Injection Bank 1	Point 1D	32	30	32.627	28.277	7.5	22.2	2.583	24	26.102	22.622	7.5	22.2	2.029	40	43.503	37.703	7.5	22.2	3.675					
	Point 1	24	32	32.784	28.413	5.0	19.7	2.303	30	30.735	26.637	5.0	19.7	2.120	30	30.735	26.637	5.0	19.7	2.304					
	Point 2D	27	32	35.578	30.834	8.5	23.2	2.943	30	32.627	28.277	7.5	22.2	2.536	30	33.354	28.907	8.5	23.2	2.945					
	Point 2	20	33	33.809	29.301	5.0	19.7	2.375	24	24.274	21.038	4.5	19.2	1.632	40	40.981	35.516	5.0	19.7	3.072					
	Point 3D	30	35	38.913	33.725	8.5	23.2	3.219	25	27.189	23.564	7.5	22.2	2.113	41	45.090	39.078	8.0	22.7	3.895					
	Point 3	23	35	35.858	31.077	5.0	19.7	2.519	24	24.588	21.310	5.0	19.7	1.696	42	43.030	37.292	5.0	19.7	3.226					
	Point 4D	30	34	36.978	32.047	7.5	22.2	2.927	25	26.882	23.297	7.0	21.7	2.042	43	46.766	40.530	7.5	22.2	3.951					
	Point 4	23	36	36.411	31.557	4.5	19.2	2.493	25	25.286	21.914	4.5	19.2	1.700	42	43.030	37.292	5.0	19.7	3.226					
Total Oxygen Injected per Day (lbs)		21.362						15.866						26.295											
Injection Bank 2	Point 5	23	30	30.343	26.297	4.5	19.2	2.077	32	31.942	27.683	4.0	18.7	2.091	32	32.366	28.050	4.5	19.2	2.365					
	Point 5D	30	31	34.093	29.547	8.0	22.7	2.760	26	28.594	24.781	8.0	22.7	2.272	40	43.990	38.125	8.0	22.7	3.800					
	Point 6D	29	31	33.333	28.889	7.0	21.7	2.579	30	32.258	27.957	7.0	21.7	2.451	40	43.010	37.276	7.0	21.7	3.552					
	Point 6	22	32	31.942	27.683	4.0	18.7	2.130	26	25.952	22.492	4.0	18.7	1.699	42	41.923	36.333	4.0	18.7	2.984					
	Point 7D	28	34	37.392	32.406	8.0	22.7	3.027	27	29.693	25.734	8.0	22.7	2.360	45	49.489	42.891	8.0	22.7	4.275					
	Point 7	22	30	29.945	25.952	4.0	18.7	1.997	30	29.945	25.952	4.0	18.7	1.960	32	31.942	27.683	4.0	18.7	2.273					
	Point 8D	30	30	32.993	28.594	8.0	22.7	2.671	32	35.192	30.500	8.0	22.7	2.797	32	35.192	30.500	8.0	22.7	3.040					
	Point 8	22	31	31.354	27.174	4.5	19.2	2.147	26	26.297	22.791	4.5	19.2	1.768	42	43.030	37.292	5.0	19.7	3.226					
Total Oxygen Injected per Day (lbs)		19.387						17.397						25.515											
Injection Bank 3	Point 9D	30	30	34.065	29.523	9.5	24.2	2.940	32	36.336	31.492	9.5	24.2	3.078	35	39.743	34.444	9.5	24.2	3.660					
	Point 9	21	34	34.389	29.803	4.5	19.2	2.354	26	25.952	22.492	4.0	18.7	1.699	40	40.457	35.063	4.5	19.2	2.956					
	Point 10	22	34	33.938	29.413	4.0	18.7	2.263	29	28.947	25.087	4.0	18.7	1.895	40	40.457	35.063	4.5	19.2	2.956					
	Point 10D	30	34	37.801	32.761	8.5	23.2	3.127	26	28.594	24.781	8.0	22.7	2.272	40	44.472	38.543	8.5	23.2	3.927					
	Point 11D	25	36	39.153	33.932	7.5	22.2	3.099	27	29.365	25.449	7.5	22.2	2.282	40	43.990	38.125	8.0	22.7	3.800					
	Point 11	17	37	36.435	31.577	3.5	18.2	2.365	28	27.573	23.896	3.5	18.2	1.757	40	39.927	34.603	4.0	18.7	2.841					
	Point 12D	24	34	37.392	32.406	8.0	22.7	3.027	30	32.993	28.594	8.0	22.7	2.622	40	43.990	38.125	8.0	22.7	3.800					
	Point 12	16	35	35.400	30.680	4.5	19.2	2.424	27	27.309	23.667	4.5	19.2	1.836	41	41.469	35.939	4.5	19.2	3.030					
