ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

Quarterly Operation, Maintenance, and Monitoring Report for the Bethpage Park Groundwater Containment System

June 2014

Operable Unit 3 (Former Grumman Settling Ponds)
Bethpage, New York

NYSDEC ID # 1-30-003A

ARCADIS

Ahren Tatro
Environmental Engineering Specialist

Paul Martorano, PE 088403
Project Engineer

Christopher Engler, PE 069748
Principal Engineer

Quarterly Operation, Maintenance, and Monitoring Report for the Bethpage Park Groundwater Containment System

June 2014

Operable Unit 3 (Former Grumman Settling Ponds)
Bethpage, New York

NYSDEC ID# 1-30-003A

Prepared for:
Northrop Grumman Systems Corporation

Prepared by:
ARCADIS of New York, Inc.
Two Huntington Quadrangle
Suite 1S10
Melville
New York 11747
Tel 631 249 7600
Fax 631 249 7610

Our Ref.:
NY001496.114I.OMMI4

Date:
August 29, 2014

ARCADIS

Table of Contents

Tables

Figures

Appendices

Quarterly Operation, Maintenance, and Monitoring Report Bethpage Park Groundwater Containment System

June 2014

1. Introduction

Pursuant to the Administrative Order on Consent (AOC) Index # W1-0018-04-01 (NYSDEC 2005) and the Operable Unit 3 (OU3) Record of Decision (ROD) (NYSDEC 2013), ARCADIS of New York, Inc. (ARCADIS), on behalf of Northrop Grumman Systems Corporation (Northrop Grumman), has prepared this OU3 Bethpage Park Groundwater Containment System (BPGWCS) Quarterly Operation, Maintenance, and Monitoring (OM&M) Report for submittal to the New York State Department of Environmental Conservation (NYSDEC). The present-day Bethpage Community Park property (Park) and the Former Grumman Plant 24 Access Road, which the NYSDEC has termed the "Former Grumman Settling Ponds Area" and designated as OU3, are referred to herein as the Site Area. A Site Area Location map is provided as Figure 1.

The BPGWCS (previously referred to as the Groundwater Interim Remedial Measure) has been operational since July 21, 2009. This quarterly OM&M report summarizes the OM&M activities performed during the second quarter of 2014 (i.e., April 1 through June 30, 2014 [the "reporting period"]). During this reporting period, Remedial System and Environmental Effectiveness Monitoring Programs were conducted in accordance with the NYSDEC-approved OU3 Groundwater Interim Remedial Measure (IRM) OM&M Manual (OM&M Manual) (ARCADIS 2009) and the remedial well maintenance program described in the 2011 Annual Report (ARCADIS 2012).

As discussed in the OU3 Site Area Remedial Investigation Report (Site Area RI) (ARCADIS 2011), Northrop Grumman does not take responsibility for certain compounds (e.g., Freon 12 and Freon 22) present in the Site Area groundwater. Throughout this report, a distinction is made between the "Project" and "Non-Project" Volatile Organic Compounds (VOCs), defined as follows:

- "Project VOCs:" VOCs that may be related to former Northrop Grumman historical activities. For this report, Project VOCs include 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene (PCE); trichloroethene (TCE); vinyl chloride (VC); cis-1,2-dichloroethene (cis-1,2-DCE); trans-1,2-dichloroethene; benzene; toluene; and total xylenes.

- "Non-Project VOCs:" VOCs, such as Freon 12 and Freon 22 that are understood to be unrelated to former Northrop Grumman activities but have been detected in the Site Area groundwater. As noted in the Site Area RI (ARCADIS 2011), a sub-plume of Freon 22 has been identified originating from the area of the Town of Oyster Bay's (Town's) former ice rink (shown on Figure 2). Based on Town

information (Zervos 2007), Freon 22 was used by the Town and released to the environment.

2. Bethpage Park Groundwater Containment System Objectives

The remedial action objectives (RAOs) for the BPGWCS are as follows:

- Mitigate the off-site migration of project-related, dissolved-phase VOCs. Specifically, the BPGWCS addresses:
  - Groundwater that has total volatile organic compound (TVOC) concentrations greater than 5 micrograms per liter (µg/L) in the upper 20 feet of the surficial aquifer across the 1,200-foot wide lateral extent of the Site Area southern boundary.
  - Groundwater below the upper 20 feet of the surficial aquifer that has TVOC concentrations greater than 50 µg/L across the 1,200-foot wide lateral extent of the Site Area southern boundary.
- Comply with applicable NYSDEC standards, criteria, and guidance values (SCGs) for treated water and air emissions.

A secondary benefit of the BPGWCS is the creation of a clean-water front atop the downgradient groundwater, which minimizes the potential for vapor intrusion downgradient of the Site Area.

3. Bethpage Park Groundwater Containment System Description

The BPGWCS consists of:

- A “pump-and-treat system” where groundwater is:
  - Extracted along the Plant 24 Access Road via four remedial wells
  - Conveyed to a treatment plant at McKay Field via four underground pipelines
  - Treated via air stripping to reduce concentrations of Project and Non-Project VOCs

  - Filtered to remove oxidized metals
  - Returned to the aquifer via a discharge pipeline routed to a recharge basin located on the adjacent former Bethpage Navy Weapons Industrial Reserve Plant (NWIRP) property

- A vapor phase treatment system that reduces concentrations of Project VOCs in the air stripper off-gas prior to discharge to the atmosphere

- A groundwater monitoring network that is periodically monitored to assess the environmental effectiveness of the BPGWCS

The major components of the BPGWCS are:

- Four remedial wells (RW-1, RW-2, RW-3, and RW-4) with design pumping rates of 30 gallons per minute (gpm), 75 gpm, 75 gpm, and 30 gpm, respectively; for a total design influent flow rate of 210 gpm

- One low-profile air stripper to remove VOCs from the extracted groundwater prior to discharge to the recharge basins

- Two bag filter units configured so that one is “operational” and the other is in “standby” mode. The system control logic automatically switches from the “operational” filter unit to the “standby” filter unit when the bag filter is full to prevent a system shutdown and the spent filters are then replaced.

- Four emission control units (ECUs), two containing vapor phase granular activated carbon (VPGAC) and two containing potassium permanganate-impregnated zeolite (PPZ). The VPGAC ECUs treat the Project VOCs in the air stripper off-gas, except for vinyl chloride, which is treated by the PPZ ECUs.

- The groundwater monitoring network, consisting of 35 monitoring locations including 17 groundwater monitoring wells, 4 remedial wells, and 14 piezometers

Additional information is provided in the OM&M Manual (ARCADIS 2009). The layout of the BPGWCS is shown on Figure 2, and a schematic drawing is provided on Figure 3. The groundwater sampling locations that form the groundwater monitoring network are shown on Figure 4. Construction details for the monitoring wells and piezometers are provided in Appendix A.

4. Operation and Maintenance Activities

The BPGWCS operated continuously, at either full or reduced flow, during the reporting period with the exception of shutdown periods for routine maintenance and alarm conditions. BPGWCS operation and maintenance (O&M) activities conducted during the reporting period are described below and summarized in Table 1:

- The BPGWCS operated at full or reduced capacity 83 out of 91 days (91% uptime).

- Based on the groundwater volume recorded at the remedial well flow meters, the remedial wells operated at average flow rates of 27 gpm (RW-1), 63 gpm (RW-2), 68 gpm (RW-3) and 27 gpm (RW-4). The observed average flow rates for all remedial wells were lower than their design flow rates due to approximately eight days of downtime for the rehabilitation of RW-2 as well as alarm related treatment system down time. The observed average flow rate for Remedial Well RW-2 was lower than RW-3 by 5 gpm, due to an additional four days of downtime for rehabilitation.

- The remedial wells operated at reduced instantaneous flow rates (between 96% and 99% of design) during portions of the reporting period due to iron buildup in the pumps, influent pipelines, and valves. The reduced flow rates were corrected by adjusting the manifold globe valves.

- The system was monitored through either site visits or remotely by wireless computer link-up.

- The Supervisory Control and Data Acquisition (SCADA) system operated as designed, and when conditions warranted (see below), shut the system down automatically and instantaneously, and notified plant operators of system advisories and alarms.

- Intentional system shutdowns were as follows (see Table 1 for more information):

  - Electrical maintenance and gasket replacement at GAC-501 (April 29, 2014)

  - Remedial Well RW-2 full mechanical redevelopment utilizing carbon dioxide and pump and motor replacement (May 19 through 23, 2014 and May 27 through 30, 2014)

- System shutdowns due to alarm conditions were as follows (see Table 1 for more information):

  - Bag filter differential high pressure (April 27, 2014): Problem: Multiple bag filter changes; Solution: The bag filters were changed and the system was restarted.

  - Remedial Well RW-3 low manifold pressure (June 27, 2014): Problem: The manifold pressure declined due to iron buildup in the pump, influent pipeline, and valve; Solution: The alarm set point was decreased to account for decreasing pump performance and the manifold valve was adjusted.

5. Treatment System Compliance and Performance Monitoring

5.1 System Monitoring Activities

The following compliance and performance monitoring activities were conducted during this reporting period (see Appendix B, Table B-1 for a summary of the compliance and performance monitoring program requirements):

- Three sampling events to collect required water samples and air samples

- Thirteen weekly site visits to monitor and record key system operational parameters

The system operation and monitoring results are summarized in the following tables, graphs, and appendices:

- An Operational Summary, including monitoring events, system operational days, and noteworthy site activities (Table 1)

- Summary of Influent and Effluent Water Sample Analytical Results (Tables 2 and 3, respectively). Table 3 also provides the BPGWCS treatment system removal efficiency. Complete validated Water Sample Analytical Result Summaries for each sampling event are included in Appendix B.

- Summary of Influent and Effluent Vapor Sample Analytical Results (Tables 4 and 5, respectively). Table 5 also provides the BPGWCS treatment system removal

efficiency. Complete, validated Vapor Sample Analytical Results, for each sample event, are included in Appendix C.

- System Parameters including flow rates, line pressures, and temperatures (Table 6).

- Summaries of Groundwater Recovered, VOC Mass Recovered, and VOC Recovery Rates (Table 7). Table 7 provides a breakdown of these parameters by Remedial Well and System and also breaks down the VOC Mass Recovered and VOC Recovery Rates into Project, Non-Project, and Total VOCs.

- Air Discharge Quality Evaluation and Compliance Table (Appendix D and Table 8, respectively)

- Concentrations of VOCs and Metals in Remedial Well Groundwater Samples (Tables 9 and 10, respectively)

- Cumulative Total, Project, and Non-Project VOC Mass Removed (Figure 5)

- Remedial Well Total, Project, and Non-Project VOC Concentrations (Figures 6A, 6B, and 6C, respectively)

- Influent Total, Project, and Non-Project VOC Concentrations (Figure 7)

- Total, Project, and Non-Project VOC Mass Recovery Rates (Figures 8A, 8B, and 8C, respectively)

5.2 Summary of OM&M Results and Conclusions

5.2.1 System Operation and Effectiveness

BPGWCS OM&M reporting period results and conclusions are summarized below:

- Total volume of groundwater recovered and treated (Table 7):
  - Second quarter 2014: 25.7 million gallons
  - Cumulative total since system startup: 509 million gallons

- Total VOC mass recovered (Table 7 and Figure 5):
  - Second quarter 2014: 27 pounds (lbs) of VOCs.
  - Cumulative total since system startup: 2,022 lbs of VOCs.
- VOC mass recovered and mass removal rates (Table 7 and Figures 8A, 8B, and 8C):
  - The majority of VOCs recovered during this reporting period were Project VOCs (78% or 21 lbs).
  - The majority of Project VOCs are recovered by RW-2 (96.7%) and RW-3 (2.9%).
  - The majority of the Non-Project VOCs are recovered by RW-3 (54%) and RW-4 (40%).
- Treatment system influent concentrations (Table 2 and Figures 6A, 6B, 6C and 7):
  - Project VOC influent concentrations, which ranged from 61 to 105 µg/L during the reporting period, are consistent with historical values, but are well below the recent peak concentration observed in 2013 (206 µg/L). Project VOC influent concentrations have generally decreased since 2010.
  - Non-Project VOC influent concentrations, which ranged from 18 to 23 µg/L during the reporting period, are consistent with historical values, but are below the recent peak concentration observed in 2013 (86 µg/L). Non-Project VOC influent concentrations have generally decreased since 2010.
  - Total iron was detected at an unusually high concentration of 26,300 µg/L in the influent sample collected on May 5, 2014. This increased concentration was likely due to iron precipitates in the sample tap. Total iron detected in the treatment system effluent sample collected on the same date was 280 µg/L, which is below the total iron discharge limit of 600 µg/L (Table 3).
  - Mercury has not been detected in an influent sample since system startup.

- Project VOCs in Remedial Wells RW-1, RW-3, and RW-4 (Table 9) were not detected during this reporting period above applicable SCGs, while several Project VOCs (cis-1,2-DCE, toluene, TCE, VC and xylene-m,p) continue to be detected above applicable SCGs. Similar to the total influent concentrations, Project VOC remedial well concentrations have generally decreased since 2010.

- Non-Project VOCs in all remedial wells (Table 9) were not detected during this reporting period above applicable SCGs. Similar to the total influent concentrations, Non-Project VOC remedial well concentrations have generally decreased since 2010.

- Metals concentrations in the remedial wells during this reporting period (Table 10) are consistent with historical metals concentrations.

- The air stripper, air stripper off-gas treatment system, and bag filter system performed within acceptable operating ranges for this reporting period, as indicated by:

  - The air stripper VOC removal efficiency was greater than 99.9 percent for Project and Non-Project VOCs (Table 3).

  - Both the water and air discharges complied with applicable SCGs and discharge limits (Tables 3, 5, and 8).

5.2.2 Regulatory Status of Discharges

5.2.2.1 Air Discharge

To determine the compliance status of air discharge from the BPGWCS treatment system, the system's effluent vapor concentrations were compared to NYSDEC Division of Air Resources Air Guide-1 (DAR-1) Model Short-term Guideline Concentrations (SGCs [NYSDEC 2014]; Table 5) and the effluent vapor laboratory results were compared to a site-specific modeled annual maximum allowable stack concentration (MASC). The annual MASC was calculated during each monitoring event for individual compounds using the output from the U.S. Environmental Protection Agency (USEPA) SCREEN3 Model in conjunction with the NYSDEC DAR-1 Annual Guideline Concentrations (AGCs). A scaling factor was calculated using the SCREEN3 model with site-specific physical layout information (e.g., building dimensions, stack height, terrain) and operating data (e.g., air flow rate, temperature)

inputs for each monitoring event. The scaling factor was then used to adjust (scale) the NYSDEC DAR-1 AGC to a site-specific MASC. A summary of the instantaneous percent (i.e., not time-weighted) of the site-specific annual MASC for detected Project and Non-Project VOCs is provided in Table 8. A summary of the cumulative annual percent (i.e., time-weighted) of the site-specific MASC is also provided in Table 8. A summary of the model inputs, outputs, and backup calculations is provided in Appendix D.

The BPGWCS air effluent met NYSDEC requirements throughout the reporting period, as indicated by the following:

- The measured concentrations of individual VOCs in the vapor effluent did not exceed applicable SGCs (Table 5).

- The measured concentration of individual VOCs in the vapor effluent did not exceed their applicable, instantaneous MASCs, as calculated using the USEPA SCREEN 3 Model (Table 8). Similarly, the time-weighted rolling averages for the individual detected Project and Non-Project VOCs are below their respective MASCs.

5.2.2.2 Water Discharge

The BPGWCS treated water effluent met NYSDEC regulatory requirements during the reporting period (Table 3 and Appendix B), as indicated by the following:

- The measured concentration of individual VOCs in the treated water effluent were below applicable discharge limits, per the interim State Pollutant Discharge Elimination System (SPDES) equivalency permit.

- The measured concentration of total iron and total mercury in the treated water effluent were below applicable discharge limits, per the interim SPDES equivalency permit. In addition, total mercury continues to be non-detect and has not been detected in any treated water effluent sample since system startup.

6. Environmental Effectiveness Monitoring

BPGWCS environmental effectiveness (i.e., hydraulic monitoring and groundwater quality monitoring) activities and results for this reporting period are discussed below.

6.1 Hydraulic Monitoring

6.1.1 Activities

In accordance with the OM&M Manual requirements and methodologies (ARCADIS 2009), a quarterly round of groundwater hydraulic monitoring was performed during the reporting period. Specifically, depth-to-water measurements were made on June 3, 2014 at the 33 locations forming the approved monitoring well network (Table 11 and Figure 4). Water-level data were mapped and hydraulic gradients were calculated as part of the evaluation of the hydraulic performance of the BPGWCS (Table 12).

6.1.2 Results

Figure 4 provides the configuration of the shallow potentiometric surface and the inferred horizontal groundwater flow directions on June 3, 2014 at the Site Area. The water table was approximately one foot lower in the second quarter of 2014 compared to the second quarter of 2013. Figure 4 indicates that groundwater under the Park is being drawn toward the remedial wells.

Vertical hydraulic gradients were also evaluated. The vertical hydraulic gradient is a measure of the potential for vertical groundwater flow between two vertically separated, closely spaced observation points (i.e., clustered or nested observation wells). The magnitude of the gradient indicates the steepness of the gradient, and the sign of the gradient indicates the direction of potential vertical flow (i.e., a positive vertical gradient indicates upward flow, while a negative vertical gradient indicates downward groundwater flow). The gradient does not provide information with respect to the rate of groundwater movement, which is affected by the hydraulic conductivity of the aquifer material through which the water is moving. Table 12 provides a summary of calculated vertical groundwater hydraulic gradients at key well pairs located along the Site Area southern boundary during the June 3, 2014 hydraulic groundwater monitoring event. The vertical hydraulic gradients generally indicate that shallow groundwater is moving downward and deeper groundwater is being drawn upward towards the remedial well screened intervals.

Figure 9 provides a cross-sectional view of vertical groundwater flow (based on groundwater levels measured on June 3, 2014), combined with a cross-section of Project VOC concentrations in groundwater above 5 µg/L (based on results from the May-June 2013 groundwater sampling round). Figure 9 indicates that groundwater containing Project VOCs above 5 µg/L is being drawn toward the remedial well screens

of RW-1 through RW-4, which is consistent with the vertical groundwater hydraulic gradient observations.

Figure 9, in combination with Figure 4, indicate that the BPGWCS is providing effective vertical and horizontal hydraulic control of groundwater containing Project VOC concentrations above 5 µg/L; therefore, the BPGWCS is accomplishing its primary remedial action objective.

6.2 Groundwater Quality Monitoring

6.2.1 Activities

Consistent with the OM&M Manual (ARCADIS 2009), groundwater quality monitoring was not required during this reporting period.

6.2.2 Results

Historical groundwater quality data are summarized on the following tables:

- Table 13 summarizes the results of laboratory analysis of VOCs in groundwater samples collected from the groundwater network wells to date.
- Table 14 summarizes the results of laboratory analysis of metals in groundwater samples collected from the groundwater network wells to date.

When an appropriate amount of data has been collected, trend graphs will be developed for selected wells.

6.3 Environmental Effectiveness Monitoring Conclusions

Collectively, Figures 4 and 9 indicate that the BPGWCS is operating as designed, that the expected capture zone has developed, and that off-site migration of groundwater containing Project VOC concentrations greater than 5 µg/L is being prevented.

7. Recommendations

- Remove mercury from the SPDES equivalency monitoring program because mercury has not been detected in any system effluent water sample analyzed for mercury.

- Continue operating, maintaining, and monitoring the system in accordance with the OM&M Manual (ARCADIS 2009) including the current quarterly preventive maintenance program performed at Remedial Wells RW-2 and RW-3 to remove iron buildup in the wells and pipelines.

- Based on the consistent operation of the BPGWCS since July 2009, the current quarterly reporting frequency should be reduced to annual. Consistent with the NYSDEC-approved OU3 Groundwater IRM OM&M Manual (ARCADIS 2009), an annual report will be prepared to summarize system operation, performance, and monitoring data; this annual report will be prepared and submitted under the supervision of a licensed, professional engineer. Additionally, pertinent data collected for the BPGWCS will be submitted to the NYSDEC as part of the semi-annual progress reports currently completed in accordance with Section III of AOC Index #W1-0018-04-01. Upon receipt of NYSDEC approval of this recommendation, the OU3 Groundwater IRM OM&M Manual (ARCADIS 2009) will be updated to reflect this change.

8. References

ARCADIS of New York, Inc. (ARCADIS). 2009. Interim Operation, Maintenance, and Monitoring Manual, Northrop Grumman Groundwater Interim Remedial Measure, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. December 2009.

ARCADIS U.S. Inc. (ARCADIS). 2011. Remedial Investigation Report (Site Area). Operable Unit 3 – Former Grumman Settling Ponds, Bethpage, New York. NYSDEC Site #1-30-003A. February 8, 2011.

ARCADIS U.S. Inc. (ARCADIS). 2012. Operation, Maintenance, and Monitoring Report for the Groundwater Interim Remedial Measure, 2011 Annual Summary Report. Operable Unit 3 – Former Grumman Settling Ponds, Bethpage, New York. NYSDEC Site # 1-30-003A. March 23, 2012.

ARCADIS U.S. Inc. (ARCADIS). 2014. Bethpage Park Containment System - Pre-Design Hydraulic Effectiveness Evaluation Work Plan. Operable Unit 3 – Former Grumman Settling Ponds, Bethpage, New York. February 11, 2014.

New York State Department of Environmental Conservation (NYSDEC). 2005. Order on Consent, Index # W1-0018-04-01, Site # 1-30-003A, July 4, 2005.

NYSDEC. 2009. Interim State Pollution Discharge Elimination System (SPDES) Letter, March 19, 2009.

NYSDEC. 2012. Re: Northrop Grumman-Bethpage, Nassau County, Oyster Bay (T), NYSDEC Site No. 1-30-003A-OU3, August 1, 2012.

NYSDEC. 2013. Record of Decision, Northrop Grumman – Bethpage Facility, Operable Unit Number: 03, State Superfund Project, Bethpage, Nassau County, Site No. 130003A, March 29, 2013.

NYSDEC. 2014. DAR-1 AGC/SGC Tables, Revised February 28, 2014.

Zervos, Theodore. 2007. Deposition of Theodore Zervos in the matter Town of Oyster Bay v. Northrop Grumman Systems Corporation et al. Case No. 05-CV-1945 (TCP)(AKT). January 22, 2007.

Tables

Table 1. Operational Summary, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

MONTH	DAY																													Days Operational (1)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
2009 Total																																160
2010 Total																																352
2011 Total																																351
2012 Total																																353
2013 Total																																354
Jan-14				b	(2)	(3)	(4)b		(5)											#/##							(6)			(7)bbbbb	b	29
Feb-14	b				b					b		(8)				b		#/##/*		(9)b						b						28
Mar-14					b					(10)#/##**	b					b				b					b	(11)b		b		b		31
Apr-14						b		#/##			b					b		b					b		b	(12)	b	(13)	b			30
May-14			b		#/##/*/**			b			b			b				b	(14)								(15)			bb			23
Jun-14	b			b					b					b				b	#/##					b			(16)b						30
2Q 2014																																83
2014 Total																																171
TOTAL																																**1,741**

Legend:

	Indicates system online for at least the majority of the day.
	Indicates system operated with reduced flow rates.
	Indicates system off-line for at least the majority of the day.
#	Indicates water compliance samples were collected.
##	Indicates water performance samples were collected.
**	Indicates vapor compliance samples were collected.
*	Indicates vapor performance samples were collected.
b	Indicates filter bag unit changed over.
K	Indicates PPZ change-out.
C	Indicates carbon change-out.

Acronyms\Key:

BF	Bag Filter
gpm	gallons per minute
PPZ	potassium permanganate-impregnated zeolite

Table 1. Operational Summary, Bethpage Park Groundwater Containment System, Operable Unit 3
(Former Grumman Settling Ponds), Bethpage, New York.

Notes:

(1) Days in which the system was operational for the majority of the day are counted as one day.

First Quarter 2014

(2) The system shut down at 1:15 am on January 5, 2014 due to a motor overload at Remedial Well RW-2. The motor was unable to be restarted at RW-2 and the system was restarted without RW-2 at 10:30 am on January 5, 2014. The system was offline for approximately 9 hours.

(3) The system shut down at 2:40 am on January 6, 2014 due to a motor overload at Remedial Well RW-3. The motor was unable to be restarted at RW-3 and the system was restarted without RW-2 and RW-3 at 10:00 am on January 6, 2014. The system was offline for approximately 6.5 hours.

(4) The system shut down at 5:20 am on January 7, 2014 due to an air stripper high sump level. The building temperature was just above freezing with ambient temperatures in the single digits. A system restart was attempted at 6:42 am but the system continued to shutdown. The system was left offline and temporary heaters were used to raise the building temperature. At 4:57 pm, the building was sufficiently heated and a system restart was attempted. It was noted that the transfer pump P-400 was only discharging 30 gpm at 60 Hertz. The system continued to shutdown and it was determined that the transfer pump would need to be replaced. The transfer pump was replaced with a spare pump and the system was restarted at 4:00 pm on January 8, 2014. The system was offline for approximately 34.5 hours.

(5) The system shut down at 9:42 pm on January 8, 2014 due to a building sump high level. The system was left offline overnight. On the following day, it was determined that a hose to the bag filter differential pressure switch leaked and lead to the building sump high level. The water was pumped down, the hose repaired and the system was restarted without RW-2 and RW-3 at 9:15 am on January 9, 2014. The system was offline for approximately 11.5 hours.

(6) The system shut down at 1:01 am on January 27, 2014 due to an air stripper high sump level. The system was restarted without RW-2 and RW-3 at 8:27 am on the same day. The system was offline for approximately 7.5 hours.

(7) The system was shut down at 3:45 pm on January 30, 2014 to modify the HDPE drop pipe and install new pumps and motors at Remedial Wells RW-2 and RW-3. The system was restarted and shut down multiple times due to rapid bag filter changes. The system was restarted at 6:36 pm on the same day and was offline for approximately 3 hours.

(8) The system was shut down at 11:13 am on February 12, 2014 for preventative maintenance and to install new bag filter influent gate valves. The system was restarted at 5:45 pm on the same day and was offline for approximately 6.5 hours.

(9) The system was shut down at 1:09 pm on February 21, 2014 for alarm testing and was restarted at 4:46 pm on the same day. The system was offline for approximately 3.5 hours.

(10) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.

(11) The system shut down at 11:49 am on March 27, 2014 due to a low manifold pressure at Remedial Well RW-3. The system was restarted at 2:16 pm on the same day and was offline for approximately 2.5 hours.

Second Quarter 2014

(12) The system shut down at 6:22 pm on April 27, 2014 due to a bag filter differential high pressure alarm resulting from multiple bag filter changes. The alarm was cleared, both of the bag filters changed and the system restarted at 9:19 am on April 28, 2014. The system was offline for approximately 17 hours.

(13) The system was shut down at 3:36 pm on April 29, 2014 to install new gaskets at GAC-501 and adjust electric controls. The system was restarted at 5:47 pm on the same day and was offline for approximately 2.2 hours.

(14) The system was shut down at 9:14 am on May 19, 2014 for mechanical redevelopment utilizing carbon dioxide at Remedial Well RW-2. The system was restarted without RW-2 at 10:47 am on May 23, 2014. The system was offline for approximately 97.5 hours.

Table 1. Operational Summary, Bethpage Park Groundwater Containment System, Operable Unit 3
(Former Grumman Settling Ponds), Bethpage, New York.

Notes continued:

(15) The system was shut down at 8:47 am on May 27, 2014 to continue mechanical redevelopment utilizing carbon dioxide at Remedial Well RW-2. The system was restarted at 4:45 pm on May 30, 2014. The system was offline for approximately 80 hours.

(16) The system shut down at 12:59 pm on June 27, 2014 due to a low manifold pressure at Remedial Well RW-3. There was no apparent cause for the alarm. The system was restarted at 2:32 pm on the same day and was offline for approximately 1.5 hours.

ARCADIS

Table 2. Summary of Influent Water Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

Compound [2]	07/01/13 (µg/L)	08/05/13 (µg/L)	09/03/13 (µg/L)	10/07/13 (µg/L)	11/14/13 (µg/L)	12/09/13 (µg/L)	01/20/14 (µg/L)	02/18/14 (µg/L)	03/10/14 (µg/L)	04/08/14 (µg/L)	05/05/14 (µg/L)	06/19/14 (µg/L)
Project VOCs												
1,1,1 - Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethane	0.46	0.41	0.41	0.41	0.45	0.30	0.30	0.36	0.37	0.36	0.37	0.57
1,2 - Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethene	0.24	0.23	0.20	ND	ND	0.20	ND	ND	0.26	0.26	ND	0.30
Tetrachloroethene	0.35	0.27	0.33	0.34	0.35	0.34	0.48	0.24	0.22	0.36	0.41	0.28
Trichloroethene	**5.3**	**5.7**	4.8	**5.3**	4.8	4.2	0.66	4.0	4.0	4.5	3.9	4.6
Vinyl Chloride	**22**	**25**	**22**	**29**	**23**	**21**	ND	**24**	**22**	22	**18**	**32**
cis 1,2-Dichloroethene	**31**	**33**	**30**	**30**	**26**	**26**	0.31	**30**	**23**	**26**	**24**	**32**
trans 1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	**22**	**20**	**21**	**24**	**22**	**22**	ND	**22**	**24**	20	**13**	**31**
Xylenes	1.7	2.1	2.3	2.9	2.5	2.5	ND	2.5	2.5	2.2	1.7	4.1
Subtotal Project VOCs	**83**	**87**	**81**	**92**	**79**	**77**	**1.8**	**83**	**76**	**76**	**61**	**105**
Non-Project VOCs												
Dichlorodifluoromethane (Freon 12)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodifluoromethane (Freon 22)	**44**	**41**	**35**	**35**	**30**	**37**	**55**	**23**	**24**	**23**	**19**	**18**
Subtotal Non-Project VOCs	**44**	**41**	**35**	**35**	**30**	**37**	**55**	**23**	**24**	**23**	**19**	**18**
Total VOCs [3]	**127**	**128**	**116**	**127**	**109**	**114**	**57**	**106**	**100**	**99**	**80**	**123**
Inorganics												
Total Iron	**520**	**1,030**	**350**	**710**	**570**	**240**	**660**	**270**	**5,020**	**350**	**26,300**	**380**
Total Mercury	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
pH [4]	5.6	6.6	5.4	5.4	5.5	5.3	5.3	5.5	5.9	6.0	6.0	5.4

See notes on last page.

Table 2. Summary of Influent Water Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Water samples collected by ARCADIS on the dates shown and submitted to ALS Environmental for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3, for iron analyses per USEPA Method 6010C and for mercury analyses per USEPA Method 7470A. The VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009). Influent water samples were collected from Water Sampling Port-5 (WSP-5); refer to Figure 3 of this OM&M Report for the schematic location of WSP-5. Data in this table corresponds to approximately the past year of system operation.

(2) Only VOCs associated with the interim SPDES equivalency program, plus Toluene, Benzene, Xylenes, non-project related Freon 12 and Freon 22, Mercury and Iron are included in this table. Complete VOC and inorganic data summary tables, including VOC TICs, are provided in Appendix B. Laboratory data qualifiers are included in the Appendix B tables.

(3) "Total VOCs" represents the sum of individual concentrations of the compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

(4) Influent pH samples collected and measured in the field by ARCADIS personnel on the dates listed using an Oakton Model 300 pH/conductivity meter. pH units are standard units.

Acronyms\Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
ASP	Analytcial Services Protocol
IRM	Interim remedial measure.
NA	Not analyzed.
ND	Analyte not detected at, or above its laboratory quantification limit.
NYSDEC	New York State Department of Environmental Conservation.
OM&M	Operation, maintenance and monitoring.
SPDES	State Pollutant Discharge Elimination System
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
µg/L	Micrograms per liter.

ARCADIS

Table 3. Summary of Effluent Water Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

Compound [2]	Discharge Limit [3] (µg/L)	07/01/13 (µg/L)	08/06/13 (µg/L)	09/03/13 (µg/L)	10/07/13 (µg/L)	11/14/13 (µg/L)	12/09/13 (µg/L)	01/20/14 (µg/L)	02/18/14 (µg/L)	03/10/14 (µg/L)	04/08/14 (µg/L)	05/05/14 (µg/L)	06/19/14 (µg/L)
Project VOCs													
1,1,1 - Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2 - Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 - Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis 1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans 1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Subtotal Project VOCs	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Project VOCs													
Dichlorodifluoromethane (Freon 12)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodifluoromethane (Freon 22)	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Subtotal Non-Project VOCs	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total VOCs [4]	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Treatment Efficiency [5]	--	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%
Inorganics													
Total Iron	600	**220**	**390**	**350**	**540**	**360**	**270**	**430**	**250**	**330**	**260**	**280**	**520**
Total Mercury	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH [6]	5.5 - 8.5	5.9	5.7	6.7	6.8	6.5	6.6	5.5	6.3	6.8	6.3	7.3	7.4

See notes on last page.

