OBG

2014 ANNUAL REPORT

Upper Harbor Brook IRM 2014 Annual Report

Honeywell

October 2015

CERTIFICATIONS

I, **Brian E. White**, am currently a registered professional engineer licensed by the State of New York. I certify that this Annual Report was prepared in substantial conformance with the DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010).

072730	10/13/15	
NYS Professional Engineer #	Date	Signature

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LIST OF ACRONYMS

Acronym	Definition
CCR	Construction Completion Report
CO	Cleanout
CSO	Combined Sewer Overflow
DBH	Diameter at Breast Height
DER	Department of Environmental Remediation
FAC	Facultative
FACW	Facultative Wetland
GPS	Global Positioning System
IRM	Interim Remedial Measure
NAPL	Non-Aqueous Phase Liquid
NYSDEC	New York State Department of Environmental Conservation
O&M	Operation and Maintenance
OBL	Obligate Wetland
OP	Observation Port
OW	Open Water
PAH	Polycyclic Aromatic Hydrocarbon
PS	Pump Station
PV&M	Performance Verification and Monitoring
S	Standards
SCO	Soil Cleanup Objective
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
TOGS	Technical and Operational Guidance Series
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
VOC	Volatile Organic Compound

1. INTRODUCTION

This Annual Report presents the 2014 Performance Verification and Monitoring (PV&M) summary for the Interim Remedial Measure (IRM) at the Upper Harbor Brook Site (the Site) located in Geddes and Syracuse, New York. This Annual Report has been prepared as set forth in the Order on Consent (Index # D7-0008-01-09) between Honeywell International, Inc. (Honeywell) and the New York State Department of Environmental Conservation (NYSDEC).

PV&M activities including verification, monitoring, inspection, and data interpretation were performed in accordance with the PV&M Plan (O'Brien & Gere, 2015a) that was approved by NYSDEC on February 13, 2015. PV&M activities are discussed in Sections 2 and 3.

Operation and maintenance (O&M) activities including inspection, troubleshooting, and repairs were performed in accordance with the O&M Plan (O'Brien & Gere, 2015b) that was submitted to NYSDEC for approval on May 18, 2015, and was approved on July 7, 2015. O&M activities associated with the Site are discussed in Section 4.1. Proposed corrective actions resulting from the evaluation of IRM performance are discussed in Section 4.2.

2. PERFORMANCE VERIFICATION AND MONITORING ACTIVITIES

This section provides an overview of the PV&M activities performed during the 2014 calendar year. PV&M activities included the following:

- Groundwater collection system performance verification
- Passive non-aqueous phase liquid (NAPL) collection system monitoring
- Surface water and sediment monitoring
- Vegetation and wetland restoration verification and monitoring
- Open water area inspection
- Drainage ditch inspection

An isolation barrier was installed to minimize the potential for impacted groundwater to discharge into Harbor Brook, and subsequently Onondaga Lake. The isolation barrier consists of a geomembrane liner or concrete liner installed in open water (OW) areas OW-1, -2, -3, and -4 and a reinforced concrete floor in Culverts-2 and -4. In addition, observed cracks and holes were sealed in the culverts that connect the OW areas, in particular in Culvert-3 where an epoxy coating was applied to the eastern culvert. The groundwater collection systems provide an additional means of minimizing the potential for impacted groundwater to discharge to Harbor Brook by creating preferential groundwater flow away from Harbor Brook and to the collection trench. With the liners and the groundwater collection systems in-place, short term shutdown of the groundwater collection system/pump station for periodic maintenance is not expected to jeopardize the IRM objectives.

2.1 GROUNDWATER COLLECTION SYSTEM PERFORMANCE VERIFICATION

Site groundwater and Onondaga Lake surface water elevations were monitored and recorded throughout the year. Groundwater elevations were collected manually from observation port (OP), pump station (PS) and cleanout (CO) locations using a handheld water level probe approximately every two weeks. The locations included Harbor Brook-1 (OP-1, PS-1, and OP-2), Harbor Brook-2 (OP-3, PS-2, and OP-4), and I-690 Drainage Ditch (CO-1, CO-3, and CO-5) groundwater collection systems. The monitoring locations are shown on **Figure 1**.

Groundwater elevations for Harbor Brook-1 and -2 collection systems were measured starting in January 2014, whereas groundwater elevations for the I-690 Drainage Ditch collection system were measured starting in September 2014. Onondaga Lake surface water elevations were obtained concurrently with Site groundwater elevations from a gage operated by the U.S. Geological Survey (USGS) on Onondaga Lake at Liverpool, New York (04240495).

2.2 PASSIVE NON-AQUEOUS PHASE LIQUID COLLECTION SYSTEM MONITORING

Groundwater elevations in the passive NAPL collection systems were monitored at three locations: NAPL-1, -3, and -4. The elevations were collected manually using a handheld water level probe approximately every two weeks starting in September 2014. The monitoring locations are shown on **Figure 1**.

2.3 SURFACE WATER AND SEDIMENT MONITORING

Nine surface water and sediment sample locations were proposed in the PV&M Plan (O'Brien & Gere, 2015a). The sampling locations included OW-1, -3, and -4, Wastebed D/E Drainage Ditch, I-690 Drainage Ditch, Railroad Drainage Ditches -1 and -2, Penn-Can Drainage Ditch, and upstream of the Site in Harbor Brook. Surface water and sediment sampling was performed on October 27 and October 28, 2014 in eight of the nine locations. The following modifications were made to the sampling plan due to the field conditions that were encountered:

- The Penn-Can Drainage Ditch sediment sampling location was moved approximately 800 feet upstream to a more representative location.

- Surface water was not sampled at the Penn-Can Drainage Ditch, as representative surface water was not observed.
- Sediment was not sampled at OW-1 because a sufficient volume of sediment required for analyses was not available.
- Neither surface water nor sediment was sampled from the I-690 Drainage Ditch as representative samples were not observed.

The samples were containerized and submitted to Accutest Laboratories in New Jersey for analyses by Methods SW8260, SW8270, SW6010, E1631, and E335.4 for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, high resolution mercury, and cyanide, respectively. Approximate sample locations are shown on **Figure 2**. Surface water and sediment sample results are included as **Table 1** and **Table 2,** respectively. Surface water and sediment sample logs are provided in **Appendix A** and a photograph log documenting sampling efforts is provided in **Appendix B**.

2.4 VEGETATION AND WETLAND RESTORATION VERIFICATION AND MONITORING

Vegetation and wetland restoration verification and monitoring consisted of two stages. Stage 1 monitoring efforts evaluated project components and construction of the wetlands related to first-year restoration activities. This monitoring occurred during and post-construction in 2013. Stage 2 monitoring efforts involved inspecting the extent of the vegetative restoration areas. This monitoring occurred on October 1 and October 8, 2014. Stage 1 and Stage 2 monitoring also consisted of vegetation inspection along the banks of open water areas, drainage ditches, and adjacent areas. Results are discussed in Sections 3.4.2.1 and 3.4.2.2.

Stage 2 monitoring efforts were performed at six vegetative plots that were established in areas representative of each wetland vegetative community. The location of the six vegetative plots are shown on **Figure 3** and outlined below:

Table 2-1. Wetland Restoration Verification and Monitoring Locations

Vegetative Plot	Wetland
1	WRR3
2	WRR3
3	WRR3
4	WRR4
5	WRR2
6	WL6

Vegetation and wetland restoration verification and monitoring activities included qualitative and quantitative evaluation of: vegetation, presence of invasive species, and survivorship of installed shrubs and trees. The percent cover of vegetation, survival of installed shrubs and trees, overall vegetative conditions, and presence of invasive species were recorded on the Wetland Determination Data Forms included in **Appendix C**. A vegetation and wetland photograph log is provided in **Appendix D**. The approximate locations and orientation of the photographs are depicted in **Figure 3**.

2.5 OPEN WATER AREA INSPECTION

As described in the PV&M Plan (O'Brien & Gere, 2015a), the Harbor Brook channels were inspected to compare observed conditions to design parameters. Inspection efforts included inspection for erosion and deposition of the channel bed and banks (including exposure of the liner, where installed), the presence of cracking, bulges, sloughing, or depressions in the banks, and condition of connecting culverts and headwalls located between the OW areas. Vegetative cover around the open water areas was also inspected and percent cover was approximated.

OW areas 1 through 5 were inspected on October 1, October 8, and November 24, 2014. A photograph log documenting observations during the OW area inspection is included as **Appendix E**.

2.6 DRAINAGE DITCH INSPECTION

Drainage ditch inspections were performed on September 30 and November 24, 2014. Inspection efforts included the following ditches:

- I-690 Drainage Ditch
- Railroad Drainage Ditch-1
- Railroad Drainage Ditch-2
- Penn-Can Drainage Ditch
- Wastebed D/E Drainage Ditch

The inspection efforts included inspection for erosion of the ditch channels (including exposure of the liner, where installed), and sediment accumulation. Vegetative cover in and around the drainage ditches was inspected and percent covers were approximated.

A photograph log documenting observations during drainage ditch inspection is included in **Appendix F**.

3. PERFORMANCE VERIFICATION AND MONITORING EVALUATION

The following sections provide results and data interpretation from the 2014 PV&M and inspection activities.

3.1 GROUNDWATER COLLECTION SYSTEM PERFORMANCE VERIFICATION

The performance criterion for the Harbor Brook-1 and -2 groundwater collection systems is that groundwater elevations in the collection trenches are maintained below the surface water elevation in Onondaga Lake, in accordance with the PV&M Plan (O'Brien & Gere, 2015a).

The operational goals for the Harbor Brook-1 and -2 groundwater collection systems are that groundwater elevations in the collection trenches are maintained below adjacent Harbor Brook substrate levels. The operational goal for the Harbor Brook-1 collection trench is to maintain groundwater elevations in the collection trench below the substrate elevation in OW-3 (361.6 feet). The operational goal for the Harbor Brook-2 collection trench is to maintain groundwater elevations in the collection trench below the substrate elevation in OW-1 (360.9 feet). The operational goals served as an indicator to evaluate the need for cleaning within the collection systems.

Groundwater elevation data and Onondaga Lake surface water elevations are included in **Table 3**. Graphical representations of comparisons between groundwater data and the performance criterion and operational goals are included as **Appendix G**.

The Harbor Brook-1 and -2 collection systems operated as designed and met the performance criteria except during a few monitoring events. Groundwater elevations in the Harbor Brook-1 and -2 collection trenches were above the performance criterion during four and five monitoring events, respectively. Proposed corrective actions to aid in meeting the performance criterion are provided in Section 4.2.

Groundwater elevations in the I-690 Drainage Ditch collection trench were recorded and served as a means to evaluate the need for cleaning the slotted pipe within the collection system. Evaluation included comparing groundwater elevations in CO-1, -3, and -5 with substrate levels at CO-1 (371.5 feet), CO-3 (369.7 feet), and CO-5 (367.6 feet), respectively. Groundwater elevations for the I-690 Drainage Ditch collection trench are included in **Table 3** and **Appendix G**.

Further details of the data interpretation for Harbor Brook-1, -2, and I-690 Drainage Ditch groundwater collection trenches follow.

Harbor Brook-1 Collection Trench

Groundwater elevations were above the performance criterion during four monitoring events, as detailed in the table below:

Table 3-1. Harbor Brook-1 Events Above Performance Criterion

Date	OP-1	OP-2	Details
January 24, 2014	1.41 feet	1.47 feet	PS-1 shutdown for cleaning and maintenance.
March 4, 2014	0.70 feet	0.86 feet	PS-1 and -2 shutdown for cleaning and maintenance.
September 26, 2014	1.85 feet	1.73 feet	Cleaning of force main required due to scale.
October 29, 2014	0.33 feet	-	Cleaning of force main required due to scale.

Harbor Brook-2 Collection Trench

Groundwater elevations were above the performance criterion during five monitoring events, as detailed in the table below:

Table 3-2. Harbor Brook-2 Events Above Performance Criterion

Date	OP-3	OP-4	Details
March 4, 2014	3.99 feet	4.06 feet	PS-1 and -2 shutdown for cleaning and maintenance.
August 28, 2014	0.67 feet	0.59 feet	Scale accumulation in force main piping (required cleaning).
September 10, 2014	2.06 feet	2.03 feet	Scale accumulation in force main piping (required cleaning).
September 26, 2014	2.29 feet	2.36 feet	Scale accumulation in force main piping (required cleaning).
October 29, 2014	2.96 feet	2.61 feet	Scale accumulation in force main piping (required cleaning).

I-690 Drainage Ditch Collection Trench

Groundwater elevations in the I-690 Drainage Ditch collection trench were monitored to evaluate the need for cleaning within the collection system. Groundwater elevations in CO-1 were 0.53 feet above substrate level at on December 23, 2014. Groundwater elevations in CO-3 were 0.39 to 1.31 feet above substrate level on December 8 and December 23, 2014. Groundwater elevations in CO-5 were 0.07 to 1.77 feet above substrate level on October 3, November 26, December 8, and December 23, 2014. Collection system cleaning events are summarized in Section 4.1.

3.2 PASSIVE NON-AQUEOUS PHASE LIQUID COLLECTION SYSTEM MONITORING

Groundwater elevations were monitored in the passive NAPL collection systems at NAPL-1, -3, and -4. NAPL was not visibly observed during groundwater elevation monitoring. Groundwater elevations in the passive NAPL collection trenches are included in **Table 3** and **Appendix G.**

3.3 SURFACE WATER AND SEDIMENT MONITORING

Surface water and sediment samples were collected and analyzed for VOCs, SVOCs, metals, high resolution mercury, and cyanide, as discussed in Section 2.3. Surface water and sediment sample results are included in **Table 1** and **2**, respectively, and sample locations are shown on **Figure 2**. Sample logs from the surface water and sediment sampling events are provided in **Appendix A** and the sampling photograph log is provided in **Appendix B**.

3.3.1 Surface Water Monitoring

Surface water samples collected in Harbor Brook and associated ditches showed constituents (bis[2-ethylhexyl]phthalate and metals) detected above NYSDEC Class C Standards (criteria) obtained from NYSDEC Ambient Water Quality Standard and Guidance Values (NYSDEC, 1998 & NYSDEC, 2000 Addendum) both on-Site and upstream of the Site. A surface water sample was collected upstream of the Site in Harbor Brook at location UHB-Offsite-01 and compared to on-Site samples.

Bis[2-ethylhexyl]phthalate was found at comparable levels both on-Site and upstream of the Site in Harbor Brook indicating that it is not originating from the Site. Metals including aluminum, and iron were detected both on-Site and upstream of the Site in Harbor Brook, but were detected above criteria on-Site only. Silver was not detected upstream of the Site in Harbor Brook, but was detected above criteria on-Site. Potential non-Site

related sources for metals detected above criteria on-Site include the upstream portions of the Wastebed D/E Drainage Ditch and Railroad Drainage Ditches-1 and -2. It is likely that the general urban and industrial nature of the surrounding area is the source of constituents detected above criteria. Surface water exceedances are summarized in **Table 3-3** and **Figure 4**. Additional analytical details are provided below.

