REMEDIAL INVESTIGATION
LAKE PUMP SITE
SITE NUMBER 734078
TOWN OF GEDDES, ONONDAGA COUNTY, NEW YORK

Prepared for:

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TABLE OF CONTENTS

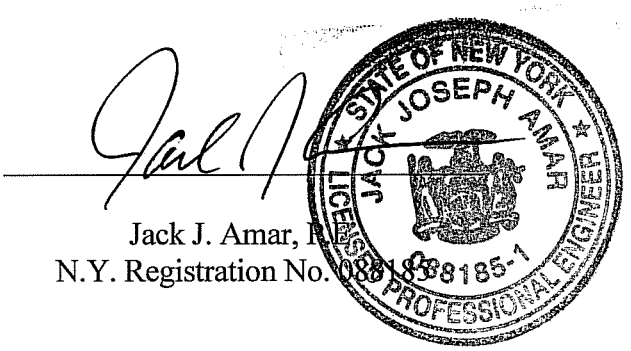
FIGURES

TABLES

APPENDICES

CERTIFICATION STATEMENT

I Jack J. Amar certify that I am currently a New York State registered professional engineer and that this Remedial Investigation was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



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EXECUTIVE SUMMARY

This document presents the results of the Remedial Investigation (RI) completed for the Lake Pump site, located in the Town of Geddes, New York, in accordance with the New York State Department of Environmental Conservation (NYSDEC) Administrative Consent Order (D-7-0001-01-07) with Coltec Industries, Inc.

As discussed with NYSDEC, the previously completed Preliminary Site Assessment (PSA) dated July 2003 (field activities completed November 2001) provided detailed investigation data for the site and based upon the Remedial Investigation/Feasibility Study (RI/FS) Work Plan approved by NYSDEC on February 23, 2011 (with the proposed number/locations of trench and boring modifications approved on July 11, 2011).

The RI investigation focused on an evaluation of the horizontal and vertical limits of the waste mass (no sampling/laboratory analysis was performed) for this study. Following evaluation of the horizontal limits of the waste mass, implementation of an Interim Remedial Measure (IRM) at the Lake Pump site was completed in November 2011.

Site Description

The Site, which measures approximately 3.5 acres in size, is located on the east side of Interstate 690. The Site is bound on the northeast by Onondaga Lake, to the south by the Interstate 690 Solvay exit ramp, to the west and northwest by lands owned by Onondaga County, and to the southwest by the Metropolitan Sewage Treatment Plant pump station property owned by Onondaga County. The site is owned by the NYSDOT and has historically been used for parking (e.g., State Fair) and storage/staging of construction equipment for area highway construction projects. As part of an IRM EnPro recently installed a 1-foot-thick stone cover at the site. Honeywell is using the Lake Pump Site as a staging area for remediation efforts of Onondaga Lake for a period of approximately 5 to 6 years. Honeywell has constructed temporary office buildings, a boat dock and parking on the Lake Pump site. Access to portions of the site is currently uncontrolled and the area is frequently used for unofficial access to Onondaga Lake. A NYSDEC boat launch will be constructed on the site after the lake cleanup is completed.

Remedial Investigation Results

As presented in a Modification of Remedial Investigation and Interim Measures letter dated July 7, 2011 (approved by NYSDEC on July 11, 2011), two borings (SB-1 and SB-2) were extended through the waste materials at the locations shown on **Figure 2**. Boring SB-2 was advanced to a total depth of approximately 32 feet below ground surface (bgs) and continuously sampled utilizing split spoons. The materials obtained from the split spoon were screened in the field with a photoionization detector (PID) and classified to evaluate if waste materials were evident. Based on field observations waste materials were indicated to a depth of approximately 26 feet bgs. Boring SB-1 was advanced to a depth of approximately 16 feet bgs with split spoon samples obtained at 3 to 5 feet, 9 to

11 feet and 14 to 16 feet bgs. Based on field observations the estimated vertical depth of waste in boring B-2 is approximately 10 feet bgs.

Based on field observations during trenching activities and as discussed on-site with NYSDEC, nine trenches/test pits and two hand-shovel dug holes were used to evaluate the horizontal extent of waste materials placed at the site. In addition, field reconnaissance in the wooded northwest portion of the site near an old Crucible building and south of the drainage ditch indicated waste materials at the ground surface. The additional trenches and hand-shovel dug holes beyond the six planned for the RI were the result of observations of waste materials at the surface in the wooded area in the northwest portion of the site. The estimated area of the waste disposal area is approximately 150,000 square feet or approximately 3.4 acres. This area includes waste materials along the bank of the Lake Pump site that were covered by Honeywell during the construction of temporary office buildings, boat docks, and the remediation of Onondaga Lake.

As indicated by the borings, the thickness of the waste materials appears to increase from the southwest to the northeast at the site and towards Onondaga Lake. Based on historical assessment and remedial investigation activities, waste materials were identified at the site ranging from zero to 3 feet below ground surface to depths of approximately 26 feet below ground surface. Assuming an average waste thickness of approximately 17 feet, the estimated volume of waste placed at the site is approximately 94,440 cubic yards which is consistent with volumes reported in the Preliminary Site Assessment (PSA) dated July 2003.

The results of the investigations conducted at the site are summarized below:

Fish and Wildlife Impact Analysis

The DFW&MR Fish and Wildlife Resource Impact Analysis (FWRIA), Step 1, that was presented in the PSA is summarized below.

The Resource Characterization completed by Terrestrial Environmental Services stated that the *Site and study areas are highly developed with industrial, transportation, and State/NYSDOT transportation maintenance uses. There are buildings, roads, highways and parking lots, waste beds, and other potential sources of urban runoff and contamination. Even the more natural communities are small, isolated, and somewhat disturbed by utility lines and adjacent land uses. The woody habitats (that is, shrub land or young forest) have grown up on abandoned waste beds that reflect disturbance factors such as drainage ditches and introduced non-native species (for example, common reed).Wildlife resources are reflective of existing habitats, many of which have resulted from human activities changing natural habitats into habitats that can be used by species tolerant of human disturbance.*

Hunting opportunities at the Site and in the immediate vicinity of the Site are limited or non-existent by reason of proximity to development, or isolation of natural habitats. Although game species such as white-tailed deer may be present in some parts of the

study area, it is unlikely that they are hunted in the immediate vicinity of the Site. However, the Site is often used for access to Onondaga Lake for duck hunting.

Other potential uses of the Site, such as bird-watching, are available to some extent but may be limited by accessibility to these habitats, and the fact that there are better and more appropriate locations along the lakeshore.

In summary, under existing conditions, the Lake Pump Site is of limited value as habitat to fish and wildlife, primarily due to the industrialized/urbanized nature of the area. However, it may be of greater value in the future due to wildlife potentially crossing the site as nearby areas of Onondaga Lake and the adjacent Wastebeds 1-8 site are remediated and the habitats restored. In addition, the area is currently used as an unofficial public access point to Onondaga Lake and Honeywell has constructed temporary office buildings, a boat dock and parking, that will be used for a period of approximately 5 to 6 years to support Onondaga Lake remediation activities. A NYSDEC boat launch will be constructed on the site after the lake cleanup is completed.

Fill Material

Based on field investigation and analytical data obtained during the PSA, the following summarizes the findings for the site:

- No hazardous waste was identified. This was based on the Toxic Characteristic Leaching Procedure (TCLP) results for subsurface soil samples and visual examination of subsurface materials from the borings and trench excavations.
- Waste materials have been identified at the site ranging from zero to 26 feet below ground surface.
- Surface soils contained no volatile organics (other than laboratory contaminants) or PCBs, and one pesticide. A variety of PAHs and several inorganics were found in the samples, several at levels above DER-10 soil cleanup objectives.
- Subsurface soils collected from soil borings and the trench excavation showed levels of PAHs, PCBs and several inorganic parameters above DER-10 soil cleanup objectives.

Groundwater

Based on field investigation and analytical data obtained during the PSA and the analytical data from the NYSDEC 2005 sampling event, the following summarizes the findings for the site:

- Three monitoring wells were installed at the site during the PSA. Two wells were located within the fill material and one well was located upgradient of the waste material.
- Groundwater flow appears to be towards the northeast and Onondaga Lake.
- Other than laboratory contaminants, the only volatile organic compounds detected in the groundwater at the Site were benzene and toluene. A variety of semi-volatile parameters were detected above the NYSDEC Class GA standards and guidance values. Groundwater analysis for inorganic parameters was conducted on both filtered and unfiltered samples. For the filtered samples, the Class GA

standards were exceeded for iron and sodium in both the upgradient and downgradient monitoring wells and for manganese in the upgradient and one of the downgradient wells.
- The upgradient well indicated no volatile organics, semi-volatile organics, and PCBs.

Lake and Sediment

Based on field investigation and analytical data obtained during the PSA, the following summarizes the findings for the site:

- Water and sediment samples were collected from Onondaga Lake near the edge of the site. Other than laboratory contaminants, benzaldehyde and endrin were the only organics detected in the water samples. Since neither of these parameters was detected in soil or groundwater on-site, it is apparent that the source of these contaminants is off-site.
- Nickel was the only inorganic parameter detected above the Class C standard.
- Toluene, PAHs, and three pesticides were detected in the sediment samples. Since none of the pesticides were detected in soil or groundwater on-site, it is apparent that the source of these contaminants is off-site.
- Levels of PCBs in lake sediment sample LS-2 were significantly lower than levels found in sediment samples collected further from the shoreline in the general area of the Lake Pump site.
- Sediment levels of several metals, including antimony, chromium, iron, manganese, and nickel exceed the NYSDEC Severe Effect Levels. In addition, metals including arsenic, cadmium, copper, and lead exceed the NYSDEC Low Effect Levels.

Drainage Ditch

Based on field investigation and analytical data obtained during the PSA, the following summarizes the findings for the site:

- Water and sediment samples collected from the drainage ditch southwest of the site appeared to be mainly Allied Solvay Process waste with a distinct blue layer a few inches below the surface.
- Water samples at both the upstream and downstream locations contained benzene, toluene, phenol, naphthalene, 2-methylnaphthalene, and iron at levels above the Class C water quality standards or guidance. Aluminum was above the Class C standard at the downstream location.
- The upstream and downstream sediment samples generally contained the same organic parameters, with benzene being the only one detected above the NYSDEC sediment criteria (at both locations). Inorganics were generally higher in the upstream sediment sample.

Cultural Resources – Phase I Reconnaissance Survey

- A *Cultural Resources Management Report Phase I Reconnaissance Survey* was completed for Honeywell by Christopher D. Hohman of the Public Archaeology

Facility and Parsons on July 26, 2011 and approved by NYSDEC on July 29, 2011(**Appendix III**).

- The report indicated that the area of the Lakeshore Complex (Lake Pump site) was either under Onondaga Lake or on the marshy shoreline of Onondaga Lake during the pre-contact and post-contact periods through the mid-20th century.
- The Syracuse Yacht Club extended out over the waters of Onondaga Lake in the vicinity of the project area for the Lakeshore Complex in the late 1800s to early 1900s.
- The Syracuse Yacht Club burned down and fill was placed off the shore of Onondaga Lake filling in a portion of the area that created the present landform that extends into Onondaga Lake.
- The fill material overlays the debris of the former yacht club and planned remedial activities will not impact the resources of the former yacht club.
- No further archaeological testing was recommended for the Lakeshore Complex (Lake Pump site).

Interim Remedial Measures

An Interim Remedial Measure (IRM) Design was completed and submitted to NYSDEC on October 28, 2011. The IRM Design was approved by NYSDEC on November 3, 2011. IRM activities completed in November 2011 included clearing of an area in the northwest portion of the Lake Pump site prior to placement of a 1-foot thick cover of #4 Stone over the site to provide a barrier to the waste materials. Approximately 7,160 tons of stone were placed as a cover for the waste material. A Report of Interim Remedial Measure was submitted to NYSDEC on January 12, 2012 and approved by NYSDEC on January 13, 2012 (**Appendix IV**).

1. INTRODUCTION

1.1 Background

The Site, which measures approximately 3.5 acres in size, is located on the eastern side of Interstate 690. The Site is bound on the northeast by Onondaga Lake, to the south by the Interstate 690 Solvay exit ramp, to the west and northwest by lands owned by Onondaga County, and to the southwest by the Metropolitan Sewage Treatment Plant pump station property owned by Onondaga County. The site is in the Town of Geddes, Onondaga County, New York. The site is owned by the NYSDOT and has historically been used for parking (e.g., State Fair) and storage/staging of construction equipment for area highway construction projects. Honeywell has constructed temporary office buildings, a boat dock and parking, which will be used for a period of approximately 5 to 6 years to support Onondaga Lake remediation activities. After the lake cleanup is completed, a NYSDEC boat launch will be constructed on the site. Currently, access to portions of the site is uncontrolled and the area is frequently used as an unofficial access point to Onondaga Lake. The site vicinity is illustrated in **Figure 1** and a site plan is provided as **Figure 2**.

It has been alleged that waste from the operation of the Crucible Plant, later of Coltec Industries, was received from 1961 to 1967. Based on available historical information and the PSA, the following describes the types and quantities of wastes believed to be deposited at the Lake Pump Site:

- **A.** slag (approximately 44,000 cubic yards) - bulky mineral residue generated from the use of electric arc furnaces to melt various mixtures of scrap metals and added alloys;
- **B.** construction and refractory debris, absorbents, and miscellaneous (approximately28,700 cubic yards) bricks, mortar, wood, steel, and other items from a variety of maintenance activities not generally produced by manufacturing processes;
- **C.** boiler house ashes (approximately 10,100 cubic yards) - fly ash and bottom ash collected from the boiler house combustion of coal;
- **D.** coolant swarf (approximately 9,600 cubic yards) - coolant swarf is the solid metal and abrasive material collected from a metal-working coolant system;
- **E.** mill scale (approximately 7,850 cubic yards) – mill scale is produced from the loosening of scale which develops on the surface of the metals as they are processed through various heating and cooling operations during steel production; and
- **F.** grinding dusts (approximately 4,800 cubic yards) collected from grinding operations on finished product.

A PSA work plan was approved by NYSDEC on September 21, 2001 and a PSA report was completed by C&S Companies in July 2003 (**Appendix I**). The PSA included the following assessment activities: fish and wild life impact analysis (Step 1); boring and monitor well installation; well development and hydraulic conductivity testing;

groundwater sampling; surface and subsurface soil sampling; lake sampling; and surface water and sediment sampling.

As required by the Order on Consent and Administrative Settlement (Order) signed and dated by the New York State Department of Environmental Conservation (NYSDEC) on August 27, 2010 and as discussed with Ms. Susan Edwards with NYSDEC on October 13, 2010, an RI/FS Work Plan was required for the site. Based on our discussion with NYSDEC, the previously completed Preliminary Site Assessment (PSA) provided detailed investigation data for the site and NYSDEC envisions the RI to include activities to evaluate the horizontal and vertical limits of the waste mass with no sampling/laboratory analysis expected unless waste materials encountered are not similar to that previously identified on-site.

S&ME Northeast, PC (S&ME) prepared a Remedial Investigation/Feasibility Study (RI/FS) Work Plan (dated February 7, 2011) for the Lake Pump site to delineate the horizontal and vertical extent of waste media at the site, surface and subsurface characteristics of the site, sources of contamination, migration pathways, potential receptors, and fish and wild life impacts. The RI/FS work plan also included a plan to identify, evaluate, and select a remedy or alternative to address the contamination identified during the RI phase of the project. NYSDEC approved the RI/FS Work Plan on February 23, 2011 (with the proposed number/locations of trench and boring modifications approved on July 11, 2011).

Remedial Investigation field activities to evaluate the horizontal and vertical extent of waste at the site were completed in July 2011. Following completion of field activities S&ME prepared an IRM design for the site that was approved by NYSDEC on November 3, 2011. Installation of the stone cover was completed in November 2011. The IRM (stone cover) included clearing of an area in the northwest portion of the Lake Pump site prior to placement of a 1-foot thick cover of #4 Stone to provide a barrier to the waste materials. Approximately 7,160 tons of stone were placed as a cover for the waste material. A Report of Interim Remedial Measures was submitted to NYSDEC on January 12, 2012 and approved by NYSDEC on January 13, 2012. A copy of the Report of Interim Remedial Measure is attached in **Appendix IV**.

1.2 Previous Investigations

A PSA work plan was approved by NYSDEC on September 21, 2001 and a PSA report was completed by C&S Companies in July 2003. The PSA included the following assessment activities: a Step 1 fish and wild life impact analysis; boring and monitor well installation; well development and hydraulic conductivity testing; groundwater sampling; surface and subsurface soil sampling; lake sampling; and surface water and sediment sampling. The following is a summary of the findings of the PSA completed by C&S Companies. A copy of the PSA is attached as a reference in **Appendix I**.

A. **Fish and Wildlife Impact Analysis.** The Lake Pump site and study areas are highly developed with industrial, transportation and State/NYSDOT maintenance

uses. The analysis indicated that the site is of limited value as habitat to fish and wildlife and other than its use as an unofficial access point to Onondaga Lake provide little value for humans. Proposed use of the site for the immediate future is for temporary office buildings, a boat dock and parking, which will be placed on the Lake Pump site for a period of approximately 5 to 6 years beginning in 2012 for remediation efforts at Onondaga Lake.