Table 3. Summary of Effluent Water Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Water samples collected by ARCADIS on the dates shown and submitted to ALS Environmental for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3, for iron analyses per USEPA Method 6010C and for mercury analyses per USEPA Method 7470A. The VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009). Effluent water samples were collected from Water Sampling Port-7 (WSP-7); refer to Figure 3 of this OM&M Report for the location of WSP-7. Data in this table corresponds to approximately the past year of system operation.

(2) Only VOCs associated with the interim SPDES equivalency program, including Toluene, Benzene, Xylenes, non-project related Freon 12 and Freon 22, Mercury and Iron are included in this table. Complete VOC and inorganic data summary tables, including VOC TICs, are provided in Appendix B. Laboratory data qualifiers are included in the Appendix B tables.

(3) Discharge limits per the interim SPDES equivalency program or Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) Quality Standards and Guidance Values and Groundwater Effluent Limitations, if the compound is not part of the interim SPDES equivalency program.

(4) "Total VOCs" represents the sum of individual concentrations of compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

(5) Treatment efficiency was calculated by dividing the difference between the influent and effluent total VOC concentrations by the influent total VOC concentration.

(6) Effluent pH samples collected and measured in the field by ARCADIS personnel on the dates listed using an Oakton Model 300 pH/conductivity meter. pH units are standard units.

Acronyms\Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
ASP	Analytical Services Protocol.
IRM	Interim remedial measure.
ND	Analyte not detected at, or above its laboratory quantification limit.
NYSDEC	New York State Department of Environmental Conservation.
OM&M	Operation, maintenance, and monitoring.
SPDES	State Pollutant Discharge Elimination System
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
µg/L	Micrograms per liter.
--	Not applicable.

ARCADIS

Table 4. Summary of Influent Vapor Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

Compound [2]	7/1/2013 (µg/m^3)	11/14/2013 (µg/m^3)	2/18/2014 (µg/m^3)	5/5/2014 (µg/m^3)
Project VOCs				
1,1,1 - Trichloroethane	ND	**1.0**	**0.95**	**0.90**
1,1 - Dichloroethane	**6.8**	**5.4**	**5.8**	**5.4**
1,2 - Dichloroethane	ND	ND	ND	ND
1,1 - Dichloroethene	**3.2**	**2.0**	**3.1**	**3.6**
Tetrachloroethene	**4.3**	**3.6**	**4.2**	**3.6**
Trichloroethene	**78**	**66**	**62**	**62**
Vinyl Chloride	**290**	**320**	**360**	**350**
cis 1,2-Dichloroethene	**570**	**470**	**530**	**480**
trans 1,2-Dichloroethene	ND	ND	ND	ND
Benzene	ND	**1.9**	**1.1**	ND
Toluene	**380**	**370**	**400**	**310**
Xylenes	**41**	**41**	**51**	**37**
Subtotal Project VOCs	**1,373**	**1,281**	**1,418**	**1,253**
Non-Project VOCs				
Dichlorodifluoromethane (Freon 12)	**2.6**	**2.4**	**2.6**	**2.3**
Chlorodifluoromethane (Freon 22)	**540**	**400**	**290**	**140**
Subtotal Non-Project VOCs	**543**	**402**	**293**	**142**
Total VOCs [3]	**1,916**	**1,683**	**1,711**	**1,395**

See notes on last page.

Table 4. Summary of Influent Vapor Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Vapor samples collected by ARCADIS on the dates shown and submitted to ALS Environmental for VOC analyses per Modified USEPA Method T0-15. A VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009). Influent samples were collected at Vapor Sampling Port-1 (VSP-1); refer to Figure 3 of this OM&M Report for the location of VSP-1. Data in this table corresponds to approximately the past year of system operation.

(2) Only VOCs that are associated with the interim SPDES equivalency program, Toluene, Benzene, Xylenes, and non-project related Freon 12 and Freon 22 are included in this table. Complete VOC summary tables, including VOC TICs, are provided in Appendix C. Laboratory data qualifiers are included in the Appendix C tables.

(3) "Total VOCs" represents the sum of individual concentrations of compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

(4) The data for the April 2013 influent sample is "estimated" because the summa cannister's vacuum was lower than laboratory protocols allow for proper quantification.

Acronyms\Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
IRM	Interim remedial measure.
ND	Analyte not detected at or above its laboratory reporting limit.
OM&M	Operation, maintenance, and monitoring.
SPDES	State Pollutant Discharge Elimination System
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
µg/m^3	Micrograms per cubic meter.

Table 5. Summary of Effluent Vapor Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

Compound [2]	Discharge Limit [3] ($\mu g/m^3$)	7/1/2013 ($\mu g/m^3$)	11/14/2013 ($\mu g/m^3$)	3/10/2014[9] ($\mu g/m^3$)	5/5/2014 ($\mu g/m^3$)
Project VOCs					
1,1,1 - Trichloroethane	9,000	ND	ND	ND	ND
1,1 - Dichloroethane	NS	**1.6**	**1.4**	**5.7**	**4.3**
1,2 - Dichloroethane	NS	ND	ND	ND	ND
1,1 - Dichloroethene	380 [4]	ND	ND	**0.77**	ND
Tetrachloroethene	1,000	ND	ND	ND	ND
Trichloroethene	14,000	**2.0**	ND	**2.3**	**1.1**
Vinyl Chloride	180,000	**50**	**2.6**	**14**	**4.7**
cis 1,2-Dichloroethene	190,000 [5]	**25**	**4.6**	**58**	**17**
trans 1,2-Dichloroethene	NS	ND	ND	ND	ND
Benzene	1,300	**1.7**	**0.91**	ND	ND
Toluene	37,000	**20**	**19**	**33**	**17**
Xylenes	4,300	ND	ND	**2.5**	ND
Subtotal Project VOCs	NA	**100**	**29**	**116**	**44**
Non-Project VOCs					
Dichlorodifluoromethane (Freon 12)	NS	**2.7**	**2.5**	**2.8**	**2.4**
Chlorodifluoromethane (Freon 22)	NS	**520**	**400**	**110**	**93**
Subtotal Non-Project VOCs	NA	**523**	**403**	**113**	**95**
Total VOCs [6]	NA	**623**	**431**	**229**	**140**
Treatment Efficiency (Total VOCs) [7]	NA	**67.5%**	**74.4%**	**86.6%**	**90.0%**
Treatment Efficiency (Project VOCs) [8]	NA	**92.7%**	**97.8%**	**91.8%**	**96.5%**

See notes on last page.

Table 5. Summary of Effluent Vapor Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Vapor samples collected by ARCADIS on the dates shown and submitted to ALS Environmental for VOC analyses per Modified USEPA Method T0-15. A VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009). Effluent samples were collected at Vapor Sampling Port-5 (VSP-5); refer to Figure 3 of this OM&M Report for the location of VSP-5. Data in this tables corresponds to approximately the past year of system operation.

(2) Only VOCs that are associated with the interim SPDES equivalency program, Toluene, Benzene, Xylenes, and non-project related Freon 12 and Freon 22 are included in this table. Complete VOC summary tables, including VOC TICs, are provided in Appendix C. Laboratory data qualifiers are included in the Appendix C tables.

(3) Discharge limit is compound-specific SGC per the NYSDEC DAR-1 AGC/SGC tables revised Februaury 28, 2014.

(4) An SGC was not provided in the DAR-1 AGC/SGC Tables, dated February 28, 2014. An interim SGC was developed based on guidance of the New York State DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants, 1991 edition. Specifically for 1,1- dichloroethene, which is not defined as provided in Section IV.A.2.b.1 a high-toxicity compound, the Interim SGC = (smaller of Time Weighted Average [TWA] - Threshold Limit Value or TWA - Recommended Exposure Limit)/4.2. or 1,600 µg/m^3 / 4.2 = approximately 380 µg/m^3. An interim SGC was developed for this compound because it has a moderate toxicity rating, as specified in the DAR-1 AGC/SGC Tables, dated February 28, 2014.

(5) An SGC was not provided in the DAR-1 AGC/SGC Tables, dated February 28, 2014. An interim SGC was developed based on guidance provided in Section IV.A.2.b.1 of the New York State DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants, 1991 edition. Specifically for cis-1,2 dichloroethene, which is not defined as a high-toxicity compound, the interim SGC = (smaller of Time Weighted Average [TWA] - Threshold Limit Value or TWA - Recommended Exposure Limit)/4.2 or 790,000 µg/m^3 / 4.2 = approximately 190,000 µg/m^3. An interim SGC was developed for this compound because it has a moderate toxicity rating, as specified in the DAR-1 AGC/SGC Tables, dated February 28, 2014.

(6) "Total VOCs" represents the sum of individual concentrations of all compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

(7) Treatment efficiency was calculated by dividing the difference between the influent and effluent Total VOC concentrations by the influent Total VOC concentration. Treatment efficiency is only calculated when there is a corresponding influent sample.

(8) Treatment efficiency was calculated by dividing the difference between the influent and effluent total Project VOC concentrations by the influent total Project VOC concentration. Treatment efficiency is only calculated when there is a corresponding influent sample.

(9) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.

Acronyms\Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
AGC	Annual guideline concentration.
DAR-1	Division of Air Resources Air Guidance-1
IRM	Interim remedial measure.
NA	Not applicable.
ND	Analyte not detected at or above its laboratory reporting limit.
NS	Guideline concentrations not specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007. An interim SGC was not developed for these compounds because they have low toxicity ratings in the NYSDEC DAR-1
NYSDEC	New York State Department of Environmental Conservation.
OM&M	Operation, maintenance, and monitoring.
SGC	Short-term Guidance Concentration
SPDES	State Pollutant Discharge Elimination System
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
µg/m^3	Micrograms per cubic meter.

Table 6. Summary of System Parameters, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Date [1]	Water Flow Rates						Water Pressures [2]					Air Flow Rate [2]	Air Pressures [5]					Air Temp. [5]
	Remedial Well [2]				Combined Influent [3]	Effluent [2]	Remedial Well Effluent [4]				Effluent	Effluent	ECU Influents				Effluent	Effluent
	RW-1 (gpm)	RW-2 (gpm)	RW-3 (gpm)	RW-4 (gpm)	(gpm)	(gpm)	RW-1 (psi)	RW-2 (psi)	RW-3 (psi)	RW-4 (psi)	(psi)	(scfm)	GAC-501 (iwc)	GAC-502 (iwc)	PPZ-601 (iwc)	PPZ-602 (iwc)	(iwc)	(^{o}R)
07/01/13	31.2	74.9	82.6	31.3	220	229	58	20	37	57	9	2,003	5.5	6.5	2.0	1.0	0.0	534
08/05/13	33.6	82.5	81.2	31.6	229	248	56	24	38	57	9	2,029	9.0	10.0	6.5	5.0	0.0	532
09/03/13	31.3	78.4	79.4	31.3	220	250	58	22	37	57	10	1,998	9.0	10.0	6.0	4.5	0.0	540
10/07/13	34.0	75.0	78.5	31.8	220	246	55	20	37	56	9	1,868	8.4	9.0	5.5	4.5	0.0	536
11/14/13	30.4	81.2	76.5	30.3	218	259	57	26	42	57	8.5[6]	1,970	8.5[6]	9.5[6]	6.0[6]	4.5[6]	0.0[6]	530[6]
12/09/13	30.8	78.0	77.0	30.3	216	251	57	24	40	57	9	1,941	8.5	9.5	5.5	4.5	0.0	530
01/20/14	30.3	0.0	0.0	30.2	60	71	58	0.0	0.0	57	6	2,070	9.5	10.8	6.5	5.0	0.0	527
02/18/14	30.9	83.0	84.4	29.6	228	239	57	50	47	57	9	2,013	6.5	7.7	6.0	4.5	0.0	514
03/10/14	30.6	74.9	84.8	30.4	221	252	57	59	41	56	8	1,974	6.5	7.5	5.8	4.4	0.0	531
04/08/14	30.4	75.6	80.6	30.4	217	247	58	49	44	56	11	1,947	6.5	7.5	5.7	4.4	0.0	534
05/05/14	29.7	74.6	79.8	30.2	214	246	58	46	40	57	11	1,963	6.8	7.8	6.0	4.6	0.0	539
06/19/14	29.6	74.5	74.8	30.0	209	204	59	54	49	57	9	1,992	7.6[7]	8.7[7]	6.7[7]	5.1[7]	0.0[7]	540[7]

See notes on last page.

Table 6. Summary of System Parameters, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

(1) Operational data collected by ARCADIS on days noted. Parameters listed were typically recorded during compliance monitoring events. Data in this table correspond to approximately the past year of system operation.
(2) Instantaneous parameters obtained from the SCADA HMI: Water Flow Rate, Water Pressure, Air Flow Rate.
(3) Combined influent water-flow rate is the sum of individual well flow rates via the SCADA System.
(4) Remedial Well effluent pressure readings measured at the influent manifold within the treatment system building.
(5) Instantaneous values from field-mounted instruments
(6) Values collected on November 11, 2013 during weekly site visit. No values collected on day of sampling.
(7) Values collected on June 17, 2014 during weekly site visit. No values collected on day of sampling.

Acronyms\Key:

ECU	Emission control unit.
gpm	Gallons per minute.
HMI	Human-machine interface.
iwc	Inches of water column.
psi	Pounds per square inch.
^{o}R	Degrees Rankine.
SCADA	Supervisory Control and Data Acquisition
scfm	Standard cubic feet per minute.
Temp.	Temperature.

Table 7. Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Operating Period [1]	Volume of Groundwater Recovered (x1,000 gal) [2]					VOC Mass Recovered (lbs) [3]															VOC Mass Recovery Rate (lbs/day) [4]													
						Total VOCs [5]					Project VOCs [6]					Non-Project VOCs [7]					Total VOCs [5]					Project VOCs [6]					Non-Project VOCs [7]				
	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total
System Pilot Test, Shakedown and Startup Totals [8]																																		
	137	270	251	150	808	NA	NA	NA	NA	1.1	NA	NA	NA	NA	1.0	NA	NA	NA	NA	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2009 Totals																																		
07/21/09 - 12/30/09	6,592	13,838	16,445	6,574	43,449	0.17	275	53	14	342	0.17	273	19	0.20	293	<0.01	0.56	35	13	48	<0.01	1.7	0.33	0.086	2.1	<0.01	1.7	0.12	<0.01	1.8	<0.01	<0.01	0.22	0.080	0.30
2010 Totals																																		
12/30/09 - 01/05/11	15,726	35,127	38,160	15,689	104,702	0.56	172	412	89	672	0.56	171	28	0.10	200	<0.01	0.17	383	89	469	<0.01	0.46	1.1	0.24	1.8	<0.01	0.46	0.075	<0.01	0.54	<0.01	<0.01	1.0	0.24	1.3
2011 Totals																																		
01/05/11 - 01/09/12	15,218	36,570	37,682	15,196	104,666	0.36	167	271	78	516	0.36	167	35	0.09	203	<0.01	1.1	236	78	314	<0.01	0.45	0.73	0.21	1.4	<0.01	0.45	0.095	<0.01	0.55	<0.01	<0.01	0.64	0.21	0.85
2012 Totals																																		
01/09/12 - 01/07/13	15,260	35,178	36,111	15,336	101,885	0.28	114	113	40	267	0.25	113	12	0.39	126	<0.01	1.5	101	40	141	<0.01	0.31	0.31	0.11	0.73	<0.01	0.31	0.032	<0.01	0.35	<0.01	<0.01	0.28	0.11	0.39
2013 Totals																																		
01/07/13 - 01/06/14	15,968	37,514	36,622	16,036	106,140	0.14	111	41	18	171	0.14	110	4.3	0.36	113	<0.01	1.6	37	18	57	<0.01	0.30	0.11	0.050	0.47	<0.01	0.30	0.012	<0.01	0.31	<0.01	<0.01	0.10	0.049	0.16
January 2014 through March 2014 Totals																																		
01/06/14 - 02/01/14	1,090	176	197	1,090	2,553	<0.01	0.50	0.095	0.77	1.4	<0.01	0.50	0.014	0.021	0.54	<0.01	<0.01	0.080	0.75	0.83	<0.01	0.019	<0.01	0.030	0.054	<0.01	0.019	<0.01	<0.01	0.021	<0.01	<0.01	<0.01	0.029	0.032
02/01/14 - 03/01/14	1,270	3,174	3,390	1,270	9,104	<0.01	9.1	1.6	0.90	12	<0.01	8.9	0.25	0.024	9.2	<0.01	0.16	1.4	0.87	2.4	<0.01	0.33	0.057	0.032	0.43	<0.01	0.32	<0.01	<0.01	0.33	<0.01	<0.01	0.050	0.031	0.086
03/01/14 - 04/01/14	1,421	3,553	3,850	1,421	10,245	<0.01	10	1.8	1.0	13	<0.01	10	0.28	0.027	10	<0.01	0.18	1.6	0.98	2.8	<0.01	0.32	0.058	0.032	0.42	<0.01	0.32	<0.01	<0.01	0.32	<0.01	<0.01	0.052	0.032	0.090
Subtotal Jan - Mar 2013 [10]	3,781	6,903	7,437	3,781	21,902	0.021	20	3.5	2.7	26	0.021	19	0.54	0.072	20	<0.01	0.34	3.1	2.6	6.0	<0.01	0.24	0.041	0.031	0.31	<0.01	0.22	<0.01	<0.01	0.24	<0.01	<0.01	0.036	0.031	0.071
April 2014 through June 2014 Totals																																		
04/01/14 - 05/01/14	1,348	3,371	3,371	1,348	9,438	<0.01	7.8	1.3	0.79	9.9	<0.01	7.7	0.23	0.025	8.0	<0.01	0.12	1.1	0.77	2.0	<0.01	0.26	0.044	0.026	0.33	<0.01	0.26	<0.01	<0.01	0.27	<0.01	<0.01	0.037	0.026	0.067
05/01/14 - 06/01/14	1,086	2,265	2,530	1,086	6,967	<0.01	5.2	1.0	0.64	6.8	<0.01	5.1	0.17	0.020	5.3	<0.01	0.079	0.82	0.62	1.5	<0.01	0.17	0.032	0.021	0.22	<0.01	0.16	<0.01	<0.01	0.17	<0.01	<0.01	0.026	0.020	0.048
06/01/14 - 07/01/14	1,379	3,446	3,117	1,379	9,321	<0.01	7.9	1.2	0.81	9.9	<0.01	7.8	0.21	0.026	8.0	<0.01	0.12	1.0	0.79	1.9	<0.01	0.26	0.040	0.027	0.33	<0.01	0.26	<0.01	<0.01	0.27	<0.01	<0.01	0.033	0.026	0.063
Subtotal April - June 2014 [11]	3,813	9,082	9,018	3,813	25,726	0.020	21	3.5	2.2	27	0.020	20.6	0.61	0.071	21	<0.01	0.32	2.9	2.2	5.4	<0.01	0.23	0.039	0.025	0.30	<0.01	0.23	<0.01	<0.01	0.23	<0.01	<0.01	0.032	0.024	0.059
2014 Totals [12]	7,594	15,985	16,455	7,594	47,628	0.041	41	7.0	4.9	53	0.041	40	1.2	0.14	41	<0.01	0.66	6.0	4.8	11	<0.01	0.23	0.040	0.028	0.30	<0.01	0.23	<0.01	<0.01	0.23	<0.01	<0.01	0.034	0.027	0.063
Total [13]	76,495	174,482	181,726	76,575	509,278	1.6	880	898	244	2,023	1.5	874	99	1.3	977	<0.01	5.6	798	243	1,040	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on next page.

Table 7. Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

(1) Represents operating period between consecutive monitoring events.
(2) Volume of groundwater recovered is based on individual local well totalized flow readings. Listed value is the difference between totalized flow values recorded between consecutive monitoring events. The total groundwater recovered during a given operating period is the sum of the individual well flow totals. Values shown are rounded to the nearest gallon, but should only be considered accurate to two significant figures to account for error associated with field measurements.
(3) Mass recovered per well was calculated by multiplying the Total VOC concentration from the most recent sampling event by the number of gallons extracted during the reporting period. The total amount recovered during a given operating period is the sum of masses recovered from each of the individual wells. Values less than ten pounds are presented using two significant figures and values greater than ten pounds have been rounded to the nearest whole number; however, these values should only be considered accurate to two significant figures to account for error associated with field measurements and analytical data.
(4) Mass recovery rates were calculated by dividing the total mass recovered for each well and for the system by the number of days in the respective operating period. Values are presented using two significant figures.
(5) "Total VOCs" represents the sum of individual concentrations of the VOCs detected.
(6) "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethelyene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and xylenes-o,m, p.
(7) "Non-Project VOCs" represents the difference between Total VOCs and Project VOCs.
(8) Values based on operational data recorded prior to system startup on July 21, 2009.
(9) Starting with the January 2013 site visit the totalized water flow readings are recorded from the SCADA HMI.
(10) The volume of groundwater recovered and mass recovered calculations represent the operational period between January 6, 2014 and April 1, 2014.
(11) The volume of groundwater recovered and mass recovered calculations represent the operational period between April 1, 2014 and July 1, 2014.
(12) The volume of groundwater recovered and mass recovered calculations represent the operational period between January 6, 2014 and July 1, 2014.
(13) "Total" refers to the amounts removed by the Operable Unit 3 Bethpage Park Groundwater Containment System.

Acronyms\Key:

IRM	Interim Remedial Measure.
gal	Gallons.
HMI	Human-machine interface.
lbs	Pounds.
lbs/day	Pounds per day.
NA	Not applicable.
SCADA	Supervisory Control and Data Acquistion
VOC	Volatile organic compound.
<	Less than.

Table 8. Summary of Air Emissions Model Output, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound [1]	AGC [2] ($\mu g/m^3$)	Percent of MASC Per Event [3]				Percent AGC [4]
		7/1/13	11/14/13	3/10/2014 [5]	5/5/14	
1,1,1 - Trichloroethane	5,000	0.00%	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethane	0.63	0.04%	0.03%	0.14%	0.10%	0.07%
1,2 - Dichloroethane	0.038	0.00%	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethene	200	0.00%	0.00%	0.00%	0.00%	0.00%
Acetone	30,000	0.00%	0.00%	0.00%	0.00%	0.00%
Carbon Disulfide	700	0.00%	0.00%	0.00%	0.00%	0.00%
Chloroform	14.7	0.99%	1.04%	6.45%	0.02%	2.46%
Ethylbenzene	1,000	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (o)	100	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (m,p)	100	0.00%	0.00%	0.00%	0.00%	0.00%
Tetrachloroethene	4.0	0.00%	0.00%	0.00%	0.00%	0.00%
Trichloroethene	0.2	0.06%	0.00%	0.00%	0.08%	0.02%
Vinyl Chloride	0.068	6.88%	0.36%	1.96%	1.06%	2.41%
cis 1,2 Dichloroethene	63	0.01%	0.00%	0.01%	0.00%	0.01%
trans 1,2 Dichloroethene	63	0.00%	0.00%	0.00%	0.00%	0.00%
Benzene	0.13	0.20%	0.11%	0.00%	0.00%	0.08%
Toluene	5,000	0.00%	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	5,000	0.00%	0.00%	0.00%	0.00%	0.00%
Dichlorodifluoromethane (Freon 12)	12,000	0.00%	0.00%	0.00%	0.00%	0.00%
Chlorodifluoromethane (Freon 22)	50,000	0.00%	0.00%	0.00%	0.00%	0.00%

See notes on last page

Table 8. Summary of Air Emissions Model Output, Bethpage Park Groundwater Containment System, Operable Unit 3
(Former Grumman Settling Ponds), Bethpage, New York.

Notes:

(1) Only VOCs that were detected in the effluent vapor sample (VSP-5) over the past year of system operation are included in this table.

(2) Compound-specific AGC values per the NYSDEC DAR-1 AGC/SGC tables, revised February 28, 2014. NYSDEC DAR-1 AGCs were scaled using the results of a site-specific annual USEPA SCREEN 3 model to calculate the annual MASC per monitoring event.

(3) Percent of AGC (or Percent MASC) was calculated by dividing the actual effluent concentration by the site-specific annual MASC. Detailed calculations are included in Appendix D.

(4) Percent AGC is the 12-month average at the end of the reporting period. The Percent AGC was calculated by time-weighting the "Percent MASCs" for the individual sampling events over the past year. MASCs are typically calculated once per quarter, thus the MASCs for each month within a quarter are assumed to be the same.

(5) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.

Acronyms\Key:

AGC	Annual Guideline Concentration.
DAR-1	Division of Air Resources Air Guidance-1.
MASC	Maximum allowable stack concentration.
NYSDEC	New York State Department of Environmental Conservation.
SGC	Short-term Guideline Concentration.
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound
$\mu g/m^3$	micrograms per cubic meter

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (µg/L)	Sample Location: / Sample Date:	RW-1 1/7/2013	RW-1 4/1/2013	RW-1 7/1/2013	RW-1 11/14/2013	RW-1 2/18/2014	RW-1 5/5/2014
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloroethane	0.6	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	1	< 0.7 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromoform	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	60	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon tetrachloride	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)	NE	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	7	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-dichloroethene	5	**0.34 J**	**0.40 J**	**0.24 J**	**0.25 J**	< 5.0 U	**0.21 J**
cis-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Methyl N-Butyl Ketone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert-Butyl Ether	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Styrene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Toluene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,2-dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethylene	5	**0.86 J**	**0.70 J**	**0.77 J**	**0.77 J**	**0.67 J**	**0.41 J**
Trichlorofluoromethane (Freon 11)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	<5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride	2	< 2 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Xylene-o	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Xylenes - m,p	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Total VOCs [2]		**1.2**	**1.1**	**1.0**	**1.0**	**0.67**	**0.62**
Project VOCs [3]		**1.2**	**1.1**	**1.0**	**1.0**	**0.67**	**0.62**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (µg/L)	Sample Location: Sample Date:	RW-2 1/7/2013	RW-2 4/1/2013	RW-2 (dup.) 4/1/2013	RW-2 7/1/2013	RW-2 11/14/2013	RW-2 2/18/2014	RW-2 5/5/2014
	NYSDEC SCGs							
1,1,1-Trichloroethane	5	**0.41 J**	**0.39 J**	**0.37 J**	**0.27 J**	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	5	**1.6 J**	**1.8 J**	**2.0 J**	**1.5 J**	**1.0 J**	**1.1 J**	**1.1 J**
1,1-Dichloroethene	5	**0.82 J**	**0.85 J**	**0.83 J**	**0.77 J**	**0.54 J**	**0.79 J**	**0.78 J**
1,2-Dichloroethane	0.6	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane	1	< 5 U	< 5.0 U	0.47 J	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	1	< 0.7 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromoform	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	60	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon tetrachloride	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)	NE	**0.33 J**	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	7	**2.1 J**	**2.2 J**	**2.3 J**	**2.2 J**	**2.0 J**	**2.2 J**	**1.7 J**
Chloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-dichloroethene	5	**160**	**170 D**	**180 D**	**140**	**100**	**130**	**100**
cis-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	5	**2.3 J**	**3.6 J**	**3.7 J**	**3.1 J**	**2.9 J**	**4.0 J**	**2.5 J**
Methyl N-Butyl Ketone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert-Butyl Ether	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Styrene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	5	**0.38 J**	**0.34 J**	**0.36 J**	**0.33 J**	**0.25 J**	**0.25 J**	< 5.0 U
Toluene	5	**82**	**110**	**110**	**95**	**84**	**85**	**63**
trans-1,2-dichloroethene	5	< 5 U	**0.26 J**	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethylene	5	**18**	**16**	**16**	**17**	**13**	**11**	**12**
Trichlorofluoromethane (Freon 11)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride	2	**75**	**110**	**110**	**100**	**88**	**99**	**87**
Xylene-o	5	**3.2 J**	**4.1 J**	**4.5 J**	**3.1 J**	**3.1 J**	**4.0 J**	**3.2**
Xylenes - m,p	5	**5.3**	**8.6**	**8.9**	**5.6**	**6.8**	**6.8**	**5.4**
Total VOCs [2]		**351**	**428**	**439**	**369**	**302**	**344**	**277**
Project VOCs [3]		**347**	**422**	**433**	**364**	**297**	**338**	**272**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (µg/L)	Sample Location: / Sample Date:	RW-3 1/7/2013	RW-3 4/1/2013	RW-3 7/1/2013	RW-3 11/14/2013	RW-3 2/18/2014	RW-3 5/5/2014
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	5	**0.21 J**	< 5.0 U	**0.21 J**	**0.23 J**	< 5.0 U	< 5.0 U
1,1-Dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloroethane	0.6	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	1	< 0.7 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromoform	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	60	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon tetrachloride	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)	NE	**190**	**130**	**98**	**61**	**45**	**34**
Chloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	7	**4.9 J**	**3.5 J**	**3.6 J**	**2.5 J**	**3.8 J**	**4.9 J**
Chloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-dichloroethene	5	**12**	**9.4**	**7.7**	**6.1**	**4.9 J**	**4.3 J**
cis-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)	5	< 5 U	< 5.0 U	< 5.0 U	**0.33 J**	< 5.0 U	< 5.0 U
Dichloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Methyl N-Butyl Ketone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert-Butyl Ether	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Styrene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	5	**0.33 J**	**0.29 J**	**0.38 J**	**0.28 J**	**0.30 J**	**0.36 J**
Toluene	5	< 5 U	< 5.0 U	< 5.0 U	**0.31 J**	< 5.0 U	< 5.0 U
trans-1,2-dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethylene	5	**5.1**	**4.3 J**	**4.5 J**	**3.9 J**	**3.6 J**	**3.6 J**
Trichlorofluoromethane (Freon 11)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)	5	< 5 U	< 5.0 U	**0.30 J**	< 5.0 U	**0.34 J**	< 5.0 U
Vinyl Chloride	2	**0.25 J**	**0.24 J**	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Xylene-o	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Xylenes - m,p	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Total VOCs [2]		**213**	**148**	**115**	**75**	**58**	**47**
Project VOCs [3]		**18**	**14**	**13**	**11**	**8.8**	**8.3**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (µg/L)	Sample Location: / Sample Date:	RW-4 1/7/2013	RW-4 4/1/2013	RW-4 7/1/2013	RW-4 11/14/2013	RW-4 2/18/2014	RW-4 5/5/2014
	NYSDEC SCGs						
1,1,1-Trichloroethane	5	< 5 U	< 5.0 U	< 5.0 U	**0.23 J**	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	5	**0.46 J**	**0.52 J**	**0.45 J**	**0.38 J**	**0.38 J**	**0.40 J**
1,1-Dichloroethene	5	**0.24 J**	**0.22 J**	< 5.0 U	**0.25 J**	**0.23 J**	< 5.0 U
1,2-Dichloroethane	0.6	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	1	< 0.7 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromoform	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	60	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon tetrachloride	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)	NE	**190 D**	**140**	**110**	**100**	**82**	**68**
Chloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	7	**0.28 J**	**0.25 J**	**0.36 J**	**0.37 J**	**0.39 J**	**0.41 J**
Chloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-dichloroethene	5	**0.24 J**	**0.29 J**	< 5.0 U	**0.22 J**	**0.20 J**	**0.24 J**
cis-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Methyl N-Butyl Ketone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert-Butyl Ether	5	**0.28 J**	< 5.0 U	**0.30 J**	**0.24 J**	**0.24 J**	**0.30 J**
Styrene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	5	**0.95 J**	**1.3 J**	**1.1 J**	**1.1 J**	**0.79 J**	**0.82 J**
Toluene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,2-dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethylene	5	**0.82 J**	**0.75 J**	**0.67 J**	**0.76 J**	**0.67 J**	**0.79 J**
Trichlorofluoromethane (Freon 11)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)	5	**0.38 J**	**0.33 J**	**0.39 J**	**0.29 J**	< 5.0 U	< 5.0 U
Vinyl Chloride	2	< 2 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Xylene-o	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Xylenes - m,p	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Total VOCs [2]		**194**	**144**	**113**	**104**	**85**	**71**
Project VOCs [3]		**2.7**	**3.1**	**2.2**	**2.9**	**2.3**	**2.3**

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Water samples collected by ARCADIS on the dates shown and submitted to ALS Environmental from January 2013 through the current reporting period for VOC analysis using NYSDEC ASP 2005 Method OLM4.3. Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009). See previous quarterly reports for historical analytical results prior to January 2013.

(2) "Total VOCs" represents the sum of individual concentrations of the VOCs detected.

(3) "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and xylenes-o,m, and p.

Acronyms\Key:

Indicates an exceedance of an SCG.

Bold value indicates a detection.

