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# Site Characterization Report

Auburn Green Street Former MGP Gas Holder  
Site

Auburn, New York

NYSDEC Site No.: 7-06-009

Index #: D0-0002-9309

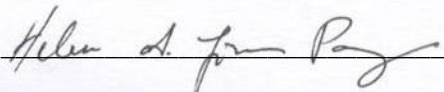
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## 1.0 Introduction

This Site Characterization (SC) Report has been prepared for NYSEG (New York State Electric and Gas Corporation) by AECOM Environment (AECOM) for a site located on Green Street in the City of Auburn, New York. The location of the site is shown on Figure 1-1. This site was the former location of a gas distribution holder for gas produced at the McMaster Street Manufactured Gas Plant (MGP) that was originally operated by the Auburn Gas Light Company. The Green Street holder was constructed in 1890 and was likely in use until approximately 1941. This SC report presents the data obtained during the SC investigation conducted in 2013, as well as a summary of the data obtained during previous investigations.

The SC investigation of the property is being conducted pursuant to a Multi-site Order on Consent between NYSEG and the New York State Department of Environmental Conservation (NYSDEC), Index # D0-0002-9309, which was executed on March 25, 1994, and in accordance with applicable guidelines of the NYSDEC, the New York State Department of Health (NYSDOH), the United States Environmental Protection Agency (USEPA) and the National Contingency Plan (NCP).

The fieldwork for the SC was performed using procedures described in the NYSDEC-approved document entitled "Site Characterization Work Plan, Auburn Green Street Former MGP Gas Holder Site, Auburn, New York, NYSDEC Site No.: 7-06-009, Index #: D0-0002-9309" (SC Work Plan), dated November 2012 [AECOM, 2012a]. Four companion documents were prepared to detail additional procedures and protocols for the SC. A Field Sampling and Analytical Plan (FSAP) [AECOM, 2012b] described the procedures to be used for the SC fieldwork. A Quality Assurance Project Plan (QAPP) [AECOM, 2012c] specified the field and laboratory quality assurance/quality control procedures. A Community Air Monitoring Plan (CAMP) [AECOM, 2012d] provided procedures to be used for the monitoring of airborne constituents during the invasive sampling tasks conducted during the investigation. A Health and Safety Plan (HASP) [AECOM, 2012e] provided the health and safety procedures required to minimize potential risk to AECOM and contractor personnel involved with implementing the SC fieldwork.

Following completion of the SC, additional sampling points and data were collected as part of an SC supplemental investigation conducted in April 2014. The supplemental activities were performed in accordance with the SC Supplemental Investigation Work Plan (AECOM, 2014) and the methodologies in the SC Work Plan (AECOM, 2012a).

### 1.1 Purpose of report

The objectives of the SC included the following:

- To collect data to determine the surface and subsurface characteristics of the site;
- To evaluate the nature of MGP-related residuals should any be identified at the site and surrounding areas;
- To identify the potential routes of off-site migration from any identified on-site sources of MGP-related residuals; and



- To obtain sufficient data to determine whether a significant threat to human health or the environment exists at the site.

## 1.2 Scope of work

The scope of work for the SC included the following:

- Subsurface utility clearance;
- Subsurface soil boring/test pit installation and subsurface soil sampling;
- Monitoring well installation and development;
- Groundwater sampling;
- Site surveying;
- Management of investigation-derived wastes; and,
- Reporting of data collected in 2013 and 2014 as well as previous investigations.

## 1.3 Report organization

This report is organized into six sections following this introduction, as follows:

- **Section 2** describes the Site and previous investigations.
- **Section 3** describes the SC field investigation and supplemental SC investigation activities performed at the Site.
- **Section 4** summarizes information regarding the Site's topography, geology, and hydrology.
- **Section 5** summarizes the results of the laboratory analyses for environmental media sampled during the initial and supplemental investigations.
- **Section 6** presents the conclusions for the investigation performed at the Site and recommendations for additional actions.
- **Section 7** provides a list of references cited in this report.

Tables, figures, and appendices are presented immediately following the report text.

Appendices to the report include the following:

- **Appendix A** –Boring logs and well construction diagrams for the SC.
- **Appendix B** – The chain-of-custody records for the samples analyzed during the SC and Data Usability Summary Reports (DUSRs), including the validated laboratory Form I report sheets (compact disk (CD-ROM)).
- **Appendix C** – The full NYSDEC Analytical Services Protocol (ASP) Category B deliverable data package (CD-ROM).
- **Appendix D** – Reports discussing the previous investigation work performed at the Site (CD-ROM).

## 2.0 Site description and history

This section presents a description of the site, summary information regarding site ownership and operational history, and summarizes the results of previous investigation work.

### 2.1 Site description

The site is located on Green Street in the City of Auburn, Cayuga County, New York, south of Water Street, east of Hulbert Street and west of Green Street. The location of the site and the surrounding features are shown on Figure 2-1.

The site is comprised of two parcels of land. Investigation work is proposed for each of these areas. The areas are summarized as follows:

- NYSEG substation Parcel 115.52-1-37 – The parcel is currently used as an active substation for NYSEG. As shown on Figure 2-2, this parcel is the location of the majority of the former MGP process features. The former distribution holder was located on this parcel.
- Adjacent NYSEG Parcel 115.52-1-38 – Northeast – To the northeast of the NYSEG substation parcel is a separate parcel of land also currently owned by NYSEG. This parcel is vacant and covered with grass and trees.

#### 2.1.1 Adjacent properties

The Site is surrounded by a mix of commercial and residential properties and is located in the downtown section of Auburn. Farther to the north is a railroad right-of-way with rail tracks, the Owasco River, and the Auburn Correctional Facility. Immediately east of the Site is a hotel followed by commercial properties. Commercial properties followed by residential properties are located to the west and south of the Site.

The nearest residence to the former MGP gas holder is approximately 300 feet to the west. The residential area in the vicinity of the site obtains its water from a public water supply whose source is Owasco Lake.

### 2.2 Site history

A review of the historical information available for the site has been performed with the results summarized in a report prepared by Atlantic Environmental Services, Inc. entitled "Manufactured Gas Plant Site Screening Report, Green Street Site, Auburn, NY", dated September 1991 [Atlantic Environmental Services, 1991]. The report included a review of the historic Sanborn Fire Insurance maps for the City of Auburn in addition to historical information from NYSEG's records. These Sanborn maps are included in Appendix D. A summary of the historical information obtained from these sources is presented in Table 2-1.