B. Borings and Monitoring Well Installation. Three borings, at the locations shown on **Figure 2,** were advanced at the Lake Pump site. Boring BR-1 (MW-1) was advanced at a location where natural materials were anticipated to be present. Borings BR-2 (MW-2) and BR-3 (MW-3) were advanced through the fill/waste materials. The borings were all converted to monitoring wells following termination.

Soils in boring BR-1 consisted of fine to medium coarse sand and gravel with minor amounts of ash and cinders to a depth of approximately 10 feet below ground surface (bgs). Below the observed loose fine to coarse sand observed at 8 feet bgs, the materials graded to native lake sediment with small shells and shell fragments. Boring MW-1 was terminated at 16 feet bgs and a 2-inch PVC monitoring well with 10 feet of well screen was installed to a depth of 15 feet bgs.

Soils in boring BR-2 included very dense fine to coarse sand with fragments of brick, ash, and metal shavings. At a depth of 16 feet bgs marl was encountered. The boring was terminated at a depth of 16 feet bgs and a 2-inch PVC monitoring well with 10 feet of well screen was installed to a depth of 15 feet bgs.

Soils in boring BR-3 consisted of dense to very dense fine to coarse sand with fragments of brick, ash, and metal shavings to a depth of approximately 15.9 feet bgs. Split spoon and auger refusal was encountered at 16 feet and the boring was converted to a 2-inch PVC monitoring well with 10 feet of well screen was installed to a depth of 15 feet bgs.

Saturated conditions were indicated at depths of 5 to 7 feet bgs. Soil samples from the three borings (samples designated as BR-1 through BR-3 identified three volatile organics (acetone, carbon disulfide and 1, 2, 4-trichlorobenzene) at concentrations below the DER-10 soil cleanup objectives. Four polynuclear aromatic hydrocarbons (PAHs) were detected above the DER-10 soil cleanup objectives in the upgradient and down gradient boring locations. PCBs were detected in both down gradient borings at concentrations below the DER-10 soil cleanup objectives. Several inorganics (metals) were indicated at concentrations above the DER-10 soil cleanup objectives and the Eastern US background levels at the upgradient and downgradient locations.

C. Groundwater. Hydraulic conductivity testing was conducted on all three wells with calculated conductivities ranging from 2.00E-2 to 4.14E-4 feet per minute. The hydraulic gradient across the Lake Pump site was determined to be

approximately 0.0032 ft/ft from well MW-1 to MW-3. The PSA reported the groundwater flow to the northwest; however, the north arrow appeared incorrect on the groundwater flow map. Groundwater flow appears to be towards the north northeast and towards Onondaga Lake.

Groundwater samples were obtained on November 19, 2001 using hand bailing and peristaltic pumps for filtered samples submitted for inorganic analysis. Other than suspected laboratory contaminants, benzene and toluene were the only volatile organics detected in MW-3. Benzene (4 micrograms per liter-ug/L) was above the NYSDEC Class GA Standard (Class GA Standard) of 1 ug/L. Toluene was below the Class GA Standard. Multiple semi-volatile organics were detected in wells MW-2 and MW-3. Pentachlorophenol (MW-3 only), benzo(a)anthracene, chrysene, benzo(b) fluoranthene (MW-3 only) indenopyrene (MW-3) were detected at concentrations above the Class GA Standards. Aroclor 1254 was detected in wells MW-2 and MW-3 at concentrations above the Class GA Standards. Both filtered (soluble) and unfiltered groundwater samples were obtained. MW-2 generally had the highest levels of both filtered and unfiltered inorganics. For the filtered samples, iron (MW-1 and MW-2), manganese (MW-1 and MW-2), selenium (MW-3), and sodium (all three wells) were above the Class GA Standards.

D. Surface Soil. Four surface soil samples (SS-1 through SS-4) were collected from the site on November 12, 2001by C&S at the locations shown on **Figure 2**. After grass and other vegetation were removed from the surface, samples were collected from 0 to 2 inches below the land surface. No observable indication of waste materials was present. Analytical results for these samples are provided in Table 2 of the PSA attached in **Appendix I**. Analysis of the four surface soil samples did not indicate the presence of volatile parameters other than one suspected laboratory contaminant. Several PAHs were detected in all four samples. No PCBs were detected in any of the samples and 4, 4'-DDT was the only pesticide that was detected. Results of the inorganics analysis indicated that the analytical results were generally similar for all four samples. Sample SS-2 usually exhibited the highest result of the four samples. Surface soil analytical results were compared to the NYSDEC's Recommended Soil Cleanup Objectives and Eastern US background soil quality values in DER-10. Several PAHs and inorganics were detected above the DER-10 soil cleanup objectives. Several inorganics were also above the Eastern US background levels given in DER-10 soil cleanup.

E. Subsurface Soil (trench). During the PSA, one trench was installed near the center of the site on November 19, 2001 as indicated on **Figure 2**. A random composite sample was obtained from the material excavated and submitted to the laboratory for analysis of VOCs, SVOCs, pesticides, PCBs, and metals. Other than one suspected laboratory contaminant, several SVOCs, two pesticides and two PCBs were detected in the composite sample. Subsurface soil analytical results were compared to the NYSDEC's soil cleanup objectives and Eastern US background soil quality values. Several PAHs (Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, and Dibenzo(a,

h)anthracene) and inorganics were detected above the DER-10 soil cleanup objectives. Several inorganics were also above the Eastern US background levels given in DER-10 soil cleanup. The two detected PCBs (Aroclor 1248 and 1250) were not above the DER-10 soil cleanup levels.

F. Lake Water and Sediment. During the PSA, Samples of water and sediment were collected on November 19, 2001 at two locations (see **Figure 2**) in Onondaga Lake. Collection of samples took place at a location approximately two to four feet from the edge of the fill. Sediment was collected from approximately the top six inches of sediment. Sediment analytical results were compared to the NYSDEC's Levels of Protection for freshwater sediments in the *Technical Guidance for Screening Contaminated Sediments (January 25, 1999).* Water analytical results were compared to Class C surface water standards and guidance values as given in NYSDEC's Division of Water Technical and Operational Guidance Series 1.1.1, *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.*
The water quality classification of the Lake in the vicinity of the Site is Class C. Other than suspected laboratory contaminants, the only organic parameters detected in the lake water samples were benzaldehyde and endrin. The endrin concentration exceeded the Class C water quality standard. Nickel, was the only inorganic parameter that was detected above the Class C standard; that was in sample LW-1. For the lake sediment samples, toluene was the only volatile parameter detected other than the suspected laboratory contaminants. Several PAHs and three pesticides were detected, with alpha-chlordane being the only one detected above the NYSDEC sediment criteria. Two PCBs were detected above the criteria, both in sediment sample LS-2. Levels of PCBs in sample LS-2 were significantly lower than levels found in sediment samples in the general area of the Lake Pump site, but farther from the shoreline. Several metals, including antimony, chromium, iron, manganese, and nickel exceed the NYSDEC Severe Effect Levels. In addition, metals including arsenic, cadmium, copper, and lead exceed the NYSDEC Low Effect Levels.

The above discussion of the analytical results for the sediments and surface water in Onondaga Lake refers to samples that were collected immediately adjacent to the site during the PSA. (An extensive database exists for sediments sampled by Honeywell in Onondaga Lake [including areas in proximity to the Lake Pump site] as part of the RI and RD for that site and those sediment results are discussed in documents submitted to NYSDEC by Honeywell [e.g.,Parsons (2011a) and Parsons (2011b)]). The areas adjacent to the site are included in the portions of the lake that are being capped, or dredged and capped, pursuant to the remedy for Onondaga Lake issued by NYSDEC and EPA in 2005.

G. Surface Water and Sediment. During the PSA, samples of water and sediment were collected at two locations (see **Figure 2**) in the drainage ditch that is adjacent to and northwest of the Site. As indicated earlier in this report, the upstream sample was collected at a location significantly upstream of the site. At the time of sampling there was a small water flow noted. Sediment at both

locations visually appeared to be mainly Allied Solvay Process waste and contained a distinct blue layer. Samples were collected from approximately the top six inches of sediment. The upstream locations were designated as DW-1 and DS-1 for the water and sediment, respectively. Sediment analytical results were compared to the NYSDEC's Levels of Protection for freshwater sediments in the *Technical Guidance for Screening Contaminated Sediments (January 25, 1999).* Surface water analytical results were compared to Class C surface water standards and guidance values as given in NYSDEC's Division of Water Technical and Operational Guidance Series 1.1.1, *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*. A variety of organic parameters were detected in both the upstream and downstream water samples. Of these, benzene, toluene, phenol, naphthalene, and 2-methylnaphthalene were above the NYSDEC Class C water quality standard or guidance levels in both the upstream and downstream samples. For the inorganics, levels of iron were above the Class C standard in both locations and aluminum was above the standard in the downstream sample.

Several organic parameters were detected in the drainage ditch sediment samples. Generally, the same parameters were detected in both the upstream and downstream samples. Benzene was the only organic parameter detected above the NYSDEC sediment criteria at both upstream and downstream locations. No pesticides or PCBs were detected. Several inorganics were detected at levels above the sediment criteria in the upstream sample while only arsenic was reported above the criteria in the downstream sample.

H. TCLP Results. Three soil samples were submitted for analysis by the Toxicity Characteristic Leaching Procedure (TCLP) for the metals parameters. These samples were from the borings BR-2 and BR-3, and a composite sample of materials excavated from the trench installed during the PSA in the central portion of the site (See **Figure 2**). All of the laboratory results were significantly below the TCLP regulatory limits.

1.3 Site Consent Order Background

As a result of the completion of the PSA, the site was listed in the Registry of Inactive Hazardous Waste Disposal Sites as Site Number 734078 with a Classification “P”. Coltec Industries was identified as a potential responsible party based on their prior ownership of Crucible Materials Corporation that was alleged to have placed caustic coated mill scale at the site from 1961 to 1967. As required by the Order on Consent and Administrative Settlement (Order) signed and dated by the New York State Department of Environmental Conservation (NYSDEC) on August 27, 2010 and as discussed with Ms. Susan Edwards with NYSDEC on October 13, 2010, an RI/FS Work Plan, Remedial Investigation, Feasibility Study, Interim Remedial Measures (IRM), and Remedial Design/Remedial Action based on the findings of the RI/FS are required for the site. Based on discussions with NYSDEC, the previously completed Preliminary Site Assessment (PSA) provided investigation data for the site and the RI included activities to evaluate the horizontal and vertical limits of the waste mass with no sampling/

laboratory analysis expected unless waste materials encountered are not similar to that previously identified on-site.

1.4 Remedial Investigation Objectives

The primary tasks of the RI was to delineate the horizontal and vertical extent of waste media at the site, evaluate surface and subsurface characteristics of the site, identify sources of contamination, migration pathways, and potential receptors, and evaluate fish and wild life impacts. As discussed with NYSDEC, site characterization will include assessment of existing data, field activities to evaluate the horizontal and vertical extent of waste materials, performing ecological risk assessments, and preparing the RI Report. The information collected during the RI will support the evaluations performed during the Feasibility Study.

2. REMEDIAL INVESTIGATION METHODS

The RI included two phases of sampling (PSA and NYSDEC groundwater sampling) and one supplemental phase to evaluate the horizontal and vertical extent of waste material placed at the site. The first phase field sampling and analysis program was completed and reported in the PSA. The field sampling and analysis program included surface and subsurface soils on-site (from soil borings and trench), groundwater, surface water (Onondaga Lake and the drainage ditch northwest of the site), and sediments (Onondaga Lake and the drainage ditch northwest of the site). The following sample identifications were used and are referenced in the attached analytical summary tables provided in the attached PSA:

MATRIX	SAMPLE DESIGNATION
Surface Soil	SS
Subsurface Soil	BR
Trench	Trench and T
Groundwater	MW
Lake Water	LW
Lake Sediment	LS
Ditch Water	DW
Ditch Sediment	DS
Hand Dug Hole	H

The first sampling conducted during the PSA occurred in November 2001 and included surface soil, subsurface soil boring samples, surface water , sediment, and groundwater samples. The first sampling analytical program included TCL VOCs, TCL SVOCs, TAL metals plus hexavalent chromium, TCL pesticides and PCBs, plus miscellaneous parameters for water (hardness, pH, dissolved oxygen, and conductivity). The goal of the PSA was to gather data to characterize the waste that may be present at the site and to determine whether the wastes pose a significant threat to the public health or environment.

Additional groundwater sampling was conducted by NYSDEC in 2005. NYSDEC sampled the three existing monitor wells. The analytical program for the groundwater sampling in 2005 was modified based on the results of the PSA. The groundwater samples were analyzed for TAL metals.

Supplemental phase investigation activities were completed following submittal and approval of the RI/FS Work Plan that was developed as requested by NYSDEC. The previously completed PSA provided detailed investigation data for the site and NYSDEC envisions the RI to include activities to evaluate the horizontal and vertical limits of the waste mass with no sampling/laboratory analysis expected unless waste materials encountered are not similar to that previously identified on-site. The initial RI/FS Work

Plan was submitted to NYSDEC on February 7, 2011 and approved by NYSDEC on February 23, 2011. The RI/FS included up to 5 borings located along Onondaga Lake to evaluate the vertical extent of waste and up to 15 trenches/test pits. Originally the trenches/test pits were to be extended into the waste. As discussed with NYSDEC on June 1, 2011 and as presented in a Modification of Remedial Investigation and Interim Measures letter dated July 7, 2011 (approved by NYSDEC on July 11, 2011), it was agreed that the number of borings would be decreased to two and no more than six trenches would be extended to the top of the waste material which is estimated to be 1 to 2 feet below the ground surface. The trenches and the addition of hand dug holes increased based on field observation during the RI.

The RI field activities were performed on July 27 and 28, 2011. No samples were obtained or submitted for analytical testing. The historical borings, monitor wells and sampling points, trenches and hand dug holes are indicated on **Figure 2**.

2.1 PSA Sampling

The PSA was conducted at the site in November 2001 and included surface and subsurface soil sampling, surface water and sediment sampling, and groundwater sampling. The investigative activities are discussed below.

A. Surface Soil. Four surface samples (SS-1 through SS-4) were collected on November 11, 2001. Sample locations are indicated on **Figure 2**. Surface soil samples were obtained from 0 to 2-inches below land surface. The samples were placed in laboratory prepared containers and transported to a New York State certified laboratory for analysis.

B. Subsurface Soil. Four subsurface soil samples (BR-1 through BR-3 and Trench) were obtained on November 12 and November 19, 2001, respectively. BR-1 through BR-3 were advanced at the locations of MW-1 through MW-3 and converted to monitoring wells. The borings and trench locations are indicated on **Figure 2**. The subsurface soil sample from the trench was collected as a random composite. Soil samples from BR-1 through BR-3 were obtained with split spoons and screened in the field with a photoionization detector. Boring BR-2 (MW-2) and BR-3(MW-3) were advanced through fill material and BR-1(MW-1) was advanced at an apparent upgradient area.

C. Groundwater. Monitoring wells were installed at borings BR-1 through BR-3. Monitoring well MW-1 (boring BR-1) was advanced in an area west of and apparently upgradient of the waste deposition area. MW-1 was installed at a depth of approximately 16 feet below ground surface and constructed with a ten foot section PVC screen. The well was screened across native materials.

Monitoring wells MW-2 (BR-2) and MW-3 (BR-3) were installed through fill material in the north and southeast areas of the site, respectively. MW-2 and MW-3 were advanced to total depths of 18 and 16 feet below ground surface,

respectively and the wells were installed at a depth of fifteen feet below ground surface.

Monitoring wells/soil borings were installed using hollow stem augers. Upon reaching the desired depths, 2-inch PVC riser pipe was installed with 10 foot sections of 0.01-inch slot PVC screen. The annular space was then backfilled with clean #0 size sand extending to 1 foot above the well screen and sealed with 1-foot bentonite. Boring logs are included in Appendix B of the PSA. A copy of the PSA is included in Appendix I.

Parratt-Wolff developed monitoring wells MW-1 through MW-3 on November 15, 2001. Because turbidity was high in the wells, 31 to 56 well volumes were removed from the wells. Groundwater samples were obtained from the wells on November 19, 2001. Three well volumes were purged from each well prior to obtaining the samples. For inorganic analysis the wells were sampled using a peristaltic pump with a new inline filter for each well. For the remaining parameters of concern, the samples were collected with disposable bailers. The samples were placed in laboratory prepared containers and shipped to a New York State certified laboratory for analysis.

C&S conducted a hydraulic conductivity test (slug test) on each of the monitoring wells on January 23, 2002 via the falling head method. The data were reduced via the Hvorslev Method using *AquiferTest*, a Waterloo hydrogeologic software package designed for the analysis of aquifer tests. The calculated hydraulic conductivities along with the semi-log plots of normalized recovery versus time generated by the *AquiferTest* software are provided in Appendix F of the PSA Report include in **Appendix I**.

Top of casing elevations for the wells were surveyed by C&S on October 29, 2001. The survey data, along with November 29, 2001 depth to water measurements, were used to calculate the groundwater elevation in each well.

D. Lake Samples. Onondaga Lake surface water and sediment samples were obtained by C&S on November 19, 2001 at two locations as indicated on **Figure 2**. Sediment samples were obtained from 0 to 6-inches and two to four feet from the edge of waste. One surface water and one sediment sample was collected from each location, placed in laboratory prepared containers and shipped to a New York State certified laboratory.