ASP	Analytical services protocol.
NYSDEC	New York State Department of Environmental Conservation.
SCGs	Standards, criteria, and guidance values.
VOC	Volatile organic compound.
µg/L	Micrograms per liter.
--	Not analyzed.
NE	Not established.
B	Compound detected in associated blank sample.
D	Compound identified from secondary dilution.
J	Compound detected but below its reporting limit; the value is estimated.
R	Concentration for the compound was rejected.
UB	Compound considered non-detect due to associated blank contamination.
< 5; <5 U	Compound not detected above its laboratory quantification limit.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (µg/L)	Sample Location: / Sample Date:	RW-1 2/10/2011	RW-1 10/3/2011	RW-1 11/11/2011	RW-1 [2] 10/1/2012	RW-1 1/7/2013	RW-1 4/1/2013	RW-1 7/1/2013	RW-1 11/14/2013	RW-1 2/18/2014	RW-1 5/5/2014
	NYSDEC SCGs										
Total Cadmium	5	--	--	< 5	< 5	--	--	--	< 5.0	--	--
Dissolved Cadmium	5	--	--	< 5	< 5	--	--	--	< 5.0	--	--
Total Chromium	50	--	--	**23**	**23**	--	--	--	**28**	--	--
Dissolved Chromium	50	--	--	**24**	**23**	--	--	--	**32**	--	--
Total Iron	300	< 100	< 100	--	< 100	--	--	--	< 100	--	--
Dissolved Iron	300	< 100	< 100	--	< 100	--	--	--	< 100	--	--
Total Manganese	300	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese	300	--	--	--	--	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	< 0.20	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (µg/L)	Sample Location: / Sample Date:	RW-2 1/7/2013	RW-2 2/4/2013	RW-2[3] 3/4/2013	RW-2 4/1/2013	RW-2 5/6/2013	RW-2 6/6/2013	RW-2 7/1/2013	RW-2 11/14/2013	RW-2 2/18/2014	RW-2 5/5/2014
	NYSDEC SCGs										
Total Cadmium	5	--	--	--	--	--	--	--	< 5.0	--	--
Dissolved Cadmium	5	--	--	--	--	--	--	--	< 5.0	--	--
Total Chromium	50	--	--	--	--	--	--	--	< 10	--	--
Dissolved Chromium	50	--	--	--	--	--	--	--	< 10	--	--
Total Iron	300	**600**	**640**	**1,950**	**1,070**	**700**	**990**	**1,200**	**1,540**	**890**	**660**
Dissolved Iron	300	**560**	**520**	**1,920**	**720**	**600**	**740**	**650**	**850**	**680**	**760**
Total Manganese	300	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese	300	--	--	--	--	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	< 0.20	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (µg/L)	Sample Location: / Sample Date:	RW-3 1/7/2013	RW-3 2/4/2013	RW-3 3/4/2013	RW-3 4/1/2013	RW-3 5/6/2013	RW-3 6/6/2013	RW-3 7/1/2013	RW-3 11/14/2013	RW-3 2/18/2014	RW-3 5/5/2014
	NYSDEC SCGs										
Total Cadmium	5	--	--	--	--	--	--	--	< 5.0	--	--
Dissolved Cadmium	5	--	--	--	--	--	--	--	< 5.0	--	--
Total Chromium	50	--	--	--	--	--	--	--	< 10	--	--
Dissolved Chromium	50	--	--	--	--	--	--	--	< 10	--	--
Total Iron	300	< 100	**290**	**130**	**230**	**330**	**280**	**180**	**280**	**170**	**190**
Dissolved Iron	300	< 100	**110**	**130**	**110**	< 100	**140**	<100	**150**	<100	<100
Total Manganese	300	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese	300	--	--	--	--	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	< 0.20	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1]

COMPOUND (µg/L)	Sample Location: / Sample Date:	RW-4 10/4/2010	RW-4 10/3/2011	RW-4 11/11/2011	RW-4 [2] 10/1/2012	RW-4 1/7/2013	RW-4 4/1/2013	RW-4 7/1/2013	RW-4 11/14/2013	RW-4 2/18/2014	RW-4 5/5/2014
	NYSDEC SCGs										
Total Cadmium	5	< 5	--	< 5	< 5	--	--	--	< 5.0	--	--
Dissolved Cadmium	5	< 5	--	< 5	< 5	--	--	--	< 5.0	--	--
Total Chromium	50	< 10	--	< 10	< 10	--	--	--	< 10	--	--
Dissolved Chromium	50	< 10	--	< 10	< 10	--	--	--	< 10	--	--
Total Iron	300	< 100	< 100	< 100	< 100	--	--	--	< 100	--	--
Dissolved Iron	300	< 100	< 100	< 100	< 100	--	--	--	< 100	--	--
Total Manganese	300	**28**	--	--	--	--	--	--	--	--	--
Dissolved Manganese	300	**29**	--	--	--	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	< 0.20	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1)

Notes:

(1) Water samples collected by ARCADIS on the dates shown and submitted to Columbia Analytical Services, Inc. through December 2012 and to ALS Environmental from December 2012 through current for metals analysis using USEPA Method 6010 and for mercury analyses using USEPA Method 7470. Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).

(2) Beginning January 2012 metals analyses for recovery wells RW-1 and RW-4 are included with annual recovery well sampling performed in October of each year.

(3) Elevated RW-2 iron concentrations are believed attributed to multiple system shutdowns and re-starts due to a fouled pressure switch on March 2 and March 3, 2013. Turbulence dislodged accumulated iron deposits at the remedial well piping.

Acronyms/Key:

	Indicates an exceedance of an SCG.
700	Bold data indicates that the analyte was detected at or above its reporting limit.
NYSDEC	New York State Department of Environmental Conservation.
ASP	Analytical services protocol.
USEPA	U.S. Environmental Protection Agenc y
SCGs	Standards, criteria, and guidance values.
µg/L	Micrograms per liter.
--	Not analyzed.
< 5	Compound not detected above its laboratory quantification limit.

ARCADIS

Table 11. Summary of Water-Level Elevations, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Well Identification	Well Casing Elevation (ft msl)	Event Date	Baseline (1) 5/8/2009 (ft msl)	1Q2010 02/04/10 (ft msl)	2Q2010 04/23/10 (ft msl)	3Q2010 08/26/10 (ft msl)	4Q2010 12/10/10 (ft msl)	1Q2011 02/04/11 (ft msl)	2Q2011 05/20/11 (ft msl)	3Q2011 08/09/11 (ft msl)	4Q2011 10/26/11 (ft msl)	1Q2012 01/25/12 (ft msl)	2Q2012 05/02/12 (ft msl)	3Q2012 08/17/12 (ft msl)	4Q2012 10/05/12 (ft msl)	1Q2013 02/13/13 (ft msl)	2Q2013 05/13/13 (ft msl)	3Q2013 08/13/13 (ft msl)	4Q2013 11/01/13 (ft msl)	1Q2014 03/07/14 (ft msl)	2Q2014 06/03/14 (ft msl)
Recovery Wells																					
RW-1	125.18		69.75	70.67	74.38	72.52	71.11	70.96	72.13	70.44	72.72	73.15	72.12	71.71	71.21	70.35	70.89	71.62	69.31	68.08	69.97
RW-2	124.48		72.27	61.80	64.88	63.44	61.35	67.99	66.31	64.18	65.11	69.05	69.81	65.3	63.7	62.66	63.33	61.35	60.23	58.2	64.45
RW-3	122.84		69.40	67.64	71.4	69.44*	68.13	67.74	68.88	67.64	69.70	70.75	71.74	74.35(2)	68.06	68.01	68.73	72.29	67.11	64.49	66.97
RW-4	121.25		69.25	70.35	74.02	71.93	70.56	67.06	71.37	69.95	72.13	72.71	71.61	70.88	70.67	69.7	70.37	71.2	68.7	67.38	69.40
Monitoring Wells																					
B24MW-2	126.96		74.31	74.13	76.16	75.86	75.65	74.96	76.06	74.35	76.00	76.28	75.57	75.76	74.63	74.85	74.32	73.81	72.88	72.65	73.48
B24MW-3	127.11		72.63	72.16	75.87	74.10	72.89	72.40	74.04	72.27	74.44	74.63	73.67	73.62	72.69	72.2	72.41	73.14	68.24	69.82	71.67
B30MW-1	128.33		73.55	73.00	76.54	74.96	73.86	73.38	74.75	73.25	75.41	75.54	74.66	NM	73.66	73.11	73.28	73.97	72.26	70.73	72.61
BCPMW-1	125.73		73.16	72.67	76.26	74.66	73.43	72.94	74.75	72.94	75.05	75.23	74.29	74.22	73.27	NM	73.09	73.51	71.66	70.27	72.86
BCPMW-2	126.39		72.55	71.83	75.52	73.69	72.55	72.03	73.64	71.94	74.16	74.33	73.29	73.17	72.39	71.82	72.09	72.66	70.77	69.51	71.41
BCPMW-3	124.94		72.46	71.59	75.24	73.40	72.27	71.74	73.25	71.64	73.94	74.05	73.06	72.85	72.14	71.56	71.79	72.44	70.57	69.25	71.12
BCPMW-4-1	128.76		72.30	71.33	75.05	73.13	72.02	71.56	73.08	71.46	73.70	73.78	72.81	72.59	71.89	71.41	71.56	72.32	70.3	69.01	70.96
BCPMW-4-2	129.15		72.58	71.36	75.07	73.16	72.08	71.56	73.06	71.51	73.74	73.83	72.83	72.61	71.92	71.42	71.58	72.31	70.32	69.03	70.98
BCPMW-4-3	129.19		72.32	71.46	75.16	73.26	72.14	71.73	73.19	71.55	73.84	73.96	72.94	72.71	71.97	71.53	71.67	72.43	70.4	69.16	71.06
BCPMW-5-1	129.37		72.79	72.14	75.66	73.94	72.72	72.74	73.81	72.14	74.46	74.77	73.67	73.34	72.62	72.06	72.19	72.87	71.01	69.78	71.56
BCPMW-6-1	126.01		72.12	71.26	74.91	72.96	71.91	71.49	72.77	71.45	73.58	73.67	72.66	72.32	71.73	71.12	71.32	72.15	70.15	68.79	70.85
BCPMW-6-2	125.16		71.74	70.96	74.64	72.60	71.59	71.17	72.49	71.01	73.26	73.37	72.30	71.97	71.39	70.84	71.01	71.84	69.83	68.49	70.48
BCPMW-7-1	124.81		72.00	71.33	74.99	72.99	71.97	71.51	72.78	71.53	73.62	73.71	72.71	72.31	71.77	71.2	71.33	72.26	70.21	68.82	70.86
MW-200-1	123.49		72.16	71.37	75.07	73.14	72.08	71.72	72.98	71.52	73.69	73.83	72.76	72.59	71.91	71.34	71.53	72.31	70.37	69.06	71.03
MW-201-1	121.69		72.04	71.10	74.84	72.87	71.79	71.33	72.69	71.25	73.48	73.55	72.53	72.28	71.65	71.09	71.28	72.05	70.08	68.75	70.75
MW-202-1	119.27		71.90	71.13	74.83	72.82	71.77	71.32	72.66	71.21	73.46	73.57	73.51	72.23	71.6	70.98	71.23	--	70.06	68.75	70.70
MW-203-1	118.25		71.83	71.10	74.75	72.77	71.75	71.30	72.61	70.20	73.43	73.52	72.49	72.13	71.56	71.02	71.17	72.01	70.01	68.7	70.64
Piezometers																					
PZ-1a	128.82		72.56	71.15	74.87	72.94	71.85	71.33	72.76	71.31	73.54	73.62	72.63	72.42	71.72	71.23	71.39	NM(3)	NM(3)	NM(3)	NM(3)
PZ-1b	128.92		72.47	71.09	74.78	72.88	71.82	71.28	72.70	71.24	73.47	73.55	72.56	72.36	71.64	71.16	71.35	72.06	70.34	68.77	70.69
PZ-1c	128.96		72.47	71.48	75.15	73.23	72.13	71.74	73.16	71.56	73.83	73.9	72.90	72.68	71.94	71.46	71.63	72.39	70.39	69.12	71.01
PZ-2a	128.36		72.47	71.09	74.82	72.87	71.81	71.34	72.74	71.30	73.45	73.57	72.57	72.32	71.64	71.14	71.32	72.06	70.08	68.73	70.74
PZ-2b	128.37		72.43	71.08	74.77	72.86	71.78	71.30	72.68	71.27	73.45	73.55	72.54	72.28	71.61	71.13	71.29	72.05	70.08	68.71	70.74
PZ-2c	128.55		72.41	71.40	75.05	73.15	72.05	71.68	73.05	71.52	73.74	73.87	72.82	72.55	71.88	71.38	71.55	72.34	70.33	69.02	70.93
PZ-3	124.99		72.52	70.94	74.69	72.71	71.65	70.93	72.55	71.08	73.28	73.4	72.35	72.16	71.44	71.06	71.18	71.92	69.95	68.61	70.60
PZ-4	125.31		72.50	71.07	74.81	72.83	71.78	71.45	72.64	71.32	73.42	73.52	72.54	72.32	71.63	71.18	71.33	72.05	70.09	68.76	70.70
PZ-5a	129.07		72.50	71.94	75.61	73.79	72.59	72.17	73.70	71.98	74.27	74.39	73.40	73.25	72.45	71.94	72.16	72.84	70.85	69.62	71.47
PZ-5b	129.06		72.50	71.84	75.53	73.69	72.51	72.08	73.67	71.88	74.16	74.29	73.29	73.15	72.35	71.85	72.08	72.73	70.72	69.51	71.35
PZ-6a	125.67		72.50	71.03	74.73	72.84	71.70	71.24	72.56	71.24	73.37	73.46	72.43	72.13	71.5	70.95	71.17	71.91	69.94	68.53	70.63
PZ-6b	125.74		72.50	70.93	74.7	72.65	71.58	71.11	72.46	71.14	73.28	73.37	72.34	72.05	71.43	70.88	71.11	71.81	69.86	68.44	70.52
PZ-7a	125.10		72.50	71.32	75.02	73.00	72.00	71.54	72.80	71.58	73.67	73.7	72.72	72.36	71.78	71.2	71.35	72.26	70.26	68.84	70.90
PZ-7b	125.06		72.50	71.21	74.85	72.83	71.83	71.37	72.68	71.26	73.45	73.53	72.51	72.13	71.54	71.05	71.16	71.54	70.07	68.68	70.64

Notes:
(1) Baseline readings were taken prior to system startup, which occurred on July 21, 2009.
(2) Measurement collected is believed to be anomalous.
(3) Well casing is broken and blockage exists at around 2ft below top of casing.
*: RW-3 water level measurement collected on September 9, 2010.

Acronyms/Key:
ft msl feet relative to mean sea level
NM not measured

ARCADIS

Table 12. Summary of Calculated Vertical Groundwater Hydraulic Gradients, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Observation Well Pairing			10/5/2012			2/13/2013			5/13/2013		
Shallow	Deep	Vertical Distance Between Screens (ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)
PZ-1A	PZ-1B	20	71.72	71.64	-0.004	71.23	71.16	-0.0035	71.39	71.35	-0.002
PZ-1B	PZ-1C	50	71.64	71.94	0.006	71.16	71.46	0.006	71.35	71.63	0.0056
PZ-2A	PZ-2B	20	71.64	71.61	-0.0015	71.14	71.13	-0.0005	71.32	71.29	-0.0015
PZ-2B	PZ-2C	50	71.61	71.88	0.0054	71.13	71.38	0.005	71.29	71.55	0.0052
PZ-5A	PZ-5B	45	72.45	72.35	-0.0022	71.94	71.85	-0.002	72.16	72.08	-0.0018
PZ-6A	PZ-6B	25	71.50	71.43	-0.0028	70.95	70.88	-0.0028	71.17	71.11	-0.0024
PZ-7A	PZ-7B	48	71.78	71.54	-0.005	71.20	71.05	-0.0031	71.35	71.16	-0.004
BCPMW-4-1	BCPMW-4-2	21	71.89	71.92	0.0014	71.41	71.42	0.0005	71.56	71.58	0.001
BCPMW-4-2	BCPMW-4-3	44	71.92	71.97	0.0011	71.42	71.53	0.0025	71.58	71.67	0.002
BCPMW-6-1	BCPMW-6-2	44.5	71.73	71.39	-0.0072	71.12	70.84	-0.0076	71.32	71.01	-0.007

Notes:

(1) Positive groundwater hydraulic gradient indicates a vertically upward gradient and a negative groundwater hydraulic gradient indicates vertically downward gradient.

(2) Well casing is broken and blockage exists at around 2ft below top of casing.

Acronyms/Key:

ft msl	feet relative to mean sea level
ft/ft	feet per foot
NM	not measured
--	not applicable

Table 12. Summary of Calculated Vertical Groundwater Hydraulic Gradients, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Observation Well Pairing			8/13/2013			11/1/2013			3/7/2014		
Shallow	Deep	Vertical Distance Between Screens (ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)
PZ-1A	PZ-1B	20	NM(2)	72.06	--	NM(2)	70.34	--	NM(2)	68.77	--
PZ-1B	PZ-1C	50	72.06	72.39	0.0066	70.34	70.39	0.001	68.77	69.12	0.007
PZ-2A	PZ-2B	20	72.06	72.05	-0.0005	70.08	70.08	0	68.73	68.71	-0.001
PZ-2B	PZ-2C	50	72.05	72.34	0.0058	70.08	70.33	0.005	68.71	69.02	0.0062
PZ-5A	PZ-5B	45	72.84	72.73	-0.0024	70.85	70.72	-0.0029	69.62	69.51	-0.0024
PZ-6A	PZ-6B	25	71.91	71.81	-0.004	69.94	69.86	-0.0032	68.53	68.44	-0.0036
PZ-7A	PZ-7B	48	72.26	71.54	-0.015	70.26	70.07	-0.004	68.84	68.68	-0.0033
BCPMW-4-1	BCPMW-4-2	21	72.32	72.31	-0.0005	70.30	70.32	0.001	69.01	69.03	0.001
BCPMW-4-2	BCPMW-4-3	44	72.31	72.43	0.0027	70.32	70.40	0.0018	69.03	69.16	0.003
BCPMW-6-1	BCPMW-6-2	44.5	72.15	71.84	-0.007	70.15	69.83	-0.0072	68.79	68.49	-0.0067

Notes:

(1) Positive groundwater hydraulic gradient indicates a vertically upward gradient and a negative groundwater hydraulic gradient indicates vertically downward gradient.

(2) Well casing is broken and blockage exists at around 2ft below top of casing.

Acronyms/Key:

ft msl	feet relative to mean sea level
ft/ft	feet per foot
NM	not measured
--	not applicable

Table 12. Summary of Calculated Vertical Groundwater Hydraulic Gradients, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Observation Well Pairing			6/3/2014		
Shallow	Deep	Vertical Distance Between Screens (ft)	Observed Head Shallow (ft msl)	Observed Head Deep (ft msl)	Vertical Hydraulic Gradient (1) (ft/ft)
PZ-1A	PZ-1B	20	NM(2)	70.69	--
PZ-1B	PZ-1C	50	70.69	71.01	0.0064
PZ-2A	PZ-2B	20	70.74	70.74	0
PZ-2B	PZ-2C	50	70.74	70.93	0.0038
PZ-5A	PZ-5B	45	71.47	71.35	-0.0027
PZ-6A	PZ-6B	25	70.63	70.52	-0.0044
PZ-7A	PZ-7B	48	70.90	70.64	-0.0054
BCPMW-4-1	BCPMW-4-2	21	70.96	70.98	0.001
BCPMW-4-2	BCPMW-4-3	44	70.98	71.06	0.0018
BCPMW-6-1	BCPMW-6-2	44.5	70.85	70.48	-0.0083

Notes:

(1) Positive groundwater hydraulic gradient indicates a vertically upward gradient and a negative groundwater hydraulic gradient indicates vertically downward gradient.

(2) Well casing is broken and blockage exists at around 2ft below top of casing.

Acronyms/Key:

ft msl	feet relative to mean sea level
ft/ft	feet per foot
NM	not measured
--	not applicable

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	B24MW-2 4/23/2009	B24MW-2 10/4/2010	B24MW-2 10/27/2011	B24MW-2 10/3/2012	*B24MW-2 6/13/2013*
1,1,1-Trichloroethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
1,1,2,2-Tetrachloroethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
1,1,2-Trichloroethane		1	< 5	< 5	< 5	< 5	*< 5.0 J*
1,1-Dichloroethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
1,1-Dichloroethene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
1,2-Dichloroethane		0.6	< 5	< 5	< 5	< 5	*< 5.0 J*
1,2-Dichloropropane		1	< 5	< 5	< 5	< 5	*< 5.0 J*
2-Butanone		NE	< 50	< 50	< 50	< 50	*< 50 J*
4-Methyl-2-Pentanone		50	< 50	< 50	< 50	< 50	*< 50 J*
Acetone		NE	< 50 B	< 50	< 50 B	< 50	*< 50 J*
Benzene		1	< 0.7	< 0.7	< 0.7	< 0.7	*< 0.70 J*
Bromodichloromethane		50	< 5	< 5	< 5	< 5	*< 5.0 J*
Bromoform		50	< 5	< 5	< 5	< 5	*< 5.0 J*
Bromomethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Carbon Disulfide		60	< 5	< 5	< 5	< 5	*< 5.0 J*
Carbon Tetrachloride		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Chlorobenzene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Chlorodibromomethane		50	< 5	< 5	< 5	< 5	*< 5.0 J*
Chlorodifluoromethane (Freon 22)		NE	< 5	< 5	< 5	**0.41 J**	*< 5.0 J*
Chloroethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Chloroform		7	< 5	**0.3 J**	< 5	**1.3 J**	***0.21 J***
Chloromethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
cis-1,2-Dichloroethene		5	< 5	< 5	< 5	**1.9 J**	***0.23 J***
cis-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	*< 5.0 J*
Dichlorodifluoromethane (Freon 12)		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Dichloromethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Ethylbenzene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Methyl N-Butyl Ketone		50	< 50	< 50	< 50	< 50	*< 50 J*
Methyl-Tert-Butylether		5	--	< 5	--	**0.45 J**	***0.21 J***
Styrene (Monomer)		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Tetrachloroethene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Toluene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
trans-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
trans-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	*< 5.0 J*
Trichloroethene		5	**3.7 J**	**4.4 J**	**3.2 J**	**25**	***4.3 J***
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Vinyl Chloride		2	< 2	< 2	< 2	< 2	*< 2.0 J*
Xylene - o		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Xylenes - m,p		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Total VOCs [3]			**3.7**	**4.7**	**3.2**	**29**	***5.0***
Project VOCs [4]			**3.7**	**4.4**	**3.2**	**27**	***4.5***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	B24MW-3 4/20/2009	B24MW-3 10/6/2010	B24MW-3 10/27/2011	B24MW-3 10/4/2012	*B24MW-3 6/13/2013*
1,1,1-Trichloroethane		5	**0.62 J**	< 5	< 5	< 5	*< 5.0 J*
1,1,2,2-Tetrachloroethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
1,1,2-Trichloroethane		1	< 5	< 5	< 5	< 5	*< 5.0 J*
1,1-Dichloroethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
1,1-Dichloroethene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
1,2-Dichloroethane		0.6	< 5	< 5	< 5	< 5	*< 5.0 J*
1,2-Dichloropropane		1	< 5	< 5	< 5	< 5	*< 5.0 J*
2-Butanone		NE	< 50	< 50	< 50	< 50	*< 50 J*
4-Methyl-2-Pentanone		50	< 50 J	< 50	< 50	< 50	*< 50 J*
Acetone		NE	< 50	< 50	< 50	< 50	*< 50 J*
Benzene		1	< 0.7	< 0.7	< 0.7	< 0.7	*< 0.70 J*
Bromodichloromethane		50	< 5	< 5	< 5	< 5	*< 5.0 J*
Bromoform		50	< 5	< 5	< 5	< 5	*< 5.0 J*
Bromomethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Carbon Disulfide		60	< 5	< 5	< 5	< 5	*< 5.0 J*
Carbon Tetrachloride		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Chlorobenzene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Chlorodibromomethane		50	< 5	< 5	< 5	< 5	*< 5.0 J*
Chlorodifluoromethane (Freon 22)		NE	< 5	< 5	< 5	< 5	*< 5.0 J*
Chloroethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Chloroform		7	< 5	< 5	**0.32 J**	**0.38 J**	***1.3 J***
Chloromethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
cis-1,2-Dichloroethene		5	**10**	**1.2 J**	**0.4 J**	**0.62 J**	*< 5.0 J*
cis-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	*< 5.0 J*
Dichlorodifluoromethane (Freon 12)		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Dichloromethane		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Ethylbenzene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Methyl N-Butyl Ketone		50	< 50 J	< 50	< 50	< 50	*< 50 J*
Methyl-Tert-Butylether		5	--	< 5	--	< 5	*< 5.0 J*
Styrene (Monomer)		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Tetrachloroethene		5	**0.51 J**	< 5	< 5	< 5	*< 5.0 J*
Toluene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
trans-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	*< 5.0 J*
trans-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	*< 5.0 J*
Trichloroethene		5	**45**	**5.9**	**1.4 J**	**1 J**	***0.44 J***
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Vinyl Chloride		2	< 2	< 2	< 2	< 2	*< 2.0 J*
Xylene - o		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Xylenes - m,p		5	< 5	< 5	< 5	< 5	*< 5.0 J*
Total VOCs [3]			**56**	**7.1**	**2.1**	**2.0**	***1.7***
Project VOCs [4]			**56**	**7.1**	**1.8**	**1.6**	***0.4***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	B30MW-1 4/23/2009	B30MW-1 10/4/2010	B30MW-1 10/27/2011	B30MW-1 10/3/2012	*B30MW-1 6/14/2013*
1,1,1-Trichloroethane		5	< 5	< 5	< 5	< 5	*< 5.0*
1,1,2,2-Tetrachloroethane		5	< 5	< 5	< 5	< 5	*< 5.0*
1,1,2-Trichloroethane		1	< 5	< 5	< 5	< 5	*< 5.0*
1,1-Dichloroethane		5	< 5	< 5	< 5	< 5	*< 5.0*
1,1-Dichloroethene		5	< 5	< 5	< 5	< 5	*< 5.0*
1,2-Dichloroethane		0.6	< 5	< 5	< 5	< 5	*< 5.0*
1,2-Dichloropropane		1	< 5	< 5	< 5	< 5	*< 5.0*
2-Butanone		NE	< 50	< 50	< 50	< 50	*< 50*
4-Methyl-2-Pentanone		50	< 50	< 50	< 50	< 50	*< 50*
Acetone		NE	< 50 B	< 50 B	< 50	< 50	*< 50*
Benzene		1	< 0.7	< 0.7	< 0.7	< 0.7	*< 0.70*
Bromodichloromethane		50	< 5	< 5	< 5	< 5	*< 5.0*
Bromoform		50	< 5	< 5	< 5	< 5	*< 5.0*
Bromomethane		5	< 5	< 5	< 5	< 5	*< 5.0*
Carbon Disulfide		60	< 5	< 5	< 5	< 5	*< 5.0*
Carbon Tetrachloride		5	< 5	< 5	< 5	< 5	*< 5.0*
Chlorobenzene		5	< 5	< 5	< 5	< 5	*< 5.0*
Chlorodibromomethane		50	< 5	< 5	< 5	< 5	*< 5.0*
Chlorodifluoromethane (Freon 22)		NE	< 5	< 5	< 5	< 5	*< 5.0*
Chloroethane		5	< 5	< 5	< 5	< 5	*< 5.0*
Chloroform		7	< 5	< 5	< 5	< 5	*< 5.0*
Chloromethane		5	< 5	< 5	< 5	< 5	*< 5.0*
cis-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	*< 5.0*
cis-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	*< 5.0*
Dichlorodifluoromethane (Freon 12)		5	< 5	< 5	< 5	< 5	*< 5.0*
Dichloromethane		5	< 5	< 5	< 5	< 5	*< 5.0*
Ethylbenzene		5	< 5	< 5	< 5	< 5	*< 5.0*
Methyl N-Butyl Ketone		50	< 50	< 50	< 50	< 50	*< 50*
Methyl-Tert-Butylether		5	--	< 5	--	< 5	*< 5.0*
Styrene (Monomer)		5	< 5	< 5	< 5	< 5	*< 5.0*
Tetrachloroethene		5	< 5	< 5	< 5	< 5	*< 5.0*
Toluene		5	< 5	< 5	< 5	< 5	*< 5.0*
trans-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	*< 5.0*
trans-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	*< 5.0*
Trichloroethene		5	< 5	< 5	< 5	< 5	*< 5.0*
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 5	< 5	< 5	*< 5.0*
Vinyl Chloride		2	< 2	< 2	< 2	< 2	*< 2.0*
Xylene - o		5	< 5	< 5	< 5	< 5	*< 5.0*
Xylenes - m,p		5	< 5	< 5	< 5	< 5	*< 5.0*
Total VOCs [3]			0	0	0	0	*0*
Project VOCs [4]			0	0	0	0	*0*