The gas distribution holder was constructed in 1890 for gas produced by the nearby McMaster MGP and possibly the Clark Street MGP. The holder existed at the site until sometime between 1931 and 1941. During this period, the holder was owned and used by the Auburn Gas Light Company from 1890 to 1911, the Empire Gas and Electric Company from 1911-1936, and NYSEG from 1936 until it was demolished between 1931 and 1941. From 1946 to 1950, a nearby lumber yard expanded

into the Site. In 1950, NYSEG constructed the substation currently present at the Site. The location of the former holder and associated buildings are shown on Figure 2-2.

The historical research identified various former site features which could have been potential source areas for MGP residuals; as such, those areas have been targeted for additional investigation. The key features of the MGP are summarized as follows:

- A 100,000 cubic feet capacity Gas Holder was present within a brick gas holder building in the center portion of the Site. The approximate former location of the Gas Holder is shown on Figure 2-2.
- A gas governor house was located on the eastern side of the Site.
- A shed was located along the southern side of the Site.

### **2.3 Previous investigation work**

The previous investigation work performed at the site is summarized as follows:

- In 1981, NYSEG collected one surface soil sample from the area of the former gas holder. The results of this sample are unknown.
- In 1987, the United States Environmental Protection Agency (USEPA) conducted a Potential Hazardous Waste Site Preliminary Assessment. The results of the assessment were presented in the document entitled "Potential Hazardous Waste Site Preliminary Assessment, NYSEG Auburn Gas Plant", dated December 7, 1987 [USEPA, 1987]. The report is included in Appendix D.
- In 1988, NYSEG conducted a site inspection that revealed the presence of a few clinkers and small quantities of demolition debris.
- In 1991, Atlantic Environmental Services, Inc. performed an assessment of site conditions that included historical research, a site reconnaissance, and surface soil sampling and analysis. The results of the assessment were presented in the document entitled "Manufactured Gas Plant Site Screening Report, Green Street Site, Auburn, NY", dated September 1991 [Atlantic Environmental Services, 1991]. The report is included in Appendix D.

The locations of the surface soil samples previously collected at the site are shown on Figure 3-1. The sample results for total benzene, toluene, ethyl benzene, and xylene (BTEX); total polycyclic aromatic hydrocarbons (TPAH); and total cyanide were generally consistent with typical urban surface soil conditions.

## 3.0 Site characterization field activities

This section provides a description of the activities performed during the 2013 SC and the 2014 supplemental SC investigations, and the methods used for conducting the fieldwork. Unless otherwise noted in the following sections, the procedures used were consistent with the methods and procedures described in the NYSDEC-approved SC Work Plan, FSAP, QAPP, CAMP, and SC Supplemental Work Plan. Each field activity performed during the investigation, grouped by field task or environmental media, is described in the following sections. The SC and supplemental SC sample locations, and the locations of the samples collected during the previous investigations, are shown on Figure 3-1.

### 3.1 Subsurface utility location

Subsurface utilities were located prior to starting the invasive subsurface investigation work. The utility locating was initiated by contacting Dig Safely New York. Each entity that had subsurface utilities present in the investigation area marked out their utility lines prior to the initiation of the subsurface work. Soil borings that were completed in close proximity to subsurface utilities were hand cleared to ensure that utilities were not encountered during the drilling activities.

### 3.2 Test pit excavation

Four test pits were excavated in and around the location of the former gas holder to evaluate the construction and size of the holder foundation and to evaluate subsurface conditions in the vicinity of the former holder (Figure 3-1). In addition, a fifth test pit was excavated in the grassy area northeast of the holder foundation to assess the subsurface conditions where future construction is planned. All test pits were excavated using an excavator. Additional information regarding the test pit excavations is included in test pit logs in Appendix A.

### 3.3 Surface soil

Although several surface soil samples were collected during a previous investigation performed at the site, additional data were needed in order to assess the potential for direct exposure of on-site and off-site workers or the public to site-related residuals. The SC surface soil sampling was focused on grassy areas bordering the Site.

Six surface soil samples (SS-4 through SS-9) were collected during the SC at the locations shown on Figure 3-1. All samples were collected at a depth of between 0 and 2 inches after the vegetative layer had been removed using a clean trowel.

In April 2014, three additional surface soil samples (SS-10, SS-11, and SS-12) were collected from the grassy areas bordering the site as part of the SC supplemental activities. These samples were collected in accordance with the approved SC Supplemental Work Plan and SC Work Plan, at a depth of between 0 and 2 inches after the vegetative layer had been removed using a clean trowel.

### 3.4 Subsurface soil borings

Fourteen soil borings were advanced during the SC to obtain information regarding the thickness and composition of the fill and native soil beneath the Site; the depth to the water table; to observe and screen subsurface soil to identify conditions that may be indicative of impacts by MGP or other residuals, and to install monitoring wells. The locations of the soil borings are shown on Figure 3-1. One boring, SB-02 was installed within the footprint of the holder foundation. Summary information for the borings is provided

in Table 3-1, including the boring designations, the sample rationale, the depth interval analyzed, and the laboratory analyses completed.

The SC Work Plan included the installation of 11 soil borings. Three additional borings were added as the fieldwork was performed to further assess the subsurface conditions at the Site. The locations of the additional soil borings are shown on Figure 3-1. The modifications to the SC Work Plan are summarized as follows:

- Two additional borings (SB12 and SB13) were completed in the grassy area to the northeast of the holder foundation location in order to assess subsurface conditions in the area of future construction at the Site.
- One additional boring (SB14) was advanced in the southwest portion of the Site to improve sampling coverage.

All subsurface soil borings were advanced using a direct-push (Geoprobe™) drilling rig equipped with Macro-Core™ samplers, with the exception of SB11 which was advanced using a conventional hollow-stem auger (HSA) drill rig equipped with Macro-Core™ samplers. These methods allowed for continuous soil samples to be collected from the ground surface to the bottom of the borehole for both field characterization (photo-ionization detector [PID] screening and observations), and for the collection of samples for chemical analysis.

In April 2014, as part of the SC supplemental investigation, two additional soil borings were advanced and completed as monitoring wells (MW-7 and MW-8). These borings were advanced using the same methodology and equipment as the original SC and are summarized in Table 3-1.