Table 3-3. Surface Water Monitoring Exceedances

Parameter	NYSDEC Class C Standards		Location					
	Criteria	Units	UHB-Offsite-01	UHB-DEDitch-01	UHB-OW03-01	UHB-OW04-01	UHB-RRD1-01	UHB-RRD2-01
BIS(2-ETHYLHEXYL)PHTHALATE	0.6(S)	µg/L	1.1	1.8	1.3	1.5	3.5	1.7
ALUMINUM	0.1(S)	mg/L	NA	0.371	0.392	0.41	0.438	0.439
IRON	0.3(S)	mg/L	NA	0.606	NA	NA	0.412	0.452
SILVER	0.0001(S)	mg/L	NA	0.0012	NA	NA	NA	NA

Notes:
- NA – Compound either not detected or does not exceed standards (S) at that location
- NYSDEC Class C Standards obtained from NYSDEC Ambient Water Quality Standard and Guidance Values (NYSDEC, 1998 & NYSDEC, 2000 Addendum).
- UHB-Offsite-01 is the sample from upstream of the Site in Harbor Brook

VOCs were detected at six of the seven locations; however, VOCs were not detected above criteria. The maximum VOC detect was benzene at location UHB-DEDitch-01 in the Wastebed D/E Drainage Ditch at a concentration of 0.95 µg/L. There were no VOC detections at location UHB-RRD1-01 in Railroad Drainage Ditch-1.

SVOCs were detected in all seven surface water samples; however, only one SVOC, bis(2-ethylhexyl)phthalate, was detected above criteria in six of the seven surface water samples. The maximum bis(2-ethylhexyl)phthalate detected concentration (3.5 µg/L) was from location UHB-RRD1-01 in Railroad Drainage Ditch-1. Bis(2-ethylhexyl)phthalate was also detected above criteria at location UHB-Offsite-01 (upstream of the Site in Harbor Brook) with a concentration of 1.1 µg/L.

Metals and inorganics were detected in all seven surface water samples. Aluminum, iron, and silver exceeded criteria at location UHB-DEDitch-01 in the Wastebed D/E Drainage Ditch. Aluminum was detected above criteria at all sampled locations except for those collected in OW-1 and at location UHB-Offsite-01 (upstream of the Site in Harbor Brook). Iron was detected above criteria in samples collected at location UHB-DEDitch-01 from the Wastebed D/E Drainage Ditch and at location UHB-RRD1-01 and UHB-RRD2-01 from Railroad Drainage Ditches-1 and -2, respectively.

3.3.2 Sediment Monitoring

Prior to bringing clean fill on-Site, as part of the IRM, the material was screened against NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives (NYSDEC, 2006). To be consistent with the Soil Cleanup Objective (SCO) criteria used for materials brought on-Site, the same SCO criteria were used to identify analytes that may have entered Harbor Brook subsequent to placement of clean fill on-Site.

Sediment samples collected in Harbor Brook and associated ditches showed constituents (SVOCs and metals) detected above SCO criteria both on-Site and upstream of the Site. A sediment sample was taken at location UHB-Offsite-01 and compared to Site samples. Two constituents, 3&4-methylphenol and barium, were detected above SCO criteria on-Site and were not detected in the upstream Harbor Brook sample. The source of 3&4-methylphenol is unknown. Barium is likely originating from the upstream portion of the Wastebed D/E Drainage Ditch. A sediment sample collected from the D/E Ditch upstream of the Site on January 31, 2013 had a barium concentration of 427 mg/kg. Other constituents detected above SCO criteria on-Site were also detected above SCO criteria at the upstream Harbor Brook location (UHB-Offsite-01). This indicates that these constituents are not originating from the Site and that the general urban and industrial nature of the surrounding area is the source of these constituents. Sediment exceedances are summarized in **Table 3-4** and **Figure 5**. Additional analytical details are provided below.

Table 3-4. Sediment Monitoring Exceedances

Parameter	NYSDEC Part 375 Unrestricted Use		Location				
	Criteria	Units	UHB-Offsite-01	UHB-OW04-01	UHB-RRD2-01	UHB-OW03-01	UHB-DEDitch-01
ACETONE	50	µg/kg	234	NA	52.5	NA	97.1
3&4-METHYLPHENOL	330	µg/kg	NA	NA	NA	334	NA
BENZO(A)ANTHRACENE	1000	µg/kg	3530	2540	2220	2040	NA
BENZO(A)PYRENE	1000	µg/kg	4230	2680	2530	2410	NA
BENZO(B)FLUORANTHENE	1000	µg/kg	6040	3310	3000	3380	1340
BENZO(K)FLUORANTHENE	800	µg/kg	2130	1270	926	1160	NA
CHRYSENE	1000	µg/kg	5530	3050	2790	3030	1160
DIBENZO(A,H)ANTHRACENE	330	µg/kg	746	456	469	458	NA
INDENO(1,2,3-CD)PYRENE	500	µg/kg	3330	2080	1900	2050	790
BARIUM	350	mg/kg	NA	NA	NA	NA	583
CHROMIUM	30	mg/kg	40.2	NA	NA	NA	NA
COPPER	50	mg/kg	90.4	NA	56.1	NA	NA
LEAD	63	mg/kg	91	NA	150	NA	NA
MERCURY	0.18	mg/kg	0.34	NA	0.4	NA	NA
ZINC	109	mg/kg	303	126	140	145	122

Notes:
- NA – Compound either not detected or does not exceed criteria at that location

- NYDEC Part 375 Unrestricted Use Soil Cleanup Objectives (NYSDEC, 2006).
- UHB-Offsite-01 is the sample from upstream of the Site in Harbor Brook

VOCs were detected in five of the seven sediment samples. Acetone was the only VOC detected above SCO criteria. Acetone exceeded SCO criteria at samples collected from the upstream location, Wastebed D/E Drainage Ditch, and Railroad Drainage Ditch-2. The highest VOC detect was for acetone at the off-Site location, with a concentration of 234 µg/kg.

SVOCs were detected in all seven sediment samples. Several polycyclic aromatic hydrocarbons (PAHs) exceeded SCO criteria and included benzo(A)anthracene, benzo(A)pyrene, benzo(B)fluoranthene, benzo(K)fluoranthene, chrysene, dibenzo(A,H)anthracene and indeno(1,2,3-CD)pyrene. The highest detected concentrations for all of these PAHs were detected at the off-Site sample location. 3&4-Methylphenol detected at location UHB-OW03-01 in OW-3 (334 µg/kg) was the only SVOC detected above SCO criteria that did not exceed the upstream sample concentration.

Inorganics were detected in all seven sediment samples. Copper, lead, mercury, and zinc exceeded SCO criteria at the upstream and Railroad Drainage Ditch-2 samples. Zinc also exceeded SCO criteria in samples collected from OW-3, OW-4, and Wastebed D/E Drainage Ditch. Chromium exceeded SCO criteria at the upstream sample location only. Barium detected at location UHB-DEDitch-01 in the Wastebed D/E Drainage Ditch (583 mg/kg) was the only inorganic detected above SCO criteria that did not exceed the upstream sample concentration.

3.4 VEGETATION AND WETLAND RESTORATION VERIFICATION AND MONITORING

This section presents the ecological verification and monitoring activities performed in the first year of the five year monitoring period. The primary goals of the restoration monitoring and verification activities were to:

- Describe activities performed to monitor the restoration and stabilization areas and document observed field conditions that enable direct comparison with performance standards specified herein
- Identify verification activities and potential adaptive measures that will be employed throughout the monitoring period to achieve project success

3.4.1 Restoration and Stabilization

Restoration

Site wetlands, ditches, and Harbor Brook banks were targeted for restoration. The general restoration goal was to recreate the following community types, where designed:

- Wet meadow (freshwater and salt tolerant variants)
- Shrub swamp
- Red maple-hardwood swamp
- Floodplain forest
- Successional shrub land

Stabilization

Adjacent areas that were impacted by the IRM construction process (*i.e.*, by clearing and grubbing) were re-graded as necessary and seeded with native species that are consistent with successional old field habitat. A vegetative cover goal of 80% was specified for stabilization areas in accordance with the NYSDEC State Pollutant Discharge Elimination System (SPDES) general permit for storm water discharges from construction activities (GP-0-10-001).

3.4.2 Monitoring Stages

Monitoring efforts were performed in two stages with the objective of evaluating the success of establishing a viable ecological community that complements the local ecosystem. Success criteria, as presented in the PV&M Plan and discussed below, are consistent with those presented for mitigation wetlands designed and constructed at other Onondaga Lake sub-sites. Stage 1 and Stage 2 monitoring efforts are described in the following sections.

3.4.2.1 Stage 1 Restoration Monitoring

The objective of Stage 1 monitoring was to evaluate project components related to first-year restoration activities (during and post-construction), and include completion and evaluation of the following:

- As-built survey (*i.e.,* finished grades qualitatively match design grades specified for the intended ecological community)
- Soil types and depths
- Habitat structure placement
- Plant species and composition
- Survivorship of installed plants

A construction supervisor was present on-Site throughout the performance of the IRM and restoration efforts to verify that finished grades, soil types, and soil application depths were installed in accordance with the design. A biologist was also present throughout the restoration process to verify that habitat structure placement, plant species, composition and installation, and the overall physical and ecological condition of restored and stabilized areas were performed in accordance with the design.

Following restoration activities, record drawings were prepared and submitted to NYSDEC as part of the Construction Completion Report (CCR) (O'Brien & Gere, 2014). The CCR presents the areal extent of the restored habitats. As presented in the CCR and PV&M Plan, the approximate area of each wetland before and after restoration is as follows:

Table 3-5. Wetland Restoration

Wetland	Original Area	Actual Restored Area
WRR1	0.046 acres	± 0.07 acres
WRR2	0.211 acres	± 0.47 acres
WRR3	1.214 acres	± 1.48 acres
WRR4	0.19 acres	± 0.22 acres
WRR5	0.038 acres	± 0.03 acres
WL6	0.352 acres	± 0.27 acres
Former Penn-Can Areas	0.447 acres	0 acres
Total Area	**2.498 acres**	**± 2.54 acres**

The Former Penn-Can Areas (WPC1, WPC2, and WPC3) were considered to be lower quality wetland areas and were not included in the mitigated wetlands that are part of the PV&M activities. The original design intent was

to restore a combined total of 0.447 acres of wetland in the WPC1, WPC2, and WPC3 Areas. The acreage loss at the Former WPC1, WPC2, and WPC3 Areas was compensated for by the addition of acreage in wetlands WRR1 through WRR4.

Stage 1 restoration monitoring was performed on November 5, 2013 following restoration activities. Structure placement and vegetative community composition were qualitatively assessed based upon field observations made at each wetland location by two O'Brien & Gere biologists. The type and abundance of structure, and details describing the overall vegetative community type of restored and stabilized areas were recorded. Initial observations suggest successful establishment of wetland vegetation across the restored wetlands, with most herbaceous plugs and potted woody plants surviving and putting on substantial growth. Deceased woody plants were tallied by species to the extent possible; however, no replacement plantings were required as survivorship exceeded the 80% threshold identified in the PV&M Plan (O'Brien & Gere, 2015a). Although not measured specifically, herbaceous cover was estimated to be greater than 90% due in part to the robust growth of herbaceous stock during the first growing season.

Location-specific observations made during the Stage 1 monitoring efforts are presented below. Restored area locations are presented in **Figure 3.**

Railroad Drainage Ditch-1

Railroad Drainage Ditch-1 flows west to east through wetlands WRR2 and WRR1 before discharging to OW-4. This ditch receives direct precipitation and surface runoff from surrounding hard surfaces (*e*.g., the former clean fill staging area and areas south of the CSX railroad). The ditch then dissects wetlands WRR1 and WRR2 before discharging to Harbor Brook. This section addresses the non-wetland segment of the ditch located upgradient of wetland WRR2.

The plant species and composition of Railroad Drainage Ditch-1 consist primarily of planted woody shrubs (over 120 individuals) including speckled alder (*Alnus incana*), black chokeberry (*Aronia melanocarpa*), eastern ninebark (*Physocarpus opulifolius*), and serviceberry (*Amelanchier canadensisis*). Approximately 80 live stakes were also installed during supplemental plantings, including gray dogwood (*Cornus racemosa*) and elderberry (*Sambucus racemosa*). Seven deceased individuals of eastern ninebark, one black chokeberry, and one speckled alder were identified during the monitoring effort. The eastern ninebark fatalities were likely attributed to over inundation of the root-ball as the ditch received relatively high surface water flows following planting efforts. Signs of moderate deer herbivory were observed on many speckled alder and black chokeberry; although stressed, these plants still exhibited healthy buds and green stems.

Wetland WRR2

Wetland WRR2, located in the central portion of the Railroad Area, encompasses the upper portion of Railroad Drainage Ditch-1. Wetland WRR2 receives direct precipitation and surface runoff from the surrounding landscape in addition to water flowing from Railroad Drainage Ditch-1. Habitat structure was placed within the wetland, including four large felled trees with intact root-balls. Additional coarse woody debris is also scattered throughout the wetland. At the time of the Stage 1 monitoring, planting of the proposed wetland WRR2 expansion had just been completed and 100% survivorship of woody trees and shrubs was observed (over 100 planted). The original extent of wetland WRR2 exhibited extensive herbaceous growth with greater than 80% cover throughout the wetland. Robust growth of beggar ticks (*Bidens frondosa*), Pennsylvania smartweed (*Polygonum pensylvanicum*), soft rush (*Juncus effusus*), sedges (*Carex spp.*), green bulrush (*Scirpus atrovirens*), and woolgrass (*Scirpus cyperinus*) was observed.

Wetland WRR1

Wetland WRR1, located along the western bank of Harbor Brook adjacent to OW-4, encompasses the lower portion of Railroad Drainage Ditch-1. Wetland WRR1 receives direct precipitation and surface runoff from surrounding hard surfaces (*e.g*., PS-1 area and railroad bed) in addition to water discharged from wetland WRR2. Flow from wetland WRR1 discharges to Harbor Brook from the eastern end of the wetland. A large felled tree has been placed in the center of wetland WRR1 to provide habitat structure. The plant species composition of wetland WRR1 consists of both woody and herbaceous vegetation (approximately 240 plants in total). Full

(100%) survivorship of woody species including speckled alder, black chokeberry, and meadow sweet (*Spirea alba*) was observed during survivability monitoring, despite signs of deer browsing and rubbing.

Railroad Drainage Ditch-2

Railroad Drainage Ditch-2 flows through wetlands WRR3 and WRR5 before discharging to OW-5. Stage 1 restoration monitoring observations made in the ditch are presented below in the respective wetland discussions.

Wetland WRR4

Wetland WRR4, located in the southwest portion of the Railroad Area, encompasses an unnamed ditch that leads to Railroad Drainage Ditch-2. Wetland WRR4 receives direct precipitation and overland flow from the former clean fill staging area to the north, a railroad bed to the south, and upgradient areas to the west via Railroad Drainage Ditch-2. The wetland has high quality habitat structure placed throughout, including several felled trees with intact root-balls and other coarse woody debris. Although no habitat structure was placed within Railroad Drainage Ditch-2, numerous logs from trees felled from the Site were placed surrounding the ditch banks in wetlands WRR4 and WRR3. Approximately 350 woody and 500 herbaceous plants were installed within WRR4 at the time of planting. Robust growth of beggar ticks, soft rush, soft-stem bulrush, and sedges were observed at the time of monitoring. Silver maple (*Acer saccharinum*), speckled alder, meadow sweet, black chokeberry, and ironwood (*Carpinus caroliniana*) were observed growing and in good health. No deceased woody species were observed within the wetland.