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	BCPMW-1 4/28/2009	BCPMW-2 4/28/2009	BCPMW-3 4/29/2009
1,1,1-Trichloroethane		5	< 5	< 10	< 25
1,1,2,2-Tetrachloroethane		5	< 5	< 10	< 25
1,1,2-Trichloroethane		1	< 5	< 10	< 25
1,1-Dichloroethane		5	**0.37 J**	**8 J**	**9.6 J**
1,1-Dichloroethene		5	< 5	**3.8 J**	**43**
1,2-Dichloroethane		0.6	< 5	**0.68 J**	< 25
1,2-Dichloropropane		1	< 5	< 10	< 25
2-Butanone		NE	< 50	< 100	< 250
4-Methyl-2-Pentanone		50	< 50	< 100	< 250
Acetone		NE	< 50 B	< 100	< 250
Benzene		1	< 0.7	< 1.4	< 3.5
Bromodichloromethane		50	< 5	< 10	< 25
Bromoform		50	< 5	< 10	< 25
Bromomethane		5	< 5	< 10	< 25
Carbon Disulfide		60	< 5	< 10	< 25
Carbon Tetrachloride		5	< 5	< 10	< 25
Chlorobenzene		5	< 5	< 10	< 25
Chlorodibromomethane		50	< 5	< 10	< 25
Chlorodifluoromethane (Freon 22)		NE	< 5	< 10	< 25
Chloroethane		5	< 5	< 10	< 25
Chloroform		7	**0.88 J**	< 10	< 25
Chloromethane		5	< 5	< 10	< 25
cis-1,2-Dichloroethene		5	**22**	**310**	**900**
cis-1,3-Dichloropropene		0.4	< 5	< 10	< 25
Dichlorodifluoromethane (Freon 12)		5	< 5	< 10	< 25
Dichloromethane		5	**0.52 J**	< 10	< 25
Ethylbenzene		5	< 5	< 10	< 25 B
Methyl N-Butyl Ketone		50	< 50	< 100	< 250
Methyl-Tert-Butylether		5	--	--	--
Styrene (Monomer)		5	< 5	< 10	< 25
Tetrachloroethene		5	< 5	**1.5 J**	< 25
Toluene		5	**0.33 J**	< 10	< 25 B
trans-1,2-Dichloroethene		5	**0.44 J**	**2.4 J**	**8.9 J**
trans-1,3-Dichloropropene		0.4	< 5	< 10	< 25
Trichloroethene		5	**190**	**180**	**470**
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 10	< 25
Vinyl Chloride		2	< 2	**4.1**	**300**
Xylene - o		5	< 5	< 10	< 25 B
Xylenes - m,p		5	< 5	< 10	< 25 B
Total VOCs [3]			**220**	**510**	**1,700**
Project VOCs [4]			**210**	**510**	**1,700**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	BCPMW-4-1 4/17/2009	BCPMW-4-1 12/1/2009	BCPMW-4-1 10/4/2010	BCPMW-4-1 10/28/2011	BCPMW-4-1 10/3/2012
1,1,1-Trichloroethane		5	< 25	**2.4 J**	**14 J**	**10 J**	**29**
1,1,2,2-Tetrachloroethane		5	< 25	< 5	< 25	< 25	< 25
1,1,2-Trichloroethane		1	< 25	**0.38 J**	< 25	< 25	**1.7 J**
1,1-Dichloroethane		5	**6.5 J**	**46**	**38**	**18 J**	**39**
1,1-Dichloroethene		5	**1.8 J**	**14**	**21 J**	**13 J**	**24 J**
1,2-Dichloroethane		0.6	< 25	**0.65 J**	< 25	**2.1 J**	**4.8 J**
1,2-Dichloropropane		1	< 25	**4.7 J**	**3.8 J**	**1.9 J**	**5.1 J**
2-Butanone		NE	< 250	< 50	< 250	< 250	< 250
4-Methyl-2-Pentanone		50	< 250 J	< 50	< 250	< 250	< 250
Acetone		NE	< 250 J	< 50	< 250	< 250B	< 250
Benzene		1	< 3.5	**0.44 J**	< 3.5	< 3.5	< 3.5
Bromodichloromethane		50	< 25	< 5	< 25	< 25	< 25
Bromoform		50	< 25	< 5	< 25	< 25	< 25
Bromomethane		5	< 25	R	< 25	< 25	< 25
Carbon Disulfide		60	< 25	< 5	< 25	< 25	< 25
Carbon Tetrachloride		5	< 25	< 5	< 25	< 25	< 25
Chlorobenzene		5	< 25	< 5	< 25	< 25	< 25
Chlorodibromomethane		50	< 25	< 5	< 25	< 25	< 25
Chlorodifluoromethane (Freon 22)		NE	**17 J**	**6.2**	**4.3 J**	**2.5 J**	< 25
Chloroethane		5	< 25	**2.4 J**	**4.1 J**	< 25	**1.6 J**
Chloroform		7	< 25	< 5	< 25	< 25	< 25
Chloromethane		5	< 25	R	< 25	< 25	< 25
cis-1,2-Dichloroethene		5	**1800 D**	**750 D**	**510**	**500**	**840**
cis-1,3-Dichloropropene		0.4	< 25	< 5	< 25	< 25	< 25
Dichlorodifluoromethane (Freon 12)		5	< 25	< 5	< 25	< 25	< 25
Dichloromethane		5	< 25	< 5	< 25	< 25 B	< 25
Ethylbenzene		5	< 25	< 5	< 25	< 25	< 25
Methyl N-Butyl Ketone		50	< 250 J	< 50	< 250	< 250	< 250
Methyl-Tert-Butylether		5	--	--	< 25	< 25	< 25
Styrene (Monomer)		5	< 25	< 5	< 25	< 25	< 25
Tetrachloroethene		5	< 25	**0.64 J**	< 25	< 25	< 25
Toluene		5	< 25	< 5	< 25	< 25	< 25
trans-1,2-Dichloroethene		5	**110**	**2.5 J**	**3.9 J**	**1.3 J**	**2.2 J**
trans-1,3-Dichloropropene		0.4	< 25	< 5	< 25	< 25	< 25
Trichloroethene		5	**22 J**	**170**	**45**	**43**	**110**
Trichlorotrifluoroethane (Freon 113)		5	< 25	< 5	< 25	< 25	< 25
Vinyl Chloride		2	**180**	**540 D**	**220**	**32**	**420**
Xylene - o		5	< 25	**8**	< 25	< 25	< 25
Xylenes - m,p		5	< 25	< 5	< 25	< 25	< 25
Total VOCs [3]			**2,100**	**1,500**	**860**	**620**	**1,500**
Project VOCs [4]			**2,100**	**1,500**	**850**	**620**	**1,500**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location:	*BCPMW-4-1*
	Sample Date:	*6/5/2013*
	NYSDEC SCGs	
1,1,1-Trichloroethane	5	***5.1***
1,1,2,2-Tetrachloroethane	5	*< 5.0*
1,1,2-Trichloroethane	1	***0.24 J***
1,1-Dichloroethane	5	***7.4***
1,1-Dichloroethene	5	***4.1 J***
1,2-Dichloroethane	0.6	***0.95 J***
1,2-Dichloropropane	1	***0.95 J***
2-Butanone	NE	*< 50*
4-Methyl-2-Pentanone	50	*< 50*
Acetone	NE	*< 50*
Benzene	1	*< 0.70*
Bromodichloromethane	50	*< 5.0*
Bromoform	50	*< 5.0*
Bromomethane	5	*< 5.0*
Carbon Disulfide	60	*< 5.0*
Carbon Tetrachloride	5	*< 5.0*
Chlorobenzene	5	*< 5.0*
Chlorodibromomethane	50	*< 5.0*
Chlorodifluoromethane (Freon 22)	NE	***1.1 J***
Chloroethane	5	***0.46 J***
Chloroform	7	*< 5.0*
Chloromethane	5	*< 5.0*
cis-1,2-Dichloroethene	5	***310 D***
cis-1,3-Dichloropropene	0.4	*< 5.0*
Dichlorodifluoromethane (Freon 12)	5	*< 5.0*
Dichloromethane	5	*< 5.0*
Ethylbenzene	5	*< 5.0*
Methyl N-Butyl Ketone	50	*< 50*
Methyl-Tert-Butylether	5	*< 5.0*
Styrene (Monomer)	5	*< 5.0*
Tetrachloroethene	5	***0.37 J***
Toluene	5	*< 5.0*
trans-1,2-Dichloroethene	5	***0.78 J***
trans-1,3-Dichloropropene	0.4	*< 5.0*
Trichloroethene	5	***16***
Trichlorotrifluoroethane (Freon 113)	5	*< 5.0*
Vinyl Chloride	2	***47***
Xylene - o	5	*< 5.0*
Xylenes - m,p	5	*< 5.0*
Total VOCs [3]		***390***
Project VOCs [4]		***390***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	BCPMW-4-2 4/17/2009	BCPMW-4-2 12/4/2009	BCPMW-4-2 10/7/2010	BCPMW-4-2 10/28/2011	BCPMW-4-2 10/3/2012
1,1,1-Trichloroethane		5	< 250	< 10	< 5	**0.33 J**	**0.23 J**
1,1,2,2-Tetrachloroethane		5	< 250	< 10	< 5	< 5	< 5
1,1,2-Trichloroethane		1	< 250	< 10	< 5	< 5	< 5
1,1-Dichloroethane		5	**57 J**	**8.7 J**	**7.3**	**2.6 J**	**1.4 J**
1,1-Dichloroethene		5	**34 J**	**2.7 J**	**1.9 J**	**1.1 J**	**0.8 J**
1,2-Dichloroethane		0.6	< 250	< 10	**0.91 J**	**0.85 J**	**0.45 J**
1,2-Dichloropropane		1	< 250	< 10	**0.9 J**	**0.39 J**	< 5
2-Butanone		NE	< 2500	< 100	< 50	< 50	< 50
4-Methyl-2-Pentanone		50	< 2500 J	< 100	< 50	< 50	< 50
Acetone		NE	< 2500 J	< 100	< 50 B	< 50	< 50
Benzene		1	< 35	< 1.4	< 0.7	< 0.7 U	< 0.7
Bromodichloromethane		50	< 250	< 10	< 5	< 5	< 5
Bromoform		50	< 250	< 10	< 5	< 5	< 5
Bromomethane		5	< 250	< 10	< 5	< 5	< 5
Carbon Disulfide		60	< 250	< 10	< 5	< 5	< 5
Carbon Tetrachloride		5	< 250	< 10	< 5	< 5	< 5
Chlorobenzene		5	< 250	< 10	< 5	< 5	< 5
Chlorodibromomethane		50	< 250	< 10	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)		NE	< 250	**0.8 J**	< 5	< 5	< 5
Chloroethane		5	< 250	**1.1 J**	**0.79 J**	< 5	< 5
Chloroform		7	< 250	< 10	**0.96 J**	**0.62 J**	**0.54 J**
Chloromethane		5	< 250	R	< 5	< 5	< 5
cis-1,2-Dichloroethene		5	**18000 D**	**270**	**99**	**59**	**70**
cis-1,3-Dichloropropene		0.4	< 250	< 10	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)		5	< 250	< 10	< 5	< 5	< 5
Dichloromethane		5	< 250	< 10	< 5	< 5	< 5
Ethylbenzene		5	**62 J**	**0.78 J**	< 5	< 5	< 5
Methyl N-Butyl Ketone		50	< 2500 J	< 100	< 50	< 50	< 50
Methyl-Tert-Butylether		5	--	--	**0.35 J**	**0.28 J**	**0.29 J**
Styrene (Monomer)		5	< 250	< 10	< 5	< 5	< 5
Tetrachloroethene		5	< 250	**0.82 J**	**0.73 J**	**0.59 J**	**0.91 J**
Toluene		5	**2400**	< 10 B	< 5	< 5	< 5
trans-1,2-Dichloroethene		5	< 250	**1.3 J**	**0.65 J**	**0.41 J**	**0.5 J**
trans-1,3-Dichloropropene		0.4	< 250	< 10	< 5	< 5	< 5
Trichloroethene		5	< 250	**310**	**66**	**50**	**68**
Trichlorotrifluoroethane (Freon 113)		5	< 250	< 10	< 5	< 5	< 5
Vinyl Chloride		2	**6300**	**58**	**54**	**20**	**9.5**
Xylene - o		5	**110 J**	< 10 B	< 5	< 5	< 5
Xylenes - m,p		5	**190 J**	< 10 B	< 5	< 5	< 5
Total VOCs [3]			**27,000**	**660**	**230**	**140**	**150**
Project VOCs [4]			**27,000**	**650**	**230**	**130**	**150**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	*BCPMW-4-2* *6/5/2013*
1,1,1-Trichloroethane		5	***0.22 J***
1,1,2,2-Tetrachloroethane		5	*< 5.0*
1,1,2-Trichloroethane		1	*< 5.0*
1,1-Dichloroethane		5	***1.5 J***
1,1-Dichloroethene		5	***0.49 J***
1,2-Dichloroethane		0.6	***0.52 J***
1,2-Dichloropropane		1	*< 5.0*
2-Butanone		NE	*< 50*
4-Methyl-2-Pentanone		50	*< 50*
Acetone		NE	***1.8 J***
Benzene		1	*< 0.70*
Bromodichloromethane		50	*< 5.0*
Bromoform		50	*< 5.0*
Bromomethane		5	*< 5.0*
Carbon Disulfide		60	*< 5.0*
Carbon Tetrachloride		5	*< 5.0*
Chlorobenzene		5	*< 5.0*
Chlorodibromomethane		50	*< 5.0*
Chlorodifluoromethane (Freon 22)		NE	*< 5.0*
Chloroethane		5	*< 5.0*
Chloroform		7	***3.3 J***
Chloromethane		5	*< 5.0*
cis-1,2-Dichloroethene		5	***47***
cis-1,3-Dichloropropene		0.4	*< 5.0*
Dichlorodifluoromethane (Freon 12)		5	*< 5.0*
Dichloromethane		5	*< 5.0*
Ethylbenzene		5	*< 5.0*
Methyl N-Butyl Ketone		50	*< 50*
Methyl-Tert-Butylether		5	***0.26 J***
Styrene (Monomer)		5	*< 5.0*
Tetrachloroethene		5	***0.63 J***
Toluene		5	*< 5.0*
trans-1,2-Dichloroethene		5	***0.40 J***
trans-1,3-Dichloropropene		0.4	*< 5.0*
Trichloroethene		5	***56***
Trichlorotrifluoroethane (Freon 113)		5	*< 5.0*
Vinyl Chloride		2	***9.7***
Xylene - o		5	*< 5.0*
Xylenes - m,p		5	*< 5.0*
Total VOCs [3]			***120***
Project VOCs [4]			***120***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	BCPMW-4-3 4/17/2009	BCPMW-4-3 12/1/2009	BCPMW-4-3 10/7/2010	BCPMW-4-3 10/28/2011	BCPMW-4-3 10/3/2012
1,1,1-Trichloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane		1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene		5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane		0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane		1	< 5	< 5	< 5	< 5	< 5
2-Butanone		NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone		50	< 50 J	< 50	< 50	< 50	< 50
Acetone		NE	< 50 J	< 50	< 50	< 50	< 50
Benzene		1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane		50	< 5	< 5	< 5	< 5	< 5
Bromoform		50	< 5	< 5	< 5	< 5	< 5
Bromomethane		5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide		60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride		5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene		5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane		50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)		NE	< 5	< 5	< 5	< 5	< 5
Chloroethane		5	< 5	< 5	< 5	< 5	< 5
Chloroform		7	**0.53 J**	**0.32 J**	< 5	< 5	**0.2 J**
Chloromethane		5	< 5	R	< 5	< 5	< 5
cis-1,2-Dichloroethene		5	**0.37 J**	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)		5	< 5	< 5	< 5	< 5	< 5
Dichloromethane		5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene		5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone		50	< 50 J	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether		5	--	--	< 5	< 5	< 5
Styrene (Monomer)		5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene		5	< 5	< 5	< 5	**0.27 J**	**0.3 J**
Toluene		5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene		5	**0.56 J**	**0.51 J**	**0.41 J**	**0.74 J**	**0.84 J**
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 5	< 5	**0.38 J**	< 5
Vinyl Chloride		2	< 2	< 2	< 2	< 2	< 2
Xylene - o		5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p		5	< 5	< 5	< 5	< 5	< 5
Total VOCs [3]			**1.5**	**0.83**	**0.41**	**1.4**	**1.3**
Project VOCs [4]			**0.93**	**0.51**	**0.41**	**1.0**	**1.1**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	*BCPMW-4-3 (REP)* *6/5/2013*	*BCPMW-4-3* *6/5/2013*
1,1,1-Trichloroethane		5	*< 5.0*	*< 5.0*
1,1,2,2-Tetrachloroethane		5	*< 5.0*	*< 5.0*
1,1,2-Trichloroethane		1	*< 5.0*	*< 5.0*
1,1-Dichloroethane		5	*< 5.0*	*< 5.0*
1,1-Dichloroethene		5	*< 5.0*	*< 5.0*
1,2-Dichloroethane		0.6	*< 5.0*	*< 5.0*
1,2-Dichloropropane		1	*< 5.0*	*< 5.0*
2-Butanone		NE	*< 50*	*< 50*
4-Methyl-2-Pentanone		50	*< 50*	*< 50*
Acetone		NE	*< 50*	*< 50*
Benzene		1	*< 0.70*	*< 0.70*
Bromodichloromethane		50	*< 5.0*	*< 5.0*
Bromoform		50	*< 5.0*	*< 5.0*
Bromomethane		5	*< 5.0*	*< 5.0*
Carbon Disulfide		60	*< 5.0*	*< 5.0*
Carbon Tetrachloride		5	*< 5.0*	*< 5.0*
Chlorobenzene		5	*< 5.0*	*< 5.0*
Chlorodibromomethane		50	*< 5.0*	*< 5.0*
Chlorodifluoromethane (Freon 22)		NE	*< 5.0*	*< 5.0*
Chloroethane		5	*< 5.0*	*< 5.0*
Chloroform		7	***0.97 J***	***1.1 J***
Chloromethane		5	*< 5.0*	*< 5.0*
cis-1,2-Dichloroethene		5	*< 5.0*	*< 5.0*
cis-1,3-Dichloropropene		0.4	*< 5.0*	*< 5.0*
Dichlorodifluoromethane (Freon 12)		5	*< 5.0*	*< 5.0*
Dichloromethane		5	*< 5.0*	*< 5.0*
Ethylbenzene		5	*< 5.0*	*< 5.0*
Methyl N-Butyl Ketone		50	*< 50*	*< 50*
Methyl-Tert-Butylether		5	*< 5.0*	*< 5.0*
Styrene (Monomer)		5	*< 5.0*	*< 5.0*
Tetrachloroethene		5	*< 5.0*	*< 5.0*
Toluene		5	*< 5.0*	*< 5.0*
trans-1,2-Dichloroethene		5	*< 5.0*	*< 5.0*
trans-1,3-Dichloropropene		0.4	*< 5.0*	*< 5.0*
Trichloroethene		5	***0.34 J***	***0.39 J***
Trichlorotrifluoroethane (Freon 113)		5	*< 5.0*	*< 5.0*
Vinyl Chloride		2	*< 2.0*	*< 2.0*
Xylene - o		5	*< 5.0*	*< 5.0*
Xylenes - m,p		5	*< 5.0*	*< 5.0*
Total VOCs [3]			***1.3***	***1.5***
Project VOCs [4]			***0.34***	***0.39***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	BCPMW-5-1 4/23/2009
1,1,1-Trichloroethane		5	< 100
1,1,2,2-Tetrachloroethane		5	< 100
1,1,2-Trichloroethane		1	< 100
1,1-Dichloroethane		5	< 100
1,1-Dichloroethene		5	**21 J**
1,2-Dichloroethane		0.6	< 100
1,2-Dichloropropane		1	< 100
2-Butanone		NE	< 1000
4-Methyl-2-Pentanone		50	< 1000
Acetone		NE	< 1000
Benzene		1	< 14
Bromodichloromethane		50	< 100
Bromoform		50	< 100
Bromomethane		5	< 100
Carbon Disulfide		60	< 100
Carbon Tetrachloride		5	< 100
Chlorobenzene		5	< 100
Chlorodibromomethane		50	< 100
Chlorodifluoromethane (Freon 22)		NE	< 100
Chloroethane		5	< 100
Chloroform		7	< 100
Chloromethane		5	< 100
cis-1,2-Dichloroethene		5	**960**
cis-1,3-Dichloropropene		0.4	< 100
Dichlorodifluoromethane (Freon 12)		5	< 100
Dichloromethane		5	< 100
Ethylbenzene		5	**48 J**
Methyl N-Butyl Ketone		50	< 1000
Methyl-Tert-Butylether		5	--
Styrene (Monomer)		5	< 100
Tetrachloroethene		5	< 100
Toluene		5	**2700**
trans-1,2-Dichloroethene		5	< 100
trans-1,3-Dichloropropene		0.4	< 100
Trichloroethene		5	**220**
Trichlorotrifluoroethane (Freon 113)		5	< 100
Vinyl Chloride		2	**330**
Xylene - o		5	**40 J**
Xylenes - m,p		5	**110**
Total VOCs [3]			**4,400**
Project VOCs [4]			**4,400**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	BCPMW-6-1 4/20/2009	BCPMW-6-1 12/4/2009	BCPMW-6-1 10/6/2010	BCPMW-6-1 10/31/2011
1,1,1-Trichloroethane		5	< 5	< 5	< 100	< 250
1,1,2,2-Tetrachloroethane		5	< 5	< 5	< 100	< 250
1,1,2-Trichloroethane		1	< 5	< 5	< 100	< 250
1,1-Dichloroethane		5	**0.3 J**	< 5	< 100	< 250
1,1-Dichloroethene		5	< 5	< 5	< 100	< 250
1,2-Dichloroethane		0.6	< 5	< 5	< 100	< 250
1,2-Dichloropropane		1	< 5	< 5	< 100	< 250
2-Butanone		NE	< 50	< 50	< 1000	< 2500
4-Methyl-2-Pentanone		50	< 50 J	< 50	< 1000	< 2500
Acetone		NE	< 50 J	< 50	< 1000	< 2500
Benzene		1	< 0.7	< 0.7	< 14	< 35
Bromodichloromethane		50	< 5	< 5	< 100	< 250
Bromoform		50	< 5	< 5	< 100	< 250
Bromomethane		5	< 5	R	< 100	< 250
Carbon Disulfide		60	< 5	< 5	< 100	< 250
Carbon Tetrachloride		5	< 5	< 5	< 100	< 250
Chlorobenzene		5	< 5	< 5	< 100	< 250
Chlorodibromomethane		50	< 5	< 5	< 100	< 250
Chlorodifluoromethane (Freon 22)		NE	**4500 D**	**1700 EJ**	**10000 D**	**7100**
Chloroethane		5	< 5	< 5	< 100	< 250
Chloroform		7	**1.7 J**	**0.32 J**	< 100	< 250
Chloromethane		5	< 5	R	< 100	< 250
cis-1,2-Dichloroethene		5	**21**	**1.7 J**	< 100	< 250
cis-1,3-Dichloropropene		0.4	< 5	< 5	< 100	< 250
Dichlorodifluoromethane (Freon 12)		5	< 5	< 5	< 100	< 250
Dichloromethane		5	< 5	< 5	< 100	< 250
Ethylbenzene		5	< 5	< 5	< 100	< 250
Methyl N-Butyl Ketone		50	< 50 J	< 50	< 1000	< 2500
Methyl-Tert-Butylether		5	--	--	<100	< 250
Styrene (Monomer)		5	< 5	< 5	< 100	< 250
Tetrachloroethene		5	**0.34 J**	< 5	< 100	< 250
Toluene		5	< 5	< 5	< 100	< 250
trans-1,2-Dichloroethene		5	< 5	< 5	< 100	< 250
trans-1,3-Dichloropropene		0.4	< 5	< 5	< 100	< 250
Trichloroethene		5	**4.9 J**	**1.6 J**	< 100	< 250
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 5	< 100	< 250
Vinyl Chloride		2	< 2	< 2	< 40	< 100
Xylene - o		5	< 5	< 5	< 100	< 250
Xylenes - m,p		5	< 5	< 5	< 100	< 250
Total VOCs [3]			**4,500**	**1,700**	**10,000**	**7,100**
Project VOCs [4]			**27**	**2.3**	0	0

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	BCPMW-6-1 10/3/2012	*BCPMW-6-1 6/7/2013*
1,1,1-Trichloroethane		5	< 100	*< 13*
1,1,2,2-Tetrachloroethane		5	< 100	*< 13*
1,1,2-Trichloroethane		1	< 100	*< 13*
1,1-Dichloroethane		5	< 100	*< 13*
1,1-Dichloroethene		5	< 100	*< 13*
1,2-Dichloroethane		0.6	< 100	*< 13*
1,2-Dichloropropane		1	< 100	*< 13*
2-Butanone		NE	< 1000	*< 130*
4-Methyl-2-Pentanone		50	< 1000	*< 130*
Acetone		NE	< 1000	*< 130*
Benzene		1	< 14	*< 1.8*
Bromodichloromethane		50	< 100	*< 13*
Bromoform		50	< 100	*< 13*
Bromomethane		5	< 100	*< 13*
Carbon Disulfide		60	< 100	*< 13*
Carbon Tetrachloride		5	< 100	*< 13*
Chlorobenzene		5	< 100	*< 13*
Chlorodibromomethane		50	< 100	*< 13*
Chlorodifluoromethane (Freon 22)		NE	**2100**	***400***
Chloroethane		5	< 100	*< 13*
Chloroform		7	< 100	*< 13*
Chloromethane		5	< 100	*< 13*
cis-1,2-Dichloroethene		5	< 100	*< 13*
cis-1,3-Dichloropropene		0.4	< 100	*< 13*
Dichlorodifluoromethane (Freon 12)		5	< 100	*< 13*
Dichloromethane		5	< 100	*< 13*
Ethylbenzene		5	< 100	*< 13*
Methyl N-Butyl Ketone		50	< 1000	*< 130*
Methyl-Tert-Butylether		5	< 100	*< 13*
Styrene (Monomer)		5	< 100	*< 13*
Tetrachloroethene		5	< 100	*< 13*
Toluene		5	< 100	*< 13*
trans-1,2-Dichloroethene		5	< 100	*< 13*
trans-1,3-Dichloropropene		0.4	< 100	*< 13*
Trichloroethene		5	< 100	*< 13*
Trichlorotrifluoroethane (Freon 113)		5	< 100	*< 13*
Vinyl Chloride		2	< 40	*< 5.0*
Xylene - o		5	< 100	*< 13*
Xylenes - m,p		5	< 100	*< 13*
Total VOCs [3]			**2,100**	***400***
Project VOCs [4]			0	*0*

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	BCPMW-6-2 5/8/2009	BCPMW-6-2 12/4/2009	BCPMW-6-2 10/6/2010	BCPMW-6-2 10/31/2011	BCPMW-6-2 10/3/2012
1,1,1-Trichloroethane		5	< 5	**0.78 J**	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane		1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane		5	**0.37 J**	**0.65 J**	**0.47 J**	**0.41 J**	**0.23 J**
1,1-Dichloroethene		5	< 5	**0.44 J**	< 5	**0.3 J**	< 5
1,2-Dichloroethane		0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane		1	< 5	< 5	< 5	< 5	< 5
2-Butanone		NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone		50	< 50	< 50	< 50	< 50	< 50
Acetone		NE	< 50	< 50	< 50	< 50	< 50
Benzene		1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane		50	< 5	< 5	< 5	< 5	< 5
Bromoform		50	< 5	< 5	< 5	< 5	< 5
Bromomethane		5	< 5	R	< 5	< 5	< 5
Carbon Disulfide		60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride		5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene		5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane		50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)		NE	< 5	< 5	< 5	< 5	**0.64 J**
Chloroethane		5	< 5	< 5	< 5	< 5	< 5
Chloroform		7	**0.53 J**	< 5	**0.41 J**	**0.3 J**	**0.38 J**
Chloromethane		5	< 5	R	< 5	< 5	< 5
cis-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)		5	< 5	< 5	< 5	< 5	< 5
Dichloromethane		5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene		5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone		50	< 50	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether		5	--	--	<5	**0.33 J**	**0.24 J**
Styrene (Monomer)		5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene		5	< 5	**0.79 J**	**2.1 J**	**1.8 J**	**1.6 J**
Toluene		5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene		5	< 5	**0.45 J**	< 5	< 5	< 5
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride		2	< 2	< 2	< 2	< 2	< 2
Xylene - o		5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p		5	< 5	< 5	< 5	< 5	< 5
Total VOCs [3]			**0.90**	**3.1**	**3.0**	**3.1**	**3.1**
Project VOCs [4]			**0.37**	**3.1**	**2.6**	**2.5**	**1.8**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	*BCPMW-6-2* *6/5/2013*
1,1,1-Trichloroethane		5	*< 5.0*
1,1,2,2-Tetrachloroethane		5	*< 5.0*
1,1,2-Trichloroethane		1	*< 5.0*
1,1-Dichloroethane		5	***0.31 J***
1,1-Dichloroethene		5	*< 5.0 J*
1,2-Dichloroethane		0.6	*< 5.0*
1,2-Dichloropropane		1	*< 5.0*
2-Butanone		NE	*< 50*
4-Methyl-2-Pentanone		50	*< 50*
Acetone		NE	*< 50*
Benzene		1	*< 0.70 J*
Bromodichloromethane		50	*< 5.0*
Bromoform		50	*< 5.0*
Bromomethane		5	*< 5.0*
Carbon Disulfide		60	*< 5.0*
Carbon Tetrachloride		5	*< 5.0*
Chlorobenzene		5	*< 5.0 J*
Chlorodibromomethane		50	*< 5.0*
Chlorodifluoromethane (Freon 22)		NE	*< 5.0*
Chloroethane		5	*< 5.0*
Chloroform		7	***0.93 J***
Chloromethane		5	*< 5.0*
cis-1,2-Dichloroethene		5	*< 5.0*
cis-1,3-Dichloropropene		0.4	*< 5.0*
Dichlorodifluoromethane (Freon 12)		5	*< 5.0*
Dichloromethane		5	*< 5.0*
Ethylbenzene		5	*< 5.0*
Methyl N-Butyl Ketone		50	*< 50*
Methyl-Tert-Butylether		5	***0.36 J***
Styrene (Monomer)		5	*< 5.0*
Tetrachloroethene		5	***1.3 J***
Toluene		5	*< 5.0 J*
trans-1,2-Dichloroethene		5	*< 5.0*
trans-1,3-Dichloropropene		0.4	*< 5.0*
Trichloroethene		5	*< 5.0 J*
Trichlorotrifluoroethane (Freon 113)		5	*< 5.0*
Vinyl Chloride		2	*< 2.0*
Xylene - o		5	*< 5.0*
Xylenes - m,p		5	*< 5.0*
Total VOCs [3]			***2.9***
Project VOCs [4]			***1.6***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	BCPMW-7-1 4/20/2009	BCPMW-7-1 12/1/2009	BCPMW-7-1 10/7/2010	BCPMW-7-1 11/1/2011	BCPMW-7-1 10/4/2012
1,1,1-Trichloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane		1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene		5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane		0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane		1	< 5	< 5	< 5	< 5	< 5
2-Butanone		NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone		50	< 50 J	< 50	< 50	< 50	< 50
Acetone		NE	< 50	< 50	< 50	< 50	< 50
Benzene		1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane		50	< 5	< 5	< 5	< 5	< 5
Bromoform		50	< 5	< 5	< 5	< 5	< 5
Bromomethane		5	< 5	R	< 5	< 5	< 5
Carbon Disulfide		60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride		5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene		5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane		50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)		NE	**2.6 J**	**1.5 J**	**5.2**	**9.2**	**3.6 J**
Chloroethane		5	< 5	< 5	< 5	< 5	< 5
Chloroform		7	< 5	< 5	< 5	< 5	**0.37 J**
Chloromethane		5	< 5	R	< 5	< 5	< 5
cis-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)		5	< 5	< 5	< 5	< 5	< 5
Dichloromethane		5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene		5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone		50	< 50 J	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether		5	--	--	< 5	**0.22 J**	**0.26 J**
Styrene (Monomer)		5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene		5	< 5	< 5	< 5	< 5	< 5
Toluene		5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene		5	< 5	< 5	< 5	< 5	< 5
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride		2	< 2	< 2	< 2	< 2	< 2
Xylene - o		5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p		5	< 5	< 5	< 5	< 5	< 5
Total VOCs [3]			**2.6**	**1.5**	**5.2**	**9.4**	**4.2**
Project VOCs [4]			0.0	0.0	0.0	**0.2**	0.0

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	*BCPMW-7-1* *6/7/2013*
1,1,1-Trichloroethane		5	*< 5.0*
1,1,2,2-Tetrachloroethane		5	*< 5.0*
1,1,2-Trichloroethane		1	*< 5.0*
1,1-Dichloroethane		5	*< 5.0*
1,1-Dichloroethene		5	*< 5.0*
1,2-Dichloroethane		0.6	*< 5.0*
1,2-Dichloropropane		1	*< 5.0*
2-Butanone		NE	*< 50*
4-Methyl-2-Pentanone		50	*< 50*
Acetone		NE	*< 50*
Benzene		1	*< 0.70*
Bromodichloromethane		50	*< 5.0*
Bromoform		50	*< 5.0*
Bromomethane		5	*< 5.0*
Carbon Disulfide		60	*< 5.0*
Carbon Tetrachloride		5	*< 5.0*
Chlorobenzene		5	*< 5.0*
Chlorodibromomethane		50	*< 5.0*
Chlorodifluoromethane (Freon 22)		NE	***2.5 J***
Chloroethane		5	*< 5.0*
Chloroform		7	***0.29 J***
Chloromethane		5	*< 5.0*
cis-1,2-Dichloroethene		5	*< 5.0*
cis-1,3-Dichloropropene		0.4	*< 5.0*
Dichlorodifluoromethane (Freon 12)		5	*< 5.0*
Dichloromethane		5	*< 5.0*
Ethylbenzene		5	*< 5.0*
Methyl N-Butyl Ketone		50	*< 50*
Methyl-Tert-Butylether		5	***0.22 J***
Styrene (Monomer)		5	*< 5.0*
Tetrachloroethene		5	*< 5.0*
Toluene		5	*< 5.0*
trans-1,2-Dichloroethene		5	*< 5.0*
trans-1,3-Dichloropropene		0.4	*< 5.0*
Trichloroethene		5	*< 5.0*
Trichlorotrifluoroethane (Freon 113)		5	*< 5.0*
Vinyl Chloride		2	*< 2.0*
Xylene - o		5	*< 5.0*
Xylenes - m,p		5	*< 5.0*
Total VOCs [3]			***3.0***
Project VOCs [4]			*0*