The soil samples obtained were logged by a qualified AECOM geologist. Information regarding the presence of fill material or subsurface structures, the nature of each geologic unit encountered, observations regarding moisture content, the results of soil screening performed with a PID, and visual and olfactory observations regarding the presence of MGP residuals was recorded on soil boring logs. The results of the soil classification and field screening are presented on the soil boring logs provided in Appendix A, and on the cross-sectional views of the Site (discussed in Section 4).

### 3.5 Monitoring well installation

Overburden monitoring wells (MW1 through MW6) were installed in six of the 14 SC soil borings. The monitoring well locations, shown on Figure 3-1, were selected so that there would be a sufficient number of wells to evaluate groundwater conditions in areas that are considered upgradient, cross-gradient, and downgradient of the historical MGP operations. In April 2014, as part of the SC supplemental investigation, two additional wells (MW-7 and MW-8) were installed to further evaluate groundwater characteristics at the site. All groundwater monitoring wells were installed so that the screened interval spanned the most impacted interval (if any) based on the field screening, or the water table. The wells were constructed using a 2-inch diameter Schedule 40 PVC well riser with a 0.02-inch PVC slotted screen, and a 1- or 2-foot long sump depending on field conditions for monitoring the presence of any dense non-aqueous phase liquid (DNAPL). The construction details for each well are shown on the respective soil boring logs provided in Appendix A.

Table 3-2 provides summary information for each well installed at the Site including the well designation, type of well completion, screened interval, ground surface elevation at each location, and elevation of the top of each well riser (in feet above North American Vertical Datum of 1988 [NAVD88]).

### 3.6 Well development

Each of the SC and supplemental SC monitoring wells was developed in order to remove fine-grained sediment and fluid residue from the well and sand pack and to improve well efficiency. A surge-and-pump

method was used to develop the wells. A surge block was used to actively surge and agitate the water column by forcing water back and forth through the well screen and sand pack. Following surging, the wells were pumped with a submersible pump.

### **3.7 Groundwater monitoring**

The groundwater monitoring activities consisted of the collection of depth-to-water measurements to map groundwater flow direction in the investigation area and the collection of groundwater samples for laboratory analyses.

#### **3.7.1 Depth-to-water measurements**

Complete rounds of depth-to-water measurements for all Site wells were taken on May 8, 2013 and August 6, 2013 as part of the original SC and on May 12, 2014 as part of the supplemental SC investigation. The data obtained is summarized on Table 3-2 and presented on Figure 4-4. Included in the table are the measurements taken at each well and the groundwater elevations, presented in feet above NAVD88. In addition, all new and existing wells were checked for the presence of light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL). Neither LNAPL nor DNAPL were observed in any of the monitoring wells at the Site.

#### **3.7.2 Groundwater sampling**

The SC groundwater sampling was performed on May 8, 2013, after the new monitoring wells were installed, developed, and left to stabilize. Groundwater samples were collected in accordance with the QAPP and FSAP. A second round of groundwater sampling on May 12, 2014 and May 13, 2014, included the 6 wells installed during the original SC and the two additional wells installed during the supplemental SC. Groundwater samples were collected in accordance with the SC Supplemental Investigation Work Plan. Summary information for both rounds of groundwater sampling including the well designations, sample rationale, and laboratory analyses performed is provided in Table 3-1.

### **3.8 Community air monitoring**

Community air monitoring was performed to provide real-time measurements of total volatile organic compounds (VOCs) and particulate (airborne dust) concentrations in air at the downwind perimeter of each designated work area when intrusive investigation activities were in progress at the Site. The procedures followed methods described in the CAMP [AECOM, 2012d]. Additionally, Site personnel monitored the perimeter stations to determine if any odors were being produced as a result of the intrusive sampling activities. The monitoring was designed to provide protection for the downwind community, such as those present at the adjacent public areas and commercial properties, from potential releases of airborne constituents resulting from the investigation activities.

Total VOCs and particulates were monitored with a PID and dust meter, respectively, located upwind and downwind of each work zone. The VOC and particulate levels at each location were recorded on field forms every 15 minutes. The PIDs and dust meters were also set to log information continuously throughout the work day. The specific action levels for VOCs and particulates are provided in the CAMP. Action levels were not reached as a result of the intrusive investigation activities at any time during the SC, so no response actions were necessary.

### **3.9 Site survey**

The location of each SC investigation sample point was surveyed by a certified Professional Land Surveyor (PLS) survey crew, along with other important Site features. The survey included reference points with elevations that were tied to the NAVD88 for vertical elevations. These reference points were used to determine the ground surface elevations for each soil boring location as well as the ground surface and the top of the PVC inner casing (groundwater elevation reference point) for each monitoring well. The

datum used for the horizontal measurements obtained during the survey was North American Datum of 1983 (NAD83) and the locations were reported in the New York State (NYS) Central Zone coordinates.

### **3.10 Investigation-derived waste management**

Several types of investigation-derived waste (IDW) were generated during the SC and supplemental SC activities including:

- soil cuttings from the Geoprobe/HSA drilling;
- well development water; and,
- groundwater sampling purge water.

All IDW generated during these tasks was staged and managed at the Site in accordance with the SC Work Plan.

## 4.0 Site physical characteristics

This section describes the regional geologic setting of the Auburn area, and presents a summary of the field measurements and observations of the physical environment of the investigation area. Included is a discussion of the topography, geology, and hydrology of the Site.

### 4.1 Regional geology

Area undisturbed soils are mapped as Cazenovia Silt Loam which are derived from a loamy till that contains limestone with an admixture of reddish lake-laid clays or reddish clay shale. These soils tend to be well-drained silt loam to silty clay loam [USDA Web Soil Survey].

### 4.2 Site geology

Observations regarding the geology of the site were obtained during the soil boring installations. These observations are summarized on the soil boring logs provided in Appendix A. Two cross-sectional views were prepared to illustrate the subsurface conditions observed during the investigation. A cross-section location map is provided as Figure 4-1. Cross-sections A-A' and B-B' are included as Figures 4-2 and 4-3, respectively. As shown on the figures, three subsurface units were identified during the investigation activities as further described in the following subsections.

#### 4.2.1 Fill

The fill material at the Site is comprised of brown fine to medium sand, some fine to coarse gravel, and trace wood, coal slag, brick fragments, ash, and/or cinders. As shown on the cross-sectional views of the Site, fill is present in all areas of the Site, thicknesses generally ranging from 5 to 7 feet though fill materials were observed as deep as 22 feet below ground surface (ft bgs).