E. Drainage Ditch. Surface water and sediment samples were obtained from two locations in the drainage ditch northwest of and adjacent to the site. One sample location upstream and one sample location downstream were established as shown on **Figure 2**. C&S obtained a sediment and surface water sample at each location on November 19, 2001. Sediment samples were obtained from the first 6-inches. Water flow in the ditch was noted to be minimal. The samples were placed in laboratory prepared container and shipped to a New York State certified laboratory.

2.2 NYSDEC Groundwater Sampling

In June 2005, NYSDEC personnel sampled monitor wells MW-1 through MW-3. Four groundwater samples (includes one duplicate were submitted to a New York State certified laboratory for analysis of TAL metals.

2.3 Supplemental RI Activities

A Remedial Investigation/Feasibility Study (RI/FS) Work Plan was prepared and submitted to NYSDEC on February 7, 2011. NYSDEC approved the RI/FS Work Plan on February 23, 2011 and our Modification of Remedial Investigation and Interim Measures letter dated July 7, 2011 on July 11, 2011. The purpose of the RI Field Activities was to delineate the horizontal and vertical limits of the Crucible metals waste.

To identify the horizontal and vertical extent of waste material, a trenching and soil boring program was implemented. As shown on **Figure 2**, twelve (12) trenches, two (2) hand dug holes, and two (2) drilled borings were performed at the Site. The trench and hand dug holes locations were generally located along the northwest to southeast perimeter of the Site, and the drilled borings were located near the center of the Site.

A. **Soil Borings**. Drilled borings were performed by Parratt-Wolff, Inc. with S&ME oversight on July 28, 2011. NYSDEC also conducted oversight during the drilling of SB-1. Two (2) soil borings, SB-1 and SB-2, were advanced using an Ingersoll Rand A-200 truck-mounted drill rig with 3.25-inch hollow-stem augers. Subsurface materials were sampled continuously on SB-1 and every 5 feet on SB-2. The removed materials were screened in the field with a PID, and visually observed for indications of waste. No samples were submitted to the laboratory for further analysis.

B. **Hand Dug Holes**. On July 27, 2012, S&ME and Clean Harbors completed two (2) hand dug in the northwest portion of the site. Waste materials were observed in the hand dug holes.

C. **Trenches**. Trench excavations were performed by Clean Harbors with S&ME and NYSDEC over-site on July 27, 2011 to evaluate the horizontal extent of waste place at the site. Trenches were excavated using a backhoe with a 12-inch wide bucket to depths of approximately 3 to 7 feet bgs depending on occurrence or lack thereof waste. Visual observation was used for identification of waste fill materials.

3. SITE CHARACTERISTICS

3.1 Surface Features and Topography

The Site, which measures approximately 3.5 acres in size, is located on the eastern side of Interstate 690 and is owned by the New York State Department of Transportation (NYSDOT). The Site is bound on the northeast by Onondaga Lake, to the southwest by the Interstate 690 Solvay exit ramp, to the west and northwest by lands owned by Onondaga County, and to the southwest by the Metropolitan Sewage Treatment Plant pump station property owned by Onondaga County. A drainage ditch is located northwest of and adjacent to the Site. The Site is located in the Town of Geddes, Onondaga County, New York.

The Site is generally flat with minimal distinguishing features. The site shows a history of use as a staging area for various roadway projects for the NYSDOT. The Site lies at an approximate elevation of 366 to 370 feet above mean sea level.

To support Onondaga Lake remediation activities, Honeywell has constructed temporary office buildings, a boat dock and parking on the Lake Pump site, which will be used for a period of approximately 5 to 6 years. Additionally, a NYSDEC boat launch will be constructed on the site after the lake cleanup is completed.

3.2 Land Use

The surrounding area is primarily industrial and commercial. The State fairgrounds parking and facilities are located to the northwest of the Site. The nearest residential areas appear to be located beyond 4000 feet southwest of the Site.

Vehicle access to portions of the Site is uncontrolled. The area is frequently used as an access site to Onondaga Lake and as a site for fishing in Onondaga Lake. Pedestrian access is possible but unlikely since there is no pedestrian walkway in the immediate area. In addition, the Site is currently used by Honeywell as a shoreline facility for remediation efforts of Onondaga Lake. The shoreline facility includes office buildings, a boat dock, and parking. A NYSDEC boat launch will be constructed on the site after the lake cleanup is completed.

West of the Site is a transportation corridor that includes the Conrail railroad and Interstate 690. Interstate 690 is a major thoroughfare for Onondaga County and the surrounding area.

3.3 Surface Water Hydrology

The site is within the Onondaga Valley sub-basin. Surface water within this sub-basin drains into Onondaga Lake. Onondaga Lake drains to the north via the Seneca River, which flows northward and eventually connects with the Oswego River. The primary watercourses of the sub-basin, which drain more than 80 percent of the sub-basin, are

Ninemile Creek and Onondaga Creek. On a regional scale, the site is located within the Oswego River basin. The Oswego River drains to the northeast into Lake Ontario.

Surface water at the Site would generally be sheet flow to the north and east towards Onondaga Lake and the ditch located northwest and adjacent to the site.

3.4 Area Geology

The Lake Pump site is located on the southern edge of the Erie-Ontario Lowlands Physiographic Province of New York State. Regional mapping indicates that the bedrock underlying the site is of the Vernon Formation, which is largely comprised of shale and shaley dolomite rock of late Silurian age. According to information obtained from the United States Geological Service, the sedimentary bedrock in the region strike east-west and dip gently to the south at about 50 feet per mile.

The sedimentary bedrock in the site area is generally covered by deposits from the advance and retreat of glaciers during the Pleistocene Epoch, which lasted from approximately 2 million years to 10,000 years ago. Topographic features of the region generally consist of drumlins and moraines that were formed during the last glaciation (Wisconsin) period that lasted from approximately 110,000 to 10,000 years ago. The soils in the site area are mainly derived from the glacial deposits and are comprised of lacustrine silts and clays.

3.5 Site Hydrogeology

Information regarding the site hydrogeology is based upon data obtained during completion of the PSA (July 2003) as well as work completed during the RI.

Soil boring MW-1, installed during the PSA, indicated fill material to a depth of approximately 10 feet below ground surface (bgs) that consisted of fine to coarse sand and gravel with minor amounts of ash and cinders. At eight feet bgs, a very loose fine to coarse sand was identified. Below the loose sand, the material graded to the native lake sediment identified as marl with small shells and fragments. Boring MW-2 and MW-3, installed during the PSA, indicated a very dense fine to coarse sand with brick, ash, cinders, and metal shavings to a depth of approximately 16 feet below ground surface. Boring MW-1 was advanced in an area apparently upgradient of the waste area and boring MW-2 and MW-3 were located near the edge of the Lake Pump site in proximity to Onondaga Lake.

RI activities completed by S&ME included the installation of two soil borings; SB-2 located in the northeast and central portion of the Site and SB-1 located in the southwest and central portion of the Site. Boring SB-2 was advanced to a total depth of approximately 32 feet bgs and continuously sampled utilizing split spoons. Based on field observations (see boring logs attached in **Appendix III**) silty fine to coarse sands with gravel and pieces of slag were indicated to a depth of approximately 25 feet bgs. In boring SB-2, sandy silts with clay, charcoal and apparent petroleum odors were identified from 25 to 32 feet bgs which may be indicative of debris from the Syracuse Yacht Club

that burned in 1917. Boring SB-1 was advanced to a depth of approximately 16 feet bgs. Fill material in boring SB-1 consisting of silt and clayey fine sand with gravel and pieces of slag identified to a depth of 10 feet bgs. The fill in boring SB-1 was underlain by silty clay (possible lake sediment) from 10 to 12 feet bgs followed by marl with shell fragments from 12 to 16 feet bgs.

As presented in the PSA, hydraulic conductivity testing was completed on the three wells installed at the site (MW-1 through MW-3). The hydraulic conductivity testing was conducted via the falling head method with conductivities ranging from 0.02 (monitor well MW-1) to 0.000414 (monitor well MW-2) feet per minute. Depth to water measurements and top of casing elevations were measured in 2001. Based on depths to groundwater and elevations, the groundwater flow was estimated to flow towards the northwest towards Onondaga Lake. However, review of Figure 2 from the PSA has indicated that the north arrow was placed incorrectly and groundwater flow is towards the northeast (towards the lake). The hydraulic gradient was estimated at 0.0032 feet per foot between monitor wells MW-1 and MW-3.

3.6 Area Cultural Resources

A *Cultural Resource Management Report – Phase 1 Reconnaissance Survey* was completed in July 2011for the site to determine if there are archeological sensitive, cultural, or sacred areas at or near the Site. The 2011 cultural resources survey was prepared by Christopher D. Hohman of the Public Archaeology Facility for Honeywell's planned Lakeshore complex at the Site.

The cultural resource survey indicated that the Site was either under Onondaga Lake or on the shoreline during the pre-contact and post-contact periods through the mid-20th century. The Syracuse Yacht Club was apparently located at the Site from 1898 to 1917 at which time the facility burned. In the mid-20th century, fill was placed at the site to create the current landform that extends into Onondaga Lake. Borings indicated that approximately 4 to 8 feet of fill on top of debris from the burned Yacht Club. Activities at the Site, including the Lakeshore Complex would not be expected to impact the former resources of the Syracuse Yacht Club and no further archaeological studies were recommended.

4. FILL CHARACTERIZATION

4.1 Potential Sources

It has been alleged that waste from the operation of the Crucible Plant, later of Coltec Industries, was received from 1961 to 1967. Based on available historical information and the PSA, the following describes the types and quantities of wastes believed to be deposited at the Lake Pump Site:

- slag (approximately 44,000 cubic yards) - bulky mineral residue generated from the use of electric arc furnaces to melt various mixtures of scrap metals and added alloys;
- construction and refractory debris, absorbents, and miscellaneous (approximately 28,700 cubic yards) bricks, mortar, wood, steel, and other items from a variety of maintenance activities not generally produced by manufacturing processes;
- boiler house ashes (approximately 10,100 cubic yards) - fly ash and bottom ash collected from the boiler house combustion of coal;
- coolant swarf (approximately 9,600 cubic yards) - coolant swarf is the solid metal and abrasive material collected from a metal-working coolant system;
- mill scale (approximately 7,850 cubic yards) – mill scale is produced from the loosening of scale which develops on the surface of the metals as they are processed through various heating and cooling operations during steel production; and
- grinding dusts (approximately 4,800 cubic yards) collected from grinding operations on finished product.

Based on TCLP results from a random soil sample from a trench installed at the central portion of the Site during the PSA, no hazardous waste has been identified at the site. In addition, the results of the PSA also indicated wastes similar to those associated with the Allied Solvay Process in the ditch located adjacent and to the northwest of the Site.

4.2 Limits of Fill

During the PSA, four surface samples (SS-1 through SS-4), one trench, and three soil borings/monitoring wells were installed at the site. Fill materials were identified at the boring/monitor well locations and the trench location. Fill materials generally identified consisted of fine to coarse sand with gravel, metal shavings, slag, brick fragments, and ash. Borings/Monitoring wells indicated that waste materials extend to the edge of the current land area with visible slag and large metal materials visible at the banks adjacent to Onondaga Lake. In addition, the fill material thickness at borings BR-2/MW-2 and BR-3/MW-3 indicted waste materials ranging from 10 to 15 feet bgs.

During the RI completed in July 2011, trench excavations were performed by Clean Harbors with S&ME and NYSDEC over-site. Trenches were excavated using a backhoe with a 12-inch wide bucket to depths of approximately 3 to 7 feet bgs depending on occurrence or lack thereof Crucible waste. Visual observation was used for identification

of waste fill materials. Based on historical data, Crucible waste was expected to occur approximately 0.5 to 3 feet below ground surface (bgs) across the Site. Trenches were not excavated beyond 7 feet bgs to look for Crucible waste. If Crucible waste was not encountered from 0 to 7 feet bgs, the location was assumed to be outside the horizontal extent of the Crucible waste mass.

Some areas of the Site had previously had a dark gray, rocky, fill placed. Crucible waste was observed in the field as a black, sandy material with metal fragments that was typically darker and sandier than the fill placed on top of it. Twelve trench locations (T-1, T-2A, T-2B, T-3A, T-3B, T-4A, T-4B,T-5, T-6, T-7, T-8 and T-9) were excavated at the site along the southwest edge of the Site and the northwest portion of the Site. Trench locations where Crucible waste was observed included T-1, T-2A, T-2B, T-3A, T-4A, T-5, T-6, T-7, and T-9. To reduce land disturbance, rather than extend trench T-5 through a more heavily vegetated area towards the drainage swale, two (2) hand dug holes were performed, 5H1 and 5H2. Crucible waste was observed in hand dug hole 5H1 but not in 5H2. Locations of the trenches and hand dug holes are shown on ***Figure 2***. Photographs taken during horizontal delineation activities have been included in ***Appendix IV***. Once desired depths were achieved, trenches and hand auger borings were backfilled with spoils material.

Borings drilled during the RI field activities in July 2011 were performed by Parratt-Wolff, Inc. with S&ME and NYSDEC oversight for SB-1 and S&ME for SB-2. Two (2) soil borings, SB-1 and SB-2, were advanced using an Ingersoll Rand A-200 truck-mounted drill rig with 3.25-inch hollow-stem augers. Locations of the drilled soil borings are shown on **Figure 2**. Completed boring logs for the two (2) drilled locations are included in **Appendix III**. Subsurface materials were sampled continuously for boring SB-1 and a 5-foot interval for SB-2 using 2-inch split-spoons. The materials were visually observed for identification of waste and periodically screened for volatile organic compounds (VOCs) in the field with a photoionization detector (PID). No significant amounts of VOCs were detected using the PID on selected SB-2 intervals. Possible Crucible waste was identified from approximately 1.5 to 3 feet bgs, with a more apparent identification of waste from approximately 3 to 25 feet bgs. Lake sediments were identified in SB-2 from approximately 25 to 32 feet bgs, however the typical lake marl was not observed. Crucible waste was identified in boring SB-1 from approximately 1.5 to 10 feet bgs. Lake sediments were identified in boring SB-1 from approximately 10 to 12 feet bgs, with the typical lake marl identified from approximately 12 to 16 feet bgs. Boring SB-1 was terminated at 16 feet bgs. Selected photographs taken during drilling of borings SB-1 and SB-2 have been included in **Appendix IV**. Field observations during the RI identified waste materials at the ground surface in the vicinity of an old Crucible building and fenced area.

The horizontal estimated limits of the waste material are shown on **Figure 3**. Based on observation and field activities completed during the PSA and the RI, the estimated area of waste fill is approximately 150,000 square feet. Based on the borings advanced at the site during the PSA and the RI, the estimated thickness of the Crucible waste ranged from 10 to 25 feet. Assuming an average thickness of 17 feet, the total volume of suspected

Crucible material placed at that Site is approximately 94,440 cubic yards. Historical information had reported approximately 105,000 cubic yards a Crucible waste. Based upon the estimates from data obtained from the PSA and RI, the suspected waste is comparable to the reported historical amounts.

4.3 Chemical Characteristics of Fill – Subsurface Soils

One sample was collected from the trench that was excavated in the center of the Site on November 19, 2001 by C&S. This sample was a random composite of material excavated from the trench. In addition, three soil borings BR-1, BR-2, and BR-3 were apparently advanced at the locations of monitoring wells MW-1, MW-2 and MW-3 as shown on **Figure 2**. Analytical results are shown in Table 2 of the PSA included in **Appendix I**. Other than two suspected laboratory contaminants (acetone and carbon disulfide), no volatile parameters were detected in the trench and soil boring samples except for 1, 2, 4-Trichlorobenzene in BR-3 at a concentration of 3 micrograms per kilogram (ug/kg). Several PAHs, two pesticides, and two PCBs were detected in the composite trench and BR-1, BR-2 and BR-3 samples.

The analytical results for the subsurface soil samples were compared to the NYSDEC's latest unrestricted, commercial and industrial use soil cleanup objectives as per DER-10 guidance and found in Subpart 375-6.

A. VOCs. The trench sample from the trench installed in 2001 was the only subsurface soil sample submitted from the trenches and test pits at the Site. Borings BR-1, BR-2 and BR-3 were also sampled in 2001. Carbon disulfide, acetone and 1, 2, 4-Trichlorobenzene were the only VOCs detected at levels above the laboratory detection limits. The concentrations were below each of the DER 10 soil cleanup objectives (Subpart 375-6). Thus the fill samples do not represent a significant source of VOCs to the surrounding environment.

B. SVOCs. The trench and boring samples indicated multiple SVOCs at concentrations above the laboratory detection limits. Benzo(a) anthracene, Chrysene, Benzo(b) fluoranthene, Benzo(k) fluoranthene, Benzo(a) pyrene, and Dibenzo(a,h) anthracene were detected at concentrations above each of the DER-10 soil cleanup objectives in one or more of the soil samples.

C. Metals. Metals are found in natural soils and fill soils and because of their natural appearance, it is important to compare analytical results with background soil concentrations. NYSDEC utilizes rural soil background concentrations when those levels are below the soil cleanup objectives. The analytical results for the trench and soil borings are provided in Table 2 of the PSA in **Appendix I**. Based upon the latest NYSDEC soil cleanup objectives in Subpart 375-6, arsenic, barium, chromium, copper, lead, total mercury, and nickel concentrations in one or more of the subsurface soil samples exceeds one or more of the restricted uses soil cleanup objectives. Total mercury and selenium concentrations only exceeded the Protection of Ecological Resources soil cleanup objectives in the trench sample and boring BR-3. Arsenic concentrations in BR-3

only exceeded the Protection of Ecological Resources soil cleanup objectives. Barium, copper, chromium (except for sample BR-2 and BR-3), and nickel (except for sample BR-2) concentrations were below the Protection of Public Health – Industrial Use soil cleanup objectives. Lead concentrations were below the Protection of Public Health – Commercial and Industrial soil cleanup objectives. The subsurface soil samples were also analyzed using the Toxic Chemical Leaching Procedure (TCLP) with no concentration detected above regulatory limits. The TCLP results indicate that metals would not be expected to leach from soils and environmental exposures appear to be limited to exposure routes associated with direct contact with subsurface soils.