Wetland WRR3

Wetland WRR3, located on the southern portion of the Railroad Area, encompasses the upper portion of Railroad Drainage Ditch-2. Wetland WRR3 receives direct precipitation and flows from Railroad Drainage Ditch-2 and adjacent uplands. At the eastern end, the wetland and ditch receive flow from a combined sewer overflow (CSO) originating from beneath the railroad tracks that border the southern portion of the Site. An abundant amount of coarse woody debris was observed scattered throughout the wetland. This wetland features an open water habitat that retains approximately 2 to 4 inches of water year-round. Robust herbaceous growth resulting from seed emergence was observed throughout the wetland. The woody species installed in wetland WRR3 consist primarily of red maple (*Acer rubrum*), swamp white oak (*Quercus bicolor*), American sycamore (*Platanus occidentalis*), eastern cottonwood (*Populus deltoides*), and silver maple. Of the over 540 woody species installed, only two deceased individuals of red maple, four swamp white oaks, one river birch, and three silver maples were recorded.

Wetland WRR5

Wetland WRR5, located along the western banks of Harbor Brook adjacent to OW-5, encompasses the lower portion of Railroad Drainage Ditch-2. Wetland WRR5 receives direct precipitation and flow directly from wetland WRR3 via Railroad Drainage Ditch-2. The majority of wetland WRR5 is the open water habitat of Railroad Drainage Ditch-2 and includes steep, vegetated banks. Coarse woody debris was placed along the banks to provide habitat structure, in addition to rock-piles within the open water areas near the inlet and outlet of the wetland. Robust herbaceous vegetation occurs above the high water mark, consisting of Pennsylvania smartweed, beggar ticks, soft rush, joe-pye weed (*Eupatorium maculatum*), and boneset (*Eupatorium perfoliatum*).

Wetland WL6

Wetland WL6, located between I-690 and Onondaga Lake near OW-1, encompasses the lower portion of the I-690 Drainage Ditch. Wetland WL6 receives direct precipitation and surface runoff from surrounding areas including the I-690 embankment and upgradient portions of the I-690 Drainage Ditch. Observations made in the I-690 Drainage Ditch upgradient of wetland WL6 are reported in Section 3.7. Two large felled trees with intact root-balls were placed within the wetland with additional coarse woody debris scattered throughout. Robust herbaceous growth of prairie cordgrass (*Spartina pectinata*), seaside goldenrod (*Solidago sempervirens*), salt meadow rush (*Juncus gerardii*), boneset, beggar ticks, and switchgrass (*Panicum virgatum*) were observed within the wetland. Greater than 80% cover was observed throughout the wetland. Approximately 150 woody

plants were installed on top of the northern bank of wetland WL6 and no mortality was observed at the time of the Stage 1 monitoring efforts.

Wastebed D/E Drainage Ditch

The Wastebed D/E Drainage Ditch enters the Site from the east via a culvert pipe beneath Hiawatha Boulevard and flows into OW-3. The ditch receives direct precipitation and surface runoff from surrounding roadways (*e.g.*, Hiawatha Boulevard and I-690 off-ramp) and an upgradient ditch. The southern uppermost bank of the Wastebed D/E Drainage Ditch was planted with a variety of woody species including silver maple, speckled alder, river birch, red maple, and American sycamore. Approximately 700 total shrubs and trees were installed along the southern bank of the ditch. No mortality of the planted woody species was observed at the time of monitoring. The lower portion of the north bank and entire south bank were seeded with a successional old field seed mix. Greater than 80% vegetative cover was observed throughout the bank areas.

Open Water Areas 1 through 5

Open water areas 1 through 5 are located along Harbor Brook. Installation of plantings for these areas varied but primarily focused on stabilization and restoration of disturbed areas. No plantings occurred around OW-2, OW-3, and OW-5 (only seeding and stabilization of disturbed areas). Full (100%) survivability was observed at OW-1 where speckled alder, meadow sweet, and witch hazel were planted along the upper portions of the open water area. Areas on top of the western bank of OW-4 were planted with speckled alder, meadowsweet, and Virginia creeper (*Parthenocissus quinquefolia*). Full (100%) survivability of woody species was also recorded in this area, despite some herbivory and rubbing by deer. Four large boulders were installed within OW-4 and three large boulders were installed in OW-3 to provide habitat structure within Harbor Brook.

3.4.2.2 Stage 2 Restoration Monitoring

This section presents the results of the first year Stage 2 monitoring efforts. Field monitoring activities were performed by two O'Brien & Gere biologists on October 1 and October 8, 2014. Characteristics monitored as part of Stage 2 efforts included the following:

- Vegetation type and cover
- Invasive species
- Hydrology
- Wildlife usage
- Wetland boundaries

These characteristics were qualitatively evaluated within the restored areas, OW areas, and adjacent areas. Quantitative information was also collected within vegetative sampling plots placed in specified wetland areas shown on **Figure 3**, and further described below.

In general, the overall vegetative establishment indicates that restoration efforts have been successful. Vegetative cover for each of the restored wetlands was qualitatively estimated to be greater than 95%, exceeding the "greater than 85%" performance criterion as specified in the PV&M Plan (O'Brien & Gere, 2015a). In addition, vegetative cover for the adjacent areas exceeds the 80% performance criterion. At this time, invasive plant species (*e.g.*, common reed) cover exceeds the "maximum of 5%" performance criterion. This will be further discussed in Section 4.2. Details pertaining to the monitoring methods and results are presented in the following sections. Monitoring data and information was recorded on Wetland Determination Data Forms presented as **Appendix C**. Photographs of the restored areas are presented in **Appendix D** and the photograph locations are indicated on **Figure 3**.

Vegetation Type and Cover

Six permanent vegetative survey plots (Vegetative Plot 1 through 6) were established in areas representative of each wetland vegetative community and their locations were recorded with a global positioning system (GPS)

unit. The vegetative plot locations are presented on **Figure 3**. Graduated sub-plots consisting of 5-foot, 15-foot, and 30-foot radius zones were established along with a three-stratum sampling design conducted in accordance with the U.S. Army Corps of Engineers Wetland Delineation Manual (USACE, 1987), as outlined below:

- *Tree stratum*
  - Woody plants, excluding vines, approximately 3 inches or more in diameter at breast height (DBH)
  - Woody vines greater than 3 feet in height
- *Sapling-shrub stratum*
  - Woody plants, excluding vines, less than 3-inch DBH and greater than or equal to 3 feet in height
- *Herb stratum*
  - Herbaceous plants and other plants less than 3 feet in height

Percent cover of herbaceous vegetation was estimated within the 5-foot zone, saplings and shrubs within the 15-foot zone, and trees and vines within the 30-foot zone. The same vegetation plots will be monitored annually during the growing season. The criterion for percent cover of hydrophytic vegetative species is a minimum of 85% for restored areas. Vegetation cover in adjacent (stabilization) areas was estimated visually; however, plot surveys were not conducted. The qualitative visual assessment of the stabilization areas was performed to evaluate whether 80% vegetative coverage had been attained).

The vegetative community of the restored areas consists primarily of herbaceous species, most of which were included in the seed mixes specified in the restoration design. A total of 36 herbaceous and shrub species were identified within the six vegetative plot monitoring locations. A few opportunistic species (*i.e.,* species originating from nearby existing invasive species and not planted as part of the Site restoration) were also observed. Minimal areas of bare soil were observed within the restoration areas.

The primary invasive vegetative species observed in the restoration areas was common reed, which was most predominate in the wetland areas. In Vegetative Plot 5 (within wetland WRR2), common reed was not in the vicinity of the plot location, but was noted to be present elsewhere within WRR2. Common reed was not observed in wetlands WRR1, WRR5, or WL6. The Percent cover of common reed within each of the wetland plots is listed below:

- Vegetative Plot 1 (WRR3) – 30% common reed cover
- Vegetative Plot 2 (WRR3) – 60% common reed cover
- Vegetative Plot 3 (WRR3) – 20% common reed cover
- Vegetative Plot 4 (WRR4) – 5% common reed cover
- Vegetative Plot 5 (WRR2) – 0% common reed cover
- Vegetative Plot 6 (WL6) – 0% common reed cover

Invasive species management was conducted in the restored areas in 2014 via herbicide application and manual stem cutting, as described in Section 3.5.1. Invasive species management will continue in 2015.

The evaluation of the presence of wetland hydrology and hydric soils within each vegetative plot was performed in accordance with the U.S. Army Corps of Engineers Wetland Delineation Manual (USACE, 1987). Information specific to each vegetative plot is presented below and on the Wetland Determination Data Forms presented as **Appendix C.**

Vegetative Plot 1

Vegetative Plot 1 is located in the southeastern portion of wetland WRR3. The vegetative species recorded from the plot included one tree (American sycamore) and multiple herbaceous species including common reed,

bird's-foot trefoil, broadleaf cattail (*Typha latifolia*), and shallow sedge (*Carex lurida*). Of the dominant plant species, 80% were obligate wetland (OBL), facultative wetland (FACW), or facultative (FAC) species, indicating the presence of a hydrophytic community. Surface water was present within and surrounding Vegetative Plot 1, to a depth of approximately 2 inches. Redox features comprised 3% of the soil matrix in the 0 to 12 inch interval, indicating that hydric soil characteristics are developing. Control methods were applied to wetland WRR3 for common reed in 2014 and will continue in 2015 (see Section 3.5.1).

Vegetative Plot 2

Vegetative Plot 2 is located in the center of wetland WRR3. The vegetative community consisted primarily of herbaceous species with two dominant trees present (red maple and silver maple). Of the dominant plant species, 100% were OBL, FACW, or FAC species, indicating the presence of a hydrophytic community. Common reed was prevalent within and surrounding the plot location. No surface water or soil saturation was observed in the plot at the time of the monitoring effort. However, the presence and dominance of hydrophytic vegetation indicates the intermittent presence of wetland hydrology in this area. Faint redox features were observed in the upper 6 inches of the soil profile, comprising 5% of the soil matrix, indicating that the soil of the wetland is developing hydric characteristics. Control methods were applied to wetland WRR3 for common reed in 2014 and will continue in 2015 (see Section 3.5.1).

Vegetative Plot 3

Vegetative Plot 3 is located in the northwestern portion of wetland WRR3 adjacent to Railroad Drainage Ditch-2. The vegetative community consisted of one dominant shrub (speckled alder), and herbaceous plant species including Virginia wildrye (*Elymus virginicus*), fowl bluegrass (*Poa palustris*), and poverty rush (*Juncus tenuis*). Of the observed species, 100% were OBL, FACW, or FAC species, indicating the presence of a hydrophytic plant community. Saturated soils and drainage patterns in the plot location are indicative of wetland hydrology. Redox features were observed in the first 7 inches of soil depth, comprising 15% of the soil matrix, indicating a hydric soil condition.

Vegetative Plot 4

Vegetative Plot 4 is located in the west-central portion of wetland WRR4. The vegetative community consisted primarily of herbaceous species, dominated by beggar ticks, poverty rush and awlfruit sedge, and the shrub speckled alder (*Alnus incana*). Of the plant species recorded in the plot, 100% were OBL, FACW, or FAC species, indicating the presence of a hydrophytic vegetative community. Although not observed within the plot, the invasive common reed was prevalent within a portion of wetland WRR4, primarily in the eastern and central areas. Control methods were applied to this species in 2014 and will continue in 2015 (see Section 3.5.1).

Wetland hydrology was indicated via soil saturation at 4 inches below ground surface. Surface water was present in various portions of the wetland (up to 1 inch deep). Evaluation of the surface soil in Vegetative Plot 4 indicated the presence of organic matter/debris, root channels, and dark organic streaking in the first inch. Faint redox features were observed throughout the soil profile in the upper 12 inches, indicating that the soil is developing hydric characteristics.

Vegetative Plot 5

Vegetative Plot 5 is located in the north-central portion of wetland WRR2. The vegetative community consisted primarily of herbaceous species, with poverty rush, bird's-foot trefoil (*Lotus corniculatus*), and woolgrass as dominant species. Of the plant species observed within the plot, 67% were OBL, FACW, or FAC species, indicating the presence of a hydrophytic vegetative community. Although not observed within the plot, the performance metric of 85% hydrophytes was observed when viewing the overall wetland community. Surface water (approximately 2 inches deep) was present in the eastern portion of the wetland near the outlet. Because of the recent creation of the wetland, the soil has had too little time to develop hydric indicators; however, faint redox features (*i.e.*, mottles) were observed in the upper six inches of the soil column.

Vegetative Plot 6

Vegetative Plot 6 is located within the north-central portion of wetland WL6. No surface water was observed in the wetland or the adjacent ditch; however, wetland hydrology was indicated via the presence of oxidized rhizospheres on living roots in the upper soil column. The vegetative community consisted entirely of herbaceous species, with salt meadow rush and beggar ticks recorded as dominants in Vegetative Plot 6. Of the observed plant species, 100% were classified as OBL, FACW, or FAC species, indicating that a hydrophytic community is present. Invasive species were not observed within WL6. Soil redox features were noted in the upper 12 inches of the soil column, indicating that hydric soils are developing in the wetland.

Construction material was noted to be staged on the top of the northern bank of wetland WL6 within the successional shrub land community. This disturbance caused the mortality of a small percentage of the woody species recently installed in the vicinity. A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix D** (Photo No. 32). Observations made upgradient of wetland WL6 in the I-690 Drainage Ditch are reported in Section 3.7.

Open Water Areas 1 through 5

Overall, the Harbor Brook bed and banks were observed to be in stable condition. Inspection of the banks showed some areas of sparse vegetation, most notably on the eastern bank of OW-4 where vegetation establishment is difficult due to the steepness of the slope. Vegetative cover on the banks along each of the OW areas, in locations where rip rap was not placed, exceeds 80%. OW areas are further discussed in Section 3.6.

Wastebed D/E Drainage Ditch

Vegetative cover along both banks of the Wastebed D/E Drainage Ditch was estimated to be greater than 90%, with some small unvegetated bare soil areas along the top of the north bank and adjacent to OW-3. Common reed stems were observed colonizing the eastern end of the ditch channel. Wastebed D/E Drainage Ditch is further discussed in Section 3.7.

The Former Penn-Can Areas

The Former Penn-Can Areas include three former emergent wetland cells (WPC1, WPC2, and WPC3) and the Penn-Can Drainage Ditch. The ditch was restored with clay and stone, which appeared stable at the time of the monitoring field effort. There was approximately one inch of surface water in the center of the ditch during Stage 2 monitoring events, which increased in volume and flow to the east. Greater than 90% vegetative cover was present in the former wetland areas, with broad-leaved cattail and common reed as the dominant species. An area of bare soil exists in the central portion of the Former WPC2 Area, potentially a result of eroded soil and fill from the adjacent berm.

Adjacent Areas

Locations impacted by the IRM construction process were stabilized following construction via re-grading as necessary and seeding with successional old field seed mix. Based on the 2014 monitoring efforts, disturbed adjacent areas were well vegetated and met the criterion of greater than 80% cover. However, an unvegetated bare soil area was observed in the eastern portion of the former clean fill staging area (located on the western portion of the Site between Railroad Drainage Ditch-1 and wetland WRR4). A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix D** (Photo No. 9).