#### 4.2.2 Sandy silt

Beneath the fill is a sandy silt/silt unit that is composed of brown sandy silt with some fine to medium gravel. The unit becomes denser and finer-grained with depth. The highest silt content was observed at the bottom of the unit, where traces of clay were sometimes identified. The thickness of the sandy silt unit generally ranges from 3 to 8 feet. With few exceptions, the sandy silt unit was identified in every soil boring installed at the Site.

#### 4.2.3 Native silty clay/clayey silt

Beneath the sandy silt/silt where present, lies a red-brown silty clay/clayey silt unit. This unit tends to grade to a till-like material including some gravel. The boundary between the overlying sand unit and the silty clay varies across the Site. The top of the silty clay unit ranges from approximately 9 to 18 feet bgs. The observed thickness of the silty clay/clayey silt unit ranges from approximately 3 to 8 feet though it is unclear whether the bottom of the unit was ever encountered. Based on the physical observations regarding the thickness and density of the unit, it appears likely that the continuous layer of silty clay/clayey silt which underlies the Site is acting as a confining unit.

### 4.3 Site topography and drainage

The ground surface in the area of the former gas holder is approximately 667 feet above Mean Sea Level (MSL). From this area the ground surface gently slopes to the north/northeast towards the Owasco Lake Outlet (approximately 657 feet above MSL). The Owasco Lake Outlet flows from the south to the north and is located approximately 500 feet north of the Site, across the Westbound Arterial and Rail Lines



(Figure 1-1). The river is classified as a NYSDEC Class D surface water body. The designated uses for a Class D water body include activities such as fishing and primary and secondary contact recreation. The City of Auburn receives its potable water supply from Owasco Lake, with its intake located approximately 3.5 miles upstream of the Site [Atlantic Environmental Services, 1991].

#### **4.4 Site hydrogeology**

Water level measurements taken at the Site wells on May 8, 2013 and August 6, 2013 and on May 12, 2014 indicated that the groundwater table is generally between 5 and 14 ft bgs across the Site. The data obtained from the wells, summarized in Table 3-2, was used to map the flow direction for groundwater across the Site (Figure 4-4). As shown on the figure, shallow groundwater flows toward the northeast across the Site. One monitoring well, MW-5, had water levels consistently lower than other site wells. The water level in this well is believed to represent a different water layer with a lower hydraulic head compared to the other site wells. This well was not included in the GW contour mapping, but the water level is listed. Based on the results of this investigation, it appears that the shallow aquifer consists of a sandy/gravelly silt confined by a silty clay/clayey silt unit. It is anticipated that the flow within the aquifer is primarily horizontal due to the underlying silty clay unit.

## 5.0 Results

This section presents the results of the test pit excavations and laboratory analyses performed for the SC and supplemental SC samples. During the field investigation, residuals from former MGP operations such as hydrocarbon sheens, staining, or NAPL were not visually observed. A discussion of the results of the test pit excavations, the laboratory analyses, and a comparison to applicable NYSDEC Standards, Criteria and Guidance (SCGs) values are presented and grouped according to environmental media in the following sections.

### 5.1 Test pit excavation

Test pit logs are presented in Appendix A. Three test trenches (TP01, TP02, and TP04) were excavated to evaluate the size and construction of the holder foundation. The test trenches were excavated to a depth of seven to ten feet bgs. The portions of the holder foundation observed in TP01 and TP04 were constructed of brick and mortar with some concrete. The foundation walls were approximately two feet thick. Based on the locations of the foundation walls identified in the test pits, the diameter of the holder foundation is approximately 70 feet and extends beneath the substation transformer area. The holder foundation was not encountered in TP02. It is likely that TP02 was located inside the holder foundation. Two concrete "steps" were encountered in the southwestern portion of TP02 at 3 ft bgs and 5.5 ft bgs. A 1" diameter steel pipe was encountered 4 ft bgs in the northern portion of TP02. The pipe was not disturbed and no further evaluation of the pipe was conducted during the test pit excavation. The bottom of the holder foundation may have been encountered at 9 ft bgs in TP01. Layers of coal fragments and ash were observed around 3 ft bgs in TP01. MGP related impacts were not observed on the holder foundation or the immediately adjacent soil in any of the test pits.

TP03 was excavated west of the high voltage transformer area. A concrete slab was encountered 2 ft bgs in the southern portion of the test trench. This test pit may have been in the footprint of a former residence according to historical drawings. No MGP related impacts were observed in the test trench. TP05 was excavated in the grassy area north of the substation. The material from 0 to 5 ft bgs contained loose bricks but no structures were encountered. This test trench was likely located in the footprint of a historical structure used previously as a garage, warehouse, and then paint business before being demolished. MGP related impacts were not observed in TP05.

### 5.2 Analytical program

Surface soil, subsurface soil, and groundwater samples were analyzed during the SC and SC Supplemental Investigation. All samples were analyzed by Test America of Buffalo, New York.

#### 5.2.1 Surface soil analyses

The surface soil samples were analyzed for the following parameters:

- Target compounds list (TCL) VOCs by U.S. EPA SW-846 Method 8260B;
- TCL semi-volatile organic compounds (SVOCs) by U.S. EPA SW-846 Method 8270C;

- Target Analyte List (TAL) Metals by U.S. EPA Method 6000-7000 Series;
- PCBs by U.S. EPA SW-846 Method 8082; and
- Total Cyanide by U.S. EPA SW-846 Method 9012A.

### 5.2.2 Subsurface soil analyses

The subsurface soil samples were analyzed for the following parameters:

- TCL VOCs by U.S. EPA SW-846 Method 8260B;
- TCL SVOCs by U.S. EPA SW-846 Method 8270C;
- TAL Metals by U.S. EPA Method 6000-7000 Series;
- PCBs by U.S. EPA SW-846 Method 8082; and
- Total Cyanide by U.S. EPA SW-846 Method 9012A.

### 5.2.3 Groundwater analyses

The groundwater samples were analyzed for the following parameters:

- TCL VOCs by U.S. EPA SW-846 Method 8260B;
- TCL SVOCs by U.S. EPA SW-846 Method 8270C;
- TAL Metals by U.S. EPA Method 6000-7000 Series;
- PCBs by U.S. EPA SW-846 Method 8082 (2013 samples only); and
- Total Cyanide by U.S. EPA SW-846 Method 9012A.