Total Oxygen Injected per Day (lbs)		21.599						17.441						26.971											
Injection Bank 4	Point 13D	23	27	29.693	25.734	8.0	22.7	2.404	36	39.591	34.312	8.0	22.7	3.146	35	38.492	33.359	8.0	22.7	3.325					
	Point 13	16	36	36.411	31.557	4.5	19.2	2.493	25	25.286	21.914	4.5	19.2	1.700	38	38.434	33.310	4.5	19.2	2.808					
	Point 14	15	49	50.834	44.056	5.5	20.2	3.662	47	48.759	42.258	5.5	20.2	3.448	58	60.171	52.148	5.5	20.2	4.626					
	Point 14D	20	33	35.890	31.105	7.5	22.2	2.841	28	30.452	26.392	7.5	22.2	2.367	37	40.240	34.875	7.5	22.2	3.400					
	Point 15D	19	39	41.449	35.923	6.5	21.2	3.133	26	27.633	23.948	6.5	21.2	2.051	40	43.010	37.276	7.0	21.7	3.552					
	Point 15	14	48	49.797	43.157	5.5	20.2	3.587	46	47.722	41.359	5.5	20.2	3.375	55	57.059	49.451	5.5	20.2	4.386					
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Total Oxygen Injected per Day (lbs)		18.119						16.086						22.097											
Injection Bank 5	Point 16D	14	31	35.201	30.507	9.5	24.2	3.038	28	31.794	27.555	9.5	24.2	2.694	36	40.878	35.428	9.5	24.2	3.765					
	Point 16	8	48	46.614	40.398	3.0	17.7	2.942	44	42.729	37.032	3.0	17.7	2.648	10	9.847	8.534	3.5	18.2	0.682					
	Point 17	13	45	45.514	39.446	4.5	19.2	3.116	50	50.571	43.829	4.5	19.2	3.399	50	50.571	43.829	4.5	19.2	3.695					
	Point 17D	18	31	33.715	29.220	7.5	22.2	2.669	27	29.032	25.161	7.0	21.7	2.206	40	43.010	37.276	7.0	21.7	3.552					
	Point 18D	25	30	32.627	28.277	7.5	22.2	2.583	28	30.107	26.093	7.0	21.7	2.287	34	36.978	32.047	7.5	22.2	3.124					
	Point 18	19	44	44.503	38.569	4.5	19.2	3.047	44	43.920	38.064	4.0	18.7	2.875	53	52.903	45.849	4.0	18.7	3.765					
	Point 19	19	43	43.491	37.693	4.5	19.2	2.978	42	42.480	36.816	4.5	19.2	2.855	50	50.571	43.829	4.5	19.2	3.695					
	Point 19D	25	29	31.183	27.025	7.0	21.7	2.413	27	29.032	25.161	7.0	21.7	2.206	37	39.785	34.480	7.0	21.7	3.286					
Total Oxygen Injected per Day (lbs)		22.785						21.169						25.564											
Injection Bank 6	Point 20D	25	36	38.709	33.548	7.0	21.7	2.995	25	26.255	22.754	6.0	20.7	1.903	40	43.010	37.276	7.0	21.7	3.552					
	Point 20	19	54	53.901	46.714	4.0	18.7	3.594	49	48.252	41.819	3.5	18.2	3.074	58	57.894	50.175	4.0	18.7	4.120					
	Point 21	20	35	35.858	31.077	5.0	19.7	2.519	27	27.309	23.667	4.5	19.2	1.836	38	38.932	33.741	5.0	19.7	2.919					
	Point 21D	29	36	39.153	33.932	7.5	22.2	3.099	23	24.154	20.934	6.0	20.7	1.750	40	43.503	37.703	7.5	22.2	3.675					
	Point 22	22	36	36.411	31.557	4.5	19.2	2.493	22	22.251	19.285	4.5	19.2	1.496	40	40.457	35.063	4.5	19.2	2.956					
	Point 22D	28	37	40.691	35.266	8.0	22.7	3.294	34	34.833	30.189	5.0	19.7	2.402	34	37.392	32.406	8.0	22.7	3.230					
	Point 23	18	36	36.882	31.965	5.0	19.7	2.591	20	20.490	17.758	5.0	19.7	1.413	39	40.460	35.065	5.5	20.2	3.110					
	Point 23D	29	37	41.578	36.034	9.0	23.7	3.514	26	27.305	23.664	6.0	20.7	1.979	38	42.701	37.008	9.0	23.7	3.851					
Total Oxygen Injected per Day (lbs)		20.585						13.874						23.563											
System Total Per Day (lbs)		123.84						101.83						150.01											