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	MW-200-1 4/29/2009	MW-200-1 12/2/2009	MW-200-1 10/5/2010	MW-200-1 11/3/2011	MW-200-1 10/4/2012
1,1,1-Trichloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane		1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane		5	**0.79 J**	< 5	< 5	< 5	< 5
1,1-Dichloroethene		5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane		0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane		1	< 5	< 5	< 5	< 5	< 5
2-Butanone		NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone		50	< 50	< 50	< 50	< 50	< 50
Acetone		NE	< 50 B	< 50	< 50	< 50	< 50
Benzene		1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane		50	< 5	< 5	< 5	< 5	< 5
Bromoform		50	< 5	< 5	< 5	< 5	< 5
Bromomethane		5	< 5	R	< 5	< 5	< 5
Carbon Disulfide		60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride		5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene		5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane		50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)		NE	< 5	< 5	< 5	< 5	< 5
Chloroethane		5	< 5	< 5	< 5	< 5	< 5
Chloroform		7	**2.3 J**	**2.3 J**	**0.5 J**	**0.21 J**	< 5
Chloromethane		5	< 5	R	< 5	< 5	< 5
cis-1,2-Dichloroethene		5	**38**	**5.7**	**3.5 J**	**11**	**1.5 J**
cis-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)		5	< 5	< 5	< 5	< 5	< 5
Dichloromethane		5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene		5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone		50	< 50	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether		5	--	--	< 5	< 5	< 5
Styrene (Monomer)		5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene		5	**0.54 J**	< 5	< 5	**0.43 J**	< 5
Toluene		5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene		5	**0.3 J**	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene		5	**34**	**12**	**7**	**20**	**3.8 J**
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride		2	< 2	< 2	< 2	< 2	< 2
Xylene - o		5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p		5	< 5	< 5	< 5	< 5	< 5
Total VOCs [3]			**76**	**20**	**11**	**32**	**5.3**
Project VOCs [4]			**74**	**18**	**11**	**31**	**5.3**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	*MW-200-1* *5/31/2013*
1,1,1-Trichloroethane		5	*< 5.0*
1,1,2,2-Tetrachloroethane		5	*< 5.0*
1,1,2-Trichloroethane		1	*< 5.0*
1,1-Dichloroethane		5	*< 5.0*
1,1-Dichloroethene		5	*< 5.0*
1,2-Dichloroethane		0.6	*< 5.0*
1,2-Dichloropropane		1	*< 5.0*
2-Butanone		NE	*< 50*
4-Methyl-2-Pentanone		50	*< 50*
Acetone		NE	*< 50*
Benzene		1	*< 0.70*
Bromodichloromethane		50	*< 5.0*
Bromoform		50	*< 5.0*
Bromomethane		5	*< 5.0*
Carbon Disulfide		60	*< 5.0*
Carbon Tetrachloride		5	*< 5.0*
Chlorobenzene		5	*< 5.0*
Chlorodibromomethane		50	*< 5.0*
Chlorodifluoromethane (Freon 22)		NE	*< 5.0*
Chloroethane		5	*< 5.0*
Chloroform		7	*< 5.0*
Chloromethane		5	*< 5.0*
cis-1,2-Dichloroethene		5	***0.41 J***
cis-1,3-Dichloropropene		0.4	*< 5.0*
Dichlorodifluoromethane (Freon 12)		5	*< 5.0*
Dichloromethane		5	*< 5.0*
Ethylbenzene		5	*< 5.0*
Methyl N-Butyl Ketone		50	*< 50*
Methyl-Tert-Butylether		5	*< 5.0*
Styrene (Monomer)		5	*< 5.0*
Tetrachloroethene		5	*< 5.0*
Toluene		5	*< 5.0*
trans-1,2-Dichloroethene		5	*< 5.0*
trans-1,3-Dichloropropene		0.4	*< 5.0*
Trichloroethene		5	***1.3 J***
Trichlorotrifluoroethane (Freon 113)		5	*< 5.0*
Vinyl Chloride		2	*< 2.0*
Xylene - o		5	*< 5.0*
Xylenes - m,p		5	*< 5.0*
Total VOCs [3]			***1.7***
Project VOCs [4]			***1.7***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	MW-201-1 5/1/2009	MW-201-1 12/2/2009	MW-201-1 10/5/2010	MW-201-1 11/3/2011	MW-201-1 10/4/2012
1,1,1-Trichloroethane		5	**5.5 J**	**3.3 J**	< 50	< 5	< 5
1,1,2,2-Tetrachloroethane		5	< 25	< 50	< 50	< 5	< 5
1,1,2-Trichloroethane		1	< 25	< 50	< 50	< 5	< 5
1,1-Dichloroethane		5	**10 J**	**9 J**	**14 J**	**0.51 J**	**1.2 J**
1,1-Dichloroethene		5	**7.9 J**	**8.1 J**	**6.9 J**	**0.21 J**	**0.65 J**
1,2-Dichloroethane		0.6	< 25	< 50	< 50	< 5	< 5
1,2-Dichloropropane		1	< 25	< 50	< 50	< 5	< 5
2-Butanone		NE	< 250	< 500	< 500	< 50	< 50
4-Methyl-2-Pentanone		50	< 250	< 500	< 500	< 50	< 50
Acetone		NE	< 250 B	< 500	< 500	< 50	< 50
Benzene		1	< 3.5	< 7	< 7	< 0.7	< 0.7
Bromodichloromethane		50	< 25	< 50	< 50	< 5	< 5
Bromoform		50	< 25	< 50	< 50	< 5	< 5
Bromomethane		5	< 25	< 50	< 50	< 5	< 5
Carbon Disulfide		60	< 25	< 50	< 50	< 5	< 5
Carbon Tetrachloride		5	< 25	< 50	< 50	< 5	< 5
Chlorobenzene		5	< 25	< 50	< 50	< 5	< 5
Chlorodibromomethane		50	< 25	< 50	< 50	< 5	< 5
Chlorodifluoromethane (Freon 22)		NE	< 25	< 50	< 50	< 5	< 5
Chloroethane		5	< 25	< 50	< 50	< 5	< 5
Chloroform		7	< 25	< 50	**4.2 J**	**3.2 J**	**2.9 J**
Chloromethane		5	< 25	R	< 50	< 5	< 5
cis-1,2-Dichloroethene		5	**970 D**	**1300**	**3900 D**	**61**	**180 D**
cis-1,3-Dichloropropene		0.4	< 25	< 50	< 50	< 5	< 5
Dichlorodifluoromethane (Freon 12)		5	< 25	< 50	< 50	< 5	< 5
Dichloromethane		5	< 25	< 50	< 50	< 5	< 5
Ethylbenzene		5	< 25	< 50	< 50	< 5	< 5
Methyl N-Butyl Ketone		50	< 250	< 500	< 500	< 50	< 50
Methyl-Tert-Butylether		5	--	--	<50	**0.75 J**	**0.22 J**
Styrene (Monomer)		5	< 25	< 50	< 50	< 5	< 5
Tetrachloroethene		5	< 25	< 50	< 50	**0.24 J**	**0.24 J**
Toluene		5	< 25	< 50	< 50	< 5 J	< 5
trans-1,2-Dichloroethene		5	**2.7 J**	**3.5 J**	**6.7 J**	< 5	**0.59 J**
trans-1,3-Dichloropropene		0.4	< 25	< 50	< 50	< 5	< 5
Trichloroethene		5	**160**	**230**	**72**	**20**	**20**
Trichlorotrifluoroethane (Freon 113)		5	< 25	< 50	< 50 U	< 5	< 5
Vinyl Chloride		2	< 10	**38**	**820**	< 2 U	**13**
Xylene - o		5	< 25	< 50	**7.2 J**	< 5	< 5
Xylenes - m,p		5	< 25	< 50	< 50	< 5	< 5
Total VOCs [3]			**1,200**	**1,600**	**4,800**	**86**	**220**
Project VOCs [4]			**1,200**	**1,600**	**4,800**	**82**	**220**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	*MW-201-1* *5/31/2013*
1,1,1-Trichloroethane		5	*< 5.0*
1,1,2,2-Tetrachloroethane		5	*< 5.0*
1,1,2-Trichloroethane		1	*< 5.0*
1,1-Dichloroethane		5	*< 5.0*
1,1-Dichloroethene		5	*< 5.0*
1,2-Dichloroethane		0.6	*< 5.0*
1,2-Dichloropropane		1	*< 5.0*
2-Butanone		NE	*< 50*
4-Methyl-2-Pentanone		50	*< 50*
Acetone		NE	*< 50*
Benzene		1	*< 0.70*
Bromodichloromethane		50	*< 5.0*
Bromoform		50	*< 5.0*
Bromomethane		5	*< 5.0*
Carbon Disulfide		60	*< 5.0*
Carbon Tetrachloride		5	*< 5.0*
Chlorobenzene		5	*< 5.0*
Chlorodibromomethane		50	*< 5.0*
Chlorodifluoromethane (Freon 22)		NE	*< 5.0*
Chloroethane		5	*< 5.0*
Chloroform		7	***0.49 J***
Chloromethane		5	*< 5.0*
cis-1,2-Dichloroethene		5	***7.9***
cis-1,3-Dichloropropene		0.4	*< 5.0*
Dichlorodifluoromethane (Freon 12)		5	*< 5.0*
Dichloromethane		5	*< 5.0*
Ethylbenzene		5	*< 5.0*
Methyl N-Butyl Ketone		50	*< 50*
Methyl-Tert-Butylether		5	*< 5.0*
Styrene (Monomer)		5	*< 5.0*
Tetrachloroethene		5	*< 5.0*
Toluene		5	*< 5.0*
trans-1,2-Dichloroethene		5	*< 5.0*
trans-1,3-Dichloropropene		0.4	*< 5.0*
Trichloroethene		5	***13***
Trichlorotrifluoroethane (Freon 113)		5	*< 5.0*
Vinyl Chloride		2	*< 2.0*
Xylene - o		5	*< 5.0*
Xylenes - m,p		5	*< 5.0*
Total VOCs [3]			***21***
Project VOCs [4]			***21***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

	Sample Location:	MW-202-1	MW-202-1	MW-202-1	MW-202-1	MW-202-1
Constituent in µg/L	Sample Date:	5/1/2009	12/2/2009	10/6/2010	11/3/2011	10/4/2012
	NYSDEC SCGs					
1,1,1-Trichloroethane	5	< 5	< 5	< 5	**0.32 J**	**0.74 J**
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	**0.86 J**	**2.1 J**
1,1-Dichloroethene	5	< 5	< 5	< 5	**0.72 J**	**1.9 J**
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone	50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	< 50	< 50	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	**0.61 J**	**0.21 J**	< 5
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	**6.2**	**6.7**	**0.93 J**	< 5	< 5
Chloromethane	5	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	5	**0.64 J**	**0.58 J**	< 5	< 5	**0.4 J**
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone	50	< 50	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether	5	--	--	< 5	**0.37 J**	< 5
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	**0.48 J**	**0.92 J**	**1.7 J**
Toluene	5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	**7.5**	**9.3**	**2.4 J**	**0.78 J**	**1.2 J**
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	**0.43 J**	**0.44 J**	**0.76 J**
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2
Xylene - o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs [3]		**14**	**17**	**4.9**	**4.6**	**8.8**
Project VOCs [4]		**8.1**	**9.9**	**2.9**	**3.6**	**8.0**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	MW-202-1 5/30/2013
1,1,1-Trichloroethane		5	***0.93 J***
1,1,2,2-Tetrachloroethane		5	*< 5.0*
1,1,2-Trichloroethane		1	*< 5.0*
1,1-Dichloroethane		5	***3.0 J***
1,1-Dichloroethene		5	***2.3 J***
1,2-Dichloroethane		0.6	*< 5.0*
1,2-Dichloropropane		1	*< 5.0*
2-Butanone		NE	*< 50*
4-Methyl-2-Pentanone		50	*< 50*
Acetone		NE	*< 50*
Benzene		1	*< 0.70*
Bromodichloromethane		50	*< 5.0*
Bromoform		50	*< 5.0*
Bromomethane		5	*< 5.0*
Carbon Disulfide		60	*< 5.0*
Carbon Tetrachloride		5	*< 5.0*
Chlorobenzene		5	*< 5.0*
Chlorodibromomethane		50	*< 5.0*
Chlorodifluoromethane (Freon 22)		NE	*< 5.0*
Chloroethane		5	*< 5.0*
Chloroform		7	*< 5.0*
Chloromethane		5	*< 5.0*
cis-1,2-Dichloroethene		5	***0.63 J***
cis-1,3-Dichloropropene		0.4	*< 5.0*
Dichlorodifluoromethane (Freon 12)		5	*< 5.0*
Dichloromethane		5	*< 5.0*
Ethylbenzene		5	*< 5.0*
Methyl N-Butyl Ketone		50	*< 50*
Methyl-Tert-Butylether		5	*< 5.0*
Styrene (Monomer)		5	*< 5.0*
Tetrachloroethene		5	***2.8 J***
Toluene		5	*< 5.0*
trans-1,2-Dichloroethene		5	*< 5.0*
trans-1,3-Dichloropropene		0.4	*< 5.0*
Trichloroethene		5	***1.6 J***
Trichlorotrifluoroethane (Freon 113)		5	***1.4 J***
Vinyl Chloride		2	*< 2.0*
Xylene - o		5	*< 5.0*
Xylenes - m,p		5	*< 5.0*
Total VOCs [3]			***13***
Project VOCs [4]			***11***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	MW-203-1 5/1/2009	MW-203-1 12/2/2009	MW-203-1 10/5/2010	MW-203-1 11/1/2011	MW-203-1 10/3/2012
1,1,1-Trichloroethane		5	< 5	< 5	< 5	< 5	**0.26 J**
1,1,2,2-Tetrachloroethane		5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane		1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane		5	< 5	< 5	< 5	**0.32 J**	**1 J**
1,1-Dichloroethene		5	< 5	< 5	< 5	< 5	**0.44 J**
1,2-Dichloroethane		0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane		1	< 5	< 5	< 5	< 5	< 5
2-Butanone		NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone		50	< 50	< 50	< 50	< 50	< 50
Acetone		NE	< 50 B	< 50	< 50 B	< 50	< 50
Benzene		1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane		50	< 5	< 5	< 5	< 5	< 5
Bromoform		50	< 5	< 5	< 5	< 5	< 5
Bromomethane		5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide		60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride		5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene		5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane		50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)		NE	**73**	**17**	**29**	**8.9**	**3.6 J**
Chloroethane		5	< 5	< 5	< 5	< 5	< 5
Chloroform		7	**7.9**	**2.6 J**	**1.5 J**	**0.68 J**	**0.36 J**
Chloromethane		5	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene		5	**1.6 J**	**0.83 J**	**0.97 J**	**1.4 J**	**0.62 J**
cis-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)		5	< 5	< 5	< 5	< 5	< 5
Dichloromethane		5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene		5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone		50	< 50	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether		5	--	--	**0.88 J**	**0.41 J**	**0.21 J**
Styrene (Monomer)		5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene		5	< 5	< 5	< 5	**0.35 J**	**0.59 J**
Toluene		5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene		5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene		0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene		5	**1.3 J**	**0.7 J**	**1.6 J**	**2.9 J**	**1.8 J**
Trichlorotrifluoroethane (Freon 113)		5	< 5	< 5	< 5	< 5	**1.1 J**
Vinyl Chloride		2	< 2	< 2	< 2	< 2	< 2
Xylene - o		5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p		5	< 5	< 5	< 5	< 5	< 5
Total VOCs [3]			**84**	**21**	**34**	**15**	**10**
Project VOCs [4]			**2.9**	**1.5**	**2.6**	**5**	**4.7**

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	*MW-203-1 (REP)* *5/31/2013*	*MW-203-1* *5/31/2013*
1,1,1-Trichloroethane		5	*< 5.0*	***0.25 J***
1,1,2,2-Tetrachloroethane		5	*< 5.0*	*< 5.0*
1,1,2-Trichloroethane		1	*< 5.0*	*< 5.0*
1,1-Dichloroethane		5	***0.98 J***	***1.1 J***
1,1-Dichloroethene		5	***0.47 J***	***0.46 J***
1,2-Dichloroethane		0.6	*< 5.0*	*< 5.0*
1,2-Dichloropropane		1	*< 5.0*	*< 5.0*
2-Butanone		NE	*< 50*	*< 50*
4-Methyl-2-Pentanone		50	*< 50*	*< 50*
Acetone		NE	*< 50*	*< 50*
Benzene		1	*< 0.70*	*< 0.70*
Bromodichloromethane		50	*< 5.0*	*< 5.0*
Bromoform		50	*< 5.0*	*< 5.0*
Bromomethane		5	*< 5.0*	*< 5.0*
Carbon Disulfide		60	*< 5.0*	*< 5.0*
Carbon Tetrachloride		5	*< 5.0*	*< 5.0*
Chlorobenzene		5	*< 5.0*	*< 5.0*
Chlorodibromomethane		50	*< 5.0*	*< 5.0*
Chlorodifluoromethane (Freon 22)		NE	***3.5 J***	***3.2 J***
Chloroethane		5	*< 5.0*	*< 5.0*
Chloroform		7	***0.28 J***	***0.27 J***
Chloromethane		5	*< 5.0*	*< 5.0*
cis-1,2-Dichloroethene		5	***0.39 J***	***0.24 J***
cis-1,3-Dichloropropene		0.4	*< 5.0*	*< 5.0*
Dichlorodifluoromethane (Freon 12)		5	*< 5.0*	*< 5.0*
Dichloromethane		5	*< 5.0*	*< 5.0*
Ethylbenzene		5	*< 5.0*	*< 5.0*
Methyl N-Butyl Ketone		50	*< 50*	*< 50*
Methyl-Tert-Butylether		5	***0.24 J***	***0.24 J***
Styrene (Monomer)		5	*< 5.0*	*< 5.0*
Tetrachloroethene		5	***0.93 J***	***1.1 J***
Toluene		5	*< 5.0*	*< 5.0*
trans-1,2-Dichloroethene		5	*< 5.0*	*< 5.0*
trans-1,3-Dichloropropene		0.4	*< 5.0*	*< 5.0*
Trichloroethene		5	***2.5 J***	***2.7 J***
Trichlorotrifluoroethane (Freon 113)		5	***1.1 J***	***1.4 J***
Vinyl Chloride		2	*< 2.0*	*< 2.0*
Xylene - o		5	*< 5.0*	*< 5.0*
Xylenes - m,p		5	*< 5.0*	*< 5.0*
Total VOCs [3]			***10***	***11***
Project VOCs [4]			***5.3***	***5.9***

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2)

Notes:

(1) Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).

(2) Samples analyzed for the TCL VOCs using NYSDEC ASP 2005 Method OLM4.3.

(3) "Total VOCs" represents the sum of individual concentrations of the VOCs detected. Results are rounded to two significant figures.

(4) "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and xylenes-o,m, and p.

Acronyms\Key:

Indicates an exceedance of an SCG.

Bold value indicates a detection.

Italicized samples collected in 2013.

RI/FS	Remedial Investigation/Feasibility Study.
NYSDEC	New York State Department of Environmental Conservation.
TCL	Target compound list.
VOC	Volatile Organic Compound.
ASP	Analytical services protocol.
SCGs	Standards, criteria, and guidance values.
µg/L	Micrograms per liter.
NE	Not established.
E	Concentration for the compound exceeded the calibration range.
J	Compound detected but below its reporting limit; the value is estimated.
D	Compound identified from secondary dilution.
R	Concentration for the compound was rejected.
B	Compound detected in associated blank sample.
< 5	Compound not detected above its laboratory quantification limit.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

Constituent in µg/L	Sample Location: / Sample Date:	NYSDEC SCGs	B24MW-2 4/23/2009	B24MW-3 4/20/2009	BCPMW-1 4/28/2009	BCPMW-2 4/28/2009	BCPMW-3 4/29/2009	BCPMW-4-1 4/17/2009	BCPMW-4-1 10/4/2010	BCPMW-4-1 10/28/2011
Cadmium, Total		5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium, Dissolved		5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chromium, Total		50	**40.3**	**28.2**	**20.8**	< 10	< 10	**22.7**	**43**	**25**
Chromium, Dissolved		50	< 10	**10.6**	< 10	< 10	< 10	**12.8**	**41**	**22**
Iron (total)		300	--	**597**	--	< 100	**2,080**	**103**	--	--
Iron (dissolved)		300	--	< 100	--	< 100	**1,760**	< 100	--	--
Manganese (total)		300	--	**16.9**	--	**12.7**	**51.4**	**11.2**	--	--
Manganese (dissolved)		300	--	**13.7**	--	**11.3**	**49.2**	< 10	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (µg/L)	Sample Location: / Sample Date:	BCPMW-4-1 10/3/2012	BCPMW-4-1 10/4/2012	*BCPMW-4-1 6/5/2013*	BCPMW-4-2 4/17/2009	BCPMW-4-2 10/7/2010	BCPMW-4-2 10/28/2011	BCPMW-4-2 10/3/2012	BCPMW-4-2 10/4/2012	*BCPMW-4-2 6/5/2013*
	NYSDEC SCGs									
Cadmium (total)	5	*< 5*	--	*< 5.0*	< 5	< 5	< 5	< 5	--	*< 5.0*
Cadmium (dissolved)	5	--	< 5	*< 5.0*	< 5	--	< 5	--	< 5	*< 5.0*
Chromium (total)	50	***32***	--	***16.1***	**10.6**	< 10	< 10	< 10	--	*< 10*
Chromium (dissolved)	50	--	**26**	***13.1***	< 10	--	< 10	--	< 10	*< 10*
Iron (total)	300	--	--	--	**4,630**	--	--	--	--	--
Iron (dissolved)	300	--	--	--	**4,080**	--	--	--	--	--
Manganese (total)	300	--	--	--	**228**	--	--	--	--	--
Manganese (dissolved)	300	--	--	--	**217**	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (µg/L)	Sample Location: / Sample Date:	BCPMW-4-3 4/17/2009	BCPMW-4-3 10/7/2010	BCPMW-4-3 10/28/2011	BCPMW-4-3 10/3/2012	BCPMW-4-3 10/4/2012	*BCPMW-4-3 (REP) 6/5/2013*	*BCPMW-4-3 6/5/2013*
	NYSDEC SCGs							
Cadmium (total)	5	< 5	< 5	< 5	*< 5*	--	*< 5.0*	*< 5.0*
Cadmium (dissolved)	5	< 5	< 5	< 5	--	< 5	*< 5.0*	*< 5.0*
Chromium (total)	50	< 10	< 10	< 10	*< 10*	--	*< 10*	*< 10*
Chromium (dissolved)	50	< 10	< 10	< 10	--	< 10	*< 10*	*< 10*
Iron (total)	300	< 100	--	--	--	--	--	--
Iron (dissolved)	300	< 100	--	--	--	--	--	--
Manganese (total)	300	< 10	--	--	--	--	--	--
Manganese (dissolved)	300	< 10	--	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (µg/L)	Sample Location: / Sample Date:	BCPMW-5-1 4/23/2009	BCPMW-6-1 4/20/2009	BCPMW-6-1 10/6/2010	BCPMW-6-1 10/31/2011	BCPMW-6-1 10/3/2012	BCPMW-6-1 10/4/2012	*BCPMW-6-1 6/7/2013*	BCPMW-6-2 5/8/2009
	NYSDEC SCGs								
Cadmium (total)	5	< 5	< 5	<5	< 5	< 5	--	*< 5.0*	< 5
Cadmium (dissolved)	5	< 5	< 5	<5	< 5	--	< 5	*< 5.0*	< 5
Chromium (total)	50	< 10	< 10	< 10	**14**	< 10	--	*< 10*	**10.3**
Chromium (dissolved)	50	< 10	< 10	<10	< 10	--	< 10	*< 10*	< 10
Iron (total)	300	**7,420**	< 100	--	--	--	--	--	--
Iron (dissolved)	300	**6,370**	< 100	--	--	--	--	--	--
Manganese (total)	300	**145**	< 10	--	--	--	--	--	--
Manganese (dissolved)	300	**131**	< 10	--	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (µg/L)	Sample Location: / Sample Date:	BCPMW-6-2 10/6/2010	BCPMW-6-2 10/31/2011	BCPMW-6-2 10/3/2012	BCPMW-6-2 10/4/2012	*BCPMW-6-2 6/5/2013*	BCPMW-7-1 4/20/2009	BCPMW-7-1 10/7/2010	BCPMW-7-1 11/1/2011	BCPMW-7-1 10/4/2012
	NYSDEC SCGs									
Cadmium (total)	5	<5	<5	< 5	--	*< 5.0*	< 5	< 5	< 5	< 5
Cadmium (dissolved)	5	<5	<5		< 5	*< 5.0*	< 5	< 5	< 5	< 5
Chromium (total)	50	<10	<10	< 10	--	*< 10*	< 10	< 10	< 10	< 10
Chromium (dissolved)	50	<10	<10		< 10	*< 10*	< 10	< 10	< 10	< 10
Iron (total)	300	--	--	--	--	--	< 100	--	--	--
Iron (dissolved)	300	--	--	--	--	--	< 100	--	--	--
Manganese (total)	300	--	--	--	--	--	**106**	--	--	--
Manganese (dissolved)	300	--	--	--	--	--	**94.8**	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (µg/L)	Sample Location: / Sample Date:	*BCPMW-7-1* *6/7/2013*	MW-200-1 4/29/2009	MW-200-1 10/5/2010	MW-200-1 11/3/2011	MW-200-1[3] 10/4/2012	MW-200-1 4/15/2013	*MW-200-1* *5/31/2013*	MW-201-1 5/1/2009	MW-201-1 10/5/2010
	NYSDEC SCGs									
Cadmium (total)	5	*< 5.0*	< 5	< 5	< 5	< 5	--	*< 5*	< 5	< 5
Cadmium (dissolved)	5	*< 5.0*	< 5	< 5	< 5	< 5	--	*< 5*	< 5	< 5
Chromium (total)	50	*< 10*	< 10	**14**	**48**	**1,130**	**86**	***15.7***	< 10	< 10
Chromium (dissolved)	50	*< 10*	< 10	< 10	**13**	**320**	**21**	*< 10*	< 10	< 10
Iron (total)	300	--	--	--	--	--	--	--	--	--
Iron (dissolved)	300	--	--	--	--	--	--	--	--	--
Manganese (total)	300	--	--	--	--	--	--	--	--	--
Manganese (dissolved)	300	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2]

COMPOUND (µg/L)	Sample Location: / Sample Date:	MW-201-1 11/3/2011	MW-201-1[3] 10/4/2012	MW-201-1 4/16/2013	*MW-201-1 5/31/2013*	MW-202-1 5/1/2009	MW-202-1 10/6/2010	MW-202-1 11/3/2011	MW-202-1[3] 10/4/2012	MW-202-1 4/16/2013	*MW-202-1 5/30/2013*
	NYSDEC SCGs										
Cadmium (total)	5	< 5	< 5	--	*< 5*	< 5	< 5	< 5	< 5	--	*< 5*
Cadmium (dissolved)	5	< 5	< 5	--	*< 5*	< 5	< 5	< 5	< 5	--	*< 5*
Chromium (total)	50	< 10	**159**	**28**	*< 10*	**16.5**	**15**	**23**	**263 J**	**19**	***34.3***
Chromium (dissolved)	50	< 10	**42**	**17**	*< 10*	< 10	<10	< 10	**22**	<10	*< 10*
Iron (total)	300	--	--	--	--	--	--	--	--	--	--
Iron (dissolved)	300	--	--	--	--	--	--	--	--	--	--
Manganese (total)	300	--	--	--	--	--	--	--	--	--	--
Manganese (dissolved)	300	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2)

COMPOUND (µg/L)	Sample Location: Sample Date:	MW-203-1 5/1/2009	MW-203-1 10/5/2010	MW-203-1 11/1/2011	MW-203-1(3) 10/3/2012	MW-203-1 10/4/2012	MW-203-1 4/16/2013	*MW-203-1(REP) 5/31/2013*	*MW-203-1 5/31/2013*
	NYSDEC SCGs								
Cadmium (total)	5	< 5	< 5	< 5	< 5	--	--	*< 5*	*< 5*
Cadmium (dissolved)	5	< 5	< 5	< 5	--	< 5	--	*< 5*	*< 5*
Chromium (total)	50	**31.5**	**31**	**37**	**1,600**	--	**155**	***38.2***	***29.5***
Chromium (dissolved)	50	< 10	< 10	< 10	--	**84**	<10	*< 10*	*< 10*
Iron (total)	300	--	--	--	--	--	--	--	--
Iron (dissolved)	300	--	--	--	--	--	--	--	--
Manganese (total)	300	--	--	--	--	--	--	--	--
Manganese (dissolved)	300	--	--	--	--	--	--	--	--

Notes:

(1) Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).

(2) Samples analyzed for the metals using USEPA Method 6010.

(3) Samples collected with HydraSleeve™ no purge method, all other samples collected by purge (3-Volume) method.

Acronyms\Key:

Indicates an exceedance of an SCG.

Bold value indicates a detection.

Italicized samples collected in 2013.

RI/FS Remedial Investigation/Feasibility Study.

NYSDEC New York State Department of Environmental Conservation.

USEPA U.S. Environmental Protection Agency

SCGs Standards, criteria, and guidance values.

µg/L Micrograms per liter.

-- Not analyzed.

< 5 Compound not detected above its laboratory quantification limit.

ARCADIS

Figures

SOURCE:
USGS 7.5 MIN. AMITYVILLE QUADRANGLE, AMITYVILLE, N.Y., 1994, FREEPORT QUADRANGLE, FREEPORT, N.Y., 1994, HICKSVILLE QUADRANGLE, HICKSVILLE, N.Y., 1967, PHOTOREVISED 1979, HUNTINGTON, N.Y., 1967, PHOTOREVISED 1979

0 2000' 4000'

SCALE IN FEET

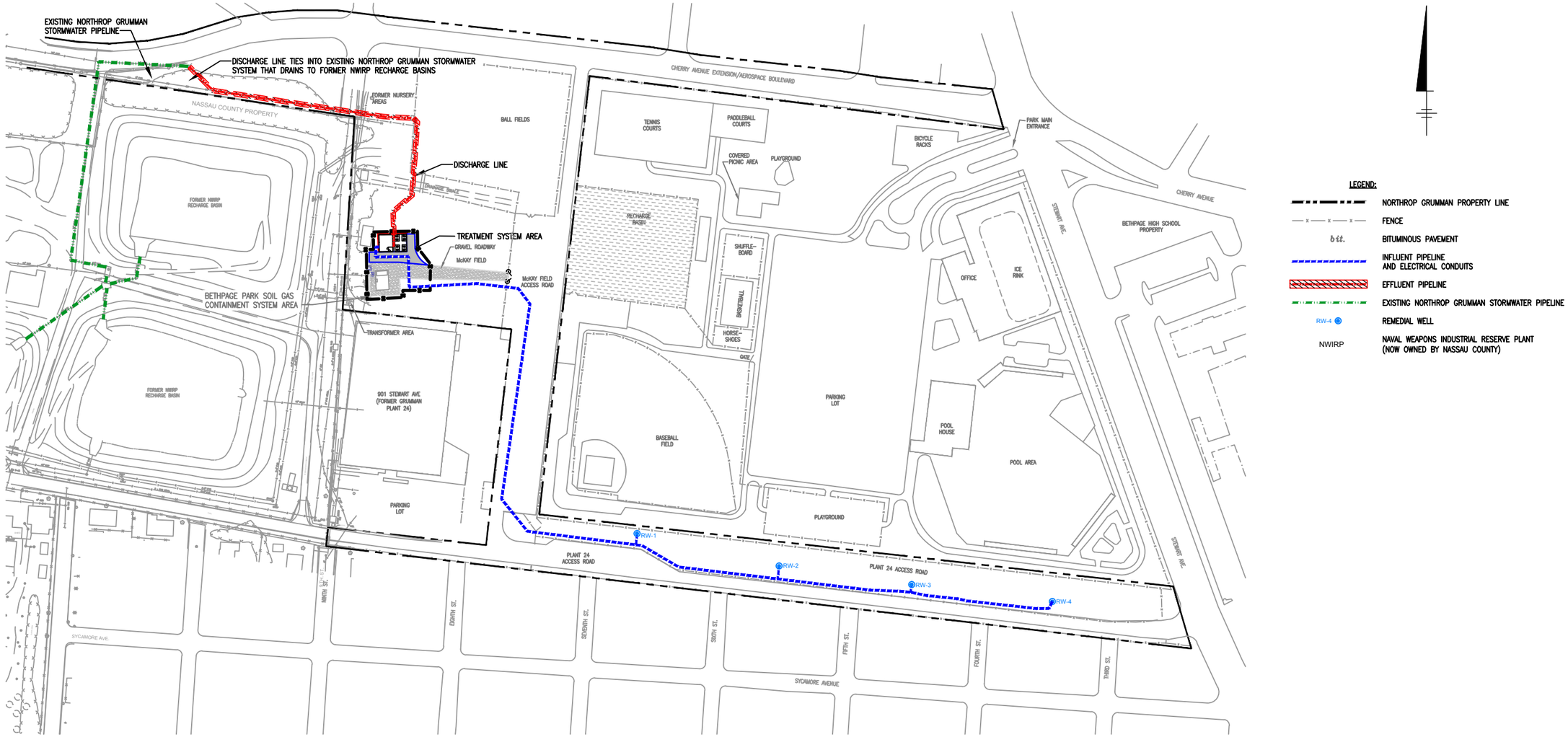
BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

SITE LOCATION

ARCADIS

FIGURE
1

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD: PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVE\NY001496\0312\GWMM4\OU3\NY1496_B01.dwg LAYOUT: BETHPAGE PARK SAVED: 3/27/2014 4:16 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/27/2014 4:31 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----
AMITYVILLE.TIF
FREEPORT.TIF
HICKSVILLE.TIF
HUNTINGTON.TIF