D. Pesticides and PCBs. The trench sample identified two pesticides (4, 4'-DDE and 4, 4'-DDT at 5.9 and 11 ug/kg, respectively) and two PCBs (Aroclor 1248 and 1254 at 200 and 140 ug/kg, respectively) at concentrations above the unrestricted use but below the commercial and industrial soil cleanup objectives. The sample from Boring BR-2 and BR-3 indicated two PCBs, with the both concentration below the commercial and industrial soil cleanup objectives, but arochlor 1254 detected in BR-2 exceeded the unrestricted use clean up objective. The sample from boring BR-1 did not indicate any pesticides or PCBs. Based on these analytical results PCBs and pesticides in subsurface soils do not represent significant source to the surrounding environment.

4.4 Chemical Characteristics of Fill – Surface Soils

Four surface soil samples were obtained by C&S during the PSA at the locations indicated on **Figure 2**. Analytical results from the PSA are presented in Table 2 of the PSA in **Appendix I**. Other than one suspected laboratory contaminant (acetone), no volatile parameters were detected in the surface soil samples. Several metals and PAHs were detected in surface samples SS-1 through SS-4. Other than 4-4'-DDT in surface sample SS-4, no other pesticides were detected. PCBs were below detection limits in all surface samples obtained.

The analytical results for the surface soil samples were compared to the NYSDEC's latest soil cleanup objectives as per DER-10 guidance and found in Subpart 375-6.

A. VOCs. Acetone in surface sample SS-2 was the only VOC detected at levels above the laboratory detection limits. The concentration was below the DER 10 soil cleanup objectives (Subpart 375-6). Thus the surface samples do not represent a significant source of VOCs to the surrounding environment.

B. SVOCs. The surface soil samples indicated multiple SVOCs at concentrations above the laboratory detection limits. Naphthalene, Benzo(a) anthracene, Chrysene, Benzo(b) fluoranthene, Benzo(k) fluoranthene, Benzo(a) pyrene, and Dibenzo(a,h) anthracene were detected at concentrations above the DER-10 soil cleanup objectives in one or more of the surface soil samples.

C. Metals. Metals are found in natural soils and fill soils and because of their natural appearance, it is important to compare analytical results with background soil concentrations. NYSDEC utilizes rural soil background concentrations when those levels are below the soil cleanup objectives. Based upon the latest NYSDEC soil cleanup objectives in Subpart 375-6, arsenic, barium, chromium, copper, total mercury, and nickel concentrations in one or more of the surface soil samples exceeds one or more of the restricted uses soil cleanup objectives. Total mercury concentrations only exceeded the Protection of Ecological Resources soil cleanup objectives in surface samples SS-1, SS-2, and SS-4. Arsenic concentrations in SS-2 and SS-3 were below the soil cleanup objectives. Arsenic concentrations in SS-1 and SS-4and in copper concentrations in SS-2 and SS-4 surface soil samples only exceeded the Protection of Ecological Resources soil cleanup objectives. The sample from SS-1 had chromium concentrations below the soil cleanup objectives. Chromium concentrations in SS-2 through SS-4 were below the Protection of Public Health – Commercial and Industrial soil cleanup objectives. Nickel concentrations in samples SS-3 and SS-4 were below the restricted use-residential use soil cleanup objectives. Barium (sample SS-1) concentrations were below the Protection of Public Health – Industrial Use soil cleanup objectives. Based upon the TCLP results from the subsurface soil samples, metals would not be expected to leach from soils and environmental exposures appear to be limited to exposure routes associated with direct contact with subsurface soils.

D. Pesticides and PCBs. Other than one pesticide (4, 4'-DDT), no other pesticides or PCBs were detected above the laboratory detection limits in the surface soil samples. The samples from boring SS-1, SS-2 and SS-3 did not indicate any pesticides or PCBs. Based on these analytical results PCBs and pesticides in surface soils do not represent significant source to the surrounding environment.

4.5 Interim Remedial Measures

An IRM Work Plan was prepared by S&ME Northeast on September 21, 2011 and approved by NYSDEC on October 27, 2011. The IRM Design was submitted to Mr. Tracy Smith with NYSDEC on October 28, 2011 (with revised page to Health and Safety Plan emailed on November 2, 2011) and approved by the NYSDEC in their letter dated November 3, 2011. Honeywell planned to utilize the Lake Pump Site as a shoreline facility for remediation efforts of Onondaga Lake. As such, NYSDEC suggested an interim remedial measure consisting of a one foot thick #4 stone cover over the waste material to limit direct contact with the waste materials. The NYSDOT stone specification was provided to S&ME Northeast by Mr. Tracy Smith in an email on April 22, 2011.

The IRM was completed in November 2011 and a Report of Interim Remedial Measure was submitted to NYSDEC on January 4, 2012 (attached in **Appendix IV**). Approximately 7,160 tons of stone were delivered to the site and placed using a frontend loader and a tracked dozer. The stone was placed directly on the ground surface with a total thickness of approximately 1-foot. Two existing monitoring wells, an apparent

concrete below ground tank (only top of tank visible) located just south of the fenced area, an additional 5 foot by 7 foot concrete pit with steel cover located approximately 20 feet east of the fenced area, and three older wells owned by Honeywell and located along the southeastern edge of the site were identified and stone was placed up to the edge of these locations to allow access. In an area immediately west of the fenced compound, Honeywell contractors placed two plastic above ground tanks and debris that prevented placement of the stone in this area. Four dump/trailer loads of stone were left on-site for placement in these areas that were in accessible. Honeywell has addressed the shoreline bank at the Site along Onondaga Lake by covering with large rip rap along the water's edge.

With completion of the IRM, and construction of buildings, landscape features, parking lots, and covering of the bank by Honeywell, direct exposure to waste fill materials at the surface of the Site have been eliminated.

5. MEDIA-SPECIFIC CHARACTERIZATION

Section 4 discussed the chemical character of the fill materials (surface and subsurface samples that were collected (Trench, BR-1 through BR-3, and SS-1 through SS-4) as part of the PSA. This section presents the analytical results of groundwater samples, lake water and sediment samples, and drainage ditch surface water and sediment samples from the surrounding environment to evaluate the effects of the fill materials.

5.1 Groundwater

Three monitoring wells were installed at the site during the PSA. MW-1 was installed in an area apparently up gradient of the fill area and MW-2 and MW-3 were installed and screened primarily within the fill area. Based on previous ground water level data collected at the site, the shallow groundwater flow is towards the northeast and Onondaga Lake (see Figure 3 of the PSA in **Appendix I**).

Two rounds of groundwater samples were collected from the three monitoring wells at the Site in November 2001 by C&S and by NYSDEC in June 2005. The November 2001 sampling event included both filtered and unfiltered samples for inorganics. Samples from the November 2001 event were analyzed for total metals (filtered and unfiltered), VOCs, SVOCs, pesticides, PCBs, and total hardness. During the June 2005 event care was taken to minimize turbidity in the groundwater samples. The samples were unfiltered and analyzed for total metals. Analytical results from the November 2001 event are summarized in Table 1 of the PSA (see **Appendix I**). Analytical results from the June 2005 event conducted by NYSDEC are summarized in **Table 1**.

A. VOCs. VOC analysis of the November 2001 groundwater samples detected one contaminant, Benzene, at a concentration of 4J micrograms per liter in MW-3, which is above the NYSDEC Class GA Standard of 1 ug/L. Other than suspected laboratory contaminants (acetone and carbon disulfide), Methyl ethyl ketone (MEK) in MW-2 and MW-3 and Toluene in MW-3 were the only other VOCs detected at concentrations below the NYSDEC Class GA Standards. MW-1 indicated no VOCs above the laboratory detection limits. Accordingly, the June 2005 groundwater sampling event excluded analysis of VOCs.

As part of an ongoing deep groundwater investigation being performed by Honeywell in the area, 2 on-site wells (WA-MW-100D and WA-MW-100BR – See Figure 2) previously installed by Honeywell were found to have elevated levels of benzene. Furthermore, three other wells (GM-34, GM-35, and GM-36– See Figure 2), which were screened below the Crucible waste, were installed at the site in 1979 (and have since been removed) by Honeywell and were also found to have elevated levels of benzene. The benzene that is present at depth is part of a benzene plume that is present in the area but it is unrelated to this site.

B. SVOCs. Several SVOCs were identified in the groundwater samples from the November 2001 sampling event. MW-1 indicated no SVOCs above the laboratory

detection limits. MW-2 and MW-3 indicated up to 19 SVOCs of which 6 compounds, Pentachlorophenol (MW-3 only), Benzo(a) anthracene, Chrysene, Benzo(b) fluoranthene, Benzo(a)pyrene, Indeno (1,2,3-cd) pyrene were slightly above the NYSDEC Class GA groundwater standards or guidance values. The analytical results suggest that groundwater impacts with respect to SVOCs are limited. Accordingly, the June 2005 NYSDEC groundwater sampling event excluded analysis of SVOCs.

C. Metals. Unfiltered groundwater samples were collected from monitoring wells MW-1, MW-2 and MW-3 on November 19, 2001 using standard hand bailing techniques. For filtered samples submitted for inorganic analysis, a peristaltic pump with a new in-line filter was used to collect samples. Both filtered (soluble) and unfiltered (total) inorganic data were collected for the groundwater samples (see results in Table 1 of the PSA provided in **Appendix I**). MW-2 generally had the highest levels of both filtered and unfiltered inorganics. For the filtered samples, the class GA standard was exceeded for iron (MW-1 and 2), manganese (MW-1 and 2), selenium (MW-3), and sodium (MW-1, 2, and 3).

The June 2005 NYSDEC groundwater sampling event for monitoring wells MW-1 through MW-3 indicated the Class GA standards were exceeded for antimony (MW-1), chromium (MW-2 and MW-3), iron (MW-1, MW-2, and MW-3), manganese (MW1 and MW-3), nickel (MW-3), selenium (MW-1 and MW-2), and sodium (MW-1, MW-2 and MW-3).

Antimony was detected at 4.1 ug/L in the upgradient well MW-1 which is slightly above the Class GA standard of 3 ug/L. Based on antimony concentrations below the Class GA standards in monitoring wells MW-2 and MW-3, antimony appears unrelated to waste materials placed at the site. Chromium concentrations in MW-2 and MW-3 were below the Class GA standards in 2001 but exceeded the standards during the 2005 event. Selenium concentrations were at or above the standards in all the monitoring wells for both sampling events (except MW-1 in 2001) suggesting that selenium concentrations are likely related to waste materials at the site. The upgradient well indicated chromium concentrations below the standards for both events suggesting that the chromium concentrations in MW-2 and MW-3 are apparently related to the waste materials placed at the site. Iron, manganese, and sodium concentrations for both sampling events were generally above the standards for monitoring wells MW-1 through MW-3. This reflects that these metals are common in natural soils.

There was a significant difference in the levels of site related metals (e.g., chromium and zinc) between the total (unfiltered) results reported for 2001 and 2005. The 2005 results were much lower likely as a result of the care that was taken to minimize turbidity (i.e. sediment within the sample) during sampling. Since soils/sediment naturally contain metals that can leach from the sediment upon contacting the acid preservative within the sample containers, it is likely that the higher concentrations detected in the non-filtered samples contain not only

soluble concentrations but also those natural concentrations that were leached from the sediment within the samples.

D. PCBs and Pesticides. One pesticide (delta-BHC) was detected in MW-3 at a concentration of 0.026 ug/L during the November 2001 sampling event. One PCB (Aroclor 1254) was detected in monitoring wells MW-2 and MW-3 at concentrations of 1.7 and 1.9 ug/L, respectively, which is above the Class GA standard of 0.09 ug/L. PCBs were detected in the soil samples at these monitoring well locations suggesting results could be related to suspended solids in the groundwater samples. Pesticides and PCBs were below detection limits in MW-1 during the November 2001 sampling event.

Accordingly the 2005 sampling event by NYSDEC excluded laboratory analysis for pesticides and PCBs.

5.2 Lake Water

Two lake water samples were obtained during completion of the PSA. The lake samples, designated LW-1 and LW-2 are indicated on **Figure 2**. Analytical results were compared to the Class C surface water standards and guidance values as given in NYSDEC's Division of Water Technical and Operational Guidance Series 1.1.1, *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* and are summarized in Table 3 of the PSA attached in **Appendix I**. The following discussion of the analytical results for the sediments and surface water refers to the samples that were collected adjacent (approximately 2 to 4 feet) to the site during the PSA. (Additionally, an extensive database exists for sediments and water sampled by Honeywell in Onondaga Lake [including areas in proximity to the Lake Pump site] as part of the RI and RD for that site and those results are discussed in documents submitted to NYSDEC by Honeywell.)

A. VOCs. Other than suspected laboratory contaminants (acetone, chloroform, and MEK) no other VOCs were detected above the laboratory quantitation limits.

B. SVOCs. Several SVOCs were identified in the lake water sample. Benzaldehyde (LW-1 and LW-2), diethyl phthalate (LW-2), Di-n-butyl phthalate (LW-2), and Bis(2-ethylhexyl)phthalate (LW-2) were detected at concentrations below the surface water standard or no standard was available.

C. Metals. Metals in the lake water samples LW-1 and LW-2 obtained during the November 2001 sampling event were below the current surface water quality standards.

D. PCBs and Pesticides. One pesticide (Endrin) was detected in LW-1 at a concentration of 0.03 ug/L which is above the surface water quality standard. Endrin was not detected in any of the soil or groundwater samples obtained at the site indicating that this constituent is not related to the Site. No PCBs were detected in sample LW-1 and LW-2 during the November 2001 sampling event.

5.3 Lake Sediment

Two lake sediment samples were obtained during completion of the PSA. The lake samples, designated LS-1 and LS-2 are indicated on **Figure 2**. Analytical results were compared to the NYSDEC's Levels of Protection for freshwater sediments in the *Technical Guidance for Screening Contaminated Sediments (January 25, 1999)* and are summarized in Table 3 of the PSA attached in **Appendix I**. The following discussion of the analytical results for the sediments and surface water refers to the samples that were collected adjacent (approximately 2 to 4 feet) to the site during the PSA. (Additionally, an extensive database exists for sediments and water sampled by Honeywell in Onondaga Lake [including areas in proximity to the Lake Pump site] as part of the RI and RD for that site and those results are discussed in documents submitted to NYSDEC by Honeywell.)

A. VOCs. Other than suspected laboratory contaminants (acetone, chloroform, methylene chloride and MEK) no other VOCs were detected above the laboratory quantitation limits except for toluene in LS-1 and LS-2. Toluene concentrations in LS-1 and LS-2 were below the sediment criteria.

B. SVOCs. Several SVOCs were identified in the lake sediment sample. SVOC concentrations were below the sediment criteria.

C. Metals. Several metals, including antimony, chromium, iron, manganese, and nickel exceeded the NYSDEC Severe Effect Levels. In addition, metals including arsenic, cadmium, copper, and lead exceeded the NYSDEC Low Effect Levels based on the sediment samples obtained during the November 2001 PSA.

D. PCBs and Pesticides. Three pesticide (Endosulfan I, Endrin ketone, and alpha-chlordane were identified in LS-2 at concentrations of 1.6, 2.2, 2.4 ug/kg, respectively. These pesticides were not identified in groundwater or soil samples obtained from the Site. Two PCBs, Aroclor 1248 and 1254, were detected at concentrations above the sediment criteria in sample LS-2. PCB concentrations were significantly lower than PCB levels that have been identified in the area of the Site.

5.4 Surface Water

Samples of water were collected during the November 2001 sampling event at two locations (see **Figure 2**) in the drainage ditch that is northwest of the Site. The upstream sample was collected at a location significantly upstream of the Site. At the time of sampling there was a small water flow. Sediment at both locations visually appeared to be mainly Allied Solvay Process waste and contained a distinct blue layer. The upstream locations was designated as DW-1 and the downstream sample was designated DW-2. Analytical results for the ditch water samples are shown in Table 4 of the PSA Report attached in **Appendix I**. Surface water analytical results were compared to Class C surface water standards and guidance values as given in NYSDEC's Division of Water Technical and Operational Guidance Series 1.1.1, *Ambient Water Quality*

Standards and Guidance Values and Groundwater Effluent Limitations. The water quality classification of the nearest body of water (Onondaga Lake) is Class C.

A. VOCs and SVOCs. A variety of organic parameters were detected in both the upstream (DW-1) and downstream (DW-2) water samples. Of these, benzene, toluene, phenol, naphthalene, and 2-methylnaphthalene were above the NYSDEC Class C water quality standard or guidance levels in both the upstream and downstream samples. Based upon the analytical results from the November 2001 sampling event, the organic constituents appear to be associated with the Allied Solvay waste and not with the waste materials at the Site.

B. Metals. For the inorganics, levels of iron were above the Class C standard in both locations and aluminum was above the standard in the downstream sample.