Wildlife Observations

Fish and wildlife observations were recorded during the monitoring field efforts conducted in 2014. A mallard (*Anas platyrhynchos*) nest was noted along the north bank of wetland WRR5 at the wetland's discharge to Harbor Brook. Individual mallards were observed on multiple occasions in wetlands WRR3, WRR5, and the Harbor Brook channel. Green frogs (*Rana clamitans*) and bullfrogs (*Rana catesbeiana*) were observed in wetland WRR3. White suckers (*Catostomus commersonii*) and common carp (*Cyprinus carpio*) were observed in the channel in OW-1, OW-3, and OW-4. While inspecting the Wastebed D/E Drainage Ditch, a red-tailed hawk (*Buteo jamaicensis*) was observed attempting to capture a prey item along the north bank. Great blue herons were often observed in Harbor Brook. Multiple species of songbirds were observed within and in the immediate vicinity of

the restored areas. White-tailed deer (*Odocoileus virginianus*) were observed on many occasions throughout the Site.

3.5 MAINTENANCE AND ADAPTIVE MANAGEMENT

Restored areas were regularly monitored to address unforeseen changes in condition or identify adaptive measures necessary to provide for the long-term sustainability of the restoration. Restored areas were watered during prolonged periods of limited precipitation and as needed to assist in plant establishment and growth. Fencing was installed around most of the larger wetland cells to minimize herbivory by deer. The presence of invasive vegetative species was monitored regularly. Adaptive management strategies applied to control invasive species are discussed below.

3.5.1 Invasive Species Control

Efforts to control common reed were implemented in September 2014, utilizing a combination of herbicide treatment and cutting. The treatment was applied directly on the leaves and stems, followed by cutting the stems 1 to 2 feet above grade in order to assist light penetration and native plant establishment the following year. Cutting was performed approximately three weeks post-herbicide treatment, which is the recommended time period for herbicide to be transported to the rhizome.

On September 3, 2014, herbicide was applied to common reed stands in the Penn-Can Drainage Ditch, I-690 Drainage Ditch, OW-1, OW-2, and wetland WL6. On September 9, 2014, herbicide was applied to common reed stands in Railroad Drainage Ditch-1, Wastebed D/E Drainage Ditch, and wetlands WRR1, WRR2, WRR4, and WRR5. Wetlands WRR1, WRR2, and WRR5 only required minimal spot applications of herbicide. Herbicide application occurred throughout all of wetland WRR3, in addition to targeting large common reed stands outside of the southeast wetland boundary. In wetland WRR4, spot application of herbicide on individual stems occurred throughout the wetland, in addition to targeting a large stand along the southwestern boundary of the wetland.

3.6 OPEN WATER AREA INSPECTION

The open water channels and banks are generally in stable condition; however, inspection revealed some areas of erosion and sloughing. These areas are localized and relatively small. Proposed corrective actions are discussed in Section 4.2. Open water areas 2 and 5 showed no signs of sloughing, erosion, or sparse vegetation.

Open Water Area 1

Two areas of erosion were observed on the southeast bank of OW-1. The observed erosion consisted of an erosion channel in the mid-section of OW-1 and erosion of crushed stone along the east wing wall for Culvert-1. These features are likely attributable to surface water runoff. A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix E** (Photos No. 1 and 2).

Open Water Area 3

One area of erosion was observed on the northwest bank of OW-3 and is likely attributable to surface water runoff. A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix E** (Photos No. 3 and 4).

Open Water Area 4

One area of sloughing was observed along the east slope of OW-4. The observed area contained sparse or no vegetative cover where an erosion control blanket was installed. A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix E** (Photo No. 5).

3.7 DRAINAGE DITCH INSPECTION

The drainage ditches are generally in stable condition; however, inspection revealed some areas of sloughing, erosion, exposed geotextile or liner system, fallen trees, and other issues that warrant proposed corrective actions. Proposed corrective actions are discussed in Section 4.2.

Penn-Can Drainage Ditch

Ruts were observed along the mid and eastern section of the Penn-Can Drainage Ditch and were likely caused by CSX workers backing in from the CSX right-of-way. In addition, an uprooted tree was observed along the mid-section of the ditch. This created an approximately 4 feet wide by 4 feet long by 2 feet deep hole within the ditch. A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix F** (Photos No. 1 to 3)

Railroad Drainage Ditch-1

A deer fence installed around the west end of wetland WRR1 adjacent to Railroad Drainage Ditch-1 had fallen down. This had likely been caused by weather or deer. In addition, an area of erosion was observed along the access road west of wetland WRR2 adjacent to Railroad Drainage Ditch-1 and is likely attributable to surface water runoff. A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix F** (Photo No. 5).

Railroad Drainage Ditch-2

An area of erosion was observed on the northeast bank of the eastern section of Railroad Drainage Ditch-2 and is likely attributable to surface water runoff. A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix F** (Photo No. 6)

Wastebed D/E Drainage Ditch

Several fallen trees were observed along the eastern section of the Wastebed D/E Drainage Ditch. Exposed, bulging geotextile was observed along the northeastern slope at the east section of the ditch. The area measured approximately 1 foot wide by 5 feet long and was likely caused by sloughing due to a lack of established vegetation. Several relatively small portions of the northeastern bank contained bare soil areas, potentially due to soil erosion, minimal established vegetation, and foot or vehicle traffic. In addition, several areas of sloughing were observed along both banks near the eastern portion of the ditch where there was minimal established vegetation. These areas were each approximately 5 feet wide by 5 feet long. A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix F** (Photos No. 8 to 10).

I-690 Drainage Ditch

Five areas of exposed liner system, likely caused by a lack of established vegetation, were observed on the banks of the I-690 Drainage Ditch. Several areas of sloughing were observed along the northern slope of the ditch where there was minimal established vegetation. Several areas of erosion, likely attributable to surface water runoff, were also observed throughout the ditch where there was minimal established vegetation. In addition, sediment accumulation, ranging from 6 to 18 inches in depth, was observed behind both check dams at the western end of the ditch. A corrective action is proposed in this area in 2015, as detailed in Section 4.2 and depicted in **Appendix F** (Photos, No. 11 to 14).

4. CORRECTIVE ACTIONS

The following sections present corrective actions completed in 2014 and proposed corrective actions for 2015 that are based on inspection observations, monitoring, and operational data collected during 2014.

4.1 COMPLETED CORRECTIVE ACTIONS

The following table presents observations recorded during routine PV&M activities and the subsequent corrective actions completed as part of O&M in 2014.

Table 4-1. Completed Corrective Actions

Observation	Completed Corrective Action	Status
1. Groundwater level in Harbor Brook-1 collection trench was above performance criterion on January 24, 2014.	Pump in Harbor Brook-1 wet well was temporarily shut down for cleaning and maintenance on January 23, 2014	Pump operational on January 27, 2014
2. Groundwater levels in Harbor Brook-1 and -2 collection trenches were above performance criterion on March 4, 2014.	The pumps were removed and cleaned and acid addition to the pump stations was initiated on a weekly basis.	Completed on March 11, 2014.
3. Bulges in the substrate material (over the liner) within the I-690 Drainage Ditch were observed on June 16, 2014.	The slotted groundwater collection pipe in the I-690 Drainage Ditch collection trench was cleaned via high pressure water jet.	Completed on June 30, 2014.
4. Groundwater level in the Harbor Brook-1 collection trench was observed to be increasing in June 2014.	The slotted groundwater collection pipes in both Harbor Brook-1 and -2 collection trenches were cleaned via high pressure water jet.	Completed on July 14, 2014.
5. Multiple areas of common reed (*Phragmites australis*) were observed in and adjacent to restored areas.	Herbicide treatment was applied to the common reed communities directly on the leaves and stems, followed by cutting the stems 1 to 2 feet above grade.	Conducted in September 2014.
6. The pump at Harbor Brook-1 pump station was not operating at design flow in mid-September 2014	Pump was replaced	Pump operational on September 29, 2014
7. Groundwater level in the Harbor Brook-1 collection trench was above the performance criterion elevation on September 26, 2014 and in the Harbor Brook-2 collection trench on August 28,	The force main piping was cleaned via high pressure water jet. Force main piping in Valve Vault 6A was modified.	Completed on October 2, 2014.

Table 4-1. Completed Corrective Actions		
Observation	**Completed Corrective Action**	**Status**
September 10, and September 26, 2014.		
8. Groundwater levels in the Harbor Brook-1 and -2 collection trenches were above the performance criterion elevation on October 29, 2014.	The force main piping was cleaned via high pressure water jet.	Completed on November 5, 2014.
9. The pump in Harbor Brook-2 pump station was not operating at design flow in late October 2014	Pump was replaced	Pump operational on November 12, 2014

4.2. PROPOSED CORRECTIVE ACTIONS

The following table presents observations recorded during the annual Site inspections and the associated proposed corrective actions to be performed in 2015.

Table 4-2. Proposed Corrective Actions		
Observation	**Proposed Corrective Action**	**Status**
1. Staged construction material was observed on the top of the northern bank of wetland WL6 within the successional shrub land community and caused mortality of a small percentage of woody species (Photo No. 32 in **Appendix D**).	Staged construction material will be relocated, and the area will be replanted, as required.	To be performed during the 2015 growing season (April through October).
2. An unvegetated bare soil area was observed in the eastern portion of the former clean fill staging area between Railroad Drainage Ditch-1 and wetland WRR4 (Photo No. 9 in **Appendix D**).	The area will be seeded, as required.	To be performed during the 2015 growing season (April through October).
3. An area of erosion was observed along the southeast bank of OW-1 (Photo No. 1 in **Appendix E**).	The source of the flow to this area will be diverted and the area restored, as required.	To be performed in 2015
4. An area of erosion was observed along the east wing wall of Culvert-1 (Photo No. 2 in **Appendix E**).	The source of the flow to this area will be diverted and the area restored, as required.	To be performed in 2015.

Table 4-2. Proposed Corrective Actions

Observation	Proposed Corrective Action	Status
5. An area of erosion was observed along the northwest bank of OW-3 (Photos No. 3 and 4 in **Appendix E**).	The source of the flow to this area will be diverted and the area restored, as required.	To be performed in 2015
6. An area along the east slope of OW-4 was observed to contain sparse or no vegetative cover where the erosion control blanket was installed (Photo No. 5 in **Appendix E**).	Evaluate options to stabilize the slope for planting/seeding, as required.	To be performed during the 2015 growing season (April through October).
7. Ruts were observed along the mid and eastern section of the Penn-Can Drainage Ditch (Photos No. 1 and 2 in **Appendix F**).	The areas with ruts will be re-graded to match the surrounding area and restored as per the design drawings.	To be performed in 2015.
8. An uprooted tree was observed in the Penn-Can Drainage Ditch that created a 2-foot deep hole (Photo No. 3 in **Appendix F**).	The tree will be removed and the area will be re-graded to match the surrounding area and restored as per the design drawings.	To be performed in 2015.
9. An area of erosion was observed along the access road west of wetland WRR-2 adjacent to Railroad Drainage Ditch-1 (Photo No. 5 in **Appendix F**).	The source of the flow to this area will be diverted and the area restored, as required.	To be performed in 2015.
10. An area of erosion was observed along the northeast bank of the eastern section of Railroad Drainage Ditch-2 (Photo No. 6 in **Appendix F**).	The source of the flow to this area will be diverted and the area restored, as required.	To be performed in 2015.
11. Areas of exposed and bulging geotextile, erosion, sloughing, and sparse vegetation were observed along the Wastebed D/E Drainage Ditch (Photos No. 8 to 10 in **Appendix F**).	These areas will be regraded and additional material will be placed and seeded, as required.	To be performed during the 2015 growing season (April through October).
12. Areas of exposed liner system, sloughing, erosion, and sparse vegetation were observed along the I-690 Drainage Ditch (Photos No. 11 to 13 in **Appendix F**).	These areas will be regraded and additional material will be placed and seeded, as required.	To be performed during the 2015 growing season (April through October).
13. Sediment accumulation was observed upstream of both check dams at the western portion of	Sediment will be removed from upstream of both check dams and in the I690 Drainage Ditch, as required.	To be performed in Spring 2015.

Table 4-2. Proposed Corrective Actions

Observation	Proposed Corrective Action	Status
the I-690 Drainage Ditch (Photo No. 14 in **Appendix F**).		
14. Multiple areas of common reed were observed in and adjacent to restored areas.	Herbicide treatment will be applied to the common reed communities directly on the leaves and stems.	Herbicide will be applied in late summer 2015.
15. Common reed was prevalent in wetland WRR3, which is likely due to lack of tree density that would assist in 'shading out' invasive species.	Tree density will be increased via the addition of seedling and live stake plantings within the red maple hardwood swamp community of wetland WRR3. Herbicide treatment will be applied to the common reed communities directly on the leaves and stems.	To be performed in the fall of 2015.

REFERENCES

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TABLES

Table 1A
Honeywell
Upper Harbor Brook 2014 Annual Report
Surface Water Samples
Method 8260 Volatile Organic Compound Data

Parameter Name	NYSDEC Class C Standards	Field Sample ID Location Sample Date Sample Purpose Units	UHB-1028-01 UHB-DEDitch-01 10/27/2014 Regular sample	UHB-1031-01 UHB-Offsite-01 10/28/2014 Regular sample	UHB-1031-02 UHB-OW01-01 10/28/2014 Regular sample	UHB-1028-02 UHB-OW03-01 10/27/2014 Regular sample	UHB-1028-04 UHB-OW04-01 10/27/2014 Regular sample	UHB-1028-03 UHB-RRD1-01 10/27/2014 Regular sample	UHB-1028-07 UHB-RRD2-01 10/27/2014 Regular sample
1,1,1-TRICHLOROETHANE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,1,2,2-TETRACHLOROETHANE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
1,1,2-TRICHLOROETHANE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,1-DICHLOROETHANE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,1-DICHLOROETHENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,2,3-TRICHLOROBENZENE	5(S)	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
1,2,4-TRICHLOROBENZENE	5(S)	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
1,2-DIBROMO-3-CHLOROPROPANE	NC	µg/l	10U	10U	10U	10U	10U	10U	10U
1,2-DIBROMOETHANE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U
1,2-DICHLOROBENZENE	5(S)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,2-DICHLOROETHANE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,2-DICHLOROPROPANE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,3-DICHLOROBENZENE	5(S)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,4-DICHLOROBENZENE	5(S)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,4-DIOXANE	NC	µg/l	130U	130U	130U	130U	130U	130U	130U
2-BUTANONE	NC	µg/l	10U	10U	10U	10U	10U	10U	10U
2-HEXANONE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
4-METHYL-2-PENTANONE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
ACETONE	NC	µg/l	10U	10U	10U	10U	10U	10U	10U
BENZENE	10(S)	µg/l	0.95J	1.0U	0.54J	1.0U	1.0U	1.0U	1.0U
BROMOCHLOROMETHANE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
BROMODICHLOROMETHANE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
BROMOFORM	NC	µg/l	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U	4.0U
BROMOMETHANE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U
CARBON DISULFIDE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U
CARBON TETRACHLORIDE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
CHLOROBENZENE	5(S)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
CHLOROETHANE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
CHLOROFORM	NC	µg/l	1.0U	0.51J	0.39J	0.31J	0.31J	1.0U	0.25J
CHLOROMETHANE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
CIS-1,2-DICHLOROETHENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
CIS-1,3-DICHLOROPROPENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
CYCLOHEXANE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
Dibromochloromethane	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
DICHLORODIFLUOROMETHANE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
ETHYLBENZENE	17(G)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
ISOPROPYLBENZENE	2.6(G)	µg/l	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U
METHYL ACETATE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
METHYL TERT-BUTYL ETHER	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
METHYLCYCLOHEXANE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U

Notes

Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.

U - not detected, J - estimated value, S - Standard value G - guidance value.

NC - No applicable criteria. [ ] - Exceeds New York State Class C Standards.