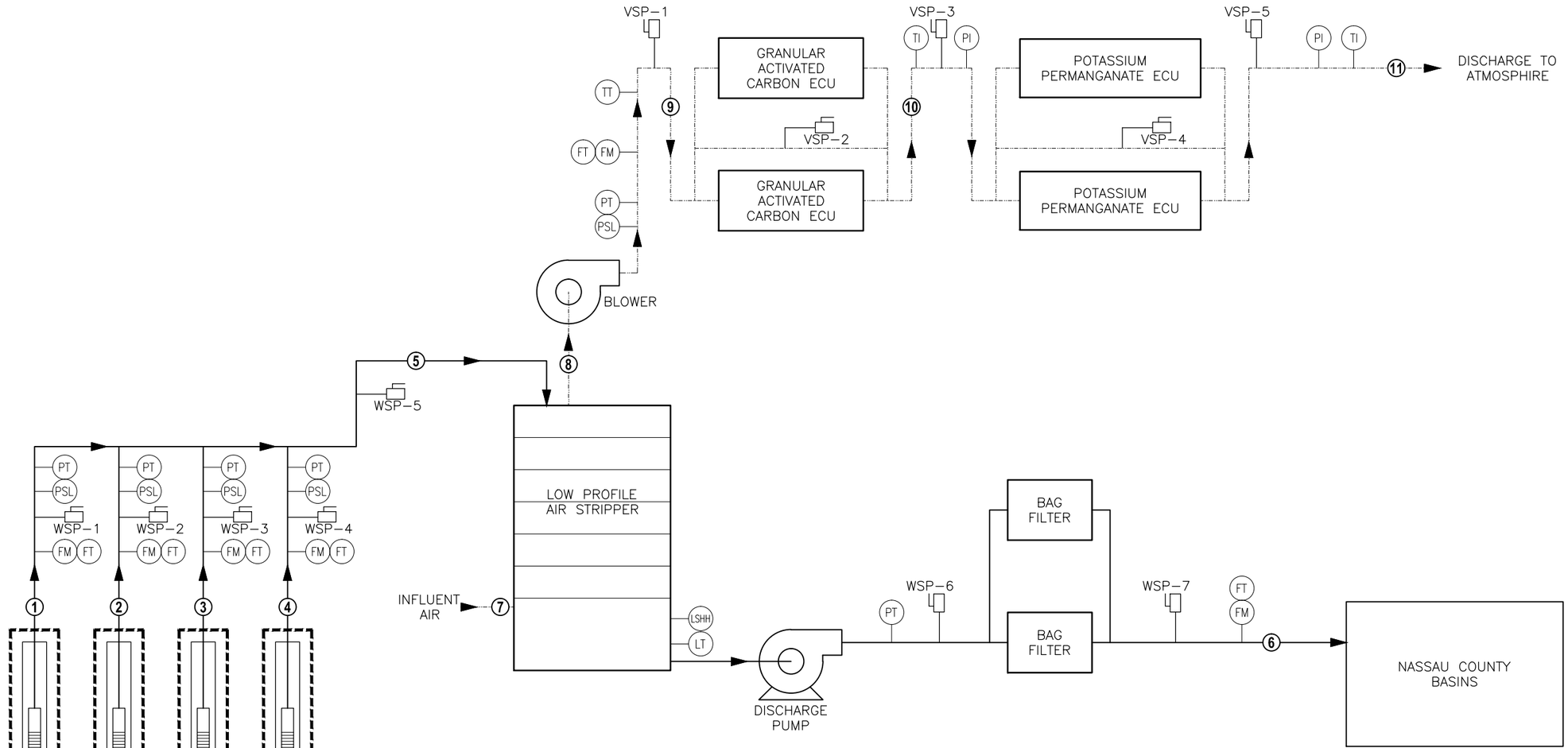
BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

SITE AND GROUNDWATER CONTAINMENT SYSTEM

ARCADIS

FIGURE
2

CITY:MELVILLE DIV/GROUP:ENR1 DB:ALS LD: PIC: PM:CSG TM: LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVE\NY001496111\4\OMM\401496B01.DWG LAYOUT: 2 SAVED: 5/23/2014 10:20 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: C-LD2B-PDF.GMS PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 5/23/2014 10:23 AM BY: STOWELL, GARY
XREFS: IMAGES: PROJECTNAME: NY001484.1807.00003



PROCESS	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
Mass Loading (lbs/day)											
Trichloroethene	0.009	0.041	0.082	0.008	0.140	<0.008	0.000	0.140	0.140	<0.014	<0.014
cis -1,2 Dichloroethene	0.007	1.877	0.431	0.030	2.346	<0.008	0.000	2.346	2.346	<0.235	<0.235
Vinyl Chloride	0.000	0.443	0.001	0.000	0.444	<0.003	0.000	0.444	0.444	0.444	<0.044
Flow Rate (gpm)	40	85	85	40	250	250	---	---	---	---	---
Flow Rate (CFM)	---	---	---	---	---	---	1,300 - 1,600	1,300	1,535	1,557	1,581
Pressure (feet of water)	10	10	10	10	8	15	---	---	---	---	---
Pressure (inches of water)	---	---	---	---	---	---	0	- 28 to - 38	12	6	0
pH	6.4	6.4	6.4	6.4	6.4	6.2	---	---	---	---	---
Temperature	55	55	55	55	55	55	10	55	97	95	95
Relative Humidity	---	---	---	---	---	---	20 - 80	100	<50	<50	<50

LEGEND:

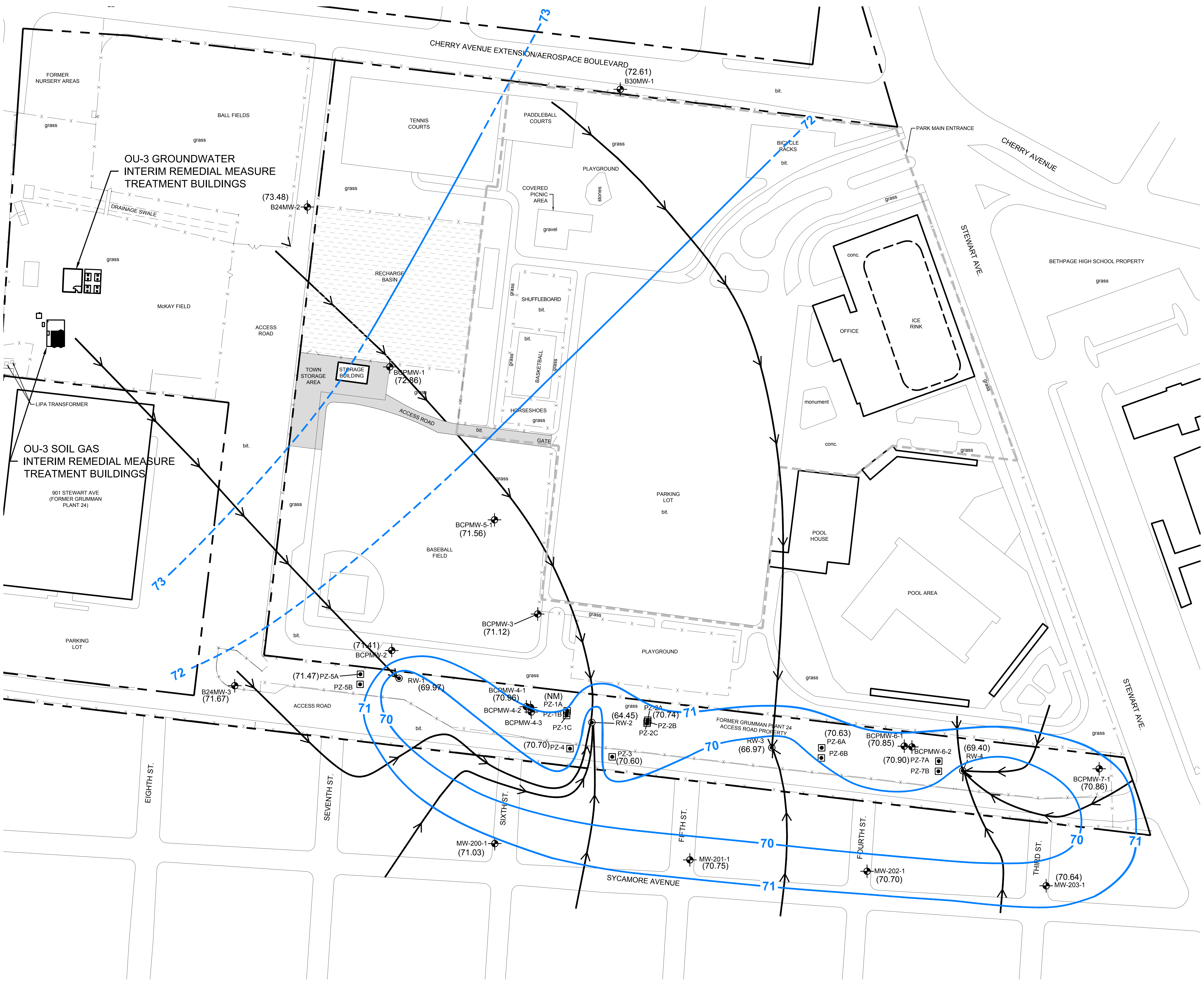
- PROCESS WATER
- PROCESS AIR
- FM — INSTRUMENT
- SAMPLE PORT
- FLOW DIRECTION
- FM FLOW METER
- FT FLOW RATE TRANSMITTER
- PSL PRESSURE VACUUM LOW
- PT PRESSURE TRANSMITTER
- PI PRESSURE INDICATOR
- LSHH LEVEL SWITCH HIGH HIGH
- LT LEVEL TRANSMITTER
- TT TEMPERATURE TRANSMITTER
- TI TEMPERATURE INDICATOR
- ⑧ PROCESS DESIGNATION
- WSP WATER SAMPLE PORT
- VSP VAPOR SAMPLE PORT
- ECU EMISSION CONTROL UNIT
- gpm GALLONS PER MINUTE
- CFM CUBIC FEET PER MINUTE
- lbs/day POUNDS PER DAY

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

GROUNDWATER TREATMENT SYSTEM PROCESS SCHEMATIC, PROCESS FLOW DIAGRAM, AND MONITORING LOCATIONS

ARCADIS

FIGURE 3



EXPLANATION:

- NORTHROP GRUMMAN PROPERTY LINE
- FENCE
- BASIN
- bit. — BITUMINOUS PAVEMENT
- MW-200-1 — MONITORING WELL
- RW-2 — REMEDIAL WELL
- PZ-2C — PIEZOMETER
- (64.45) — WATER-LEVEL ELEVATION (FEET MEAN SEA LEVEL)
- (NM) — NOT MEASURED
- 70 — GROUNDWATER ELEVATION CONTOUR IN FEET RELATIVE TO MEAN SEA LEVEL (DASHED WHERE LESS CONTROL AVAILABLE)
- DIRECTION OF THE HORIZONTAL COMPONENT OF GROUNDWATER FLOW

NOTES:

1. MONITORING WELLS, REMEDIAL WELLS, AND PIEZOMETERS SURVEYED TO NORTH AMERICAN DATUM (NAD) 83.
2. PARK FEATURES SHOWN WERE PRESENT PRIOR TO TOWN OF OYSTER BAY REDEVELOPMENT IN 2005.
3. WATER LEVEL ELEVATIONS CALCULATED FROM DATA COLLECTED ON JUNE 3, 2014.
4. PZ-1A COULD NOT BE ACCESSED; THEREFORE, WATER LEVEL WAS NOT MEASURED.
5. REFER TO TABLE 6 FOR PUMPING RATES OF REMEDIAL WELLS.

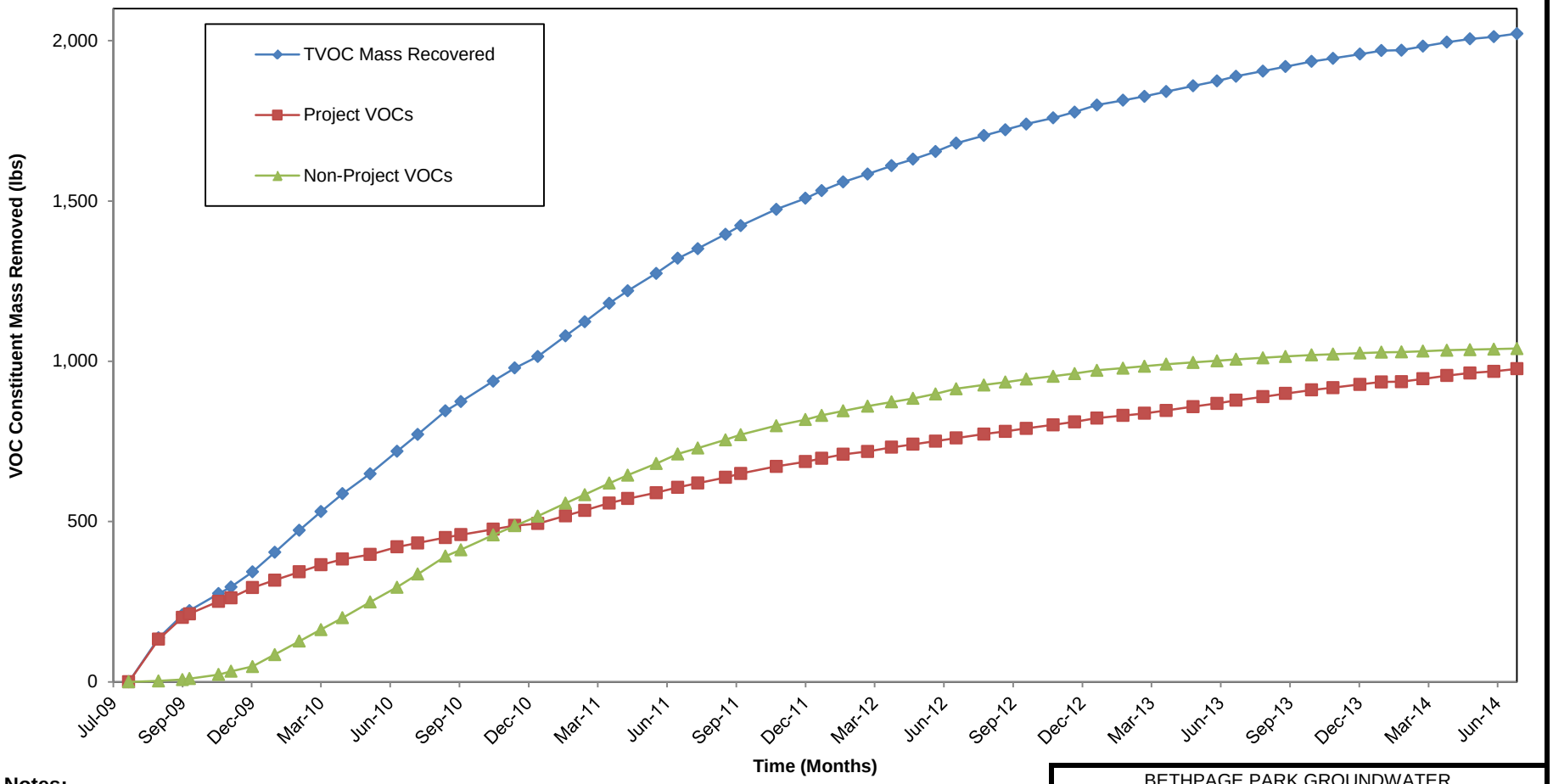
0 100' 200'
SCALE IN FEET

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

GROUNDWATER MONITORING NETWORK AND CONFIGURATION OF THE SHALLOW POTENTIOMETRIC SURFACE AND GROUNDWATER FLOW DIRECTIONS SECOND QUARTER 2014

ARCADIS

FIGURE
4



Notes:

VOC = Volatile organic compound.

lbs = Pounds.

TVOCs = Sum of VOCs detected.

Project VOCs = Sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes.

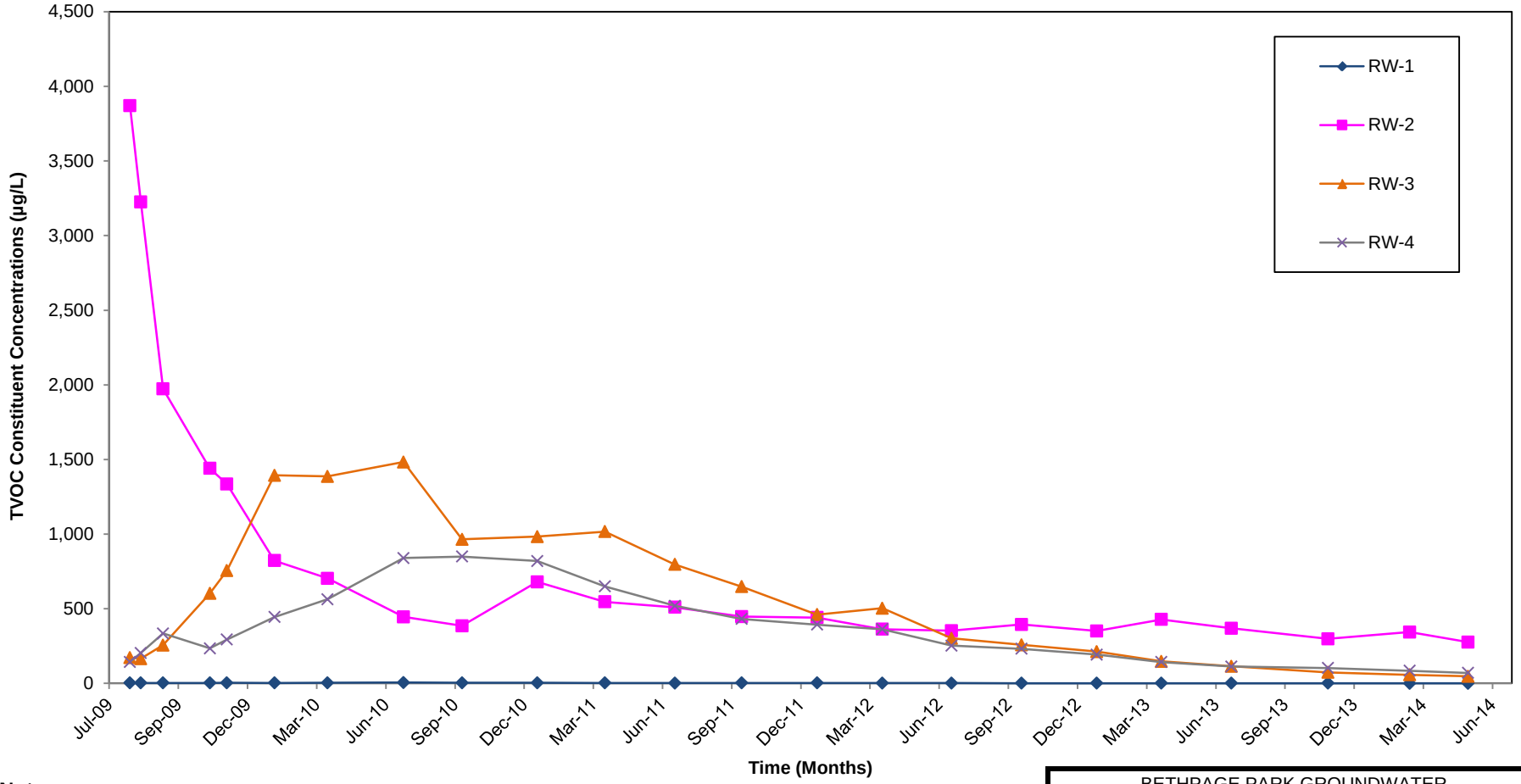
Non-Project VOCs = Sum of VOCs that are not Project VOCs.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

CUMULATIVE TOTAL, PROJECT, AND NON-PROJECT VOC MASS REMOVED THROUGH JUNE 2014

ARCADIS

FIGURE 5



Notes:

VOC = Volatile organic compound.

µg/L = Micrograms per liter.

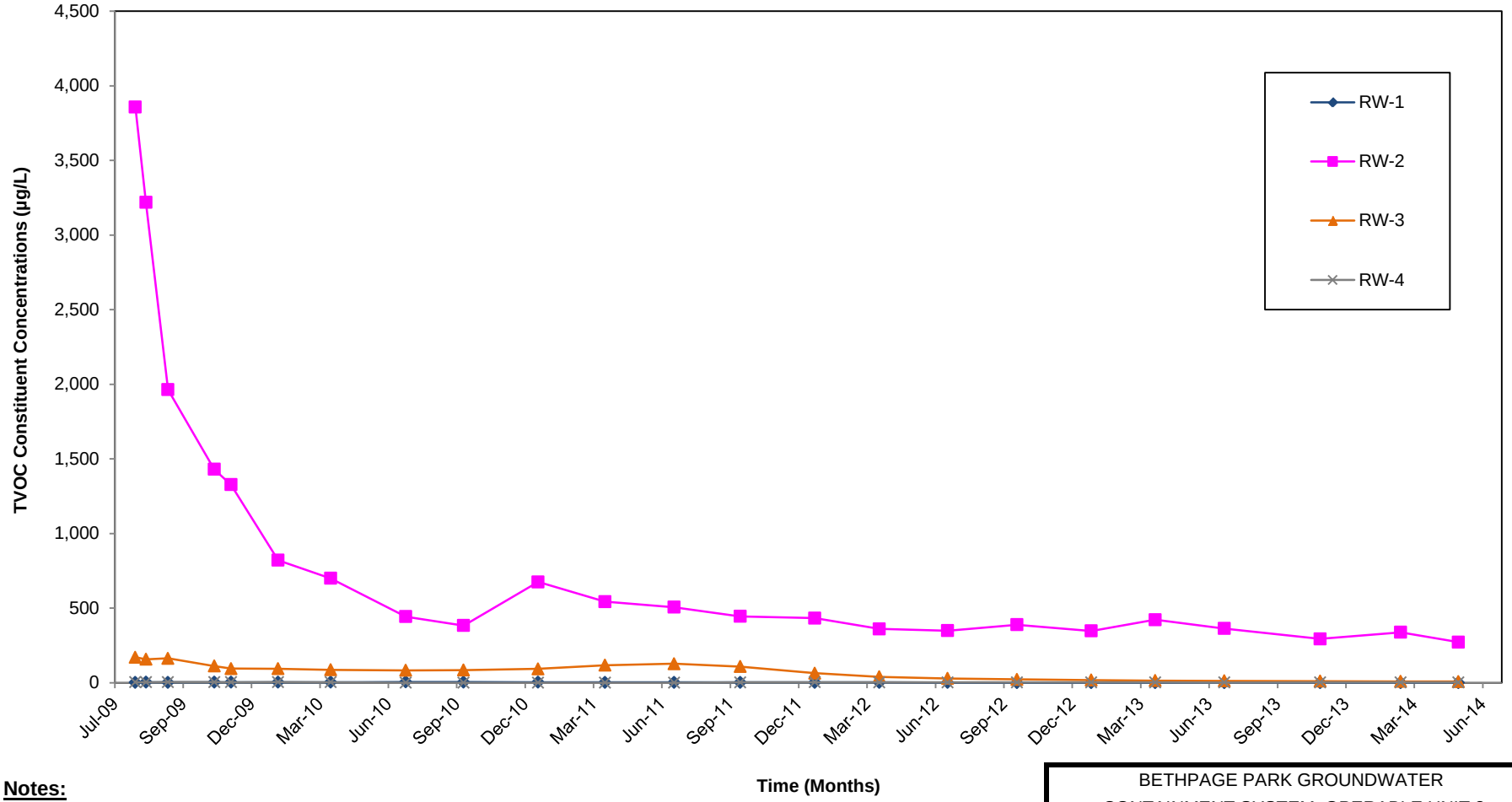
TVOCs = Sum of VOCs detected.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

REMEDIAL WELL TVOC CONCENTRATIONS THROUGH JUNE 2014

ARCADIS

FIGURE 6A



Notes:

VOC = Volatile organic compound.

µg/L = Micrograms per liter.

TVOCs = Sum of VOCs detected.

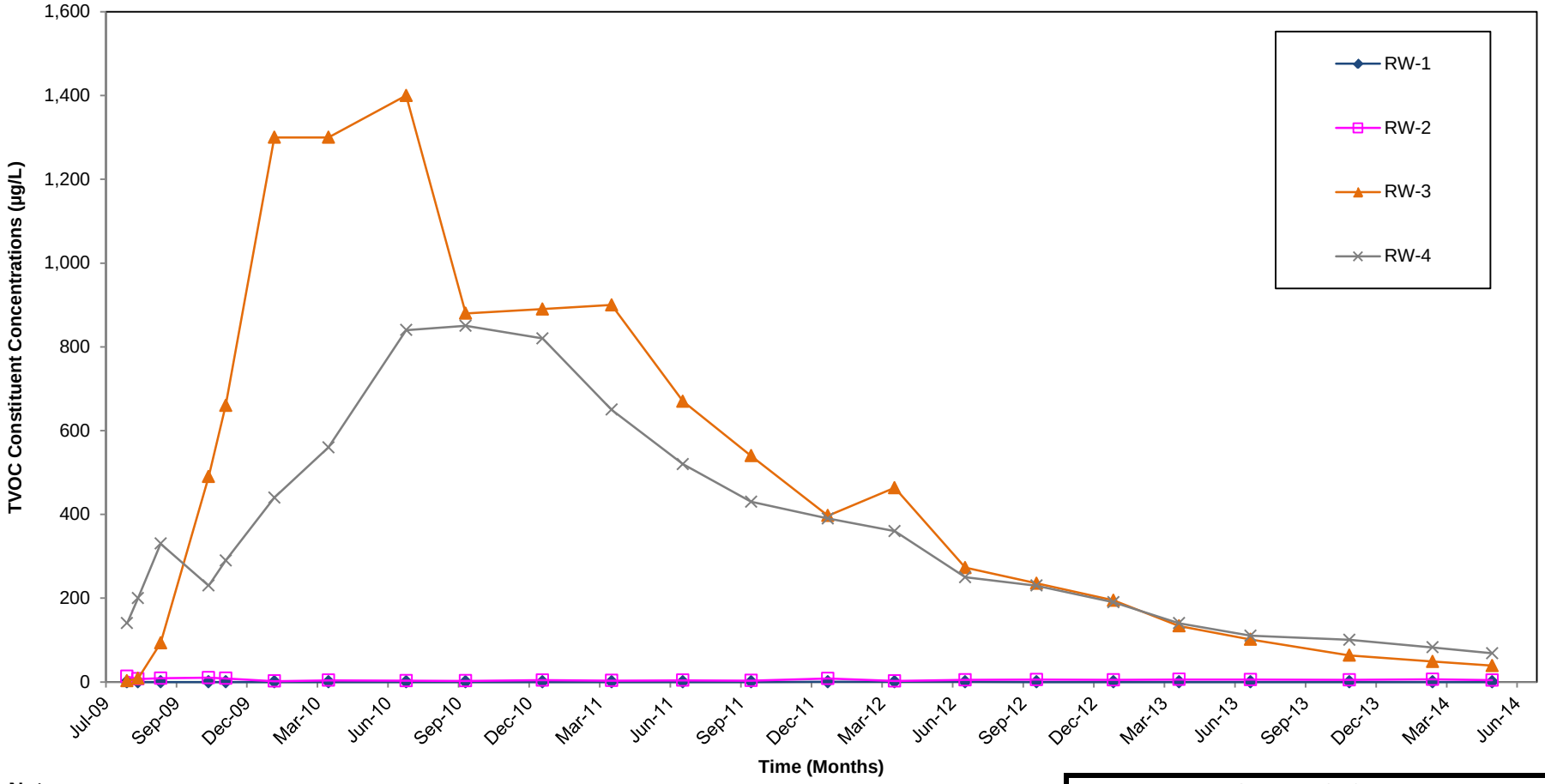
Project VOCs = Sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene and total xylenes.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

REMEDIAL WELL PROJECT VOC CONCENTRATIONS THROUGH JUNE 2014

ARCADIS

FIGURE
6B



Notes:

VOC = Volatile organic compound.

µg/L = Micrograms per liter.

TVOCs = Sum of VOCs detected.

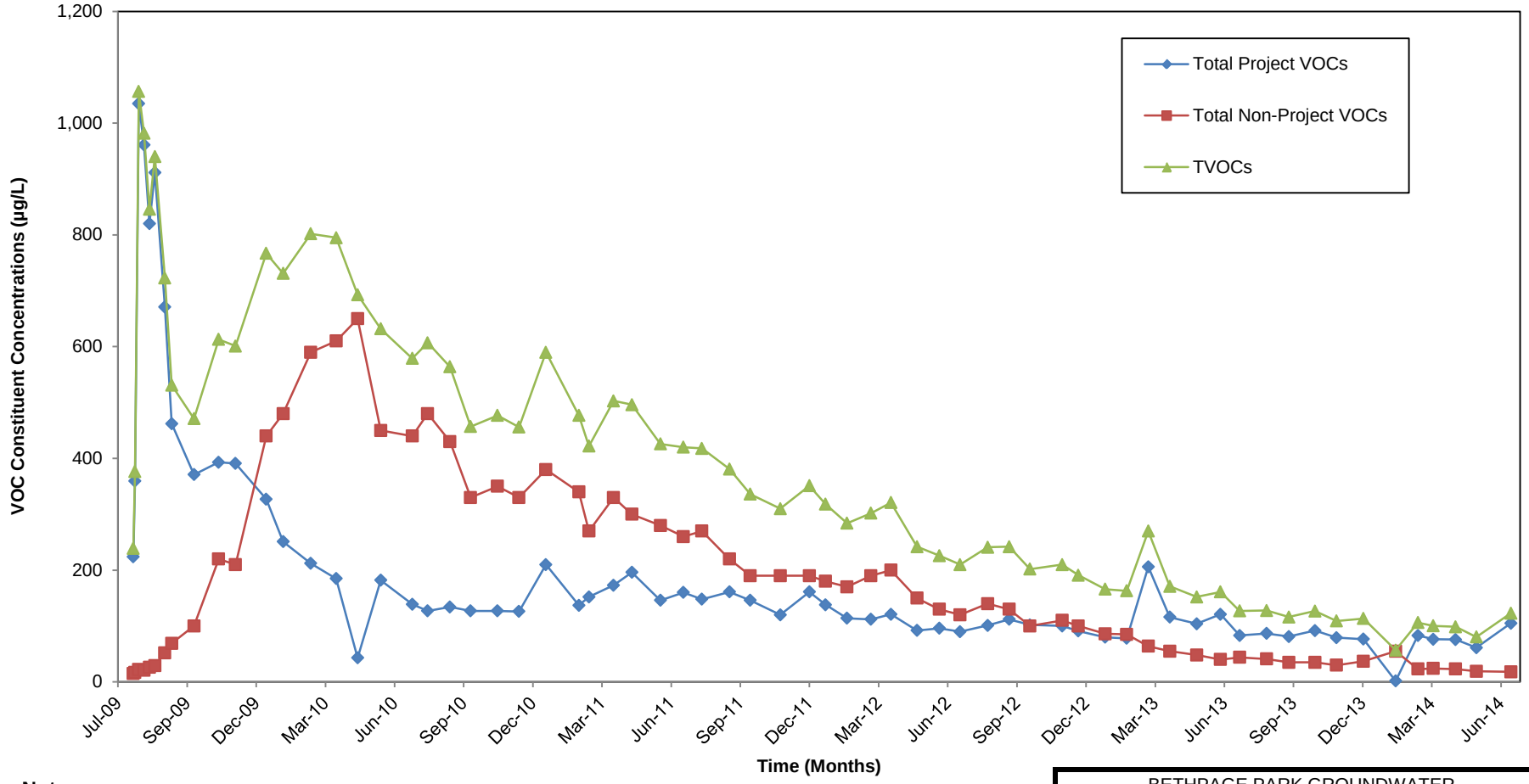
Non-Project VOCs = Sum of TVOCs that are not Project VOCs.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

REMEDIAL WELL NON-PROJECT VOC CONCENTRATIONS THROUGH JUNE 2014

ARCADIS

FIGURE
6C



Notes:

VOC = Volatile organic compound.

µg/L = Micrograms per liter.

TVOCs = Sum of VOCs detected.

Project VOCs = Sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes.