C. Pesticides and PCBs. One pesticide was indicated in the upstream sample, delta-BHC at a concentration of 0.029 ug/L. No PCBs were detected in the upstream and downstream samples obtained from the ditch.

5.5 Ditch Sediment

Sediment samples were collected during the November 2001 sampling event at two locations (see **Figure 2**) in the drainage ditch that is northwest of the Site. The upstream sample was collected at a location significantly upstream of the Site. At the time of sampling there was a small water flow. Sediment at both locations visually appeared to be mainly Allied Solvay Process waste and contained a distinct blue layer. The upstream locations was designated as DS-1 and the downstream sample was designated DS-2. Analytical results for the ditch sediment samples are shown in Table 4 of the PSA Report attached in **Appendix I**. Sediment analytical results were compared to the NYSDEC's Levels of Protection for freshwater sediments in the *Technical Guidance for Screening Contaminated Sediments (January 25, 1999).*

A. VOCs and SVOCs. Several organic parameters were detected in the drainage ditch sediment samples. Generally, the same parameters were detected in both the upstream and downstream samples. Only one organic parameter (benzene) was detected at both the upstream and downstream locations at concentrations above the NYSDEC sediment criteria determined during the PSA.

B. Metals. Several metals were identified in the upstream sample DS-1 at concentrations above the NYSDEC Low Effect Level. Chromium, Copper, Lead, Manganese, and Nickel were detected in DS-1 one at concentrations above the NYSDEC Lowest Effect Levels but below the Severe Effect Levels. Arsenic was the only metal detected in the downstream sample DS-2 at a concentration above the NYSDEC Lowest Effect Level but below the Severe Effect Level.

C. Pesticides and PCBs. No pesticides or PCBs were detected.

6. CONSTITUENT FATE AND TRANSPORT

Section 4 and 5 presented above discuss the chemical characteristics of the on-site and off-site media (soil groundwater, surface water and sediments). This section discusses how the constituents of concern may persist, degrade or migrate in the environment and the physical and chemical processes that could affect them. The following discussion of the analytical results for the sediments and surface water refers to the samples that were collected adjacent (approximately 2 to 4 feet) to the site during the PSA. (Additionally, an extensive database exists for sediments and water sampled by Honeywell in Onondaga Lake [including areas in proximity to the Lake Pump site] as part of the RI and RD for that site and those results are discussed in documents submitted to NYSDEC by Honeywell.)

6.1 Transport Mechanisms

The principal ways the site related chemicals of concern could be transported off-site include: Airborne Transport of Particulates; Surface Water Transport of Dissolved and Suspended Materials; and Groundwater Transport in the Dissolved Phase.

Airborne transport is controlled by the one-foot stone cover system that was placed at the Site during the IRM. The stone cover system should eliminate dust production as a transport mechanism and therefore airborne releases will not be considered.

6.2 Surface Water Transport

The stone cover placed at the site during the IRM (one-foot-thickness of #4 stone) currently covers the site and limits the transport of constituents via surface water runoff. Runoff from the site is more likely to have occurred in the past prior to placement of the stone cover. Surface water flow at the site would generally flow towards Onondaga Lake. Surface water in the northwestern portion of the site would flow towards the drainage ditch that flows to Onondaga Lake. Suspended site sediments in the surface run-off, if present, would likely settle out in a relatively short distance due to insignificant movement in Onondaga Lake.

Surface water samples collected during the PSA (at locations two to four feet from the edge of the fill) from the lake did not contain VOCs (other than suspected lab contaminants) or metals at concentrations above the surface water quality standards. Several SVOCs were detected in the lake surface waters at concentrations either below the surface water standards or no standards were available. One pesticide was detected above the surface water standard but that constituent was not identified at the Site. No PCBs were detected in the lake water samples.

The ditch surface water sample indicated VOCs, SVOCs, metals and one pesticide above the surface water standards. However, the upstream sample location indicated that the constituents identified are likely from an off-site source.

Sediment samples from Onondaga Lake collected during the PSA (at locations two to four feet from the edge of the fill) indicated no VOCs (other than suspected laboratory

contaminants) and SVOCs were detected in the lake sediments above the sediment criteria. Three pesticides were identified at concentrations above the sediment criteria. However, these constituents were not identified at the Site. Two PCBs were identified in one sediment sample at concentrations above the sediment criteria. The PCB concentrations were lower than PCB concentrations identified in the area surrounding the site.

The sediment samples from the ditch identified several VOCs and SVOCs in the upstream and downstream location that indicate the constituents identified in the ditch are from an off-site source. No pesticides or PCBs were detected in the ditch sediment samples. As discussed in Section 4.5, the IRM include the placement of a one-foot stone cover at the site that would limit surface water runoff. Therefore, there is no related source from which those compounds would enter the surface water system in dissolved or suspended sediment.

6.3 Groundwater Transport

As discussed previously, groundwater flow would be towards Onondaga Lake. Analytical data for lake water samples were below the Class C surface water standards indicating the groundwater transport to Onondaga Lake is limited. In addition, groundwater concentrations identified on-site appear to be consistent from the November 2001 to the 2005 sampling event indicating stable conditions currently at the site.

7. QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

A qualitative exposure assessment was completed for the site, in accordance with NYSDOH guidance on qualitative exposure assessments. The purpose of the exposure assessment is to evaluate whether on-site and off-site human receptors, under both existing and possible future site conditions, can potentially be exposed to site-related contaminants. Accordingly, the exposure assessment considers the site in its current state, and also considers future site occupancy scenarios that might occur if the land use for the site or surrounding areas change over time.

The exposure assessment evaluates five elements associated with exposure pathways. The exposure pathway elements include:

1) A description of the contaminant source(s) including the location waste release to the environment or the contaminated media at the point of exposure;
2) An explanation of the contaminant release and transport mechanisms to the exposed population;
3) Identification of potential exposure points;
4) Routes of exposure; and characterization of the receptor population; and
5) A characterization of the receptor population who may be exposed to contaminants at the point of exposure.

7.1 Characterization of the Exposure Setting

Site characteristics were reviewed, including the results of sampling data for surface soil, subsurface soil, surface water, groundwater and sediment to evaluate the physical condition of contaminant sources at the Site which may pose a potential health risk to the community.

Land uses and setting determines the likelihood that potential receptors could contact impacted media. Isolated sites and access control to media pose less potential risk to human health than sites with access by large populations.

A. Site Characterization. The Site, which measures approximately 3.5 acres in size, is located on the north side of Interstate 690. The Site is bound on the northeast by Onondaga Lake, to the south by the Interstate 690 Solvay exit ramp, to the west and northwest by lands owned by Onondaga County, and to the east by the Metropolitan Sewage Treatment Plant pump station property owned by Onondaga County. The site is owned by the NYSDOT and has historically been used for parking (e.g., State Fair) and storage/staging of construction equipment for area highway construction projects. Honeywell is currently using the Lake Pump Site as a staging area for remediation efforts of Onondaga Lake for approximately 5 to 6 years. Temporary office buildings, a boat dock and parking, have been constructed on the Lake Pump site. Access to the site is currently uncontrolled and the area is frequently used for unofficial access site to Onondaga Lake. A

NYSDEC boat launch will be constructed on the site after the lake cleanup is completed.

The horizontal estimated limits of the waste material are shown on **Figure 3**. Based on observation and field activities completed during the PSA and the RI, the estimated area of waste fill is approximately 150,000 square feet. Based on the borings advanced at the site during the PSA and the RI, the estimated thickness of the Crucible waste ranged from 10 to 25 feet. Assuming and average thickness of 17 feet, the total volume of suspected Crucible material placed at that Site is approximately 94, 440 cubic yards. Historical information had reported approximately 105,000 cubic yards a Crucible waste.

B. Populations. The surrounding area is a mixture of industrial, commercial, and suburban with the immediate area surrounding the site consisting of the Interstate 690, the State Fairgrounds, and industrial sites beyond which is residential area. Based on review of the 2010 Census information on-line maps, S&ME estimates a population of approximately 133,000 within 4 miles of the site.

The Site has been used as an unofficial access point for boats and for fishing. The placement of the stone cover during the IRM at the Site and construction of buildings, landscape features, parking lots, and covering of the bank by Honeywell removes the direct exposure to surface soils at the site by those visiting or using the site for unofficial recreation purposes.

7.2 Overview of Exposure Pathways

Both current and future potential exposure pathways were considered in the assessment, based on the site location, and the surrounding areas. An exposure pathway describes the means by which an individual may be exposed to contaminants that originate from the site and include the following:

- Contaminant Source;
- Contaminant release and Transport Mechanism;
- Point of Exposure;
- Route of Exposure; and
- Receptor.

Human receptors are potentially exposed to contaminants only if there is a complete exposure pathway. An exposure pathway is complete when all five elements of an exposure pathway are documented. A potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway is not documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future. If a particular exposure pathway is determined to be incomplete, then there is no exposure possibility by that pathway.

A. Contaminant Source. The Lake Pump site was observed to contain fill during field investigations including a variety of materials such as dense slag, construction and refractory debris, and ash. Some material including large pieces of slag (since covered) were noted at the ground surface and along the bank to Onondaga Lake.

B. Contaminant Release and Transport Mechanism. Contaminant release and transport carries contaminants from source points to points were people may be exposed. The principal methods that site contaminants could be transported off-site include: airborne transport of particulates, surface water transport of dissolved and suspended materials, and groundwater transport of dissolved phase contaminants.

Airborne transport is controlled by the stone cover at the site that should eliminate surface soil erosion by wind. This reduces the capacity for "dust" to form that could be transported by wind. Because airborne releases are considered small compared to water-related transport and thus airborne transport will not be presented for further discussion.

The stone cover placed at the site during the IRM and construction of buildings, landscape features, parking lots, and covering of the bank with rip rap by Honeywell significantly reduces transport of contaminants via surface water runoff. However, it is likely that surface water run-off could have occurred in the past. Surface water flow from the site flows towards Onondaga Lake and the drainage ditch located adjacent to and northwest of the Site. Field observations and sample results have indicated the drainage ditch impact is related to an off-site source and not affected by the Site.

Sediment samples collected during the PSA (at locations approximately two to four feet from the edge of the fill) from Onondaga Lake indicated no VOCs (other than suspected laboratory contaminants) and SVOCs were detected in the lake sediments above the sediment criteria. Three pesticides were identified at concentrations above the sediment criteria. However, these constituents were not identified at the Site. Two PCBs were identified in one sediment sample at concentrations above the sediment criteria. The PCB concentrations were significantly lower than PCB concentrations identified in the surrounding area. This data indicates that the lake Sediments do not appear to be affected by the Site.

Surface water samples from the lake collected during the PSA (at locations approximately two to four feet from the edge of the fill) did not contain VOCs (other than suspected lab contaminants) or metals at concentrations above the surface water quality standards. Several SVOCs were detected in the lake surface waters at concentrations either below the surface water standards or no standards were available. One pesticide was detected above the surface water standard but that constituent was not identified at the Site. No PCBs were detected in the lake

water samples. Several metals, including antimony, chromium, iron, manganese, and nickel exceed the NYSDEC Severe Effect Levels. In addition, metals including arsenic, cadmium, copper, and lead exceed the NYSDEC Low Effect Levels.

Groundwater flow would be towards Onondaga Lake. Analytical data for lake water samples were below the Class C surface water standards indicating the groundwater transport to Onondaga Lake is limited.

C. Receptors. The receptor populations are those who are or may be exposed to contaminants at a point of exposure. Based on site conditions (one foot stone cover and construction of buildings, landscape features, parking lots, and covering of the bank that inhibits access to surface and subsurface materials) construction workers are the principal receptors.

For current scenarios, it is unlikely that children or adult trespassers would be exposed to on-site contaminants based on the proposed use of the site by Honeywell during the remedial process associated with Onondaga Lake, the cover that inhibits access to the surface and subsurface soils by the public, and the property ownership by NYSDOT that would likely preclude the use of the property for residential purposes.

The future land use scenarios associated with exposure to contaminants at the Site would be by workers, primarily during construction related activities. It is anticipated that future deed restriction would likely be placed on the Site.

D. Exposure Point. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. For the Site, this includes direct contact with the fill material (on-site) and contact with Onondaga Lake sediments and water (off-site). As stated previously, fill at the site has been found to contain varying concentrations of metals, semi-volatile organics, pesticides, and PCBs. Based on the findings of the PSA and RI, the drainage ditch, lake water and sediment do not appear affected by materials from this Site. The Lake Pump waste material represents the exposure point for this exposure assessment. Onondaga Lake sediments and water would likely be exposure points related to other sources and evaluated by others.

E. Route of Exposure. The route of exposure is the manner in which a contaminant actually enters or contacts the body. Based on site conditions, dermal contact (direct contact with skin) and ingestion are the principal exposure routes. Inhalation of vapors and dust are not considered potential exposure routes under current or future conditions because volatile organic compounds were not detected in the surface soils and inhalation of dust is considered to be minimal since the Site has been covered.

Table 2 summarizes the exposure pathways that were retained for analysis along with the rational for rejecting possible exposure pathways. The exposure scenarios are based upon site conditions and reasonable future land use. Exposure pathways for each sampled media are presented below.

7.3 Media Specific Exposure Paths

7.3.1 Surface Soil

Exposure site surface soils is considered a complete pathway under current and future site conditions for site employees/construction workers based on potential construction activities that could occur at the site involving installation of infrastructure (i.e., foundations, sewer lines, water lines, electrical, etc.).

Inhalation of vapors and dust are not considered potential exposure routes and is not a pathway under current or future conditions because volatile organic compounds were not detected in the surface soils and inhalation of dust is considered to be minimal because the site has been covered.

7.3.2 Surface Water

Investigation data (obtained by C&S during the PSA) suggests that the surface water impacts noted in the drainage ditch are related to an off-site source and not related to the Lake Pump Site. Based on the investigation data, exposure to contaminates related to the site in the surface water in the adjacent drainage ditch is not considered as a complete exposure pathway.

7.3.3 Ditch Sediment

Investigation data (obtained by C&S during the PSA) suggests that the sediments impacts noted in the drainage ditch are related to an off-site source and not related to the Lake Pump Site. Based on the investigation data, exposure to contaminates related to the site in the sediments in the adjacent drainage ditch is not considered as a complete exposure pathway.

7.3.4 Lake Water

Exposure to Onondaga Lake water is not considered a complete pathway in relation to the Lake Pump site. The contaminants identified in the lake samples appear to be unrelated to those identified in surface soils and groundwater at the site. The lake water would likely be considered a complete pathway for studies related to remedial efforts associated with unrelated off-site sources.

7.3.5 Lake Sediment

Exposure to Onondaga Lake sediments is not considered a complete pathway in relation to the Lake Pump site. In general the contaminants identified in the lake samples appear to be unrelated to those identified in surface soils and groundwater at the site. Lake sediments would likely be considered a complete pathway for studies related to remedial efforts associated with unrelated off-site sources.

7.3.6 Groundwater

RI data has shown that the fill has impacted the shallow groundwater. Analytical results for the lake water did not indicate results above the Class C standards which indicate transport of contaminants from the shallow groundwater to the lake have not occurred. Presently there is no exposure to the shallow groundwater in the fill area. Future exposure to groundwater via ingestion would require the installation of a water supply well. Future land restrictions would likely restrict the installation of a water supply well. However, there are no current restrictions for the site preventing groundwater use and thus the groundwater is considered a remote possibility for a complete pathway.

Future exposure to groundwater would also be possible if site construction activities below ground surface intersect the water table. The exposure route includes dermal contact and ingestion.

7.3.7 Subsurface Soils

Exposure to site subsurface soils is considered a complete pathway under current and future site conditions for site employees/construction workers based on potential construction activities that could occur at the site involving installation of infrastructure (i.e., foundations, sewer lines, water lines, electrical, etc.).

Inhalation of vapors and dust are not considered potential exposure routes and is not a pathway under current or future conditions because volatile organic compounds were not detected in the subsurface soils above soil cleanup objectives and inhalation of dust is considered to be minimal because the site has been covered.

7.4 Selection of Constituents of Potential Concern

If a complete or potentially complete exposure pathway was identified for a particular medium, the concentrations of each constituent detected and that medium were evaluated to determine if the concentrations could potentially represent a health risk. For each medium (surface soil/fill, surface water, ditch sediment, lake water, lake sediment, groundwater, and subsurface soil/fill) screening concentrations were based on the maximum detected concentration and average concentration for each constituent. Constituents with undetectable levels were assumed to be half the highest concentration when calculating the average. It is our opinion that the maximum concentration is a conservative screening concentration.

The exposure concentrations were compared to the regulatory screening levels based on the most conservative exposure assumptions to determine if the contaminants identified are constituents of potential concern (COPC). **Tables 3, 4, and 5** present the evaluations of COPCs for the complete pathways discussed above (surface soil/fill, subsurface soil/fill, and groundwater). The concentrations were compared to the EPA Regional Screening Levels (RSLs) for Region 9.

7.4.1 Current/Future Scenarios-Site Surface and Subsurface Soil/Fill

Surface soil/fill and subsurface soil/fill were identified as complete pathways under the current and future use scenarios for the site. While a site worker/construction worker is

the most likely exposures, the COPC determination includes the residential exposure even though this scenario would be considered a low probability. Analytical data for 4 on-site surface soil/fill (SS-1 through SS-4) and 4 subsurface soil/fill (Trench, BR-1 through BR-3) samples determined the exposure point concentrations for VOCs, SVOCs, metals, pesticides, and PCBs. No VOCs were identified in the surface soil/fill samples other than suspected laboratory contaminants. A constituent was considered a COPC if its maximum concentration exceeded the EPA Region 9 Regional Screening Levels (RSLs). Because residential is not a likely pathway of concern, the COPC determination is highly conservative.