NYS Class C Fresh Surface Water Criteria obtained from NYSDEC Ambient Water Quality Standard and Guidance Values (June 1998, April 2000 Addendum).

Table 1A
Honeywell
Upper Harbor Brook 2014 Annual Report
Surface Water Samples
Method 8260 Volatile Organic Compound Data

Parameter Name	NYSDEC Class C Standards	Field Sample ID Location Sample Date Sample Purpose Units	UHB-1028-01 UHB-DEDitch-01 10/27/2014 Regular sample	UHB-1031-01 UHB-Offsite-01 10/28/2014 Regular sample	UHB-1031-02 UHB-OW01-01 10/28/2014 Regular sample	UHB-1028-02 UHB-OW03-01 10/27/2014 Regular sample	UHB-1028-04 UHB-OW04-01 10/27/2014 Regular sample	UHB-1028-03 UHB-RRD1-01 10/27/2014 Regular sample	UHB-1028-07 UHB-RRD2-01 10/27/2014 Regular sample
METHYLENE CHLORIDE	200(S)	µg/l	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U	2.0U
O-XYLENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
STYRENE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
TETRACHLOROETHENE	1(G)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
TOLUENE	100(G)	µg/l	1.0U	1.0U	1.0U	1.0U	0.72J	1.0U	1.0U
TRANS-1,2-DICHLOROETHENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
TRANS-1,3-DICHLOROPROPENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
TRICHLOROETHENE	40(S)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
TRICHLOROFLUOROMETHANE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
VINYL CHLORIDE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
XYLENES, M & P	NC	µg/l	1.0U	1.0U	1.0U	1.0U	0.53J	1.0U	1.0U
XYLENES, TOTAL	65(G)	µg/l	1.0U	1.0U	0.28J	1.0U	0.53J	1.0U	1.0U

Notes

Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.

U - not detected, J - estimated value, S - Standard value G - guidance value.

NC - No applicable criteria. [ ] - Exceeds New York State Class C Standards.

NYS Class C Fresh Surface Water Criteria obtained from NYSDEC Ambient Water Quality Standard and Guidance Values (June 1998, April 2000 Addendum).

Table 1B
Honeywell
Upper Harbor Brook 2014 Annual Report
Surface Water Samples
Method 8270 Semivolatile Organic Compound Data

Parameter Name	NYSDEC Class C Standards	Field Sample ID Location Sample Date Sample Purpose Units	UHB-1028-01 UHB-DEDitch-01 10/27/2014 Regular sample	UHB-1031-01 UHB-Offsite-01 10/28/2014 Regular sample	UHB-1031-02 UHB-OW01-01 10/28/2014 Regular sample	UHB-1028-02 UHB-OW03-01 10/27/2014 Regular sample	UHB-1028-04 UHB-OW04-01 10/27/2014 Regular sample	UHB-1028-03 UHB-RRD1-01 10/27/2014 Regular sample	UHB-1028-07 UHB-RRD2-01 10/27/2014 Regular sample
1,1'-BIPHENYL	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
1,2,4,5-TETRACHLOROBENZENE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
2,2'-OXYBIS(1-CHLOROPROPANE)	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
2,3,4,6-TETRACHLOROPHENOL	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
2,4,5-TRICHLOROPHENOL	1(S)	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
2,4,6-TRICHLOROPHENOL	1(S)	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
2,4-DICHLOROPHENOL	1(S)	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
2,4-DIMETHYLPHENOL	5(S)	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
2,4-DINITROPHENOL	400(S)	µg/l	20U	20U	20U	20U	21U	21U	20U
2,4-DINITROTOLUENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
2,6-DINITROTOLUENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
2-CHLORONAPHTHALENE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
2-CHLOROPHENOL	1(S)	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
2-METHYLNAPHTHALENE	4.7(G)	µg/l	1.0U	1.0U	1.0U	1.0U	0.92J	1.0U	1.0U
2-METHYLPHENOL	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
2-NITROANILINE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
2-NITROPHENOL	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
3&4-METHYLPHENOL	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
3,3'-DICHLOROBENZIDINE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
3-NITROANILINE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
4,6-DINITRO-2-METHYLPHENOL	NC	µg/l	20U	20U	20U	20U	21U	21U	20U
4-BROMOPHENYL PHENYL ETHER	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
4-CHLORO-3-METHYLPHENOL	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
4-CHLOROANILINE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
4-CHLOROPHENYL PHENYL ETHER	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
4-NITROANILINE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
4-NITROPHENOL	NC	µg/l	10U	10U	10U	10U	10U	10U	10U
ACENAPHTHENE	5.3(G)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
ACENAPHTHYLENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
ANTHRACENE	3.8(G)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
ATRAZINE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
BENZALDEHYDE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
BENZO(A)ANTHRACENE	0.03(G)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
BENZO(A)PYRENE	0.0012(G)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
BENZO(B)FLUORANTHENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
BENZO(G,H,I)PERYLENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
BENZO(K)FLUORANTHENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
BIS(2-CHLOROETHOXY)METHANE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
BIS(2-CHLOROETHYL)ETHER	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
BIS(2-ETHYLHEXYL)PHTHALATE	0.6(S)	µg/l	[1.8BJ]	[1.1J]	2.0U	[1.3BJ]	[1.5BJ]	[3.5B]	[1.7BJ]
BUTYLBENZYL PHTHALATE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U

Notes

Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.

U - not detected, J - estimated value, S - Standard value G - guidance value.

NC - No applicable criteria. [ ] - Exceeds New York State Class C Standards.

NYS Class C Fresh Surface Water Criteria obtained from NYSDEC Ambient Water Quality Standard and Guidance Values (June 1998, April 2000 Addendum).

Table 1B
Honeywell
Upper Harbor Brook 2014 Annual Report
Surface Water Samples
Method 8270 Semivolatile Organic Compound Data

Parameter Name	NYSDEC Class C Standards	Field Sample ID Location Sample Date Sample Purpose Units	UHB-1028-01 UHB-DEDitch-01 10/27/2014 Regular sample	UHB-1031-01 UHB-Offsite-01 10/28/2014 Regular sample	UHB-1031-02 UHB-OW01-01 10/28/2014 Regular sample	UHB-1028-02 UHB-OW03-01 10/27/2014 Regular sample	UHB-1028-04 UHB-OW04-01 10/27/2014 Regular sample	UHB-1028-03 UHB-RRD1-01 10/27/2014 Regular sample	UHB-1028-07 UHB-RRD2-01 10/27/2014 Regular sample
CAPROLACTAM	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
CARBAZOLE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
CHRYSENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
DI-N-BUTYL PHTHALATE	NC	µg/l	12.4B	5.8B	3.7B	7.0B	8.6B	5.7B	4.1B
DI-N-OCTYL PHTHALATE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
DIBENZO(A,H)ANTHRACENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
DIBENZOFURAN	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
DIETHYL PHTHALATE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
DIMETHYL PHTHALATE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
FLUORANTHENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
FLUORENE	0.54(G)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
HEXACHLOROBENZENE	0.00003(S)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
HEXACHLOROBUTADIENE	0.01(S)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
HEXACHLOROCYCLOPENTADIENE	0.45(S)	µg/l	10U	10U	10U	10U	10U	10U	10U
HEXACHLOROETHANE	0.6(S)	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
INDENO(1,2,3-CD)PYRENE	NC	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
ISOPHORONE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
N-NITROSO-DI-N-PROPYLAMINE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
N-NITROSODIPHENYLAMINE	NC	µg/l	5.0U	5.0U	5.0U	5.0U	5.2U	5.2U	5.1U
NAPHTHALENE	13(G)	µg/l	1.0U	1.0U	2.2	1.0U	1.0U	1.0U	1.0U
NITROBENZENE	NC	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
PENTACHLOROPHENOL	1(S)	µg/l	10U	10U	10U	10U	10U	10U	10U
PHENANTHRENE	5(G)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
PHENOL	5(S)	µg/l	2.0U	2.0U	2.0U	2.0U	2.1U	2.1U	2.0U
PYRENE	4.6(G)	µg/l	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U

Notes

Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.

U - not detected, J - estimated value, S - Standard value G - guidance value.

NC - No applicable criteria. [ ] - Exceeds New York State Class C Standards.

NYS Class C Fresh Surface Water Criteria obtained from NYSDEC Ambient Water Quality Standard and Guidance Values (June 1998, April 2000 Addendum).

Table 1C
Honeywell
Upper Harbor Brook 2014 Annual Report
Surface Water Samples
Method 6010/1631/335.4 Inorganic Data

Parameter Name	NYSDEC Class C Standards (hardness dependent)	NYSDEC Class C Standards	Field Sample ID Location Sample Date Sample Purpose Units	UHB-1028-01 UHB-DEDitch-01 10/27/2014 Regular sample	UHB-1031-01 UHB-Offsite-01 10/28/2014 Regular sample	UHB-1031-02 UHB-OW01-01 10/28/2014 Regular sample	UHB-1028-02 UHB-OW03-01 10/27/2014 Regular sample	UHB-1028-04 UHB-OW04-01 10/27/2014 Regular sample	UHB-1028-03 UHB-RRD1-01 10/27/2014 Regular sample	UHB-1028-07 UHB-RRD2-01 10/27/2014 Regular sample
MERCURY	NC	0.00077(S)	mg/L	6.00E-06	1.50E-06	4.6e-007B	1.10E-06	1.10E-06	2.70E-06	2.60E-06
CYANIDE	NC	0.0052(S)	mg/L	0.010U	0.0044B	0.010U	0.010U	0.010U	0.010U	0.010U
ALUMINUM	NC	0.1(S)	mg/L	[0.371]	0.0862B	0.0918B	[0.392]	[0.41]	[0.438]	[0.439]
ANTIMONY	NC	NC	mg/L	0.006U	0.006U	0.006U	0.006U	0.006U	0.006U	0.006U
ARSENIC	NC	0.15(S)	mg/L	0.003U	0.006U	0.0068	0.003U	0.003U	0.003U	0.003U
BARIUM	NC	NC	mg/L	0.702	0.0608B	0.0926B	0.0701B	0.0712B	0.0841B	0.0661B
BERYLLIUM	NC	1.1(S)	mg/L	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U	0.001U
CADMIUM	0.0082642	NC	mg/l	0.003U	0.003U	0.003U	0.003U	0.0007B	0.003U	0.003U
CALCIUM	NC	NC	mg/L	182	261	257	194	205	79.6	105
CHROMIUM	0.310507	NC	mg/l	0.01U	0.0009B	0.0017B	0.0009B	0.0011B	0.01U	0.001B
COBALT	NC	0.005(S)	mg/L	0.05U	0.0009B	0.05U	0.05U	0.05U	0.05U	0.05U
COPPER	0.0399244	NC	mg/l	0.0029B	0.0052B	0.0041B	0.0041B	0.003B	0.0039B	0.0039B
IRON	NC	0.3(S)	mg/L	[0.606]	0.16	0.172	0.133	0.136	[0.412]	[0.452]
LEAD	0.0237776	NC	mg/l	0.003U	0.0015B	0.003U	0.003U	0.003U	0.003U	0.0025B
MAGNESIUM	NC	NC	mg/L	15.7	45.3	44.2	34.6	35.9	20.4	19.2
MANGANESE	NC	NC	mg/L	0.154	0.0304	0.0355	0.0209	0.0232	0.0558	0.102
NICKEL	0.228421	NC	mg/l	0.0025B	0.0011B	0.0011B	0.0014B	0.0012B	0.0014B	0.0018B
POTASSIUM	NC	NC	mg/L	10.1	3.41B	4.02B	3.28B	3.36B	4.72B	5B
SELENIUM	NC	0.0046(S)	mg/L	0.01U	0.01U	0.01U	0.01U	0.01U	0.01U	0.01U
SILVER	NC	0.0001(S)	mg/l	[0.0012B]	0.01U	0.01U	0.01U	0.01U	0.01U	0.01U
SODIUM	NC	NC	mg/L	568	179	202	139	150	67.2	228
THALLIUM	NC	0.008(S)	mg/L	0.002U	0.004U	0.004U	0.004U	0.004U	0.002U	0.002U
VANADIUM	NC	0.014(S)	mg/L	0.05U	0.05U	0.05U	0.05U	0.05U	0.05U	0.0013B
ZINC	0.356309	NC	mg/l	0.02U	0.0113B	0.0103B	0.02U	0.02U	0.0077B	0.0172B
MERCURY	NC	0.00077(S)	mg/L	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U	0.0002U

Notes

Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.

U - not detected, J - estimated value, S - Standard value G - guidance value.

NC - No applicable criteria. [ ] - Exceeds New York State Class C Standards.

Hardenss dependent values calculated using mean Harbor Brook Site Hardness value of 575 mg/L.

NYS Class C Fresh Surface Water Criteria obtained from NYSDEC Ambient Water Quality Standard and Guidance Values (June 1998, April 2000 Addendum).

Table 2A
Honeywell
Upper Harbor Brook 2014 Annual Report
Sediment Samples
Method 8260 Volatile Organic Compound Data

Parameter Name	NYSDEC Part 375 Unrestricted Use	Field Sample ID Location Sample Date Sample Depth Sample Purpose Units	UHB-1029-01 UHB-DEDitch-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-01 UHB-Offsite-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-05 UHB-OW03-01 10/27/2014 0-0.33 Ft Regular sample	UHB-1030-01 UHB-OW04-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-03 UHB-PCD-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-07 UHB-RRD1-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1030-03 UHB-RRD2-01 10/27/2014 0-0.5 Ft Regular sample
1,1,1-TRICHLOROETHANE	680	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,1,2,2-TETRACHLOROETHANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,1,2-Trichloro-1,2,2-Trifluoroethane	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,1,2-TRICHLOROETHANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,1-DICHLOROETHANE	270	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,1-DICHLOROETHENE	330	µg/kg	0.97J	22U	13U	11U	6.5U	7.1U	8.7U
1,2,3-TRICHLOROBENZENE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,2,4-TRICHLOROBENZENE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,2-DIBROMO-3-CHLOROPROPANE	NC	µg/kg	21U	45U	25U	22U	13U	14U	17U
1,2-DIBROMOETHANE	NC	µg/kg	2.1U	4.5U	2.5U	2.2U	1.3U	1.4U	1.7U
1,2-DICHLOROBENZENE	1100	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,2-DICHLOROETHANE	20	µg/kg	2.1U	4.5U	2.5U	2.2U	1.3U	1.4U	1.7U
1,2-DICHLOROPROPANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,3-DICHLOROBENZENE	2400	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,4-DICHLOROBENZENE	1800	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
1,4-DIOXANE	100	µg/kg	260U	560U	310U	280U	160U	180U	220U
2-BUTANONE	120	µg/kg	21U	45U	25U	22U	13U	14U	17U
2-HEXANONE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
4-METHYL-2-PENTANONE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
ACETONE	50	µg/kg	[97.1]	[234]	36.1	46.4	13U	14U	[52.5]
BENZENE	60	µg/kg	0.72J	4.5U	2.5U	4.8	1.3U	1.4U	1.7U
BROMOCHLOROMETHANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
BROMODICHLOROMETHANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
BROMOFORM	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
BROMOMETHANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
CARBON DISULFIDE	NC	µg/kg	0.54J	12.5J	1.0J	1.8J	6.5U	7.1U	8.7U
CARBON TETRACHLORIDE	760	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
CHLOROBENZENE	1100	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
CHLOROETHANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
CHLOROFORM	370	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
CHLOROMETHANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
CIS-1,2-DICHLOROETHENE	250	µg/kg	10U	2.2J	13U	11U	6.5U	7.1U	8.7U
CIS-1,3-DICHLOROPROPENE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
CYCLOHEXANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
Dibromochloromethane	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
DICHLORODIFLUOROMETHANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
ETHYLBENZENE	1000	µg/kg	0.58J	4.5U	2.5U	0.46J	1.3U	1.4U	1.7U
ISOPROPYLBENZENE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
METHYL ACETATE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
METHYL TERT-BUTYL ETHER	930	µg/kg	2.1U	4.5U	2.5U	2.2U	1.3U	1.4U	1.7U
METHYLCYCLOHEXANE	NC	µg/kg	0.73J	22U	13U	11U	6.5U	7.1U	8.7U