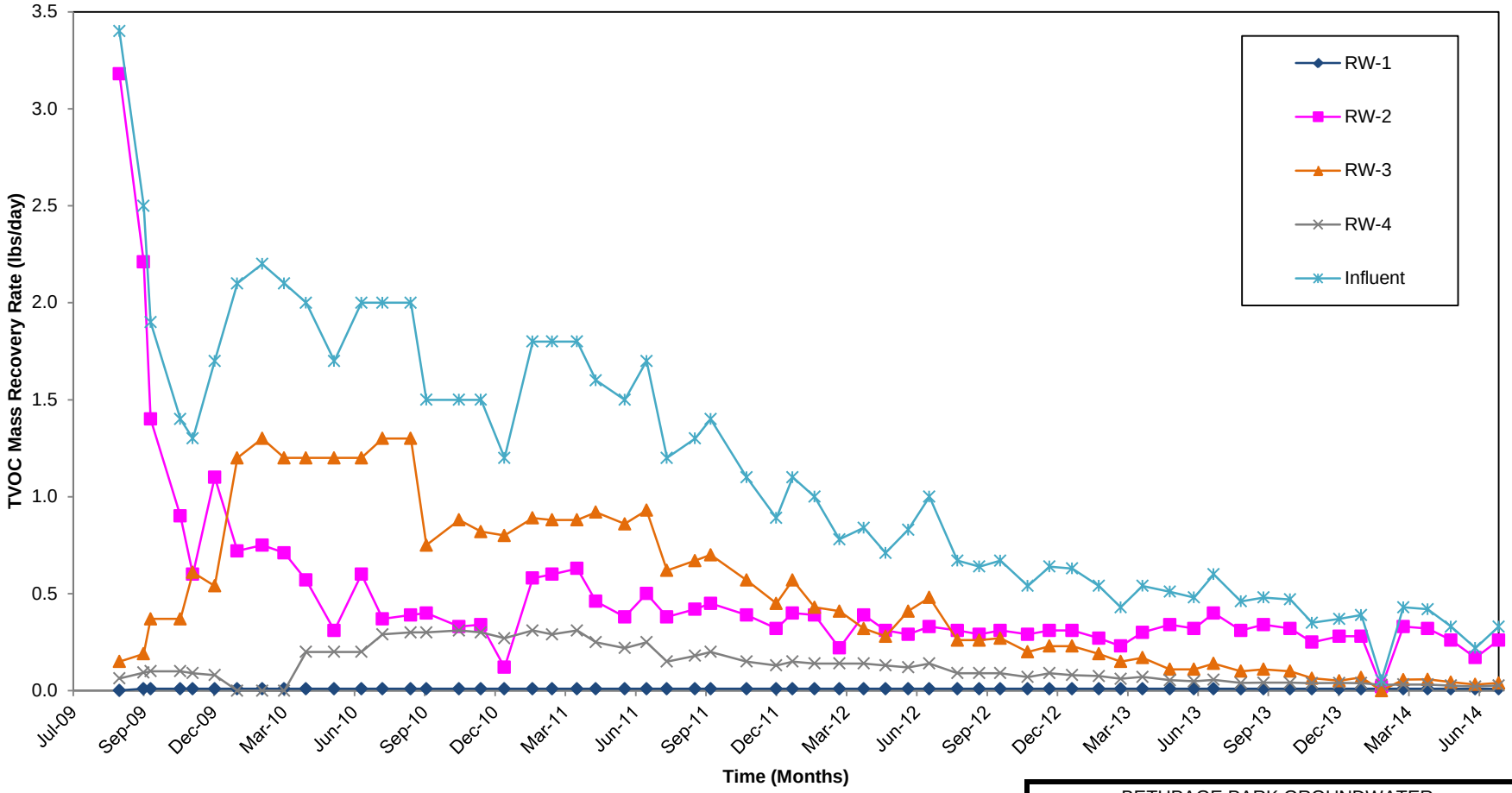
Non-Project VOCs = Sum of VOCs that are not Project VOCs.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

INFLUENT TOTAL, PROJECT, AND NON-PROJECT VOC CONCENTRATIONS THROUGH JUNE 2014

ARCADIS

FIGURE
7



Notes:

VOC = Volatile organic compound.

lbs/day = Pounds per day.

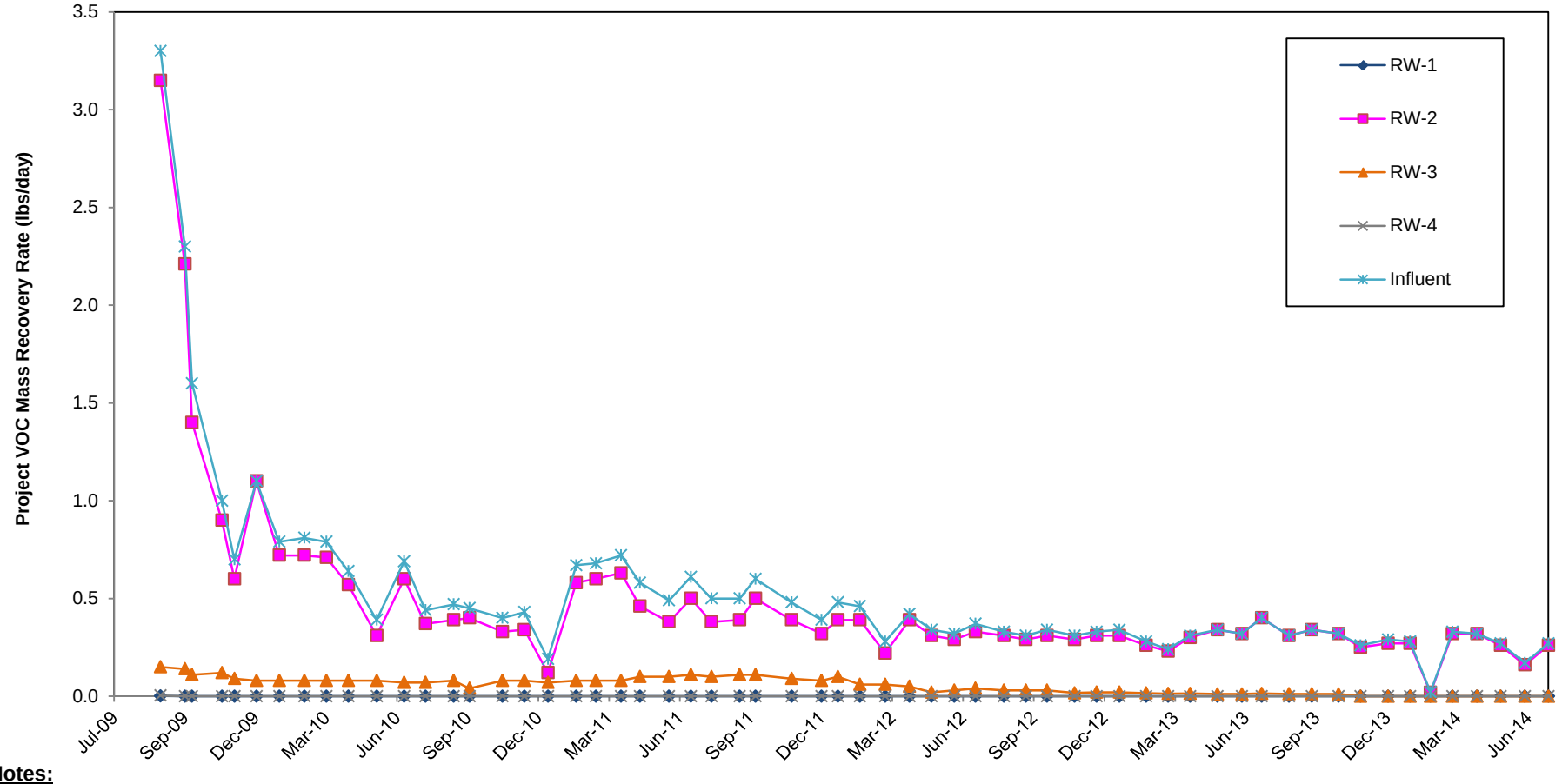
TVOCs = Sum of VOCs detected.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

TVOC MASS RECOVERY RATES THROUGH JUNE 2014

ARCADIS

FIGURE 8A



Notes:

VOC = Volatile organic compound.

lbs/day = Pounds per day.

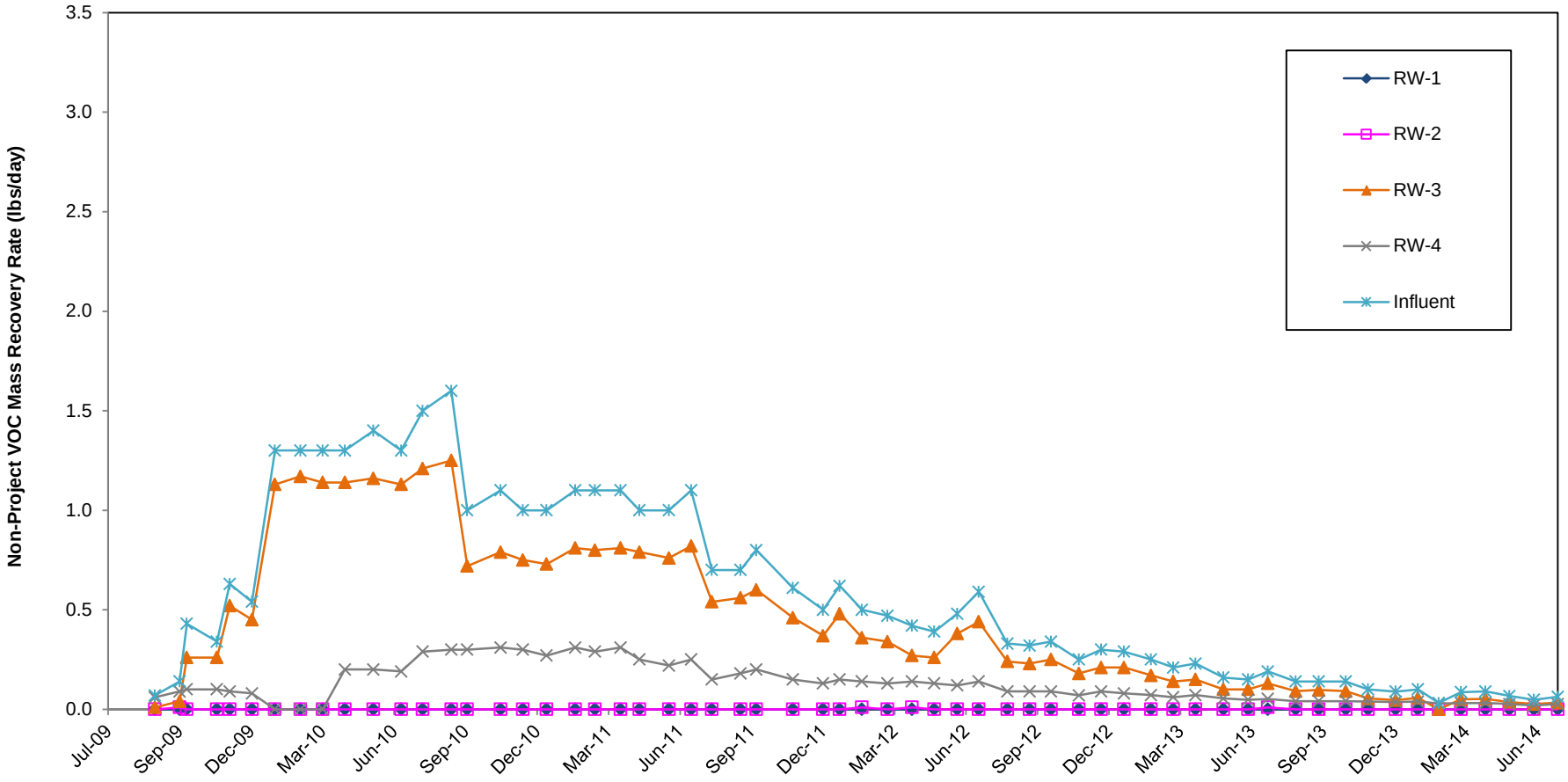
Project VOCs = Sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

PROJECT VOC MASS RECOVERY RATES THROUGH JUNE 2014

ARCADIS

FIGURE
8B



Notes:

VOC = Volatile organic compound.

lbs/day = Pounds per day.

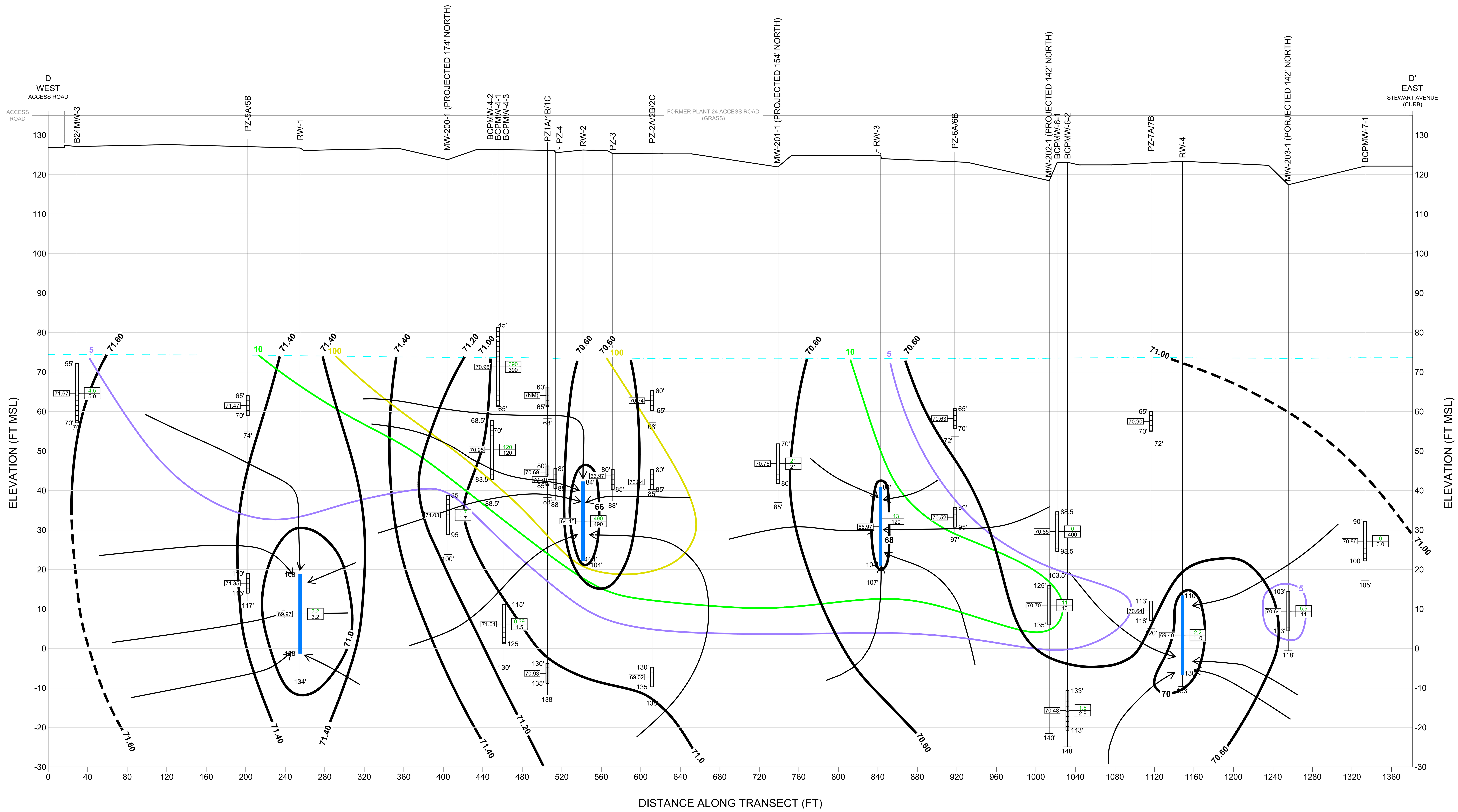
Non-Project VOCs = Sum of VOCs that are not Project VOCs.

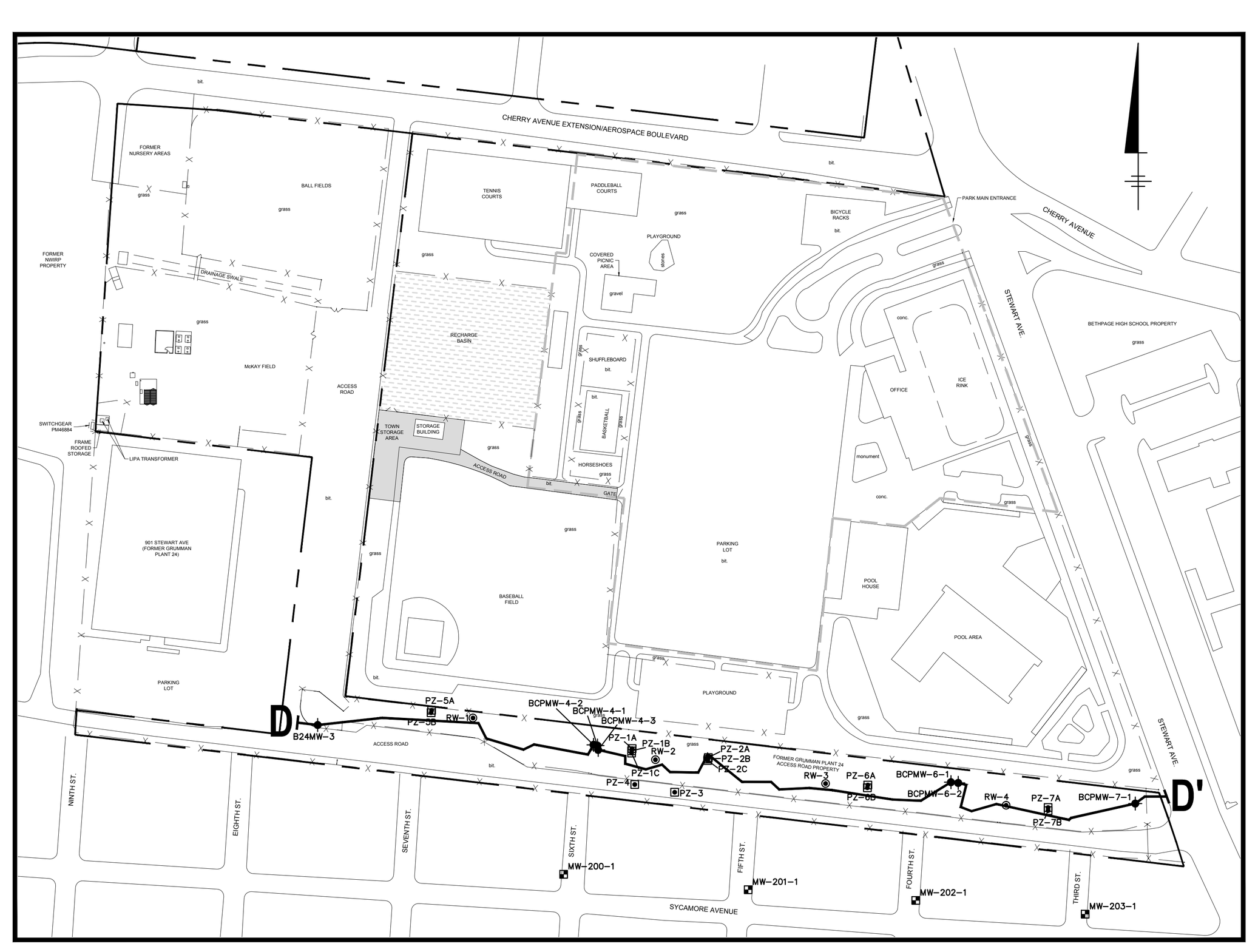
BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

NON-PROJECT VOC MASS RECOVERY RATES THROUGH JUNE 2014

ARCADIS

FIGURE
8C

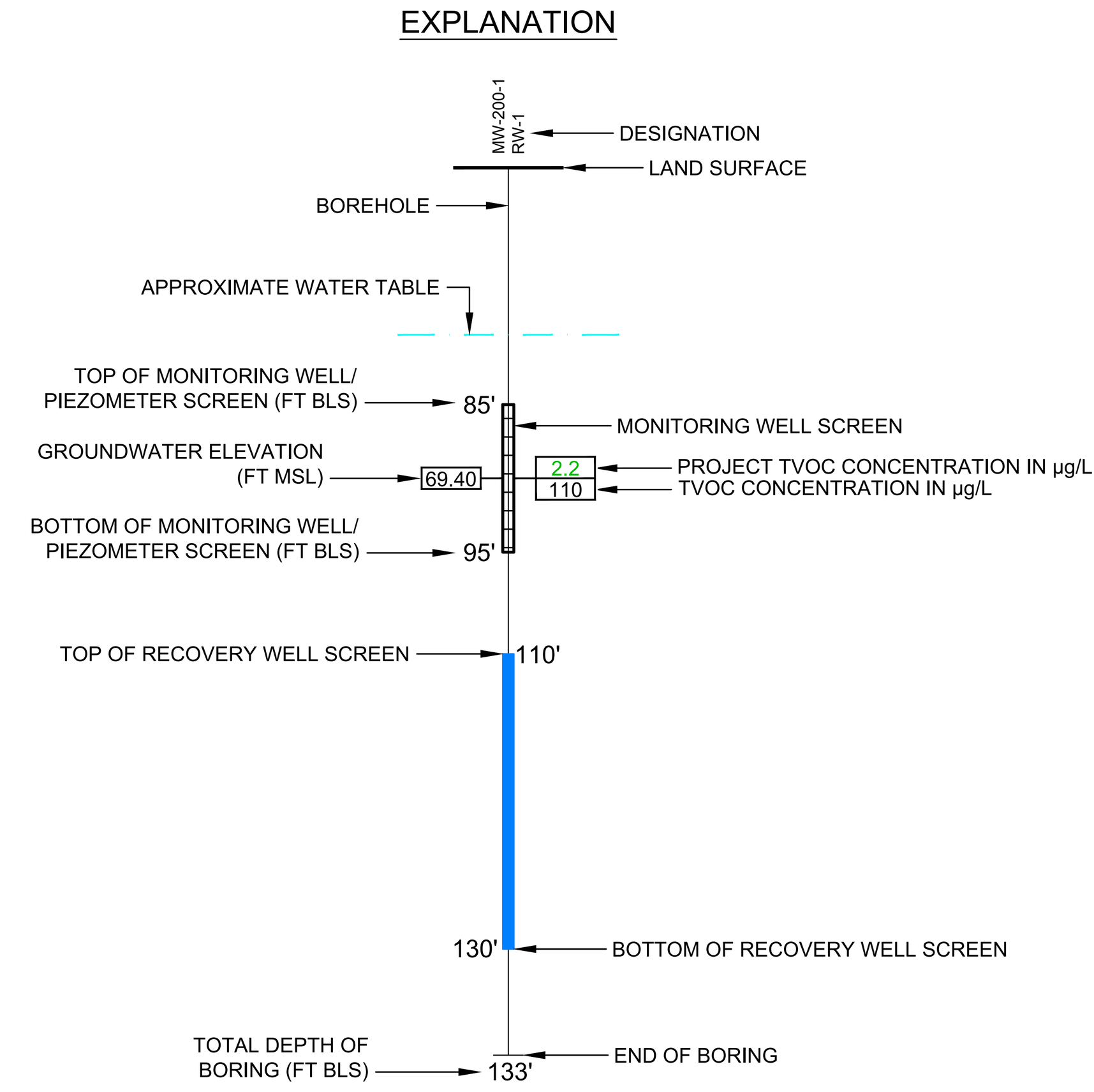




KEY PLAN
SHOWING CROSS SECTION D-D'

SCALE IN FEET

EXPLANATION



VERTICAL SCALE IN FEET
EXAGGERATION: 4x

HORIZONTAL SCALE IN FEET (0 – 40; vertical 0 – 10)

DEFINITIONS:

FT - FEET
MSL - MEAN SEA LEVEL
BLS - BELOW LAND SURFACE
µg/L - MICROGRAMS PER LITER
TVOC - TOTAL VOLATILE ORGANIC COMPOUND
NM - NO MEASURED

LEGEND:

70.60 — GROUNDWATER ELEVATION CONTOUR IN FEET RELATIVE TO MEAN SEA LEVEL, DASHED WHERE LESS CONTROL AVAILABLE

← VERTICAL DIRECTION OF GROUNDWATER FLOW

10.0 — PROJECT TVOC CONTOUR IN µg/L, DASHED WHERE LESS CONTROL AVAILABLE

NOTES:

1. WATER LEVEL ELEVATIONS CALCULATED FROM DATA COLLECTED ON JUNE 3, 2014.
2. MONITORING WELL TVOC/PROJECT TVOC DATA FROM THE MAY-JUNE 2013 COMPREHENSIVE SAMPLING ROUND. RESULT REPRESENTATIVE OF ENTIRE WELL SCREEN INTERVAL.
3. TVOC CONTOURS ARE BASED ON PROJECT TVOC DATA, SEE NOTE 2 AND 5.
4. THE BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM HAS BEEN DESIGNED TO ADDRESS GROUNDWATER THAT HAS TVOC CONCENTRATIONS GREATER THAN 5 µg/L IN THE UPPER 20 FEET OF THE SURFICIAL AQUIFER AND GROUNDWATER BELOW THE UPPER 20 FEET OF THE SURFICIAL AQUIFER THAT HAS TVOC CONCENTRATIONS GREATER THAN 50 µg/L.
5. PROJECT VOCS ARE VOCS THAT MAY BE RELATED TO FORMER GRUMMAN HISTORICAL ACTIVITIES. NON-PROJECT VOCS ARE VOCS THAT ARE NOT RELATED TO FORMER GRUMMAN ACTIVITIES BUT HAVE BEEN DETECTED IN THE SITE AREA. PLEASE REFER TO THE REPORT TABLES FOR LISTS OF PROJECT AND NON-PROJECT VOCS.
6. REFER TO TABLE 6 FOR PUMPING RATES OF REMEDIAL WELLS.

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

CROSS SECTION D-D' SHOWING TVOCs IN GROUNDWATER AND DIRECTION OF VERTICAL GROUNDWATER FLOW SECOND QUARTER 2014

ARCADIS

FIGURE
9

PLOTTED: 7/29/2014 10:56 AM BY: IAMICELI, KIMBERLY

Appendix A

Well Construction Information and Environmental Effectiveness Monitoring Program

Appendix A-1. Well Construction Information and Environmental Effectiveness Monitoring Program, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds Northrop Grumman Systems Corporation, Bethpage, New York. [1,2]

Well ID	Well Diameter (inches)	Depth to Screen Top (ft bls)	Depth to Screen Bottom (ft bls)	Screen Length (ft)	Well Depth (ft)	Well Materials	Water Levels [3]	MONITORING ACTIVITY WATER QUALITY [4] VOC	Cd/Cr	Fe/Mn
Monitoring Wells										
BCPMW-1	2	50	65	15	65	Sch. 40 PVC	Quarterly	Baseline	Baseline	--
BCPMW-2	2	60	75	15	75	Sch. 40 PVC	Quarterly	Baseline	Baseline	Baseline
BCPMW-3	2	59	74	15	74	Sch. 40 PVC	Quarterly	Baseline	Baseline	Baseline
BCPMW-4-1	4	45	65	20	70	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	Baseline
BCPMW-4-2	4	68.5	83.5	15	88.5	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	Baseline
BCPMW-4-3	4	115	125	10	130	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	Baseline
BCPMW-5-1	4	50	65	15	70	Sch. 80 PVC/ SS	Quarterly	Baseline	Baseline	Baseline
BCPMW-6-1	4	88.5	98.5	10	103.5	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
BCPMW-6-2	4	133	143	10	148	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
BCPMW-7-1	4	90	100	10	105	Sch. 40 PVC	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
B24MW-2	2	54	74	20	74	PVC	Quarterly	Baseline/Annual	Baseline	--
B24MW-3	2	55	70	15	70	PVC	Quarterly	Baseline/Annual	Baseline	--
B30MW-1	2	57	72	15	72	PVC	Quarterly	Baseline/Annual	Baseline	--
MW-200-1	4	85	95	10	100	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
MW-201-1	4	70	80	10	85	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
MW-202-1	4	125	135	10	140	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
MW-203-1	4	103	113	10	118	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual [5]	Baseline/Annual	--
Remedial Wells [6]										
RW-01	8	108	128	20	134	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--
RW-02	6	84	104	20	104	Steel/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--
RW-03	8	84	104	20	107	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--
RW-04	8	110	130	20	133	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--

See notes on last page.

Appendix A-1. Well Construction Information and Environmental Effectiveness Monitoring Program, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds
Northrop Grumman Systems Corporation, Bethpage, New York. (1,2)

Well ID	Well Diameter (inches)	Depth to Screen Top (ft bls)	Depth to Screen Bottom (ft bls)	Screen Length (ft)	Well Depth (ft)	Well Materials	MONITORING ACTIVITY: Water Levels (3)	MONITORING ACTIVITY: WATER QUALITY (4) VOC	Cd/Cr	Fe/Mn
Piezometers										
PZ-01a	2	60	65	5	68	Sch. 40 PVC	Quarterly	--	--	--
PZ-01b	1	80	85	5	88	Sch. 40 PVC	Quarterly	--	--	--
PZ-01c	1	130	135	5	138	Sch. 40 PVC	Quarterly	--	--	--
PZ-02a	2	60	65	5	68	Sch. 40 PVC	Quarterly	--	--	--
PZ-02b	1	80	85	5	85	Sch. 40 PVC	Quarterly	--	--	--
PZ-02c	1	130	135	5	138	Sch. 40 PVC	Quarterly	--	--	--
PZ-03	1	80	85	5	88	Sch. 40 PVC	Quarterly	--	--	--
PZ-04	1	80	85	5	88	Sch. 40 PVC	Quarterly	--	--	--
PZ-05a	2	65	70	5	74	Sch. 40 PVC	Quarterly	--	--	--
PZ-05b	1	110	115	5	117	Sch. 40 PVC	Quarterly	--	--	--
PZ-06a	2	65	70	5	72	Sch. 40 PVC	Quarterly	--	--	--
PZ-06b	1	90	95	5	97	Sch. 40 PVC	Quarterly	--	--	--
PZ-07a	2	65	70	5	72	Sch. 40 PVC	Quarterly	--	--	--
PZ-07b	1	113	118	5	120	Sch. 40 PVC	Quarterly	--	--	--

Notes:

(1) Water samples will be collected and analyzed in accordance with the method and procedures described in the Sampling and Analysis Plan (SAP).
(2) Approximate locations of the wells and piezometers in the OU-3 Groundwater Interim Remedial Measure Monitoring Program are shown in Figure 1.
(3) Water levels will be measured in all wells/piezometers during the baseline monitoring event. Water levels will be measured in accordance with the procedures presented in the SAP.
(4) VOC: VOCs, per Table D-3 in the Quality Assurance Project Plan (QAPP), using NYSDEC ASP 2000 Method OLM 4.3.
Cd/Cr: Cadmium and Chromium using USEPA Method 6010.
Fe/Mn: Iron and Manganese using USEPA Method 6010, both total and dissolved.
(5) Semiannual wells will be monitored annually after Year 1.
(6) Some of the analyses listed here are also covered in the Remedial System Sampling Program (Table B-1) and some of the analyses and/or frequencies may be modified based on review of short-term and/or long-term testing results. (e.g. the Cd/Cr sampling frequency was changed from quarterly to annually in 2011).

Acronyms\Key:

Sch. 80 PVC	Schedule 80 polyvinyl chloride.
Sch. 40 PVC	schedule 40 polyvinyl chloride.
SS	Stainless steel.
Steel	Low carbon steel.
ft	Feet.
ft ms	Feet relative to mean sea level.
ft bls	Feet below land surface.
--	Not applicable.
VOC	Volatile organic compound.

Appendix B

Compliance and Performance Program and Water Sample Analytical Results

Appendix B-1. Compliance and Performance Program Elements, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Sample Location/Instrument [1]	Parameter (Method) [2]	Frequency			
		Short-Term [3] (first month)	Short-Term [3] (five month period following first month)	Long-Term [4]	SCADA Data Acquisition
Water Samples [5]					
Remedial Well 1 (WSP-1)	VOCs (NYSDEC 2005 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010C)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010C)[11]	---	Annually	Annually	NA
Remedial Well 2 (WSP-2)	VOCs (NYSDEC 2005 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010C)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010C)[11]	---	Annually	Annually	NA
Remedial Well 3 (WSP-3)	VOCs (NYSDEC 2005 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010C)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010C)[11]	---	Annually	Annually	NA
Remedial Well 4 (WSP-4)	VOCs (NYSDEC 2005 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010C)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010C)[11]	---	Annually	Annually	NA
Air Stripper Influent (WSP-5)	VOCs (NYSDEC 2005 OLM 4.3)	1-hr [6]; Days 1, 3, & Weekly	Monthly	Quarterly	NA
	Iron (USEPA 6010C)	1-hr [6]; Days 1, 3, & Weekly	Monthly	Quarterly	NA
Air Stripper Effluent (WSP-6)	Iron (USEPA 6010C)	1-hr [6]; As Needed	As Needed	As Needed	NA
Plant Effluent (WSP-7)	**VOCs (NYSDEC 2005 OLM 4.3)**	**1-hr [6]; Days 1, 3, & Weekly**	**Monthly**	**Monthly**	NA
	Iron (USEPA 6010C)	**1-hr [6]; Days 1, 3, & Weekly**	**Monthly**	**Monthly**	NA
	Mercury (USEPA 7470A) [7]	**1-hr [6]; Days 1, 3, & Weekly**	**Monthly**	**Monthly**	NA
	pH (field) [8]	**1-hr [6]; Days 1, 3, & Weekly**	**Monthly**	**Monthly**	NA
	Cadmium and Chromium (USEPA 6010C)[11]	---	Quarterly	Quarterly	NA
Air Samples [9] [10]					
Air Stripper Effluent/ECU-1 Influent (VSP-1)	VOCs (TO-15 Modified)	Monthly	Monthly	Quarterly	NA
ECU-1 Effluent/ECU-2 Influent (VSP-2)	VOCs (TO-15 Modified)	As Needed	As Needed	As Needed	NA
ECU-2 Effluent/ECU-3 Influent (VSP-3)	VOCs (TO-15 Modified)	As Needed	As Needed	As Needed	NA
ECU-3 Effluent/ECU-4 Influent (VSP-4)	VOCs (TO-15 Modified)	As Needed	As Needed	As Needed	NA
Total Effluent (VSP-5)	**VOCs (TO-15 Modified)**	**Monthly**	**Monthly**	**Quarterly**	NA

See notes on last page.