A total of 15 constituents were identified as COPCs in the surface soil/fill and subsurface soil/fill based on the maximum concentrations detected. Of the 15 COPCs, seven metals (antimony, iron, lead, manganese, nickel, thallium, and vanadium), one SVOC (indeno (1,2, 3-cd) pyrene), and one PCB (Aroclor 1254) exceeded only the residential RSLs. **Tables 3 and 4** present the surface and subsurface soil/fill evaluations.

7.4.2 Future Scenarios-Groundwater

Groundwater data from the PSA indicated that concentrations are biased based on high turbidity. The November 2001 filtered samples for metals were used for the COPC evaluation. The 2005 NYSDEC groundwater sampling event included analysis for only metals. These results were considered in determining the maximum and average concentrations for wells MW-1 through MW-3. The tap water RSLs were used to assess future exposure of an on-site construction worker, site employee, or resident to groundwater. Use of the tap water RSL is extremely conservative because groundwater use at the site is unlikely as a potable water source. A total of sixteen COPCs were identified based on the maximum detected concentrations (**Table 5**), including one VOC (benzene), six SVOCs (pentachlorophenol, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and bis(2-ethylhexyl)phthalate), eight metals (arsenic, chromium, cobalt, iron, manganese, selenium, thallium, and vanadium), and one PCBs (Aroclor 1254). Based upon review of the filtered and unfiltered sample results, suspended solids bias metals results at the site and several metals may exceed the RSLs due to the elevated concentrations from suspended solids.

It is expected that deed restrictions will be placed on the site. In addition, construction worker exposure to groundwater would be limited by the reasonable care that is incorporated into work-specific health and safety plans.

8. CONCLUSIONS

The Lake Pump site is located on the north side of Interstate 690 in the Town of Geddes, Onondaga County, New York. It has been alleged that waste from the operation of the Crucible Plant, later of Coltec Industries, was received from 1961 to 1967. The fill material allegedly contained slag from the use of electric arc furnaces to melt various mixtures of scrap metals and added alloys, construction and refractory debris, absorbents, and miscellaneous bricks, mortar, wood, steel, and other items from a variety of maintenance activities, boiler house ashes, coolant swarf, mill scale, and grinding dusts. This initiated completion of a detailed PSA, a ground water sampling event directed by NYSDEC, and this Remedial Investigation. The remedial investigation focused on collecting sufficient data regarding the nature and extent of contamination and/or impacts by identifying any target metals and compounds in the fill, groundwater, and adjacent surface water and sediments. The results are summarized below.

8.1 Site Soil and Fill Characteristics

The site, which measures approximately 3.5 acres in size, is located on the north side of Interstate 690. The site is bound on the northeast by Onondaga Lake, to the south by the Interstate 690 Solvay exit ramp, to the west and northwest by lands owned by Onondaga County and to the east by the Metropolitan Sewage Treatment Plant pump station property owned by Onondaga County. The site is owned by the NYSDOT and has historically been used for parking (e.g., State Fair) and storage/staging of construction equipment for area highway construction projects. Honeywell is using the Lake Pump site as a staging area for remediation efforts of Onondaga Lake for a period of approximately 5 to 6 years. Temporary office buildings, a boat dock and parking, have been constructed on the Lake Pump site. Access to the site is currently uncontrolled and the area is frequently used for unofficial access site to Onondaga Lake. A NYSDEC boat launch will be constructed on the site after the lake cleanup is completed.

Observations and field activities completed during the PSA and the RI indicates the estimated area of waste fill is approximately 150,000 square feet. The estimated thickness of the Crucible waste ranged from 10 feet near the eastern portion of the site to 25 feet in the central/western portion of the site. Assuming and average thickness of 17 feet, the total volume of suspected Crucible material placed at the site is approximately 94,440 cubic yards.

The analyses of the fill included trenches, hand dug holes, surface soil samples and subsurface soil samples. Referencing the NYSDEC soil cleanup objectives in Subpart 375-6, arsenic, barium, chromium, copper, lead, total mercury, and nickel concentrations in one or more of the subsurface soil samples exceeds one or more of the restricted uses soil cleanup objectives. Total mercury and selenium concentrations only exceeded the Protection of Ecological Resources soil cleanup objectives.

Other than suspected laboratory contaminants, only one soil boring indicated one VOC (1, 2, 4-Trichlorobenzene) at 3 ug/kg which is below the soil cleanup objectives. Six

SVOCs were detected in the trench and soil borings and seven SVOCs were detected in the surface soil samples at concentrations above the DER-10 soil cleanup objectives. The surface soil/fill samples had one pesticide (4, 4-DDT) at a concentration below the soil cleanup objectives. The trench sample (subsurface soil/fill) indicated two pesticides (4, 4-DDE and 4, 4-DDT) at concentrations below the soil cleanup objectives. PCBs were detected in subsurface soils/fill from the Trench and soil borings BR-2 and BR-3 at concentrations below soil cleanup objectives. No PCBs were detected in the surface soil samples. Although VOCs, SVOCs, and pesticides are present in site soils and fill, they are also noticeably present in off-site areas, including upstream of the site.

An Interim Remedial Measure (IRM) Design was completed and submitted to NYSDEC on October 28, 2011. The IRM Design was approved by NYSDEC on November 3, 2011. IRM activities completed in November 2011 included clearing of an area in the northwest portion of the Lake Pump site prior to placement of a 1-foot thick cover of #4 Stone over the site to provide a barrier to the waste materials. Approximately 7,160 tons of stone were placed as a cover for the waste material. Additionally, in May, 2012, Honeywell has addressed the shoreline bank at the Site along Onondaga Lake by placing large rip rap along the water's edge.

8.2 Ditch Surface Water and Sediment Characteristics

The analytical data indicated that the ditch located northwest and adjacent to the site contains two metals (aluminum and iron) above the surface water standards. The surface waters of the ditch also indicated multiple VOCs and SVOCs at the upstream and downstream sample locations. Five constituents (benzene, toluene, phenol, naphthalene, and 2-methylnaphthalene) were above the surface water standards in the upstream and downstream samples. For the inorganics, levels of iron were above the Class C standard in both locations and aluminum was above the standard in the downstream sample. One pesticide was indicated in the upstream sample, delta-BHC at a concentration of 0.029 ug/L. No PCBs were detected in the upstream and downstream samples obtained from the ditch.

Several VOCs and SVOCs were detected in the drainage ditch sediment samples. Generally, the same parameters were detected at both the upstream and downstream sample locations. Only one organic parameter (benzene) was detected at both the upstream and downstream locations at concentrations above the NYSDEC sediment criteria determined during the PSA. Several metals were identified in the upstream sediment sample at concentrations above the NYSDEC Low Effect Level. Chromium, Copper, Lead, Manganese, and Nickel were detected in the upstream sediment sample at concentrations above the NYSDEC Lowest Effect Levels but below the Severe Effect Levels. Arsenic was the only metal detected in the downstream sample DS-2 at a concentration above the NYSDEC Lowest Effect Level but below the Severe Effect Level. No Pesticides or PCBs were detected in the ditch sediment samples.

Based upon the analytical results from the November 2001 sampling event, the constituents identified (VOC, SVOCs, and metals) appear to be associated with an off-site source (Allied Solvay waste) and not with the waste materials at the site.

8.3 Groundwater Characteristics

Three monitoring wells were installed at the site during the PSA. MW-1 was installed in an area apparently up gradient of the fill area and MW-2 and MW-3 were installed and screened primarily within the fill area.

Benzene was the only VOC (MW-3) detected at an estimated concentration of 4 ug/L, which is above the NYSDEC Class GA Standard. Other than suspected laboratory contaminants, two other VOCs were detected in monitor wells, Methyl ethyl ketone (MEK) in MW-2 and MW-3 and Toluene in MW-3 at concentrations below the NYSDEC Class GA Standards. MW-1 indicated no VOCs above the laboratory detection limits.

MW-2 and MW-3 indicated up to 19 SVOCs of which 6 compounds, Pentachlorophenol (MW-3 only), Benzo(a) anthracene, Chrysene, Benzo(b) fluoranthene, Benzo(a)pyrene, Indeno (1,2,3-cd) pyrene were slightly above the NYSDEC Class GA groundwater standards or guidance values. No SVOCs were detected in the upgradient well MW-1.

One pesticide (delta-BHC) was detected in MW-3 at a concentration of 0.026 ug/L during the November 2001 sampling event. One PCB (Aroclor 1254) was detected in monitoring wells MW-2 and MW-3 at concentrations of 1.7 and 1.9 ug/L, respectively, which is above the Class GA standard of 0.09 ug/L. PCBs were detected in the soil samples at these monitoring well locations suggesting results could be related to suspended solids in the groundwater samples. Pesticides and PCBS were below detection limits in MW-1.

Groundwater flows toward Onondaga Lake. However, based on a review of site data, the site does not appear to an active source of contaminants to the lake. Analytical results for the lake water did not indicate results above the Class C standards which indicate transport of contaminants from the shallow groundwater to the lake have not occurred.

8.4 Lake Water and Sediment Characteristics

Onondaga Lake is located adjacent and east of the site. The following information is based on field investigation and analytical data obtained from the PSA from samples collected near the edge of the site.

No VOCs were detected in the lake surface water samples, other than suspected laboratory contaminants. Several SVOCs were identified in the lake water sample. Benzaldehyde (LW-1 and LW-2), diethyl phthalate (LW-2), Di-n-butyl phthalate (LW-2), and Bis (2-ethylhexyl) phthalate (LW-2) were detected at concentrations below the surface water standard or no standard was available. No metals were detected at concentrations above the surface water quality standards.

One pesticide (Endrin) was detected in surface water sample from Onondaga Lake at a concentration of 0.03 ug/L, which is above the surface water quality standard. Endrin was not detected in any of the soil or groundwater samples obtained at the site indicating that this constituent is not related to the site. No PCBs were detected in the lake surface water samples.

Two sediment samples were obtained during the PSA in November 2001. Analytical results indicated other than suspected laboratory contaminants, one VOC (toluene) at a concentration below the sediment criteria. No SVOCs were detected at concentrations above the sediment criteria.

Several metals, including antimony, chromium, iron, manganese, and nickel exceeded the NYSDEC Severe Effect Levels. In addition, metals including arsenic, cadmium, copper, and lead exceeded the NYSDEC Low Effect Levels.

Three pesticide (Endosulfan I, Endrin ketone, and alpha-chlordane were identified in one lake sediment sample (LS-2) at concentrations of 1.6, 2.2, 2.4 ug/kg, respectively. These pesticides were not identified in groundwater or soil samples obtained from the site. Two PCBs, Aroclor 1248 and 1254, were detected at concentrations in one sediment sample (LS-2) above the sediment criteria. PCB concentrations were significantly lower than PCB levels that have been identified in the area of the site.

8.5 Fate and Migration Summary

Sediment samples from Onondaga Lake indicated no VOCs (other than suspected laboratory contaminants) and SVOCs were detected in the lake sediments above the sediment criteria. Three pesticides were identified at concentrations above the sediment criteria. However, these constituents were not identified at the site. Two PCBs were identified in one sediment sample at concentrations above the sediment criteria. The PCB concentrations were significantly lower than PCB concentrations identified in the area surrounding the site. Site-related metals (e.g., chromium) are present at elevated concentrations in the sediment samples collected as part of the RI and RD for Onondaga Lake. Historically, the site may have contributed to these elevated levels.

The sediment samples from the ditch identified several VOCs and SVOCs in the upstream and downstream location that indicate the constituents identified in the ditch are from an off-site source. No pesticides or PCBs were detected in the ditch sediment samples.

The one-foot stone cover system placed at the site should limit surface water transport of suspended particulates towards Onondaga Lake and the ditch located adjacent and northwest of the Lake Pump site.

Groundwater flows towards Onondaga Lake. However, based on review of site data, the site does not appear to be an active source of contaminants to the lake. Analytical data for lake water samples were below the Class C surface water standards indicating the groundwater transport to Onondaga Lake is limited.

8.6 Human Health Exposure Assessment

The qualitative human health exposure assessment indicates that constituents of potential concern (COPCs) are present on-site in surface soil/fill, subsurface soil/fill and groundwater. The complete pathways identified for the site included a current and future

use scenario for site employee/construction worker related to contact with soil/fill during potential construction activities and a future use scenario for groundwater ingestion and contact. The future use of the site would not likely include residential and use of groundwater is highly unlikely due to the on-going environmental investigations and remedial action in the vicinity of the site.

A total of 15 constituents were identified as COPCs in the surface soil/fill and subsurface soil/fill based on the maximum concentrations detected. Of the 15 COPCs, seven metals (antimony, iron, lead, manganese, nickel, thallium, and vanadium), one SVOC (indeno (1, 2, 3-cd) pyrene), and one PCB (Aroclor 1254) exceeded only the residential RSLs.

The tap water RSLs were used to assess future exposure of an on-site construction worker, site employee, or resident to groundwater. Use of the tap water RSL is extremely conservative because groundwater use at the site is unlikely as a potable water source. A total of sixteen COPCs were identified based on the maximum detected concentrations, including one VOC (benzene), six SVOCs (pentachlorophenol, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and bis92-ethylhexyl)phthalate), eight metals (arsenic, chromium, cobalt, iron, manganese, selenium, thallium, and vanadium), and one PCBs (Aroclor 1254). Based upon review of the filtered and unfiltered sample results, suspended solids bias metals results at the site and several metals may exceed the RSLs due to the elevated concentrations from suspended solids.

The results of the assessment are a conservative depiction of exposure possibilities, which may overstate the actual exposure risk. The conservative nature of the assessment should be taken into account as remedial alternatives are screened during the feasibility study. Accordingly, the feasibility study will need to consider whether the proposed remedies are likely to achieve a measurable reduction in the actual exposure risk.

8.7 Fish and Wildlife Impact

Base on the January 25, 2011 letter from NYSDEC concerning review of the draft RI/FS Work Plan, if no new data is collected, then the DFW&MR Fish and Wildlife Resource Impact Analysis (FWRIA) that was presented in the PSA can be utilized for the RI and completion of the ecological impact assessment-Step 2 would not be required. No new data from the remedial investigation activities were identified that warrants completion of ecological impact assessment.

The Lake Pump site and study areas are highly developed with industrial, transportation and State/NYSDOT maintenance uses. The analysis indicated that the site is of limited value as habitat to fish and wildlife and other than its use as an unofficial access point to Onondaga Lake provide little value for humans. Proposed use of the site for the immediate future is for temporary field office buildings, a boat dock and parking, which will be placed on the Lake Pump site for a period of approximately 5 to 6 years beginning in 2012 for remediation efforts at Onondaga Lake. A NYSDEC boat launch will be constructed on the site after the lake cleanup is completed.

8.8 Cultural Resources Survey

A *Cultural Resources Management Report Phase I Reconnaissance Survey* was completed for Honeywell by Christopher D. Hohman of the Public Archaeology Facility and Parsons on July 26, 2011 and approved by NYSDEC on July 29, 2011. The report indicated that the area of the Lakeshore Complex (Lake Pump site) was either under Onondaga Lake or on the marshy shoreline of Onondaga Lake during the pre-contact and post-contact periods through the mid-20th century. The Syracuse Yacht Club extended out over the waters of Onondaga Lake in the vicinity of the project area for the Lakeshore Complex in the late 1800s to early 1900s. The Syracuse Yacht Club burned down and fill was placed off the shore of Onondaga Lake filling in a portion of the area that created the present landform that extends into Onondaga Lake. The fill material overlays the debris of the former yacht club and planned remedial activities will not impact the resources of the former yacht club. No further archaeological testing was recommended for the Lakeshore Complex (Lake Pump site).

8.9 Feasibility Study

The findings of the RI provide sufficient information for completing a feasibility study (FS) for the site. A principal objective of the FS should be to select a remedy that will effectively minimize future human and wildlife exposure to fill material. Accordingly, the remedial approach can be aimed at preventing future release of fill constituents and minimizing human and wildlife contact with fill material and affected sediments.
The exposure of site/construction workers to site-related constituents can be managed by the health and safety protocols. In addition, deed restrictions enacted as part of the selected remedy could control development activity and use of groundwater to further minimize future exposures.

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NYSDEC, 1994. Technical and Administrative Guidance Memorandum HWR-94-4046, Determination of Soil Cleanup Objectives and Cleanup Levels.

NYSDEC, 1999. Technical Guidance for Screening Contaminated Sediments, Division of Fish, Wildlife, and Marine Resources.

NYSDEC Standards, Criteria and Guidance for DER-10

NYSDEC Groundwater Sample Results 2005

Cultural Resources Management Report Phase I Reconnaissance Survey, Christopher D. Hohman of the Public Archaeology Facility and Parsons, July 26, 2011

USEPA Region 9 Regional Screening Levels, May 2012

S&ME Northeast, February 2011. Remedial Investigations/Feasibility Study Work Plan, Lake Pump Site, NYSDEC Site 734078, Town of Geddes, New York.