Notes
Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.
U - not Detected, J - estimated value, B - detected in associated laboratory blank.
NYSDEC Part 375 Unrestricted Use Soil Use Cleanup Objectives (2006)

Table 2A
Honeywell
Upper Harbor Brook 2014 Annual Report
Sediment Samples
Method 8260 Volatile Organic Compound Data

Parameter Name	NYSDEC Part 375 Unrestricted Use	Field Sample ID Location Sample Date Sample Depth Sample Purpose Units	UHB-1029-01 UHB-DEDitch-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-01 UHB-Offsite-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-05 UHB-OW03-01 10/27/2014 0-0.33 Ft Regular sample	UHB-1030-01 UHB-OW04-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-03 UHB-PCD-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-07 UHB-RRD1-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1030-03 UHB-RRD2-01 10/27/2014 0-0.5 Ft Regular sample
METHYLENE CHLORIDE	50	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
O-XYLENE	260	µg/kg	2.1U	4.5U	2.5U	0.52J	1.3U	1.4U	1.7U
STYRENE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
TETRACHLOROETHENE	1300	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
TOLUENE	700	µg/kg	1.0J	4.5U	2.5U	0.81J	1.3U	1.4U	1.7U
TRANS-1,2-DICHLOROETHENE	190	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
TRANS-1,3-DICHLOROPROPENE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
TRICHLOROETHENE	470	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
TRICHLOROFLUOROMETHANE	NC	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
VINYL CHLORIDE	20	µg/kg	10U	22U	13U	11U	6.5U	7.1U	8.7U
XYLENES, M & P	260	µg/kg	2.1U	4.5U	2.5U	1.1J	1.3U	1.4U	1.7U
XYLENES, TOTAL	260	µg/kg	2.1U	4.5U	2.5U	1.6J	1.3U	1.4U	1.7U

Notes
Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.
U - not Detected, J - estimated value, B - detected in associated laboratory blank.
NYSDEC Part 375 Unrestricted Use Soil Use Cleanup Objectives (2006)

Table 2B
Honeywell
Upper Harbor Brook 2014 Annual Report
Sediment Samples
Method 8270 Semivolatile Organic Compound Data

Parameter Name	NYSDEC Part 375 Unrestricted Use	Field Sample ID Location Sample Date Sample Depth Sample Purpose Units	UHB-1029-02 UHB-DEDitch-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-02 UHB-Offsite-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-06 UHB-OW03-01 10/27/2014 0-0.33 Ft Regular sample	UHB-1030-02 UHB-OW04-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-04 UHB-PCD-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-08 UHB-RRD1-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1030-04 UHB-RRD2-01 10/27/2014 0-0.5 Ft Regular sample
1,1'-BIPHENYL	NC	µg/kg	120U	230U	140U	140U	79U	97U	26.5J
1,2,4,5-TETRACHLOROBENZENE	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
2,2'-OXYBIS(1-CHLOROPROPANE)	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
2,3,4,6-TETRACHLOROPHENOL	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
2,4,5-TRICHLOROPHENOL	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
2,4,6-TRICHLOROPHENOL	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
2,4-DICHLOROPHENOL	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
2,4-DIMETHYLPHENOL	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
2,4-DINITROPHENOL	NC	µg/kg	1200U	2300U	1400U	1400U	790U	970U	1100U
2,4-DINITROTOLUENE	NC	µg/kg	62U	110U	69U	72U	40U	48U	53U
2,6-DINITROTOLUENE	NC	µg/kg	62U	110U	69U	72U	40U	48U	53U
2-CHLORONAPHTHALENE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
2-CHLOROPHENOL	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
2-METHYLNAPHTHALENE	NC	µg/kg	120U	230U	60.1J	62.2J	79U	97U	77.8J
2-METHYLPHENOL	330	µg/kg	120U	230U	140U	140U	79U	97U	110U
2-NITROANILINE	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
2-NITROPHENOL	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
3&4-METHYLPHENOL	330	µg/kg	120U	230U	[334]	140U	79U	97U	110U
3,3'-DICHLOROBENZIDINE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
3-NITROANILINE	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
4,6-DINITRO-2-METHYLPHENOL	NC	µg/kg	1200U	2300U	1400U	1400U	790U	970U	1100U
4-BROMOPHENYL PHENYL ETHER	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
4-CHLORO-3-METHYLPHENOL	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
4-CHLOROANILINE	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
4-CHLOROPHENYL PHENYL ETHER	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
4-NITROANILINE	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
4-NITROPHENOL	NC	µg/kg	620U	1100U	690U	720U	400U	480U	530U
ACENAPHTHENE	20000	µg/kg	75.8	228	142	230	40U	48U	265
ACENAPHTHYLENE	100000	µg/kg	78.8	193	154	231	19.2J	48U	656
ANTHRACENE	100000	µg/kg	240	733	439	785	37.5J	22.0J	1040
ATRAZINE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
BENZALDEHYDE	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
BENZO(A)ANTHRACENE	1000	µg/kg	880	[3530]	[2040]	[2540]	119	53.5	[2220]
BENZO(A)PYRENE	1000	µg/kg	966	[4230]	[2410]	[2680]	132	56.4	[2530]
BENZO(B)FLUORANTHENE	1000	µg/kg	[1340]	[6040]	[3380]	[3310]	197	80.9	[3000]
BENZO(G,H,I)PERYLENE	100000	µg/kg	717	3350	1860	1880	107	43.9J	1810
BENZO(K)FLUORANTHENE	800	µg/kg	397	[2130]	[1160]	[1270]	58.2	30.0J	[926]
BIS(2-CHLOROETHOXY)METHANE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
BIS(2-CHLOROETHYL)ETHER	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
BIS(2-ETHYLHEXYL)PHTHALATE	NC	µg/kg	382	1240	1290	352	79U	64.9J	362
BUTYLBENZYL PHTHALATE	NC	µg/kg	120U	135J	140U	96.8J	79U	97U	120

Notes
Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.
U - not Detected, J - estimated value, B - detected in associated laboratory blank.
NYSDEC Part 375 Unrestricted Use Soil Use Cleanup Objectives (2006)

Table 2B
Honeywell
Upper Harbor Brook 2014 Annual Report
Sediment Samples
Method 8270 Semivolatile Organic Compound Data

Parameter Name	NYSDEC Part 375 Unrestricted Use	Field Sample ID Location Sample Date Sample Depth Sample Purpose Units	UHB-1029-02 UHB-DEDitch-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-02 UHB-Offsite-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-06 UHB-OW03-01 10/27/2014 0-0.33 Ft Regular sample	UHB-1030-02 UHB-OW04-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-04 UHB-PCD-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-08 UHB-RRD1-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1030-04 UHB-RRD2-01 10/27/2014 0-0.5 Ft Regular sample
CAPROLACTAM	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
CARBAZOLE	NC	µg/kg	143	590	377	369	79U	97U	345
CHRYSENE	1000	µg/kg	[1160]	[5530]	[3030]	[3050]	151	64.2	[2790]
DI-N-BUTYL PHTHALATE	NC	µg/kg	412B	534B	584B	112BJ	43.7BJ	288B	533B
DI-N-OCTYL PHTHALATE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
DIBENZO(A,H)ANTHRACENE	330	µg/kg	167	[746]	[458]	[456]	21.8J	48U	[469]
DIBENZOFURAN	7000	µg/kg	51.7J	130J	131J	149	79U	97U	145
DIETHYL PHTHALATE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
DIMETHYL PHTHALATE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
FLUORANTHENE	100000	µg/kg	2010	9810	4880	5430	221	77.9	4790
FLUORENE	30000	µg/kg	125	269	201	358	40U	48U	338
HEXACHLOROBENZENE	330	µg/kg	120U	230U	140U	140U	79U	97U	110U
HEXACHLOROBUTADIENE	NC	µg/kg	62U	110U	69U	72U	40U	48U	53U
HEXACHLOROCYCLOPENTADIENE	NC	µg/kg	620U	1100U	690U	720U	400U	480U	530U
HEXACHLOROETHANE	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
INDENO(1,2,3-CD)PYRENE	500	µg/kg	[790]	[3330]	[2050]	[2080]	104	48.3	[1900]
ISOPHORONE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
N-NITROSO-DI-N-PROPYLAMINE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
N-NITROSODIPHENYLAMINE	NC	µg/kg	310U	570U	350U	360U	200U	240U	260U
NAPHTHALENE	12000	µg/kg	44.5J	67.4J	201	154	40U	48U	62.3
NITROBENZENE	NC	µg/kg	120U	230U	140U	140U	79U	97U	110U
PENTACHLOROPHENOL	800	µg/kg	620U	1100U	690U	720U	400U	480U	530U
PHENANTHRENE	100000	µg/kg	1170	4330	2540	3230	117	36.4J	3300
PHENOL	330	µg/kg	120U	230U	88.1J	140U	79U	97U	110U
PYRENE	100000	µg/kg	1790	8210	4320	4770	191	84.2	4560

Notes
Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.
U - not Detected, J - estimated value, B - detected in associated laboratory blank.
NYSDEC Part 375 Unrestricted Use Soil Use Cleanup Objectives (2006)

Table 2C
Honeywell
Upper Harbor Brook 2014 Annual Report
Sediment Samples
Method 6010/7471/9012 Inorganic Data

Parameter Name	NYSDEC Part 375 Unrestricted Use	Field Sample ID Location Sample Date Sample Depth Sample Purpose Units	UHB-1029-02 UHB-DEDitch-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-02 UHB-Offsite-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-06 UHB-OW03-01 10/27/2014 0-0.33 Ft Regular sample	UHB-1030-02 UHB-OW04-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-04 UHB-PCD-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-08 UHB-RRD1-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1030-04 UHB-RRD2-01 10/27/2014 0-0.5 Ft Regular sample
SOLIDS, PERCENT	NC	%	46.4	25.1	43.5	40.5	72.9	66.8	57.2
ALUMINUM	NC	mg/kg	4540	11900	5600	6850	15200	16700	11700
ANTIMONY	NC	mg/kg	0.83B	1.5B	1.0B	0.66B	2.0U	2.0U	1.0B
ARSENIC	13	mg/kg	3.7	6.3	2.7	3.4	7.7	5.6	7.3
BARIUM	350	mg/kg	[583]	113	95.7	145	74.9	119	101
BERYLLIUM	7.2	mg/kg	0.19B	0.58	0.28	0.35	0.71	0.65	1.4
CADMIUM	2.5	mg/kg	0.36B	0.85	0.50B	0.42B	0.23B	0.21B	1.7
CALCIUM	NC	mg/kg	202000	121000	158000	200000	20500	33300	57900
CHROMIUM	30	mg/kg	13	[40.2]	20.6	19.7	22.3	21.8	27.1
COBALT	NC	mg/Kg	3.8B	8.6	4.3B	5.3	9.3	10	9.6
COPPER	50	mg/kg	31.2	[90.4]	43.5	35.8	29	34.3	[56.1]
CYANIDE	27	mg/kg	1.1	0.98U	0.56U	0.58U	0.34U	0.37U	0.41U
IRON	NC	mg/Kg	24300	22300	10300	11100	20500	24400	18000
LEAD	63	mg/kg	38	[91.0]	56.6	56.1	15.7	14.2	[150]
MAGNESIUM	NC	mg/kg	6580	22300	10400	15400	8390	11500	18200
MANGANESE	1600	mg/kg	697	204	222	273	522	653	371
MERCURY	0.18	mg/kg	0.17	[0.34]	0.14	0.13	0.099	0.044B	[0.40]
NICKEL	30	mg/kg	11.5B	29.9	13.8	14.2	22.4	23.3	25.1
POTASSIUM	NC	mg/kg	1070	2940	1580	1730	2770	2860	2490
SELENIUM	3.9	mg/kg	1.3B	0.94B	1.1B	1.6B	2.0U	2.0U	1.6B
SILVER	2	mg/kg	2.5U	1.1	2.5U	2.5U	0.86	0.17B	0.68
SODIUM	NC	mg/kg	1530	11700	642B	685B	140B	243B	501B
THALLIUM	NC	mg/kg	0.99U	1.0U	1.0U	1.0U	1.0U	1.0U	0.58B
VANADIUM	NC	mg/Kg	11.7	30.6	14.6	17	27.6	31	27.3
ZINC	109	mg/kg	[122]	[303]	[145]	[126]	51.9	66.1	[140]

Notes
Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.
U - not Detected, J - estimated value, B - detected in associated laboratory blank.
NYSDEC Part 375 Unrestricted Use Soil Use Cleanup Objectives (2006)

Table 2D
Honeywell
Upper Harbor Brook 2014 Annual Report
Sediment Samples
Method 2540G Percent Moisture Data

Parameter Name	NYSDEC Part 375 Unrestricted Use	Field Sample ID Location Sample Date Sample Depth Sample Purpose Units	UHB-1029-02 UHB-DEDitch-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-02 UHB-Offsite-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-06 UHB-OW03-01 10/27/2014 0-0.33 Ft Regular sample	UHB-1030-02 UHB-OW04-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1032-04 UHB-PCD-01 10/28/2014 0-0.5 Ft Regular sample	UHB-1029-08 UHB-RRD1-01 10/27/2014 0-0.5 Ft Regular sample	UHB-1030-04 UHB-RRD2-01 10/27/2014 0-0.5 Ft Regular sample
SOLIDS, PERCENT	NC	%	46.4	25.1	43.5	40.5	72.9	66.8	57.2

Notes
Data has not been validated. Location UHB-Offsite-01 is upstream of the site in Harbor Brook.
U - not Detected, J - estimated value, B - detected in associated laboratory blank.
NYSDEC Part 375 Unrestricted Use Soil Use Cleanup Objectives (2006)