## 5.3 Quality assurance/quality control analyses

Field and laboratory quality control samples were collected and analyzed to document the accuracy and precision of the laboratory methods. The quality assurance/quality control (QA/QC) samples included trip blanks, field duplicates, matrix spikes, and matrix spike duplicates. The data quality level for the investigation was Level IV and was consistent with procedures outlined in the NYSDEC ASP July 2005 methodologies. A full Category B data package has been prepared by the laboratory for all samples collected during the SC and Supplemental SC and is included in Appendix C. The results of the field QA/QC samples and the laboratory QA/QC samples are included in Appendix B.

## 5.4 DUSR review

For quality control purposes, comprehensive Contract Laboratory Protocol (CLP)-like data packages were produced by Test America for the soil and groundwater samples for review by a qualified chemist. A data usability summary report (DUSR) was prepared by an AECOM project chemist for each soil and water sample delivery group. The DUSRs for this project are included in Appendix B.

As part of the data review process, analytical results and data qualifiers were corrected where necessary to reflect quality control issues. The Form I Report Sheets in Appendix B, and the data summary spreadsheets discussed in this section, have been modified to reflect the findings of the DUSRs.

Organic data quality was evaluated by reviewing the following parameters: holding times; GC/MS tuning and performance; internal standards; initial and continuing calibrations; surrogate recoveries; matrix spike/matrix spike duplicate (MS/MSD) samples; MS/MSD relative percent differences (RPDs); laboratory control standards (LCSs); laboratory blanks; laboratory and field duplicates; compound identification; and compound quantitation. As a result of the review, all data were found to be useable with some qualifications, which do not affect the conclusions of this report.

Inorganic data quality was evaluated by reviewing the following parameters: holding times; matrix spikes; initial and continuing calibrations; contract required detection limit (CRDL) standard recoveries; laboratory control samples; inductively couple plasma (ICP) interference check sample results; ICP serial dilution results; laboratory and field duplicates; and laboratory blanks. All inorganic results were found to be useable with some qualification, which do not affect the conclusions of this report.

## 5.5 Soil results

A list of the surface and subsurface soil samples collected and the analyses performed is included in Table 3-1. The results of the surface soil samples are summarized in Tables 5-1 (VOC results), 5-2 (SVOC results), 5-3 (PCB results), and 5-4 (metals and total cyanide results). The results of the subsurface soil samples are summarized in Tables 5-5 (VOC results), 5-6 (SVOC results), 5-7 (PCB results), and 5-8 (metals and total cyanide results).

The surface and subsurface soil results included in the tables are compared to both the Restricted-Residential Use and Commercial Use Soil Cleanup Objectives (SCOs) provided in 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 [NYSDEC, 2006]. The soil results are also compared to the Protection of Groundwater SCOs. Where a result is greater than the respective Subpart 375-6-Restricted-Residential Use SCO, the result is shown with a bold font. If a result is greater than the respective Subpart 375-6 Commercial Use SCO, the result has been shaded yellow on the tables. If a result is greater than the respective Protection of Groundwater SCO, the result has been shaded blue on the tables.

As indicated in the SC Work Plan, the sampling rationale included the collection of one to two samples for laboratory analyses from each boring, targeting the most impacted intervals based on PID screening and field observations (visual and olfactory) regarding the presence of MGP-related residuals. Impacts were not encountered in any of the soil borings advanced during the investigation. Therefore, the soil samples were generally collected from the intervals one foot beneath the water table. Samples were also collected from the bottom of several of the borings, to assess soil quality in the silty clay unit below shallower zones. The intervals sampled at each boring location are shown on the boring logs in Appendix A and are summarized in Table 3-1. The results of the analyses are discussed by area below.

### 5.5.1 Surface soil results

Six surface soil samples (SS-4 through SS-9) were collected from the grassy areas bordering the Site during the initial SC. Three additional surface soil samples (SS-10 through SS-11) were

collected in April 2014 as part of the SC Supplemental Investigation. Surface soil samples were collected at a depth of between 0 and 2 inches after the vegetative layer had been removed.

### **VOCs**

As shown on Table 5-1, no VOC compounds were detected at concentrations greater than the corresponding laboratory reporting limits in any of the surface soil samples collected.

### **SVOCs**

As shown on Table 5-2, PAH compounds were detected in all surface soil samples collected from the Site. Where detected, total PAH concentrations ranged from 1.88 milligram per kilogram (mg/Kg) in sample SS-8 to 4.22 mg/Kg in sample SS-9. No SVOCs were detected above the Restricted-Residential, Commercial Use or Protection of Groundwater SCOs.

### **PCBs**

As shown on Table 5-3, no PCB compounds were detected in any of the surface soil samples collected.

### **Metals and total cyanide**

As shown on Table 5-4, several metals were detected in the surface soil samples at concentrations less than the Restricted-Residential or Commercial Use SCOs. Arsenic was detected at concentrations above the Restricted-Residential, Commercial Use and Protection of Groundwater SCOs, at 17 mg/Kg, 23.8 mg/Kg, and 24.9 mg/Kg in samples SS-4, SS-6, and SS-10, respectively, as shown in Figure 5-1

Total cyanide was detected in the soil samples SS-90 (duplicate of SS-9), SS-11, and SS-62 (duplicate of SS-12) at estimated concentrations of 1.1 mg/Kg, 1.6 mg/Kg, and 1.3 mg/Kg, respectively. All detections were less than the Restricted-Residential and Commercial Use SCOs of 27 mg/Kg. Total cyanide was not detected in any other surface soil samples.

## **5.5.2 Subsurface soil results**

Twenty-four subsurface soil samples were analyzed from the borings advanced and test pits excavated within the Site during the SC. An additional 3 subsurface soil samples were collected during the 2014 SC Supplemental Investigation for a final total of 27 samples. Sampling intervals are indicated in ft bgs in parentheses within the sample identification (i.e., SB14 (18-20) was sampled from 18-20 ft bgs).