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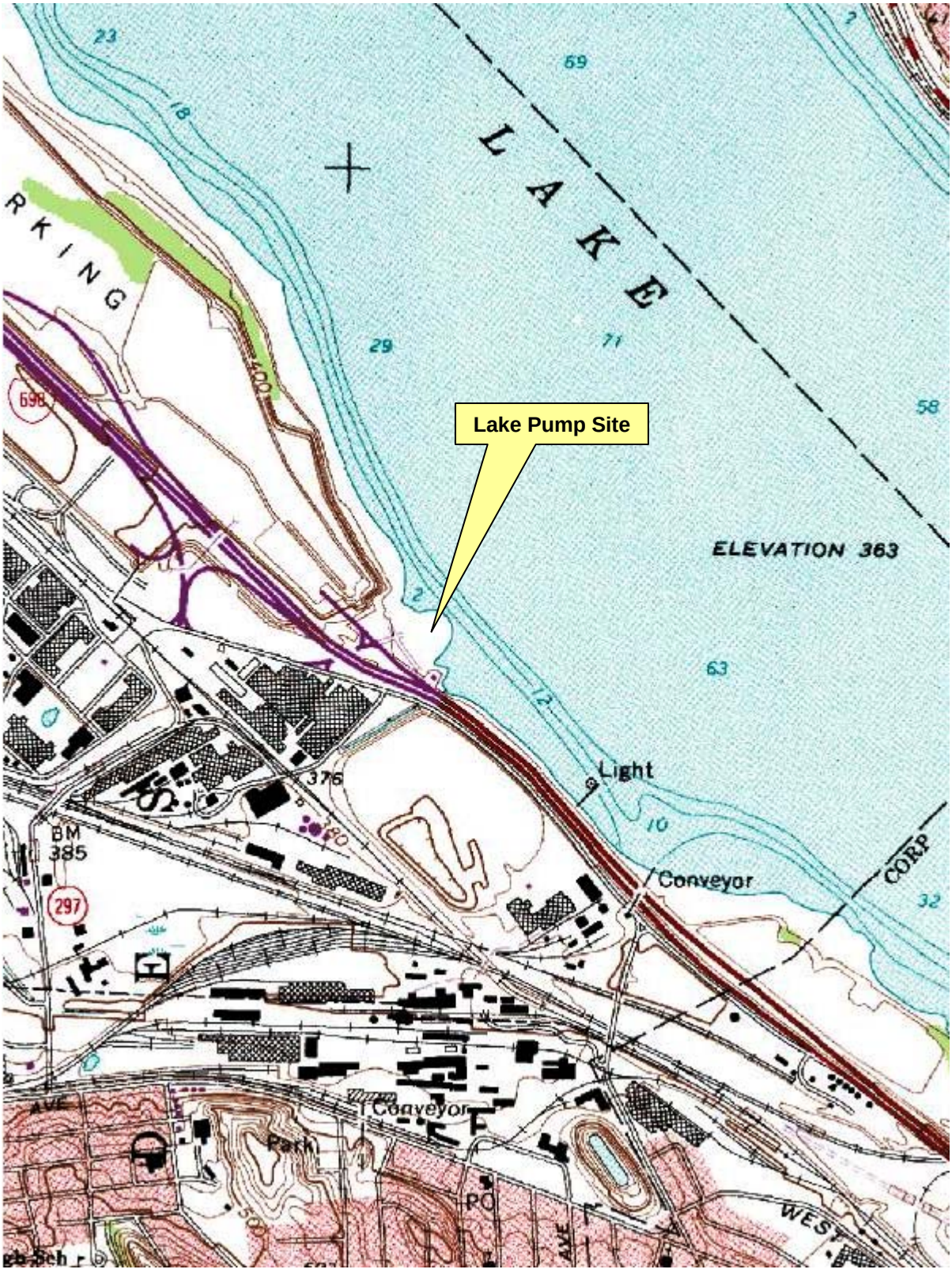
Parsons (2011a). *Onondaga Lake Pre-Design Investigation: Phase IV Data Summary Report*. Prepared for Honeywell, Morristown, New Jersey and Syracuse, New York. January

Parsons (2011b). *Onondaga Lake Pre-Design Investigation: Phase V Data Summary Report*. Prepared for Honeywell, Morristown, New Jersey and Syracuse, New York. January

FIGURES



1 in ~ 1260 ft

Source: Syracuse, New York, USGS Topographic Map obtained from http://msrmaps.com

Scale: As Shown	S&ME	Site Vicinty Map Lake Pump Site Onondaga Lake Town of Geddes, New York	**Figure** 1
Drawn by: PRL			
Checked by: MNM			
Date: 11-29-2010		S&ME Job No.: 1354-10-052A	

N 1120000

N 1119500

E 921000

ONONDAGA LAKE

DRAINAGE SWALE

DW-2
DS-2

S-H2

S-H1

PUMP HOUSE

NO OVERHEAD WIRES

TRAILER

MW-2/BR-2

LS-2
LW-2

LS-1
LW-1

T-6

T-9

T-5

DRAINAGE DITCH

48" RCP

DW-1
DS-1

GRAVEL ROAD

SS-4

SS-3

SB-2

T-4B

T-4A

TRENCH (PSA 2001)

SB-1

SS-1

SS-2

MW-3/BR-3

T-3A

T-3B

T-7

T-2A

INTERSTATE 690

MW-1/BR-1

T-2B

T-1

T-8

OLD HONEYWELL DECOMMISSIONED WELLS (GM-34, GM-35, GM-36)

EDGE OF WATER AS LOCATED ON JUNE 28,2011. AVG. ELEV.=363.0'±

WA-MW-100D & WA-WM-100BR (APPROXIMATE LOCATIONS)

BENCHMARK
RR SPIKE IN UTILITY POLE
ELEV.=372.18'

ONONDAGA COUNTY WEST SIDE PUMP STATION

LEGEND

- ABUTTERS LOT LINE
- PROPERTY LINE
- CHAIN LINK FENCE
- SEWER LINE
- OVERHEAD WIRES
- TREE LINE
- INTERMEDIATE CONTOURS
- INDEX CONTOURS
- BOLLARD
- MONITORING WELL
- SIGN POST
- GUY WIRE
- UTILITY POLE
- UTILITY POLE W/TRANSFORMER
- UTILITY POLE W/RISER
- POST
- LIGHT POLE
- LIMITS OF STONE COVER
- APPROXIMATE RIP-RAP LIMIT ALONG BANK
- APPROXIMATE LIMIT OF SILT FENCE
- AREAS OF CLEARING
- T-1A APPROXIMATE TRENCH LOCATION
- SOIL BORING
- HAND DUG HOLE (S-H1)
- SURFACE SOIL SAMPLE (PSA, 2001)
- MONITOR WELL (PSA, 2001)
- LAKE SEDIMENT/WATER SAMPLE (PSA, 2001)
- DITCH SEDIMENT/WATER SAMPLE (PSA, 2001)
- MONITORING WELLS OWNED BY OTHERS

30 0 15 30 60

(IN FEET)
1 inch = 30 ft.

S&ME
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9751 SOUTHERN PINE BLVD.
CHARLOTTE, NC 28273
PH: (704)525-1728

NO.	DATE	DESCRIPTION	BY

SITE PLAN

LAKE PUMP SITE
GEDDES, NEW YORK

ENGINEERING LICENSE NO: F-0176

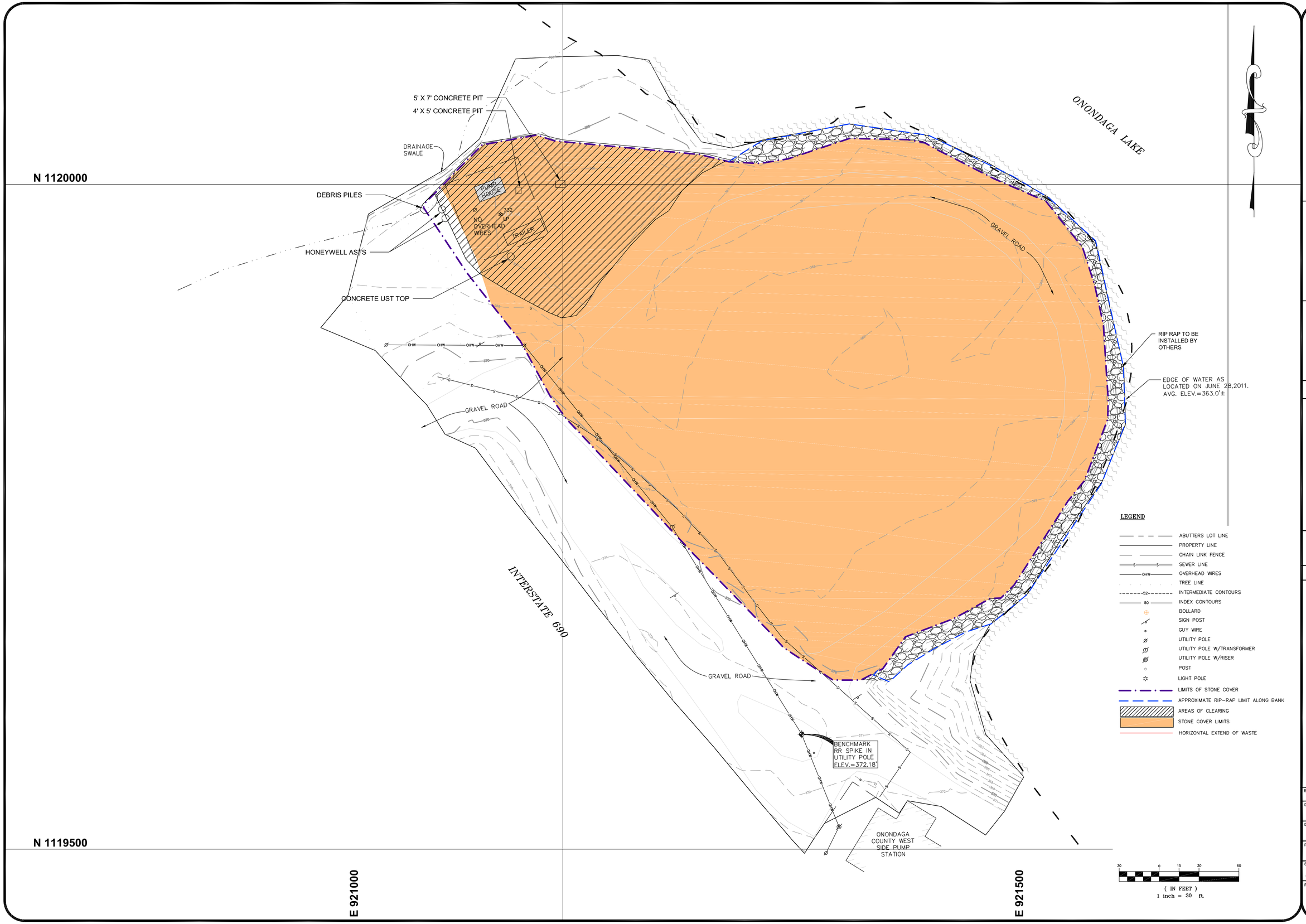
DRAWN BY:	CHECKED BY:
CLD	
DESIGNED BY:	APPROVED BY:

PROJECT NUMBER: 1354-10-052A

SCALE:	DATE:
AS SHOWN	8-5-11

FIGURE:	OF:
2	3

DRAWING PATH: G:\1354\2010\052A LAKE PUMP SITE\LAKE PUMP SURVEY_WGPSCORRECTED.DWG



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CHARLOTTE, NC 28273
PH.: (704)523-4726

NO.	DATE	DESCRIPTION	BY

HORIZONTAL LIMITS OF WASTE MATERIAL/ STONE COVER

LAKE PUMP SITE
GEDDES, NEW YORK

ENGINEERING LICENSE NO: F-0176

DRAWN BY:	CHECKED BY:
CLD	
DESIGNED BY:	APPROVED BY:

PROJECT NUMBER: 1354-10-052A

SCALE:	DATE:
AS SHOWN	8-5-11
FIGURE:	OF:
3	3

DRAWING PATH: Q:\1354\2010\052A LAKE PUMP SITE\LAKE PUMP SURVEY_WDPSOSRECT03.DWG

TABLES

Table 1
NYSDEC 2005 Groundwater Sample Results
Lake Pump Site

SAMP_ID LAB_ID	UNITS	RESULTS CLPS-MW1 D0765-01A	LAB	UNITS	RESULTS CLPS-MW2 D0765-02A	LAB	UNITS	RESULTS CLPS-MW3 D0765-03A	LAB	UNITS	RESULTS CLPS-MW3D D0765-04A	LAB	
ANALYTE	UNITS	06/29/2005		UNITS	06/29/2005		UNITS	06/29/2005		UNITS	06/29/2005		Method
Aluminum	ug/L	1390	E	ug/L	1020	E	ug/L	143	BE	ug/L	119	BE	SW6010B_W
Antimony	ug/L	4.1	B	ug/L	1.2	U	ug/L	1.2	U	ug/L	1.2	U	SW6010B_W
Arsenic	ug/L	12.1	B	ug/L	1.6	U	ug/L	10.2	B	ug/L	9.2	B	SW6010B_W
Barium	ug/L	158	BE	ug/L	158	BE	ug/L	139	BE	ug/L	140	BE	SW6010B_W
Beryllium	ug/L	0.15	U	ug/L	0.15	U	ug/L	0.15	U	ug/L	0.15	U	SW6010B_W
Cadmium	ug/L	0.1	U	ug/L	0.1	U	ug/L	0.1	U	ug/L	0.1	U	SW6010B_W
Calcium	ug/L	1410000		ug/L	179000		ug/L	810000		ug/L	825000		SW6010B_W
Chromium	ug/L	2.7	B	ug/L	102		ug/L	113		ug/L	82.2		SW6010B_W
Cobalt	ug/L	1.8	B	ug/L	0.15	U	ug/L	26.6	B	ug/L	20.6	B	SW6010B_W
Copper	ug/L	6.5	B	ug/L	16.4	B	ug/L	20.5	B	ug/L	15.7	B	SW6010B_W
Iron	ug/L	10500	E	ug/L	1460	E	ug/L	31200	E	ug/L	28800	E	SW6010B_W
Lead	ug/L	12.9		ug/L	0.46	U	ug/L	10.6		ug/L	8.9	B	SW6010B_W
Magnesium	ug/L	75000	E	ug/L	20	UE	ug/L	50400	E	ug/L	51400	E	SW6010B_W
Manganese	ug/L	460	E	ug/L	99.4	E	ug/L	357	E	ug/L	347	E	SW6010B_W
Nickel	ug/L	3.9	B	ug/L	46.7	B	ug/L	104		ug/L	75.2		SW6010B_W
Potassium	ug/L	27200		ug/L	75800		ug/L	20000		ug/L	20500		SW6010B_W
Selenium	ug/L	13.8	B	ug/L	90.3		ug/L	9.9	B	ug/L	8.6	B	SW6010B_W
Silver	ug/L	0.91	U	ug/L	0.91	U	ug/L	0.91	U	ug/L	0.91	U	SW6010B_W
Sodium	ug/L	1580000		ug/L	665000		ug/L	1300000		ug/L	1310000		SW6010B_W
Thallium	ug/L	28.3		ug/L	1.2	U	ug/L	18.0	B	ug/L	17.5	B	SW6010B_W
Vanadium	ug/L	1.4	B	ug/L	123		ug/L	1.9	B	ug/L	0.47	U	SW6010B_W
Zinc	ug/L	11.1	B	ug/L	34.1	B	ug/L	5.4	B	ug/L	11.6	B	SW6010B_W
Mercury	ug/L	0.064	U	ug/L	0.062	U	ug/L	0.064	U	ug/L	0.061	U	SW7470A

TABLE 2
EXPOSURE PATHWAYS
Lake Pump Site

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Selected for Analysis?	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Soil/Fill	Surface soil	site ground surface	Construction/Site Workers	adult	ingestion/dermal	On-site	Yes	Potentially complete pathway
				Trespasser		ingestion/dermal	On-site	No	One-foot Stone Cover removes access to on-site soils
				Tresspasser	teen	ingestion/dermal	On-site	No	One-foot Stone Cover removes access to on-site soils
					child	ingestion/dermal	On-site	No	One-foot Stone Cover removes access to on-site soils
	Subsurface Soil/Fill	Subsurface Soil	Subsurface Soil	Construction/Site Workers	adult	ingestion/dermal	On-site	Yes	Potentially complete pathway
				Trespasser		ingestion/dermal	On-site	No	One-foot Stone Cover removes access to on-site soils
				Tresspasser	teen	ingestion/dermal	On-site	No	One-foot Stone Cover removes access to on-site soils
					child	ingestion/dermal	On-site	No	One-foot Stone Cover removes access to on-site soils
	Ditch Surface Water	Surface Water	Ditch	Construction/Site Workers	adult	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
				Trespasser		ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
				Tresspasser	teen	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
					child	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
	Ditch Sediment	Ditch Sediment	Ditch	Construction/Site Workers	adult	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
				Trespasser		ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
				Tresspasser	teen	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
					child	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
	Onondaga Lake Surface Water	Surface Water	Lake	Site Workers	adult	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
				Recreational User	adult	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
					teen	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
					adult	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
	Onondaga Lake Sediment	sediment	Lake	Site Workers	adult	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
				Recreational User	adult	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
					teen	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site
					adult	ingestion/dermal	Off-site	Yes	Potentially complete pathway. Not Selceted for analysis because constituents are from source unrelated to the Lake Pump Site