Appendix B-1. Compliance and Performance Program Elements, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Sample Location/Instrument [1]	Parameter (Method) [2]	Frequency			
		Short-Term [3] (first month)	(five month period following first month)	Long-Term [4]	SCADA Data Acquisition
Water Flow Measurements					
Remedial Well RW-1 (FT - 110)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-2 (FT - 120)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-3 (FT - 130)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-4 (FT - 140)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Combined Influent (FR - 200)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
System Effluent (FT-700)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Air Flow Measurements					
Air Stripper Effluent (FT-500)	Flow rate (SCFM)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Water Pressure Measurements					
Remedial Well RW-1 (PT - 110)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-2 (PT - 120)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-3 (PT - 130)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-4 (PT - 140)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Air Stripper Effluent (PT-700)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Air Temperature & Relatively Humidity Measurements					
Air Stripper Effluent (TT-500)	Temperature	Weekly	Weekly	Weekly	Continuously
ECU Mid-Train (TI-503)	Temperature	Weekly	Weekly	Weekly	NA
Effluent (TI-603)	Temperature	Weekly	Weekly	Weekly	NA

See notes on last page.

Appendix B-1. Compliance and Performance Program Elements, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Sample Location/Instrument [1]	Parameter (Method) [2]	Frequency			
		Short-Term [3] (first month)	Short-Term [3] (five month period following first month)	Long-Term [4]	SCADA Data Acquisition
Air Pressure Measurements					
Air Stripper Effluent (PT-500)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	Continuously
ECU #1 Influent (PI-501)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
ECU #2 Influent (PI-502)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
ECU #3 Influent (PI-601)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
ECU #4 Influent (PI-602)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
System Effluent (PI-603)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA

See notes on last page.

Appendix B-1. Compliance and Performance Program Elements, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Notes:

(1) Refer to Figure 3 of this Operation, Maintenance, & Monitoring (OM&M) Report and Appendix E of the Groundwater IRM OM&M Manual (OM&M Manual (ARCADIS 2009)) for a diagram showing referenced sample locations and measurement points.
(2) Parameters/methods may be modified based on review of short-term and/or long-term testing results. Parameters shown in **Bold** indicate parameters that require NYSDEC notification/approval prior to change in monitoring schedule.
(3) Short-term schedule is tentative. Modification may be required/recommended based on the results of start-up and performance testing.
(4) Long-term schedule is tentative. Modification may be required/recommended based on the results of short-term testing or water quality trends.
(5) Water samples will be collected in accordance with the methods described in the Sampling and Analysis Plan, which is included as Appendix A of the OM&M Manual (ARCADIS 2009). Samples will be analyzed in accordance with the methods and procedures described in the Sampling and Analysis Plan.
(6) Per NYSDEC request, a 1-hr pilot test was performed during system shake-down. The 1-hr pilot test samples were also analyzed for Mercury (Hg).
(7) Per the interim treated effluent (water) discharge criteria provided in the NYSDEC letter dated March 19, 2009, select samples were analyzed for Mercury (Hg).
(8) As authorized by the NYSDEC, the pH monitoring frequency was reduced from weekly to monthly beginning on February 8, 2010.
(9) Air samples collected and analyzed in accordance with methods described in the Sampling and Analysis Plan, which is included as Appendix A of the OM&M Manual (ARCADIS 2009).
(10) Additional air samples will be collected to help calculate media usage rates and to help determine media changeout frequencies.
(11) Cadium and Chromium analyses are part of the Environmental Effectiveness Monitoring Program (Table A-1) and the original discharge permit application. They are included here for consistency.

Acronyms\Key:

NA	Not Applicable.
---	Not Required
ECU	Emissions control unit.
VOCs	Volatile organic compounds (refer Tables D-3 and D-5 in the Quality Assurance Project Plan (QAPP) (Appendix D of the OM&M Manual (ARCADIS 2009)) for the analyte lists for aqueous and air samples, respectively).
gal.	Gallons.
gpm	Gallons per minute.
i.w.g.	Inches water gauge.
NYSDEC	New York State Department of Environmental Conservation.
EPA	U.S. Environmental Protection Agency.
SCADA	Supervisory Control And Data Acquisition.
OM&M	Operation, maintenance and monitoring.

Appendix B-2. Water Sample Analytical Results - April 8, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-05 Influent 4/8/2014	WSP-05 Dup. Influent 4/8/2014	WSP-07 Effluent 4/8/2014
Volatile Organic Compounds				
1,1,1-Trichloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane		**0.36 J**	**0.31 J**	< 5.0
1,1-Dichloroethene		**0.26 J**	**0.24 J**	< 5.0 U
1,2-Dichloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane		< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone		< 50 U	< 50 U	< 50 U
4-Methyl-2-Pentanone		< 50 U	< 50 U	< 50 U
Acetone		< 50 U	< 50 U	< 50 U
Benzene		< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane		< 5.0 U	< 5.0 U	< 5.0 U
Bromoform		< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane		< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide		< 5.0 U	< 5.0 U	< 5.0 U
Carbon Tetrachloride		< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene		< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane		< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)		**23**	**20**	< 5.0 U
Chloroethane		< 5.0 U	< 5.0 U	< 5.0 U
Chloroform		**2.3 J**	**2.0 J**	< 5.0 U
Chloromethane		< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-Dichloroethene		**26**	**23**	< 5.0 U
cis-1,3-Dichloropropene		< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)		< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane		< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene		**0.70 J**	**0.23 J**	< 5.0 U
Methyl N-Butyl Ketone		< 50 U	< 50 U	< 50 U
Methyl-Tert-Butylether		< 5.0 U	< 5.0 U	< 5.0 U
Styrene (Monomer)		< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene		**0.36 J**	**0.21 J**	< 5.0 U
Toluene		**20 J**	**6.8 J**	< 5.0 U
trans-1,2-Dichloroethene		< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-Dichloropropene		< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethene		**4.5 J**	**4.3 J**	< 5.0 U
Trichlorofluoromethane (Freon 11)		< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)		< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride		**22 J**	**13 J**	< 2.0 U
Xylene-o		**0.84 J**	**0.27 J**	< 5.0 U
Xylenes - m,p		**1.4 J**	**0.46 J**	< 5.0 U
Tentatively Identified Compounds		ND	ND	ND
Total VOCs [4]		**102**	**71**	ND

See notes on last page.

Appendix B-2. Water Sample Analytical Results - April 8, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-05 Influent 4/8/2014	WSP-05 Dup. Influent 4/8/2014	WSP-07 Effluent 4/8/2014
Metals				
Cadmium (Dissolved)		--	--	--
Cadmium (Total)		--	--	--
Chromium (Dissolved)		--	--	--
Chromium (Total)		--	--	--
Iron (Dissolved)		**170**	--	**170**
Iron (Total)		**350**	--	**260**
Manganese (Dissolved)		--	--	--
Manganese (Total)		--	--	--
Mercury (Dissolved)		--	--	--
Mercury (Total)		--	--	< 0.20 U

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to ALS Environmental for VOC analyses using New York State Department of Environmental Conservation ASP 2005 Method OLM 4.3 and metals using USEPA Method 6010C, except for mercury, which was analyzed using USEPA Method 7470A.

(2) Refer to Figure 3 of this OM&M Report for schematic sample locations.

(3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009).

(4) "Total VOCs" represents the sum of individual concentrations of VOCs detected. Values shown have been rounded to the nearest whole number.

Acronyms\Key:

Bold value indicates a detection.

dup.	Duplicate.
J	Estimated value.
ND	TIC not detected.
OM&M	Operation, maintenance and monitoring.
TIC	Tentatively identified compound.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/L	Micrograms per liter.
--	Not analyzed.
< 5 U	Compound not detected above its laboratory quantification limit.

Appendix B-3. Water Sample Analytical Results - May 5, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-01 RW-1 5/5/2014	WSP-02 RW-2 5/5/2014	WSP-03 RW-3 5/5/2014	WSP-04 RW-4 5/5/2014	WSP-05 Influent 5/5/2014	WSP-07 Effluent 5/5/2014
Volatile Organic Compounds							
1,1,1-Trichloroethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane		< 5.0 U	**1.1 J**	< 5.0 U	**0.40 J**	**0.37 J**	< 5.0 U
1,1-Dichloroethene		< 5.0 U	**0.78 J**	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloroethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone		< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
4-Methyl-2-Pentanone		< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone		< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene		< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromoform		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Tetrachloride		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)		< 5.0 U	< 5.0 U	**34**	**68**	**19**	< 5.0 U
Chloroethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform		< 5.0 U	**1.7 J**	**4.9 J**	**0.41 J**	**2.0 J**	< 5.0 U
Chloromethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-Dichloroethene		**0.21 J**	**100**	**4.3 J**	**0.24 J**	**24**	< 5.0 U
cis-1,3-Dichloropropene		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene		< 5.0 U	**2.5 J**	< 5.0 U	< 5.0 U	**0.40 J**	< 5.0 U
Methyl N-Butyl Ketone		< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl-Tert-Butylether		< 5.0 U	< 5.0 U	< 5.0 U	**0.30 J**	< 5.0 U	< 5.0 U
Styrene (Monomer)		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene		< 5.0 U	< 5.0 U	**0.36 J**	**0.82 J**	**0.41 J**	< 5.0 U
Toluene		< 5.0 U	**63**	< 5.0 U	< 5.0 U	**13**	< 5.0 U
trans-1,2-Dichloroethene		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-Dichloropropene		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethene		**0.41 J**	**12**	**3.6 J**	**0.79 J**	**3.9 J**	< 5.0 U
Trichlorofluoromethane (Freon 11)		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride		< 2.0 U	**87**	< 2.0 U	< 2.0 U	**18**	< 2.0 U
Xylene-o		< 5.0 U	**3.2 J**	< 5.0 U	< 5.0 U	**0.65 J**	< 5.0 U
Xylenes - m,p		< 5.0 U	**5.4**	< 5.0 U	< 5.0 U	**1.0 J**	< 5.0 U
Tentatively Identified Compounds		ND	ND	ND	ND	ND	ND
Total VOCs [4]		**0.62**	**277**	**47**	**71**	**83**	0

See notes on last page.

Appendix B-3. Water Sample Analytical Results - May 5, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-01 RW-1 5/5/2014	WSP-02 RW-2 5/5/2014	WSP-03 RW-3 5/5/2014	WSP-04 RW-4 5/5/2014	WSP-05 Influent 5/5/2014	WSP-07 Effluent 5/5/2014
Metals							
Cadmium (Dissolved)		--	--	--	--	--	< 5.0 U
Cadmium (Total)		--	--	--	--	--	< 5.0 U
Chromium (Dissolved)		--	--	--	--	--	< 10 U
Chromium (Total)		--	--	--	--	--	< 10 U
Iron (Dissolved)		--	**660**	< 100 U	--	**190**	**140**
Iron (Total)		--	**760**	**190**	--	**26,300**	**280**
Manganese (Dissolved)		--	--	--	--	--	--
Manganese (Total)		--	--	--	--	--	--
Mercury (Dissolved)		--	--	--	--	--	--
Mercury (Total)		--	--	--	--	--	< 0.20 U

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to ALS Environmental for VOC analyses using New York State Department of Environmental Conservation ASP 2005 Method OLM 4.3 and metals using USEPA Method 6010C, except for mercury, which was analyzed using USEPA Method 7470A.

(2) Refer to Figure 3 of this OM&M Report for schematic sample locations.

(3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009).

(4) "Total VOCs" represents the sum of individual concentrations of VOCs detected. Values shown have been rounded to the nearest whole number.

Acronyms\Key:

Bold value indicates a detection.

dup.	Duplicate.
J	Estimated value.
ND	TIC not detected.
OM&M	Operation, maintenance and monitoring.
TIC	Tentatively identified compound.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/L	Micrograms per liter.
--	Not analyzed.
< 5 U	Compound not detected above its laboratory quantification limit.

Appendix B-4. Water Sample Analytical Results - June 19, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. [1,2,3]

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-05 Influent 6/19/2014	WSP-05 Dup. Influent 6/19/2014	WSP-07 Effluent 6/19/2014
Volatile Organic Compounds				
1,1,1-Trichloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane		**0.57 J**	**0.51 J**	< 5.0 U
1,1-Dichloroethene		**0.30 J**	**0.21 J**	< 5.0 U
1,2-Dichloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane		< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone		< 50 U	< 50 U	< 50 U
4-Methyl-2-Pentanone		< 50 U	< 50 U	< 50 U
Acetone		< 50 U	< 50 U	< 50 U
Benzene		< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane		< 5.0 U	< 5.0 U	< 5.0 U
Bromoform		< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane		< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide		< 5.0 U	< 5.0 U	< 5.0 U
Carbon Tetrachloride		< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene		< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane		< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)		**18**	**19**	< 5.0 U
Chloroethane		< 5.0 U	< 5.0 U	< 5.0 U
Chloroform		**1.7 J**	**1.9 J**	< 5.0 U
Chloromethane		< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-Dichloroethene		**32**	**32**	< 5.0 U
cis-1,3-Dichloropropene		< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)		< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane		< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene		**1.1 J**	**1.3 J**	< 5.0 U
Methyl N-Butyl Ketone		< 50 U	< 50 U	< 50 U
Methyl-Tert-Butylether		< 5.0 U	< 5.0 U	< 5.0 U
Styrene (Monomer)		< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene		**0.28 J**	**0.33 J**	< 5.0 U
Toluene		**31**	**32**	< 5.0 U
trans-1,2-Dichloroethene		< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-Dichloropropene		< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethene		**4.6 J**	**4.6 J**	< 5.0 U
Trichlorofluoromethane (Freon 11)		< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)		< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride		**32**	**32**	< 2.0 U
Xylene-o		**1.4 J**	**1.3 J**	< 5.0 U
Xylenes - m,p		**2.7 J**	**2.3 J**	< 5.0 U
Tentatively Identified Compounds		ND	ND	ND
Total VOCs [4]		**126**	**127**	ND

See notes on last page.

Appendix B-4. Water Sample Analytical Results - June 19, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND (ug/L)	Sample ID: / Sample Location: / Sample Date:	WSP-05 Influent 6/19/2014	WSP-05 Dup. Influent 6/19/2014	WSP-07 Effluent 6/19/2014
Metals				
Cadmium (Dissolved)		--	--	--
Cadmium (Total)		--	--	--
Chromium (Dissolved)		--	--	--
Chromium (Total)		--	--	--
Iron (Dissolved)		**340**	--	**320**
Iron (Total)		**380**	--	**520**
Manganese (Dissolved)		--	--	--
Manganese (Total)		--	--	--
Mercury (Dissolved)		--	--	--
Mercury (Total)		--	--	< 0.20 U

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to ALS Environmental for VOC analyses using New York State Department of Environmental Conservation ASP 2005 Method OLM 4.3 and metals using USEPA Method 6010C, except for mercury, which was analyzed using USEPA Method 7470A.

(2) Refer to Figure 3 of this OM&M Report for schematic sample locations.

(3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009).

(4) "Total VOCs" represents the sum of individual concentrations of VOCs detected. Values shown have been rounded to the nearest whole number.

Acronyms\Key:

Bold value indicates a detection.

dup.	Duplicate.
J	Estimated value.
ND	TIC not detected.
OM&M	Operation, maintenance and monitoring.
TIC	Tentatively identified compound.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/L	Micrograms per liter.
--	Not analyzed.
< 5 U	Compound not detected above its laboratory quantification limit.

Appendix C

Vapor Sample Analytical Results

Appendix C-1. Vapor Sample Analytical Results - May 5, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND (ug/m^3)	Location ID: / Sample Location: / Sample Date:	VSP-1 Influent 5/5/2014	VSP-2 GAC Mid-Train 5/5/2014	VSP-3 Midfluent 5/5/2014	VSP-4 PPZ Mid-Train 5/5/2014	VSP-5 Effluent 5/5/2014
Volatile Organic Compounds						
1,1,1-Trichloroethane		**0.90**	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
1,1,2,2-Tetrachloroethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
1,1,2-Trichloroethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
1,1-Dichloroethane		**5.4**	**3.7**	**4.1**	**4.2**	**4.3**
1,1-Dichloroethene		**3.6**	**2.3**	**2.1**	**1.8**	< 0.75 U
1,2-Dichloroethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
1,2-Dichloropropane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
1,3-Butadiene		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
1-Chloro-1,1-difluoroethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
2-Butanone		< 7.4 U	< 7.7 U	< 7.8 U	< 7.3 U	< 7.5 U
4-Methyl-2-Pentanone		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Acetone		< 7.4 U	< 7.7 U	**12**	**34**	**18**
Benzene		< 0.74 U	< 0.77 U	< 0.78 U	**1.1**	< 0.75 U
Bromodichloromethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Bromoform		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Bromomethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Carbon Disulfide		< 7.4 U	< 7.7 U	< 7.8 U	< 7.3 U	< 7.5 U
Carbon Tetrachloride		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Chlorobenzene		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Chlorodibromomethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Chlorodifluoromethane (Freon 22)		**140**	**94**	**110**	**110**	**93**
Chloroethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Chloroform		**29**	**14**	**14**	**15**	**16**
Chloromethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
cis-1,2-Dichloroethene		**480 D**	**430 D**	**480 D**	**300 D**	**17**
cis-1,3-Dichloropropene		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Dichlorodifluoromethane (Freon 12)		**2.3**	**2.4**	**2.4**	**2.4**	**2.4**
Dichloromethane		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Ethylbenzene		**11**	< 0.77 U	**1.4**	< 0.73 U	< 0.75 U
Methyl N-Butyl Ketone		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Methyl-Tert-Butylether		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Styrene		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Tetrachloroethene		**3.6**	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Toluene		**310 D**	< 0.77 U	**32**	**16**	**17**
trans-1,2-Dichloroethene		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
trans-1,3-Dichloropropene		< 0.74 U	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Trichloroethene		**62**	< 0.77 U	**4.3**	**4.6**	**1.1**
Trichlorofluoromethane (Freon 11)		**1.3**	**1.2**	**1.2**	**1.2**	**1.2**
Trichlorotrifluoroethane (Freon 113)		**2.6**	**1.2**	**0.96**	**1.0**	**1.1**
Vinyl Chloride		**350 D**	**350 D**	**340 D**	**190 D**	**4.7**
Xylene - o		**14**	< 0.77 U	< 0.78 U	< 0.73 U	< 0.75 U
Xylenes - m,p		**23**	< 1.5 U	**1.7**	< 1.5 U	< 1.5 U
Total VOCs		**1,439**	**899**	**1,006**	**681**	**176**

See notes on last page.

Appendix C-1. Vapor Sample Analytical Results - May 5, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

COMPOUND (ug/m^3)	Location ID: / Sample Location: / Sample Date:	VSP-1 Influent 5/5/2014	VSP-2 GAC Mid-Train 5/5/2014	VSP-3 Midfluent 5/5/2014	VSP-4 PPZ Mid-Train 5/5/2014	VSP-5 Effluent 5/5/2014
Tentatively Identified Compounds						
1,2,3-Trimethylbenzene		**3.6 JN**	--	--	--	--
2-Methyl-trans-Decalin		--	--	--	**23 JN**	**3.6 JN**
2-Methylundecane		--	--	--	**61 JN**	**7.8 JN**
2,5-Hexanedione		**5.8 JN**	--	--	--	--
3-Methylundecane		--	--	--	**72 JN**	**9.2 JN**
4-Methylundecane		--	--	--	**39 JN**	**4.8 JN**
5-Methylundecane		--	--	--	**66 JN**	**9.2 JN**
Acetaldehyde		--	--	--	--	**8.9 JN**
Acetophenone		**19 JN**	**4.0 JN**	--	**60 JN**	**9.9 JN**
alpha-Cumyl Alcohol		**91 JN**	**4.5 JN**	--	**75 JN**	**7.2 JN**
alpha-Methylstyrene		**10 JN**	--	--	--	--
Benzaldehyde		--	--	--	--	**3.5 JN**
$C_{12}H_{26}$ Branched Alkane		--	--	--	**18 JN**	**4.2 JN**
$C_{12}H_{26}$ Branched Alkane		--	--	--	**22 JN**	**3.2 JN**
$C_{13}H_{28}$ Branched Alkane		--	--	--	**36 JN**	**5.0 JN**
Decahydronaphthalene Isomer		--	--	--	**25 JN**	--
Ethyl Methacrylate		**3.0 JN**	--	--	--	--
Hexamethylcyclotrisiloxane		**3.3 JN**	--	**5.1 JN**	--	--
Isobutane		--	--	**3.7 JN**	--	--
Isopentane		--	--	**25 JN**	--	--
Methylcyclohexane		**5.2 JN**	--	--	--	--
Methyl Methacrylate		**7.1 JN**	--	--	--	--
N-Butanal		--	--	--	--	**5.3 JN**
N-Decane		--	--	--	**29 JN**	--
N-Dodecane		--	--	--	**43 JN**	**5.3 JN**
N-Pentane		--	--	**7.0 JN**	--	--
N-Undecane		--	--	--	**31 JN**	**4.7 JN**
Pentylcyclohexane		--	--	--	**32 JN**	**4.7 JN**
Propylene Glycol		**4.4 JN**	--	--	--	--
Trimethylsilanol		--	**5.2 JN**	**9.5 JN**	--	--
Unidentified Compound		--	**4.6 JN**	--	**15 JN**	**23 JN**
Unidentified Compound		--	--	--	**20 JN**	--
Unidentified Compound		--	--	--	**18 JN**	--
Unidentified Compound		--	--	--	**14 JN**	--
Unidentified Compound		--	--	--	**15 JN**	--
Unidentified Siloxane		--	--	--	--	**21 JN**

See notes on last page.

Appendix C-1. Vapor Sample Analytical Results - May 5, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. (1,2,3)

Notes:

(1) Samples collected by ARCADIS on the dates shown and submitted to ALS Environmental for VOC analyses per Modified USEPA Method TO-15.
(2) Refer to Figure 3 of this OM&M Report for schematic sample locations.
(3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M (ARCADIS 2009).

(4) "Total VOCs" represents the sum of individual concentrations of VOCs detected. Values shown have been rounded to the nearest whole number.

Acronyms\Key:

Bold value indicates a detection.

D	Concentration is based on a diluted sample analysis.
JN	Compound tentatively identified, concentration is estimated.
OM&M	Operation, maintenance and monitoring.
NYSDEC	New York State Department of Environmental Conservation.
TIC	Tentatively identified compound.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/m^3	Micrograms per cubic meter.
< 1.5 U	Compound not detected above its laboratory quantification limit.
--	TIC not detected.

ARCADIS

Appendix D

Air Discharge Quality Evaluation

Appendix D-1. Annual Summary of SCREEN3 Model Input and Outputs, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Parameters	Date Sampled:	07/01/13	11/14/13	3/10/2014 (10)	05/05/14
SCREEN3 Model Input					
Source Type		Point	Point	Point	Point
Emission Rate (g/s)		1	1	1	1
Stack Height (ft)		13.5	13.5	13.5	13.5
Stack Height (m)		4.1	4.1	4.1	4.1
Stack Inside Diameter (m)		0.36	0.36	0.36	0.36
Air Flow Rate (scfm)(1),(9)		2,003	1,970	1,974	1,963
Air Flow Rate (acfm @ stack temp)(2)		2,017	1,969	1,976	1,995
Stack Gas Exit Temperature (K)(1)		296	294	295	299
Ambient Air Temperature (K)(3)		295	281	276	286
Receptor Height (m)(4)		1.5	1.5	1.5	1.5
Urban/Rural		Urban	Urban	Urban	Urban
Building Height (m)		2.6	2.6	2.6	2.6
Min Horizontal Bldg Dim (m)		7.9	7.9	7.9	7.9
Max Horizontal Bldg Dim (m)		9.8	9.8	9.8	9.8
Consider Bldg Downwash?		Yes	Yes	Yes	Yes
Simple/Complex Terrain Above Stack		Simple	Simple	Simple	Simple
Simple/Complex Terrain Above Stack Base		Simple	Simple	Simple	Simple
Meteorology		Full	Full	Full	Full
Automated Distances Array		Yes	Yes	Yes	Yes
Terrain Height Above Stack Base		0	0	0	0
SCREEN3 Model Output					
1-HR Max Concentration at Receptor Height ($\mu g/m^3$) (5)		1,988	2,067	2,066	2,033
Annualization Factor(6)		0.08	0.08	0.08	0.08
Average Annual Concentration at Receptor Height ($\mu g/m^3$)(7)		159	165	165	163
Distance To Max Concentration (m)(8)		8	8	8	8

See notes on last page.

Appendix D-1. Annual Summary of SCREEN3 Model Input and Outputs, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

(1) The stack air flow rate (in scfm) and temperature were measured using inline instrumentation. Values were measured at the blower effluent location.

(2) The stack air flow rate at the stack temperature (in acfm) was calculated by dividing the stack air flow rate in scfm by the ratio of the standard temperature to the actual stack gas exit temperature in degrees Rankine.

(3) The ambient temperature was recorded from the weather.newsday.com and/or weather underground (www.wunderground.com) websites for Islip, New York. The mean actual temperature from the website(s) was used in model calculation.

(4) The receptor height corresponds to the average inhalation level.

(5) SCREEN3 calculated constituent concentration at listed conditions at the specified inhalation level.

(6) A USEPA time averaging conversion factor of 1/0.08 was used to convert the 1-hour maximum concentration output to an annual average.

(7) Average annual constituent concentration at the receptor height was calculated by multiplying the one hour maximum concentration by the annualization factor.

(8) SCREEN3 calculated distance to the 1-hour maximum concentration.

(9) Beginning with the January 2013 site visit the air flow rate in scfm is obtained from SCADA HMI.

(10) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.

Acronyms\Key:

$\mu g/m^3$	Micrograms per cubic meter.
acfm	Actual cubic feet per minute.
ft	Feet.
g/s	Grams per second.
K	Kelvin.
m	Meters.
scfm	Standard cubic feet per minute.
USEPA	United States Environmental Protection Agency.

Appendix D-2. Annual Summary of Maximum Allowable Stack Concentration Calculations, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	Actual Effluent Concentrations[1] (µg/m^3)			
	07/01/13	11/14/13	3/10/2014[5]	05/05/14
1,1,1 - Trichloroethane	0	0	0	0
1,1 - Dichloroethane	1.6	1.4	5.7	4.3
1,2 - Dichloroethane	0	0	0	0
1,1 - Dichloroethene	0	0	0.77	0
Acetone	97	15	32	18
Carbon Disulfide	0	8.9	0	0
Chloroform	2.8	2.9	18	16
Ethylbenzene	0	0	0.94	0
Xylene - o	0	0	0.83	0
Xylenes - m,p	0	0	1.7	0
Tetrachloroethene	0	0	0	0
Trichloroethene	2	0	0	1.1
Vinyl Chloride	50	2.6	14	4.7
cis 1,2-Dichloroethene	25	4.6	58	17
trans 1,2 Dichloroethene	0	0	0	0
Benzene	1.7	0.91	0	0
Toluene	20	19	33	17
Trichlorofluoromethane (Freon 11)	0	1.8	1.5	1.2
Dichlorodifluoromethane (Freon 12)	2.7	2.5	2.8	2.4
Chlorodifluoromethane (Freon 22)	520	400	110	93

See notes on last page.

Appendix D-2. Annual Summary of Maximum Allowable Stack Concentration Calculations, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	AGC[2] ($\mu g/m^3$)	MASC[3] ($\mu g/m^3$)			
		07/01/13	11/14/13	3/10/2014[5]	05/05/14
1,1,1 - Trichloroethane	5,000	3.30E+07	3.25E+07	3.24E+07	3.27E+07
1,1 - Dichloroethane	0.63	4.16E+03	4.10E+03	4.09E+03	4.12E+03
1,2 - Dichloroethane	0.038	2.51E+02	2.47E+02	2.47E+02	2.48E+02
1,1 - Dichloroethene	200	1.32E+06	1.30E+06	1.30E+06	1.31E+06
Acetone	30,000	1.98E+08	1.95E+08	1.95E+08	1.96E+08
Carbon Disulfide	700	4.62E+06	4.55E+06	4.54E+06	4.57E+06
Chloroform	14.7	9.71E+04	9.56E+04	9.54E+04	9.60E+04
Ethylbenzene	1,000	6.61E+06	6.51E+06	6.49E+06	6.53E+06
Xylene - o	100	6.61E+05	6.51E+05	6.49E+05	6.53E+05
Xylenes - m,p	100	6.61E+05	6.51E+05	6.49E+05	6.53E+05
Tetrachloroethene	4	2.64E+04	2.60E+04	2.59E+04	2.61E+04
Trichloroethene	0.2	1.32E+03	1.30E+03	1.30E+03	1.31E+03
Vinyl Chloride	0.068	4.49E+02	4.42E+02	4.41E+02	4.44E+02
cis 1,2 Dichloroethene	63	4.16E+05	4.10E+05	4.09E+05	4.12E+05
trans 1,2 Dichloroethene	63	4.16E+05	4.10E+05	4.09E+05	4.12E+05
Benzene	0.13	8.59E+02	8.46E+02	8.43E+02	8.49E+02
Toluene	5,000	3.30E+07	3.25E+07	3.24E+07	3.27E+07
Trichlorofluoromethane (Freon 11)	5,000	3.30E+07	3.25E+07	3.24E+07	3.27E+07
Dichlorodifluoromethane (Freon 12)	12,000	7.93E+07	7.81E+07	7.78E+07	7.84E+07
Chlorodifluoromethane (Freon 22)	50,000	3.30E+08	3.25E+08	3.24E+08	3.27E+08

See notes on last page.

Appendix D-2. Annual Summary of Maximum Allowable Stack Concentration Calculations, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	Percent of MASC[4]			
	07/01/13	11/14/13	3/10/2014[5]	05/05/14
1,1,1 - Trichloroethane	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethane	0.04%	0.03%	0.14%	0.10%
1,2 - Dichloroethane	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethene	0.00%	0.00%	0.00%	0.00%
Acetone	0.00%	0.00%	0.00%	0.00%
Carbon Disulfide	0.00%	0.00%	0.00%	0.00%
Chloroform	0.00%	0.00%	0.02%	0.02%
Ethylbenzene	0.00%	0.00%	0.00%	0.00%
Xylene - o	0.00%	0.00%	0.00%	0.00%
Xylenes - m,p	0.00%	0.00%	0.00%	0.00%
Tetrachloroethene	0.00%	0.00%	0.00%	0.00%
Trichloroethene	0.15%	0.00%	0.00%	0.08%
Vinyl Chloride	11.13%	0.59%	3.17%	1.06%
cis 1,2 Dichloroethene	0.01%	0.00%	0.01%	0.00%
trans 1,2 Dichloroethene	0.00%	0.00%	0.00%	0.00%
Benzene	0.20%	0.11%	0.00%	0.00%
Toluene	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	0.00%	0.00%	0.00%	0.00%
Dichlorodifluoromethane (Freon 12)	0.00%	0.00%	0.00%	0.00%
Chlorodifluoromethane (Freon 22)	0.00%	0.00%	0.00%	0.00%

Notes/Acronyms:

(1) Actual effluent concentrations are analytical results from air samples collected on the dates shown. Data in this table corresponds to approximately the past year of system operation.

(2) Compound-specific AGC values per the NYSDEC DAR-1 AGC/SGC tables, revised February 28, 2014.

(3) Maximum allowable stack concentrations were calculated by dividing the product of the annual guideline concentration of a compound and the ratio of the SCREEN3 gas emission rate and the SCREEN3 average concentration at receptor height by the air flow rate at the stack temperature and multiplying by the appropriate conversion factors.

(4) Percent of MASC was calculated by dividing the actual effluent concentration by the MASC for a given monitoring event.

(5) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.

$\mu g/m^3$ Micrograms per cubic meter

AGC Annual guideline concentration

MASC Maximum allowable stack concentration