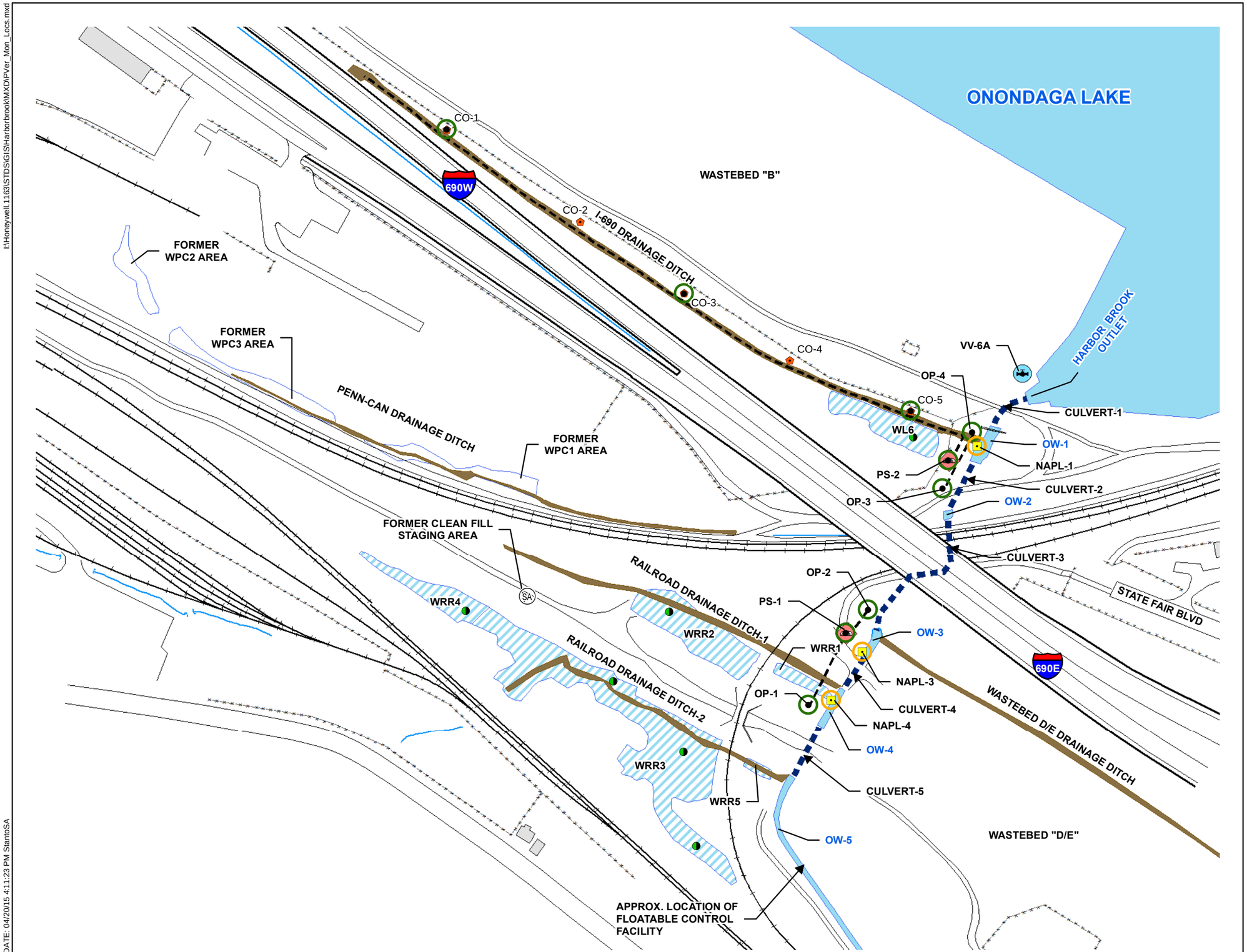
Table 3
Honeywell
Upper Harbor Brook 2014 Annual Report
Upper Harbor Brook Water Elevations
Groundwater and NAPL Elevation Monitoring Data Summary

Date	USGS 04240495 Onondaga Lake Elevation at Liverpool	Harbor Brook-1 Collection System			Harbor Brook-2 Collection System			I-690 Collection Trench			Passive NAPL Collection Trench		
		OP-2 (North)	PS-1	OP-1 (South)	OP-4 (North)	PS-2	OP-3 (South)	CO-1	CO-3	CO-5	NAPL-1	NAPL-3	NAPL-4
1/10/2014	363.18	358.46	358.04	358.17	362.32	362.30	362.27	-	-	-	-	-	-
1/24/2014	362.97	**364.44**	**364.25**	**364.38**	358.94	358.82	358.97	-	-	-	-	-	-
2/6/2014	362.61	358.21	357.75	358.33	361.17	361.12	360.96	-	-	-	-	-	-
3/4/2014	362.47	**363.33**	**363.15**	**363.17**	**366.53**	**366.52**	**366.46**	-	-	-	-	-	-
4/3/2014	364.31	362.65	362.30	362.59	362.38	362.15	362.50	-	-	-	-	-	-
4/18/2014	364.53	358.09	357.30	358.34	358.81	358.75	358.78	-	-	-	-	-	-
4/29/2014	363.71	361.57	361.46	361.47	361.40	361.47	361.04	-	-	-	-	-	-
5/16/2014	363.88	360.22	359.95	360.29	359.46	359.40	359.46	-	-	-	-	-	-
6/2/2014	363.28	361.63	361.15	362.11	359.59	361.95	359.32	-	-	-	-	-	-
6/16/2014	363.36	359.56	359.30	362.40	359.98	359.99	360.05	-	-	-	-	-	-
7/16/2014	362.77	358.61	358.73	358.74	359.39	359.50	359.13	-	-	-	-	-	-
7/29/2014	362.97	359.01	358.40	358.87	359.77	359.49	359.89	-	-	-	-	-	-
8/15/2014	362.91	359.37	358.86	359.60	359.61	359.54	359.63	-	-	-	-	-	-
8/28/2014	362.42	359.67	359.17	360.04	**363.01**	**363.00**	**363.09**	-	-	-	-	-	-
9/10/2014	362.62	361.39	360.91	361.86	**364.65**	**364.60**	**364.68**	-	-	-	-	-	-
9/26/2014	362.47	**364.2**	**364.41**	**364.32**	**364.83**	**364.79**	**364.76**	369.59	368.31	367.24	362.99	363.00	363.96
10/3/2014	362.37	360.51	360.15	361.16	360.58	360.47	360.65	369.59	368.52	367.67	362.47	362.75	363.84
10/14/2014	362.48	358.88	358.69	359.67	360.22	360.10	360.11	369.38	368.20	366.96	362.45	362.66	363.63
10/29/2014	362.89	362.85	**362.95**	**363.22**	**365.50**	**365.40**	**365.85**	370.48	369.16	367.60	363.59	363.30	364.19
11/11/2014	362.82	359.31	358.70	360.06	360.70	360.38	360.90	370.55	369.16	367.46	362.95	363.07	363.87
11/26/2014	362.96	360.36	360.16	359.88	359.90	359.83	359.94	370.73	369.50	367.66	363.07	363.10	363.73
12/8/2014	363.4	359.91	359.95	359.69	360.39	360.28	360.42	371.22	370.09	367.95	363.55	363.50	364.01
12/23/2014	363.35	361.61	361.45	361.45	361.76	361.95	361.65	372.03	371.01	369.37	364.13	363.67	364.36

Note:
- Bolded dates indicate when one or both of the Harbor Brook collection systems were above performance criterion.

FIGURES

FIGURE 1



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N

LEGEND

- PUMP STATION
- VALVE VAULT (VV-6A)
- GROUNDWATER OBSERVATION PORT
- NAPL OBSERVATION PORT
- CLEAN OUT
- VEGETATIVE PLOT
- GROUNDWATER COLLECTION SYSTEM MONITORING LOCATION
- PASSIVE NAPL COLLECTION SYSTEM MONITORING LOCATION
- CULVERT
- GROUNDWATER COLLECTION PIPE
- FENCELINE
- RAILROAD
- HIGHWAY
- ROAD
- OPEN WATER
- DITCH
- WETLAND
- BUILDINGS

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PERFORMANCE VERIFICATION MONITORING LOCATIONS

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Feet

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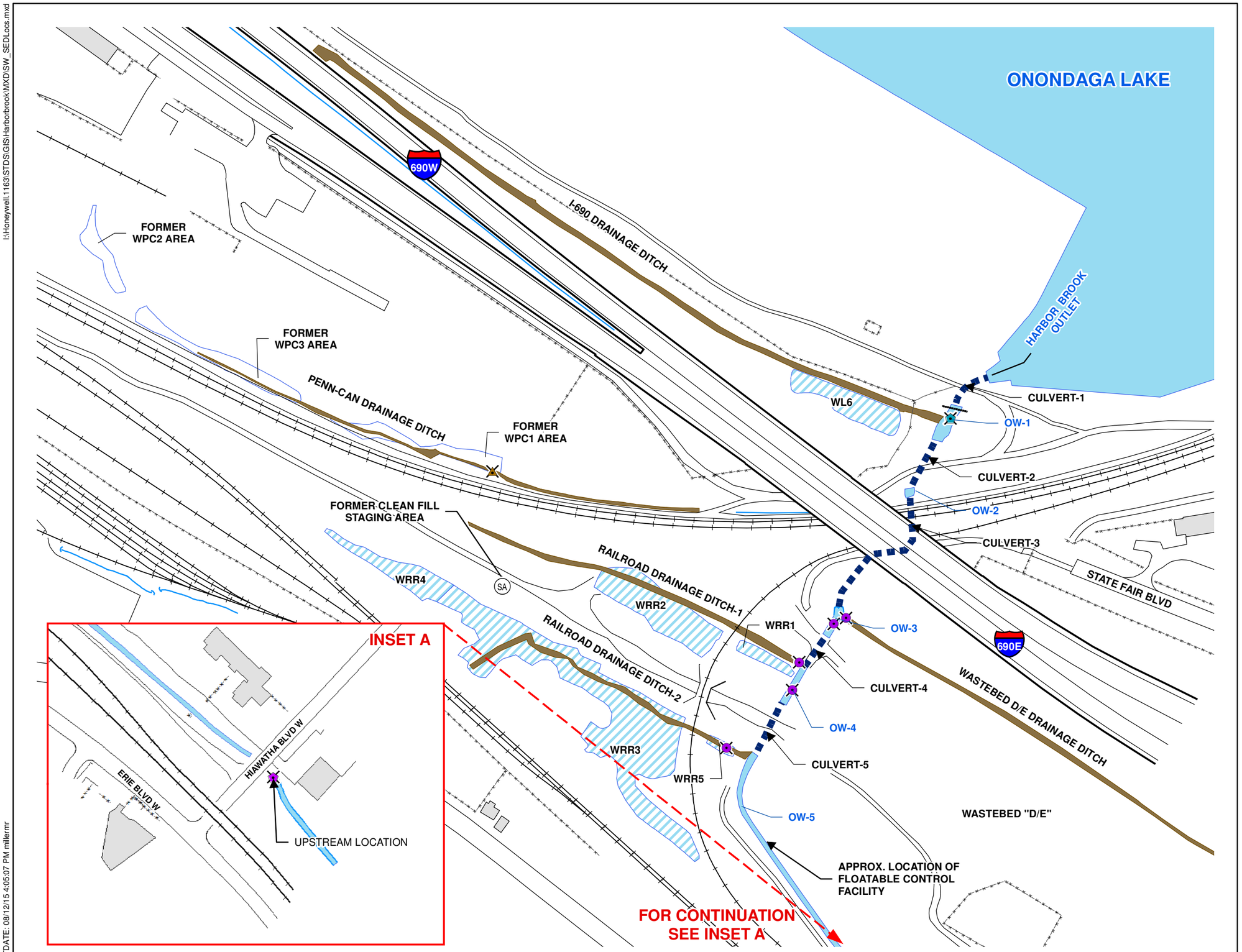
FIGURE 2



N

LEGEND

- SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- SURFACE WATER
- SEDIMENT SAMPLE
- CULVERT
- FENCELINE
- RAILROAD
- HIGHWAY
- ROAD
- WETLAND
- BUILDINGS

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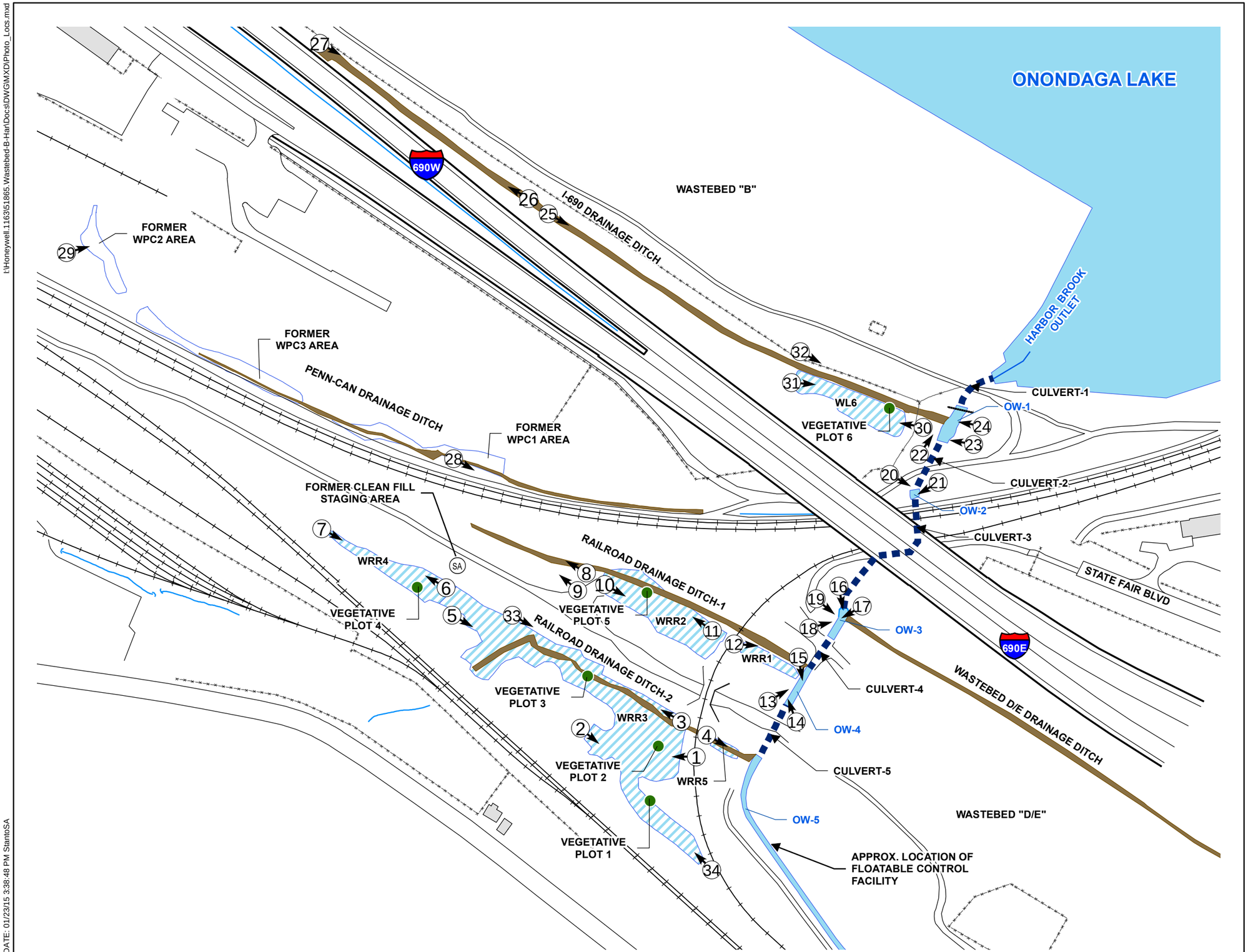
FIGURE 3