TABLE 3

EVALUATION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE SOIL/FILL

LAKE PUMP SITE

Scenario Timeframe: Current

Medium: Surface soil

Exposure Medium: surface soil

Exposure Point: ground surface

Chemical	Min. (1) Conc.	Max. (1) Conc.	Ave. Conc.	Units	Location of Maximum Concentration	Background Value (BS 1-4)	EPA Regional Screening Levels (ug/kg) - Residential	EPA Regional Screening Levels (ug/kg) - Industrial	COPC Flag	Rationale for (3) Contaminant Deletion or Selection
Naphthalene	ND	1,700	1063	ug/kg	SS-4	Not tested	3,600	18,000		BSL
Acetaphenone	ND	1,100	688	ug/kg	SS-4	Not tested	7,800,000	100,000,000		BSL
Acenaphthylene	ND	1,000	625	ug/kg	SS-4	Not tested	NA	NA		NTX
Acenaphthene	ND	69	44	ug/kg	SS-3	Not tested	3,400,000	34,000,000		BSL
Fluorene	ND	110	69	ug/kg	SS-3	Not tested	NA	NA		NTX
Phenanthrene	300	1,300	873	ug/kg	SS-3	Not tested	N/A	N/A		NTX
Anthracene	ND	430	261	ug/kg	SS-4	Not tested	17,000,000	170,000,000		BSL
Fluoranthene	500	3,300	1820	ug/kg	SS-4	Not tested	2,300,000	23,000,000		BSL
Pyrene	610	3,800	1903	ug/kg	SS-4	Not tested	1,700,000	17,000,000		BSL
Benzo(a)anthracene	380	2,200	1010	ug/kg	SS-4	Not tested	150	2100	YES	ASL
Chrysene	400	2,300	1040	ug/kg	SS-4	Not tested	15,000	210,000		BSL
Benzo(b)fluoranthene	400	2,500	1055	ug/kg	SS-4	Not tested	150	2100	YES	ASL
Benzo(k)fluoranthene	200	1,900	695	ug/kg	SS-4	Not tested	1,500	1,500		BSL
Benzo(a)pyrene	390	1,400	745	ug/kg	SS-4	Not tested	15	210	YES	ASL
Indeno(1,2,3-cd)pyrene	210	980	498	ug/kg	SS-4	Not tested	150	2100	YES	OASL
Dibenz(a,h)anthracene	ND	280	156	ug/kg	SS-4	Not tested	15	210	YES	ASL
Benzo(g,h,i)perylene	260	870	503	ug/kg	SS-4	Not tested	N/A	N/A		NTX
Dibenzofuran	ND	13	8	ug/kg	SS-4	Not tested	78,000	78,000		BSL
Carbazole	ND	22	14	ug/kg	SS-4	Not tested	NA	NA		BSL
bis(2-ethylhexyl)phthalate	ND	36	23	ug/kg	SS-1	Not tested	35,000	120,000		BSL
ALUMINUM	2480	7,270	4413	mg/kg	SS-3	Not tested	77,000	990,000		BSL
ANTIMONY	1.4	16.3	8.5	mg/kg	SS-2	Not tested	31	410		BSL
ARSENIC	4.4	15.5	8.3	mg/kg	SS-1	Not tested	0.39	1.60	YES	ASL
BARIUM	61	605	251	mg/kg	SS-1	Not tested	15,000	190,000		BSL
BERYLLIUM	0.30	0.42	0.36	mg/kg	SS-4	Not tested	160	2000		BSL
CADMIUM	0.14	0.49	0.31	mg/kg	SS-4	Not tested	70	800		BSL
CALCIUM	38300	344,000	182075	mg/kg	SS-1	Not tested	N/A	N/A		NUT
CHROMIUM, TOTAL	19	1,110	546	mg/kg	SS-2	Not tested	NA	NA	YES	HIST
COBALT	3.5	52.9	31.0	mg/kg	SS-2	Not tested	23	300	YES	OASL
COPPER	24.2	68.4	44.4	mg/kg	SS-4	Not tested	3,100	41,000		BSL
IRON	9520	17,800	14505	mg/kg	SS-2	Not tested	55,000	720,000		BSL
LEAD	11.2	84	47.2	mg/kg	SS-2	Not tested	400	800		BSL
MAGNESIUM	5890	12,900	10723	mg/kg	SS-2	Not tested	N/A	N/A		NTX
MANGANESE	382	527	470	mg/kg	SS-4	Not tested	1,800	23,000		BSL
MERCURY	0.082	0.69	0.273	mg/kg	SS-4	Not tested	10	43		BSL
NICKEL	13	521	252	mg/kg	SS-2	Not tested	1,500	20,000		BSL
POTASSIUM	642	1,310	867	mg/kg	SS-3	Not tested	N/A	N/A		NUT
SELENIUM	ND	2.2	1.6	mg/kg	SS-2	Not tested	390	5100		BSL
SILVER	ND	0.22	0.153	mg/kg	SS-1	Not tested	390	5100		BSL
SODIUM	109	689	306	mg/kg	SS-4	Not tested	N/A	N/A		NTX
THALLIUM	ND	ND		mg/kg		Not tested	0.78	10		BSL
VANADIUM	7.6	63	38.6	mg/kg	SS-2	Not tested	390	5200		BSL
ZINC	22.5	67.5	42.7	mg/kg	SS-4	Not tested	23,000	310,000		BSL
HEXAVALENT	ND	2.60	1.6	mg/kg	SS-4	Not tested	0.29	5.60		NHIST*
4,4'-DDT	ND	7	4.4	ug/kg	SS-4	Not tested	1,700.0	7,000.0		BSL

(1)Minimum/maximum detected concentration. Definitions:

(3)Rationale Codes: Selection/Deletion Reason: SQL = Sample Quantitation Limit

Infrequent Detection and not Associated Historically (NHIST) COPC =Not a COPC

Toxicity Information Available (TX) MCL = Federal Maximum Contaminant Level

Frequent Detection and Associated Historically (HIST) COPC =COPC

Above Screening Levels (ASL) SMCL = Secondary Maximum Contaminant Level

No Toxicity Information (NTX)

Essential Nutrient (NUT)

Below Screening Level (BSL)

Only Above Residential Screening Level (OASL)

* Data Quality Issue

TABLE 4

EVALUATION OF CHEMICALS OF POTENTIAL CONCERN - SUBSURFACE SOIL/FILL
LAKE PUMP SITE

Scenario Timeframe: Current and Future

Medium: Subsurface soil

Exposure Medium: subsurface soil

Exposure Point: subsurface

Chemical	Min. (1) Conc.	Max. (1) Conc.	Ave. Conc.	Units	Location of Maximum Concentration	EPA Regional Screening Levels (ug/kg) - Residential	EPA Regional Screening Levels (ug/kg) - Industrial	COPC Flag	Rationale for (3) Contaminant Deletion or Selection
1,2,4 Trichlorobenzene	ND	3	2	ug/kg	BR-3	22,000	99,000		BSL
Naphthalene	ND	300	188	ug/kg	SS-4	3,600	18,000		BSL
Acetaphenone	ND	ND		ug/kg	SS-4	7,800,000	100,000,000		NA
2-Methylnaphthalene	ND	320	200	ug/kg	SS-4	230,000	2,200,000		BSL
Acenaphthene	ND	220	163	ug/kg	SS-3	3,400,000	34,000,000		BSL
Fluorene	ND	490	346	ug/kg	SS-3	NA	NA		NTX
Phenanthrene	660	4,900	2665	ug/kg	SS-3	N/A	N/A		NTX
Anthracene	100	1,800	808	ug/kg	SS-4	17,000,000	170,000,000		BSL
Fluoranthene	940	7,600	3535	ug/kg	SS-4	2,300,000	23,000,000		BSL
Pyrene	820	6,500	3080	ug/kg	SS-4	1,700,000	17,000,000		BSL
Benzo(a)anthracene	410	3,600	1610	ug/kg	SS-4	150	2100	YES	ASL
Chrysene	410	3,000	1413	ug/kg	SS-4	15,000	210,000		BSL
Benzo(b)fluoranthene	350	2,600	1175	ug/kg	SS-4	150	2100	YES	ASL
Benzo(k)fluoranthene	180	1,500	698	ug/kg	SS-4	1,500	1,500		BSL
Benzo(a)pyrene	310	2,500	1135	ug/kg	SS-4	15	210	YES	ASL
Indeno(1,2,3-cd)pyrene	130	920	428	ug/kg	SS-4	150	2100	YES	OASL
Dibenz(a,h)anthracene	ND	260	160	ug/kg	SS-4	15	210	YES	ASL
Benzo(g,h,i)perylene	140	810	393	ug/kg	SS-4	N/A	N/A		NTX
Dibenzofuran	ND	300	174	ug/kg	SS-4	78,000	78,000		BSL
Di-n-butyl phthalate	ND	28	19	ug/kg	SS-4	6,100,000	62,000,000		BSL
Carbazole	ND	250	171	ug/kg	SS-4	NA	NA		BSL
bis(2-ethylhexyl)phthalate	ND	240	178	ug/kg	SS-1	35,000	120,000		BSL
ALUMINUM	987	8,470	4262	mg/kg	SS-3	77,000	990,000		BSL
ANTIMONY	2.3	341.0	122.6	mg/kg	SS-2	31	410	YES	OASL
ARSENIC	4.9	38.5	22.4	mg/kg	SS-1	0.39	1.60	YES	ASL
BARIUM	65.3	410	194.6	mg/kg	SS-1	15,000	190,000		BSL
BERYLLIUM	0.28	0.53	0.39	mg/kg	SS-4	160	2000		BSL
CADMIUM	0.18	1.60	1.02	mg/kg	SS-4	70	800		BSL
CALCIUM	15000	224,000	81075	mg/kg	SS-1	N/A	N/A		NUT
CHROMIUM, TOTAL	118	26,500	9547	mg/kg	SS-2	N/A	NA	YES	HIST
COBALT	10.3	934.0	501.8	mg/kg	SS-2	23	300	YES	ASL
COPPER	22.2	588.0	364.1	mg/kg	SS-4	3,100	41,000		BSL
IRON	10300	265,000	128975	mg/kg	SS-2	55,000	720,000	YES	OASL
LEAD	22.3	614	198.8	mg/kg	SS-2	400	800	YES	OASL
MAGNESIUM	971	115,000	33523	mg/kg	SS-2	N/A	N/A		NTX
MANGANESE	315	6,010	2414	mg/kg	SS-4	1,800	23,000	YES	OASL
MERCURY	0.018	0.27	0.135	mg/kg	SS-4	10	43		BSL
NICKEL	61	10,900	4643	mg/kg	SS-2	1,500	20,000	YES	OASL
POTASSIUM	120	1,270	651	mg/kg	SS-3	N/A	N/A		NUT
SELENIUM	ND	14.6	12.1	mg/kg	SS-2	390	5100		BSL
SILVER	ND	1.30	1.125	mg/kg	SS-1	390	5100		BSL
SODIUM	100	910	406	mg/kg	SS-4	N/A	N/A		NTX
THALLIUM	ND	4.6	2.88	mg/kg	Trench	0.78	10	YES	OASL
VANADIUM	17.4	829	581.9	mg/kg	SS-2	390	5200	YES	OASL
ZINC	18.6	99.9	50.2	mg/kg	SS-4	23,000	310,000		BSL
HEXAVALENT	ND	1.60	1.0	mg/kg	SS-4	0.29	5.60		NHIST
4,4'-DDE	ND	5.9	3.69	ug/kg	Trench	1,400	5,100		BSL
AROCLOR 1242	ND	46	28.8	ug/kg	BR-3	220	740		BSL
AROCLOR 1248	ND	200	125	ug/kg	Trench	220	740		BSL
AROCLOR 1254	ND	610	340	ug/kg	BR-2	220	740	YES	OASL

(1)Minimum/maximum detected concentration. Definitions:

(3)Rationale Codes: Selection/Deletion Reason: SQL = Sample Quantitation Limit
Infrequent Detection and not Associated Historically (NHIST) COPC =Not a COPC
Toxicity Information Available (TX) MCL = Federal Maximum Contaminant Level
Frequent Detection and Associated Historically (HIST) COPC =COPC
Above Screening Levels (ASL) SMCL = Secondary Maximum Contaminant Level
No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Only Above Residential Screening Level (OASL)
* Data Quality Issue

TABLE 5

EVALUATION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER

LAKE PUMP SITE

Scenario Timeframe: Future

Medium: Groundwater

Exposure Medium: groundwater

Exposure Point: groundwater

Chemical	Min. (1) Conc.	Max. (1) Conc.	Ave. Conc.	Units	Location of Maximum Concentration	EPA MCL (ug/L)	COPC Flag	Rationale for (3) Contaminant Deletion or Selection
Benzene	ND	4	2.7	ug/L	MW-3	0.39	YES	ASL
Toluene	ND	1	0.67	ug/L	MW-3	860		BSL
2-Methylphenol	ND	1	0.67	ug/L	MW-3	NA		NTX
Diethyl phthalate	ND	0.4	0.27	ug/L	MW-3	11,000		BSL
Fluorene	ND	1	0.80	ug/L	MW-3	220		BSL
Pentachlorophenol	ND	5	3.33	ug/L	MW-3	0.17	YES	ASL
Phenanthrene	2	6	3.67	ug/L	MW-3	NA		NTX
Anthracene	0.4	5	2.63	ug/L	MW-3	1,300		BSL
Fluoranthene	1	3	1.83	ug/L	MW-3	630		BSL
Pyrene	1	3	1.83	ug/L	MW-3	87		BSL
Butyl benzyl phthalate	ND	0.4	0.27	ug/L	MW-3	NA		BSL
Benzo(a)anthracene	0.3	1	0.60	ug/L	MW-3	0.029	YES	ASL
Chrysene	0.3	1	0.60	ug/L	MW-3	2.9		BSL
Benzo(b)fluoranthene	0.3	1	0.60	ug/L	MW-3	0.029	YES	ASL
Benzo(a)pyrene	ND	0.7	0.47	ug/L	MW-3	0.0029	YES	ASL
Indeno(1,2,3-cd)pyrene	ND	0.3	0.20	ug/L	MW-3	0.029	YES	ASL
Benzo(g,h,i)perylene	ND	0.4	0.27	ug/L	MW-3	NA		NTX
Dibenzofuran	0.5	1	0.27	ug/L	MW-3	5.8		BSL
Di-n-butyl phthalate	ND	0.4	0.27	ug/L	MW-3	670		BSL
Carbazole	0.5	2	1.17	ug/L	MW-3	NA		NTX
bis(2-ethylhexyl)phthalate	2	4	2.67	ug/L	MW-3	0.071	YES	ASL
ALUMINUM	39	1,390	552	ug/L	MW-1	16,000		BSL
ANTIMONY	ND	4.1	3.2	ug/L	MW-1	6		BSL
ARSENIC	ND	12.1	7.0	ug/L	MW-1	0.045	YES	ASL
BARIUM	0.3	349	184.8	ug/L	MW-3	2,900		BSL
BERYLLIUM	0.15	0.59	0.31	ug/L	MW-1	16		BSL
CADMIUM	ND	0.10	0.08	ug/L	MW-1	6.9		BSL
CALCIUM	179,000	1,410,000	7.4E+05	ug/L	MW-1	NA		NUT
CHROMIUM, TOTAL	ND	113	64.5	ug/L	MW-3	100*	YES	ASL
COBALT	ND	26.6	10.9	ug/L	MW-3	4.7	YES	ASL
COPPER	ND	20.5	12.4	ug/L	MW-3	620		BSL
IRON	21	31,200	13320	ug/L	MW-3	11,000	YES	ASL
LEAD	ND	12.9	7.2	ug/L	MW-1	15*		BSL
MAGNESIUM	20	75,000	41908	ug/L	MW-1	NA		NTX
MANGANESE	1	771	335.1	ug/L	MW-2	320	YES	ASL
MERCURY	ND	0.064	0.048	ug/L	SS-4	0.63		BSL
NICKEL	ND	104	36.8	ug/L	MW-3	300		BSL
POTASSIUM	20500	115,000	52617	ug/L	MW-3	NA		NTX
SELENIUM	ND	90.3	41.5	ug/L	MW-2	78	YES	ASL
SILVER	ND	0.91	0.68	ug/L	MW-1	71		BSL
SODIUM	665000	1,580,000	1.2E+06	ug/L	MW-1	NA		NTX
THALLIUM	ND	28.3	14.99	ug/L	MW-1	0.16	YES	ASL
VANADIUM	ND	123	50.5	ug/L	MW-2	78	YES	ASL
ZINC	ND	34.1	17.99	ug/L	MW-2	4,700		BSL
HEXAVALENT	ND	0.0160	0.0061	ug/L	MW-3	0.031		BSL
delta BHC	ND	0.026	0.017	ug/L	MW-3	NA		NTX
AROCLOR 1254	ND	1.9	1.52	ug/L	MW-3	0.034	YES	ASL

(1)Minimum/maximum detected concentration.

(3)Rationale Codes: Selection/Deletion Reason: SQL = Sample Quantitation Limit
Infrequent Detection and not Associated Historically (NHIST) COPC =Not a COPC
Toxicity Information Available (TX) MCL = Federal Maximum Contaminant Level
Above Screening Levels (ASL) SMCL = Secondary Maximum Contaminant Level
No Toxicity Information (NTX)
Essential Nutrient (NUT)
Below Screening Level (BSL)
Only Above Residential Screening Level (OASL)
* Water MCL

NA= Not available