### **VOCs**

As shown on Table 5-5, benzene, toluene, ethylbenzene, and total xylenes (BTEX) compounds were detected in 12 of the 27 subsurface samples collected from the borings and test pits (Table 5-5). Where detected, total BTEX concentrations ranged from 0.0016 mg/Kg (SB12 (9-11)) to 16.39 mg/Kg (SB04 (18-20)). Benzene was detected in sample SB04 (18-20) at a concentration greater than the Restricted-Residential Use SCO of 4.8 mg/Kg at 11 mg/Kg. Benzene was detected in six samples at concentrations greater than the Protection of Groundwater SCO of 0.06 mg/Kg. These detections ranged from 0.066 mg/Kg in sample SB03 (18-20) to 11 mg/Kg in sample SB04 (18-20).

Toluene and xylenes were detected in sample SB04 (9-11) at concentrations of 1.1 mg/Kg and 2.5 mg/Kg. These concentrations were greater than the Protection of Groundwater SCOs of 0.7 mg/Kg and 1.6 mg/Kg, respectively. Ethylbenzene and xylenes were detected in sample SB04 (18-20) at concentrations of 1.1 mg/Kg and 4.1 mg/Kg. These concentrations were greater than the respective Protection of Groundwater SCOs of 1.0 mg/Kg and 1.6 mg/Kg. Figure 5-2 shows all VOC concentrations in exceedance of Protection of Groundwater SCOs. BTEX compounds were not detected at concentrations greater than the respective Restricted-Residential Use or Commercial Use SCOs in any other soil samples collected.

### SVOCs

As shown on Table 5-6, PAH compounds were detected in 23 (and 2 duplicates) of the 27 subsurface samples collected. Where detected, total PAH concentrations ranged from 0.0078 mg/Kg in sample TP03-FLOOR (7.5) to 154.6 mg/Kg in sample SB02 (13-16).

Five samples had one or more PAH compound detected above the Restricted-Residential Use and/or Protection of Groundwater SCOs. Figure 5-2 shows all SVOC concentrations in exceedance of Protection of Groundwater SCOs. These samples include:

- TP01-WALLNW (3) – Total PAHs = 10.79 mg/Kg. This sample was collected from the northwest wall of Test Pit 1 (TP01) at 3 ft bgs located outside the northwest portion of the holder foundation. PAHs were not detected at concentrations greater than the SCOs in the deeper floor samples collected from TP01.
- TP04-FLOORE (7) – Total PAHs = 14.32 mg/Kg. This sample was collected from the eastern side of the floor of Test Pit 04, 7 ft bgs, located east of the holder foundation.
- SB02 (13-16) – Total PAHs = 154.6 mg/Kg. This sample was collected from a boring located north of the holder foundation.
- SB03 (9-11) – Total PAHs = 35.32 mg/Kg. This sample was collected from a boring located east of the holder foundation.
- SB12 (9-11) – Total PAHs = 9.175 mg/Kg. This sample was collected from a boring located in the southwest corner of the grassy area north of the substation. Only one compound in this sample, benzo(b)fluoranthene, had a concentration greater than the Restricted-Residential SCO of 1 mg/Kg at 1.1 mg/Kg. This concentration was less than the Protection of Groundwater SCO of 1.7 mg/Kg.

Samples TP01-WALLNW (3), TP04-FLOORE (7), SB02 (13-16), and SB03 (9-11) contained one or more PAH compounds at concentrations greater than the Commercial Use SCOs.

Seven other SVOCs were detected in the subsurface soil samples (1,1'-biphenyl, acetophenone, benzaldehyde, bis (2 ethylhexyl) phthalate, carbazole, dibenzofuran, and phenol). None of these SVOCs were detected at concentrations greater than the respective Restricted-Residential or Commercial Use SCOs.

## PCBs

As shown on Table 5-7, no PCB compounds were detected at concentrations greater than the laboratory reporting limits in any of the subsurface soil samples collected.

## Metals and Total Cyanide

Several metals were detected in the subsurface soil samples at concentrations less than the Restricted-Residential, Commercial Use and Protection of Groundwater SCOs. Arsenic was detected at concentrations above the Restricted-Residential, Commercial Use and Protection of Groundwater SCOs in eight samples (SB11 (9.1-13), TP02-FLOORS (7), TP04-FLOORE (7), SB01 (5-7), SB03 (9-11), SB12 (9-11), SB13 (8-10), and MW-7 (9-11)).

Total cyanide was detected in the soil samples TP01-WALLNW (3), TP02-FLOORS (7), TP04-FLOORE (7), SB02 (13-16), and SB12 (9-11) at concentrations ranging from 0.59 mg/Kg to 14.5 mg/Kg, which were less than the Restricted-Residential, Commercial Use and Protection of Groundwater SCOs of 27 mg/Kg, 27 mg/Kg and 40 mg/Kg, respectively. Total cyanide was not detected in any other subsurface soil samples.

## 5.6 Groundwater analytical results

The results of the groundwater samples collected during the SC and 2014 SC Supplemental Investigation are summarized in Tables 5-9 (VOC results), 5-10 (SVOC results), 5-11 (PCB results), and 5-12 (metals and cyanide results). The evaluation of the groundwater results in the following sections is based on a comparison to the guidance or standard values provided in the NYSDEC - Division of Water – Technical Operation Guidance Series (TOGS) (1.1.1) [NYSDEC, 1998, with addendums]. In the tables, where a result is greater than the method reporting limits, the result is shown with a bold font. Where a result is greater than the respective groundwater standard or guidance value concentration, the result is shaded in the tables. Figure 5-3 shows all exceedances of groundwater standards for VOCs and SVOCs for the 2013 SC and 2014 SC Supplemental Investigation.

Six groundwater monitoring wells were sampled during the May 2013 event (MW-1 through MW-6). In May 2014, a second round of groundwater sampling was conducted that included the six wells installed during the initial SC and the two additional wells (MW-7 and MW-8) installed during the supplemental SC fieldwork. Monitoring well locations are presented on Figure 3-1.

### VOCs (2013)

BTEX compounds were detected in samples from five of the six wells sampled during the 2013 sampling event: MW-1 through MW-5. No VOCs were detected in the sample collected from MW-6. The total detected BTEX concentrations ranged from 13.83 µg/L in MW-3 to 3,135 µg/L in MW-4. Benzene was detected at concentrations greater than the groundwater standard of 1 µg/L in wells MW-1 through MW-5, ranging in concentration from 10 µg/L in well MW-3 to 2,100 µg/L in MW-4. Ethylbenzene, toluene, and Xylenes were also detected at concentrations greater than the groundwater standard values in MW-4 (25 µg/L, 750 µg/L, and 260 µg/L respectively). Well MW-4 is located north of the holder foundation.