LEGEND

- 19 PHOTO LOCATION
- VEGETATIVE PLOT
- CULVERT
- HIGHWAY
- ROAD
- FENCELINE
- RAILROAD
- WETLAND
- BUILDINGS

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VEGETATION AND WETLAND INSPECTION PHOTOGRAPH LOCATIONS

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Feet

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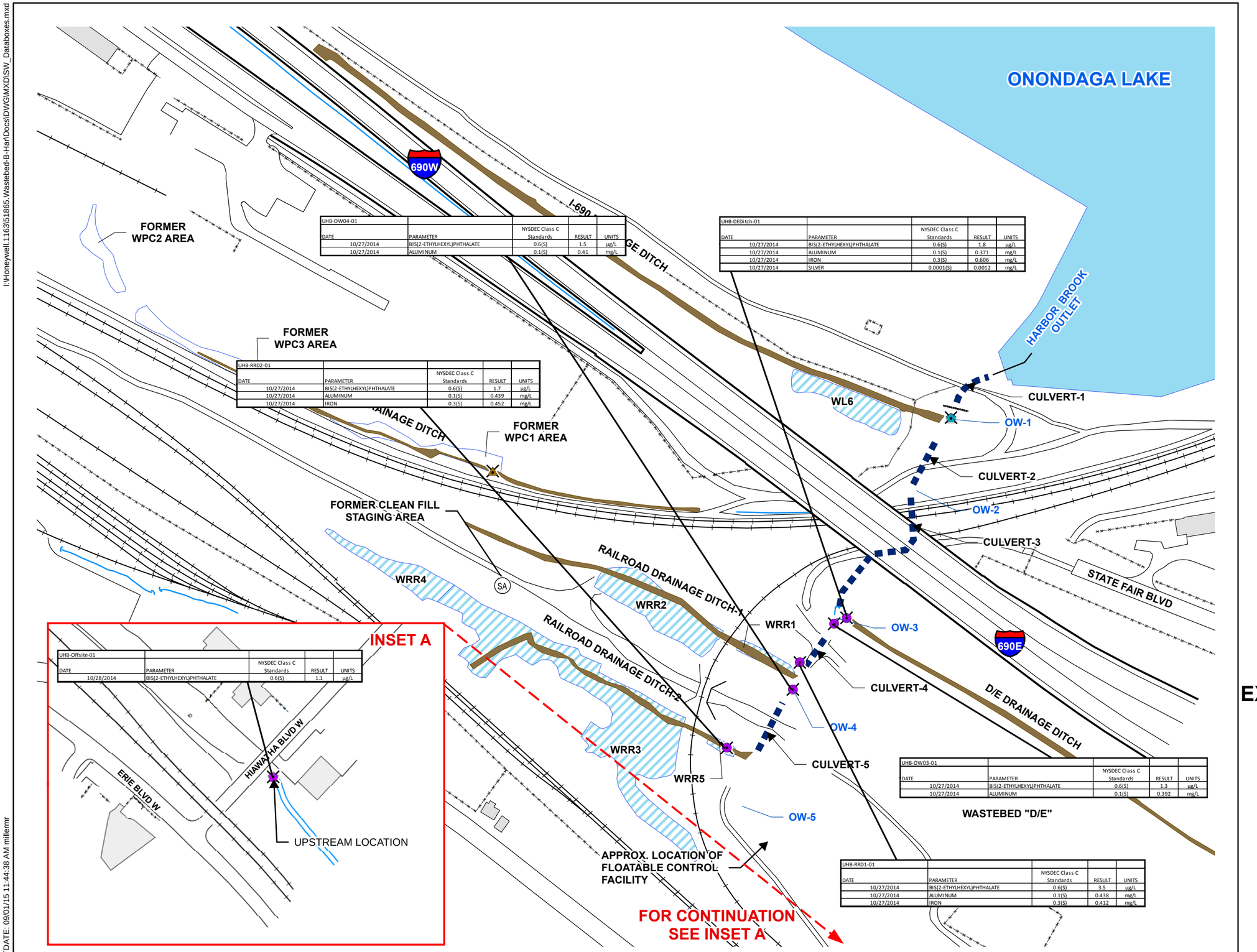
FIGURE 4



UHB-OW04-01				
DATE	PARAMETER	NYSDEC Class C Standards	RESULT	UNITS
10/27/2014	BIS(2-ETHYLHEXYL)PHTHALATE	0.6(S)	1.5	µg/L
10/27/2014	ALUMINUM	0.1(S)	0.41	mg/L

UHB-DEDitch-01				
DATE	PARAMETER	NYSDEC Class C Standards	RESULT	UNITS
10/27/2014	BIS(2-ETHYLHEXYL)PHTHALATE	0.6(S)	1.8	µg/L
10/27/2014	ALUMINUM	0.1(S)	0.371	mg/L
10/27/2014	IRON	0.3(S)	0.606	mg/L
10/27/2014	SILVER	0.0001(S)	0.0012	mg/L

UHB-RRD2-01				
DATE	PARAMETER	NYSDEC Class C Standards	RESULT	UNITS
10/27/2014	BIS(2-ETHYLHEXYL)PHTHALATE	0.6(S)	1.7	µg/L
10/27/2014	ALUMINUM	0.1(S)	0.439	mg/L
10/27/2014	IRON	0.3(S)	0.452	mg/L

UHB-Offsite-01				
DATE	PARAMETER	NYSDEC Class C Standards	RESULT	UNITS
10/28/2014	BIS(2-ETHYLHEXYL)PHTHALATE	0.6(S)	1.1	µg/L

UHB-OW03-01				
DATE	PARAMETER	NYSDEC Class C Standards	RESULT	UNITS
10/27/2014	BIS(2-ETHYLHEXYL)PHTHALATE	0.6(S)	1.3	µg/L
10/27/2014	ALUMINUM	0.1(S)	0.392	mg/L

UHB-RRD1-01				
DATE	PARAMETER	NYSDEC Class C Standards	RESULT	UNITS
10/27/2014	BIS(2-ETHYLHEXYL)PHTHALATE	0.6(S)	3.5	µg/L
10/27/2014	ALUMINUM	0.1(S)	0.438	mg/L
10/27/2014	IRON	0.3(S)	0.412	mg/L

N

LEGEND

- SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- SURFACE WATER
- SEDIMENT SAMPLE
- CULVERT
- FENCELINE
- RAILROAD
- HIGHWAY
- ROAD
- WETLAND
- BUILDINGS

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SURFACE WATER EXCEEDANCE LOCATIONS

0 100 200 400
Feet

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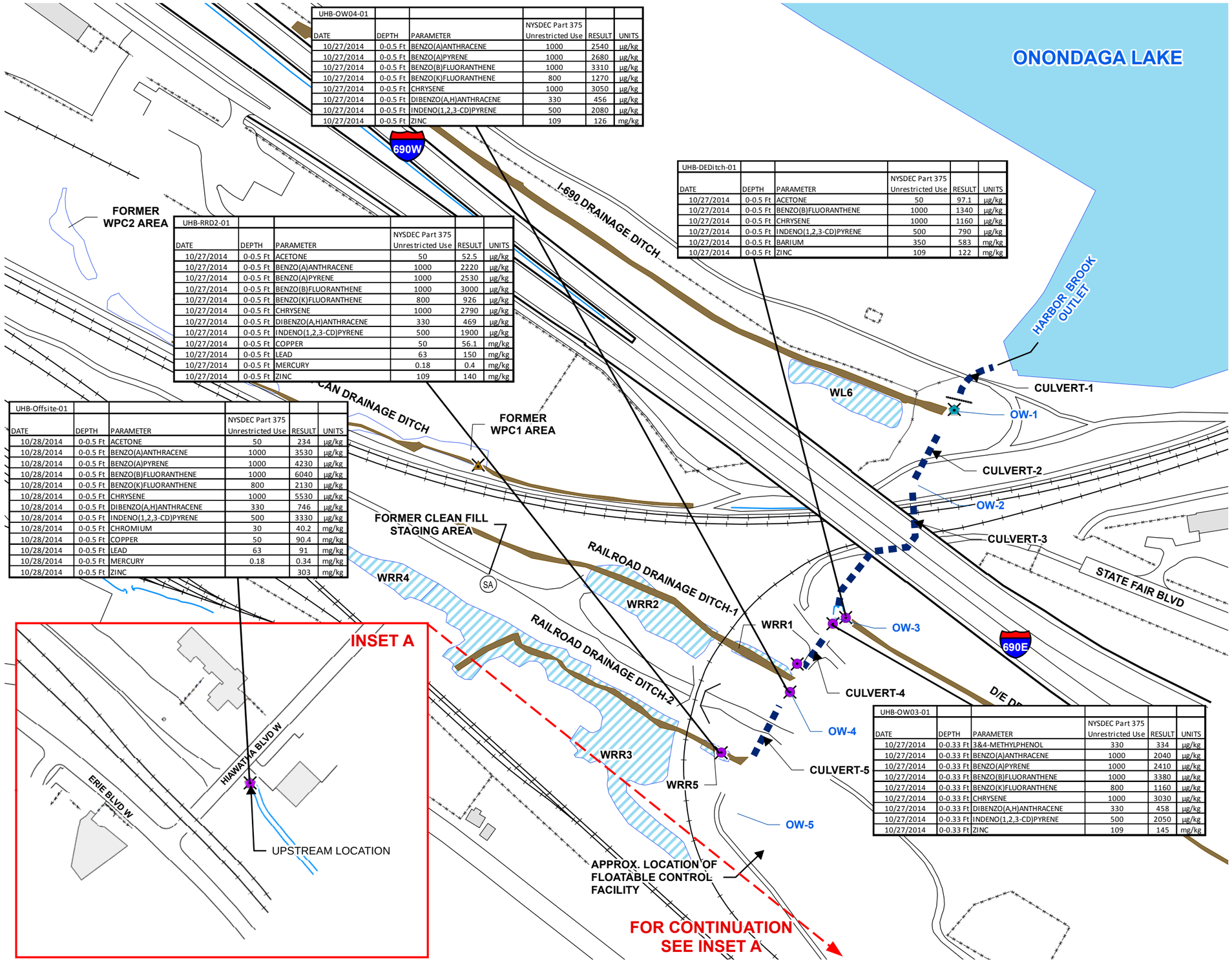
FIGURE 5



UHB-OW04-01					
DATE	DEPTH	PARAMETER	NYSDEC Part 375 Unrestricted Use	RESULT	UNITS
10/27/2014	0-0.5 Ft	BENZO(A)ANTHRACENE	1000	2540	µg/kg
10/27/2014	0-0.5 Ft	BENZO(A)PYRENE	1000	2680	µg/kg
10/27/2014	0-0.5 Ft	BENZO(B)FLUORANTHENE	1000	3310	µg/kg
10/27/2014	0-0.5 Ft	BENZO(K)FLUORANTHENE	800	1270	µg/kg
10/27/2014	0-0.5 Ft	CHRYSENE	1000	3050	µg/kg
10/27/2014	0-0.5 Ft	DIBENZO(A,H)ANTHRACENE	330	456	µg/kg
10/27/2014	0-0.5 Ft	INDENO(1,2,3-CD)PYRENE	500	2080	µg/kg
10/27/2014	0-0.5 Ft	ZINC	109	126	mg/kg

UHB-DEDitch-01					
DATE	DEPTH	PARAMETER	NYSDEC Part 375 Unrestricted Use	RESULT	UNITS
10/27/2014	0-0.5 Ft	ACETONE	50	97.1	µg/kg
10/27/2014	0-0.5 Ft	BENZO(B)FLUORANTHENE	1000	1340	µg/kg
10/27/2014	0-0.5 Ft	CHRYSENE	1000	1160	µg/kg
10/27/2014	0-0.5 Ft	INDENO(1,2,3-CD)PYRENE	500	790	µg/kg
10/27/2014	0-0.5 Ft	BARIUM	350	583	mg/kg
10/27/2014	0-0.5 Ft	ZINC	109	122	mg/kg

UHB-RRD2-01					
DATE	DEPTH	PARAMETER	NYSDEC Part 375 Unrestricted Use	RESULT	UNITS
10/27/2014	0-0.5 Ft	ACETONE	50	52.5	µg/kg
10/27/2014	0-0.5 Ft	BENZO(A)ANTHRACENE	1000	2220	µg/kg
10/27/2014	0-0.5 Ft	BENZO(A)PYRENE	1000	2530	µg/kg
10/27/2014	0-0.5 Ft	BENZO(B)FLUORANTHENE	1000	3000	µg/kg
10/27/2014	0-0.5 Ft	BENZO(K)FLUORANTHENE	800	926	µg/kg
10/27/2014	0-0.5 Ft	CHRYSENE	1000	2790	µg/kg
10/27/2014	0-0.5 Ft	DIBENZO(A,H)ANTHRACENE	330	469	µg/kg
10/27/2014	0-0.5 Ft	INDENO(1,2,3-CD)PYRENE	500	1900	µg/kg
10/27/2014	0-0.5 Ft	COPPER	50	56.1	mg/kg
10/27/2014	0-0.5 Ft	LEAD	63	150	mg/kg
10/27/2014	0-0.5 Ft	MERCURY	0.18	0.4	mg/kg
10/27/2014	0-0.5 Ft	ZINC	109	140	mg/kg

UHB-Offsite-01					
DATE	DEPTH	PARAMETER	NYSDEC Part 375 Unrestricted Use	RESULT	UNITS
10/28/2014	0-0.5 Ft	ACETONE	50	234	µg/kg
10/28/2014	0-0.5 Ft	BENZO(A)ANTHRACENE	1000	3530	µg/kg
10/28/2014	0-0.5 Ft	BENZO(A)PYRENE	1000	4230	µg/kg
10/28/2014	0-0.5 Ft	BENZO(B)FLUORANTHENE	1000	6040	µg/kg
10/28/2014	0-0.5 Ft	BENZO(K)FLUORANTHENE	800	2130	µg/kg
10/28/2014	0-0.5 Ft	CHRYSENE	1000	5530	µg/kg
10/28/2014	0-0.5 Ft	DIBENZO(A,H)ANTHRACENE	330	746	µg/kg
10/28/2014	0-0.5 Ft	INDENO(1,2,3-CD)PYRENE	500	3330	µg/kg
10/28/2014	0-0.5 Ft	CHROMIUM	30	40.2	mg/kg
10/28/2014	0-0.5 Ft	COPPER	50	90.4	mg/kg
10/28/2014	0-0.5 Ft	LEAD	63	91	mg/kg
10/28/2014	0-0.5 Ft	MERCURY	0.18	0.34	mg/kg
10/28/2014	0-0.5 Ft	ZINC		303	mg/kg

UHB-OW03-01					
DATE	DEPTH	PARAMETER	NYSDEC Part 375 Unrestricted Use	RESULT	UNITS
10/27/2014	0-0.33 Ft	3&4-METHYLPHENOL	330	334	µg/kg
10/27/2014	0-0.33 Ft	BENZO(A)ANTHRACENE	1000	2040	µg/kg
10/27/2014	0-0.33 Ft	BENZO(A)PYRENE	1000	2410	µg/kg
10/27/2014	0-0.33 Ft	BENZO(B)FLUORANTHENE	1000	3380	µg/kg
10/27/2014	0-0.33 Ft	BENZO(K)FLUORANTHENE	800	1160	µg/kg
10/27/2014	0-0.33 Ft	CHRYSENE	1000	3030	µg/kg
10/27/2014	0-0.33 Ft	DIBENZO(A,H)ANTHRACENE	330	458	µg/kg
10/27/2014	0-0.33 Ft	INDENO(1,2,3-CD)PYRENE	500	2050	µg/kg
10/27/2014	0-0.33 Ft	ZINC	109	145	mg/kg

N

LEGEND

- SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- SURFACE WATER
- SEDIMENT SAMPLE
- CULVERT
- FENCELINE
- RAILROAD
- HIGHWAY
- ROAD
- WETLAND
- BUILDINGS

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SEDIMENT EXEEDANCE LOCATIONS

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