Acetone was also detected in well MW-5 at a concentration greater than the guidance value of 50 µg/L, at 82 µg/L. Acetone is a common laboratory contaminant that was detected in several other wells at concentrations less than the guidance value. Three other VOCs were also detected in the

wells at concentrations less than their standard or guidance values: 2-butanone; carbon disulfide; and chloroform.

### **VOCs (2014)**

BTEX compounds were detected in samples from two of the eight wells sampled at the Site, MW-4 and MW-7. The total detected BTEX concentrations were 2,040 µg/L in MW-4 and 22 µg/L in MW-7 µg/L. Benzene was detected at concentrations greater than the groundwater standard of 1 µg/L in both wells. Benzene was the only VOC detected in MW-7 at a concentration of 22 µg/L. Benzene was detected at a concentration of 1,400 µg/L in MW-4. Ethylbenzene, toluene, and Xylenes were also detected at concentrations greater than the groundwater standard values in MW-4 (20 µg/L, 400 µg/L, and 220 µg/L respectively).

Additional VOCs were detected in MW-1, MW-3, and the duplicate of MW-4. Styrene was detected in the duplicate of MW-4 at the estimated concentration of 33 µg/L which is greater than the groundwater standard of 5 µg/L. Carbon-disulfide and cyclohexane were detected in MW-1 at concentrations less than their respective guidance values. In addition, acetone was detected in MW-3 below the guidance value.

VOCs were not detected in the samples collected from MW-2, MW-5, MW-6, and MW-8.

### **SVOCs (2013)**

PAH compounds were detected above the method reporting limits in three of the six wells. Total PAH concentrations ranged from 0.46 µg/L (MW-5) to 141.8 µg/L (MW-4). One PAH compound, naphthalene was detected in the groundwater sample collected from MW-4 at a concentration of 140 µg/L, which was greater than the groundwater guidance value of 10 µg/L. PAHs were not detected at concentrations greater than the groundwater standards or guidance values in any other samples collected from the Site monitoring wells during May 2013.

Three of the six wells had at least one other SVOC detected; however, all of these detections were below the groundwater standard or guidance values with the exception of phenol in MW-4. Phenol was detected at a concentration of 5.3 µg/L which is greater than the groundwater standard value of 1 µg/L.

No SVOCs were detected in wells MW-1 and MW-6.

### **SVOCs (2014)**

Three PAH compounds were detected above the method reporting limits in one of the eight wells (MW-4) during the 2014 sampling event. The concentration of total PAHs for MW-4 was 122.65 µg/L. Naphthalene was detected in the groundwater sample collected from MW-4 at a concentration of 120 µg/L which was greater than the groundwater guidance value of 10 µg/L. 2-Methylnaphthalene and acenaphthylene were also detected in MW-4 at estimated concentrations of 1.7 µg/L and 0.95 µg/L, respectively. PAHs were not detected at concentrations greater than the groundwater standards or guidance values in any other samples collected during the May 2014 sampling event.

Four of the eight wells had at least one other SVOC detected below the groundwater standard or guidance values with the exception of phenol in MW-4. Phenol was detected at an estimated concentration of 4.9 µg/L, which is greater than the groundwater standard value of 1 µg/L.



No SVOCs were detected in wells MW-1, MW-2, MW-6, and MW-8.

### **PCBs**

As seen in Table 5-11, no PCBs were detected in the monitoring wells at the Site during the May 2013 sampling. The May 2014 groundwater monitoring analyses did not include PCBs.

### **Metals and Total Cyanide (2013)**

Several metals were detected in the groundwater samples at concentrations less than the groundwater standard or guidance values (Table 5-12). Iron was detected above the groundwater standard value of 300 µg/L in five of six wells, MW-1 through MW-5. These concentrations ranged from 870 µg/L in MW-2 to 975,000 µg/L in MW-5. Sodium was also detected in five of six wells (MW-2 through MW-6) at concentrations greater than the standard value of 20,000 µg/L. These concentrations ranged from 23,700 µg/L in MW-4 to 444,000 µg/L in MW-3. Magnesium was detected in two wells (MW-3, 42,100 and MW-5, 3,730,000 µg/L) at concentrations in exceedance of the groundwater standard of 35,000 µg/L. Manganese was detected in four of six wells (MW-1 at 360 µg/L, MW-3 at 470 µg/L, MW-5 at 24,800 µg/L, and MW-6, at 540 µg/L) at concentrations greater than the groundwater standard of 300 µg/L. In addition, well MW-5 contained the following metals at concentrations greater than the respective groundwater standard or guidance values: arsenic; barium; beryllium; chromium; copper, lead; mercury; nickel; and selenium.

Total cyanide was detected in four of the six wells sampled in May 2013. The estimated detected concentrations ranged from 5.3 µg/L at MW-3 to 910 µg/L at MW-4. The estimated total cyanide concentration in well MW-4 (910 µg/L) was greater than the groundwater standard of 200 µg/l.

### **Metals and Total Cyanide (2014)**

Several metals were detected in the groundwater samples at concentrations less than the groundwater standard or guidance values (Table 5-12). Iron was detected above the groundwater standard value of 300 µg/L in all eight wells, MW-1 through MW-8. These concentrations ranged from 600 µg/L in the duplicate (MW-4) to 33,800 µg/L in MW-8. Sodium was also detected in all of the wells (MW-1 through MW-8) at concentrations greater than the standard value of 20,000 µg/L. These concentrations ranged from 24,300 µg/L in MW-4 to 456,000 µg/L in MW-8. Magnesium was detected in three of eight wells (MW-5 at 41,600 µg/L, MW-7 at 38,500 µg/L, and MW-8, at 45,600 µg/L) at concentrations greater than the groundwater standard of 35,000 µg/L. Manganese was detected in three of eight wells (MW-6 at 410 µg/L, MW-7 at 420 µg/L, and MW-8, at 2,100 µg/L) at concentrations greater than the groundwater standard of 300 µg/L. In addition, Barium was detected above the groundwater standard value of 1,000 µg/L in MW-3 at a concentration of 1,900 µg/L.

Total cyanide was detected in four of the eight wells sampled in May 2014. The detected concentrations ranged from an estimated value of 5.7 µg/L in MW-7 to 1,300 µg/L in MW-4. The total cyanide concentration in well MW-4 (1300 µg/L) was greater than the groundwater standard of 200 µg/l.

## 6.0 Conclusions and Recommendations

This section summarizes the findings and provides recommendations based on the site characterization of the Auburn Green Street Site. An overview of the nature and extent of constituents of concern (COC) is presented by media, and known and potential source areas are identified.

### 6.1 Site geology

- Historic fill material covers the majority of the Site in a layer of varying thickness generally ranging from 5 to 7 feet but up to 22 feet in the area of the former holder.
- The fill consists primarily of sand, gravel, and bricks and sporadically contains varying amounts of wood, coal slag, cinders, and ash.
- Beneath the fill is a sandy silt unit that is composed of brown fine sand and silt with some gravel.
- A red-brown silty clay/clayey silt unit was identified beneath the sandy silt. This unit consists of likely native silty clay and clayey silt that grades to a till-like material including some gravel. The bottom of this unit was not definitively encountered in any of the soil borings at the Site.

### 6.2 Site hydrogeology

- Groundwater is found at depths which ranged from approximately 3 to 6 feet bgs across the Site.
- Shallow groundwater flow direction varies across the Site. Groundwater flow is generally from the southwest to the northeast across the middle portion of the Site.
- Groundwater is not used for drinking water in the immediate vicinity of the Site. Drinking water for the City of Auburn is provided by municipal sources.

### 6.3 Nature and extent of constituents of interest

Two media were investigated at the Site, soil and groundwater. Conclusions for each media are summarized below.

#### 6.3.1 Surface Soil

- Though PAHs were detected in all nine surface soil samples collected, none were detected at concentrations greater than the corresponding recommended soil cleanup objectives.
- Arsenic was detected at concentrations above the Restricted-Residential, Commercial Use and Protection of Groundwater SCOs in samples SS-4, SS-6, and SS-10.

#### 6.3.2 Subsurface soil

- No coal tar or coal tar NAPL impacts were visually observed in the test pits or soil borings advanced at the Site.

- Soil borings SB-02 and SB-04 were advanced within the footprint of the holder foundation.
- One sample, SB04 (18-20), contained benzene above the Restricted-Residential Use SCO.
- BTEX compounds were detected in 11 of the 27 subsurface samples collected but were not detected at concentrations greater than the respective Restricted-Residential Use or Commercial Use SCOs with the exception of SB04 (18-20). BTEX compounds were detected in six subsurface samples at concentrations greater than the respective Protection of Groundwater SCOs as discussed above..
- One or more PAHs were detected in five samples at concentrations greater than the respective Restricted-Residential Use SCOs. Four samples had one or more PAH compounds detected at concentrations greater than the Commercial Use and Protection of Groundwater SCOs.
- Arsenic was detected at concentrations above the Restricted-Residential, Commercial Use and Protection of Groundwater SCOs in eight subsurface soil samples.
- Total cyanide was detected in five subsurface soil samples. However, the concentrations were less than the Restricted-Residential, Commercial Use and Protection of Groundwater SCOs.

### 6.3.3 Groundwater

- BTEX compounds were detected at concentrations in exceedance of the groundwater standard values in five of the six wells sampled in 2013. In 2014, BTEX compounds were in exceedance of groundwater standards in two of the eight wells sampled. Additional VOCs were in exceedance of standard values in one of the six sampled wells in 2013.
- One PAH compound, naphthalene, was detected at concentrations greater than the guidance value in the groundwater samples collected from MW-4 during both sampling events. Phenol was also detected in MW-4 during both sampling events in exceedance of the groundwater standard. All other SVOC detections during 2013 and 2014 were below groundwater standard or guidance values.
- PCBs were not detected in any wells in 2013 and therefore were not analyzed during the 2014 sampling event.
- Several metals were detected at concentrations greater than groundwater standard or guidance values during both the 2013 and 2014 sampling events. Iron was detected above the groundwater standard value in five of six wells in 2013 and all eight wells in 2014. Sodium was also detected in five of six wells at concentrations greater than the standard value in 2013 and seven of eight wells in 2014. Magnesium was detected in two wells at concentrations greater than the groundwater standard in 2013 and three of eight wells in 2014. Manganese was detected in four of six wells at concentrations in exceedance of the groundwater standard in 2013 and in three of eight wells in 2014. In addition, barium was detected in exceedance of the standard value in MW-3 in 2014. Monitoring well MW-5 contained the following metals at concentrations in exceedance of the groundwater standard or guidance values during the 2013 sampling event: arsenic; barium; beryllium; chromium; copper; lead; mercury; nickel; and selenium.

- Total cyanide was detected in three of the six wells sampled in May 2013 and four of eight wells sampled in 2014. The total cyanide concentrations in well MW-4 during both sampling events were greater than the associated groundwater standard.

#### **6.4 Recommendations**

The scope of work completed during this SC provides sufficient data to satisfy most of the general requirements of a Remedial Investigation. With the observations and data presented in this report, an evaluation of conditions at the Site has been performed fulfilling the requirements of the Order on Consent. Accordingly, no additional investigation is recommended at this time.

Interim Remedial Measures (IRMs) are warranted when existing Site conditions pose an immediate threat to human health or the environment. Such conditions often come about due to on-going releases of constituents to surface water, groundwater, or soil vapor, or where exposure pathways allow the receptors to come into contact with the impacted media. Conditions that would warrant an IRM were not observed during the SC. Groundwater in the vicinity of the Site is not used for drinking water [Atlantic Environmental Services, 1991], therefore does not pose an immediate risk to receptors as the residuals are isolated from human contact.

Following approval of this report by the NYSDEC, a Feasibility Study (FS) evaluation of remedial options may be prepared to identify methods that may be used to address the impacted media. The evaluation will review potential remedial actions and will address surface soil, subsurface soil, and groundwater. Depending on the remedy which is ultimately selected, additional field testing and sampling may be required during the design phase, to gather additional data that may be needed in order to effectively implement a specific remedial technology.

## 7.0 References

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**Appendix A.  
Boring Logs, Test Pit Logs, and  
Well Construction Diagrams**

**Appendix B.  
Chains of Custody and Data  
Usability Summary Report  
(CD-ROM)**



**Appendix C.  
NYSDEC ASP Category B Data  
Packages (CD-ROM)**

**Appendix D.  
Previous Investigation Reports  
(CD-ROM)**